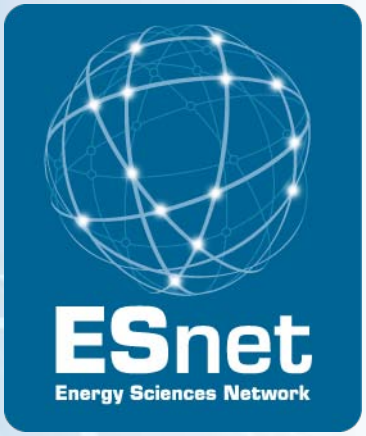

OSCARS Production Deployment Experiences

The Good, The Bad, and The Ugly

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On-demand Secure Circuits and Advance Reservation System (OSCARS)

- Started as a DOE funded project in 2004
- Layer 2 circuit-service deployed in production in ESnet in mid 2007
  - Layer 2 inter-domain capability in late 2007
  - Layer 3 circuit-service deployed in 2005
- OSCARS circuits currently carry about 50% of all traffic in ESnet
  - Different circuit requirements: High Energy Physics, Climate Sciences, Computational Astrophysics, and Biological and Environmental Research
- Adopted by SCinet since 2009 to manage dynamic circuit bandwidth for demos and bandwidth challenges
- Currently (as of Sep 2012) deployed in 40+ networks including wide-area backbones, regional networks, exchange points, local-area networks, and testbeds

Lessons Learned

The Good

- End-to-end (inter-domain*) capability is necessary
  - IDCP currently supported, NSI CS v2.0 API support being developed for demo at SC12
- Having a common topology* (schema) simplifies other functions (e.g. monitoring and measurement)
- Several technologies supported (e.g. OpenFlow, VPLS, EoMPLS, DRAGON, etc)
- Multipoint, Multi-technology (and multi-vendor) capabilities on the way

The Bad

- Provisioning is technology specific, every new technology requires some customization of the code (OpenFlow might help here)
- Not a turn key installation, requires some pre-work on how transport will be provisioned (e.g. policies, technology specifics, etc)
- Current API outpaced by user requirements (e.g. multipoint)
- Supporting heterogeneous security (AA) frameworks* / requirements is not trivial

The Ugly

- Modeling a network topology for dynamic provisioning is not a trivial process, it typically requires some fore-thought and manual configuration
- Dynamic circuit provisioning by itself is not a very useful production service unless it can be paired with monitoring and measurement capabilities
- Troubleshooting end-to-end inter-domain* is complex but necessary
- Supporting a large installation base without community support is non-sustainable

NB:** **Requires collaboration with networking community and providers

Top 3 Wish List

- Topology
  - Automated distribution
  - “Normalized” with monitoring and measurement systems
- Security
  - Develop / implement security model / profiles that support the user community without compromising provider requirements
- End-to-end Monitoring and Measurement systems
  - Monitoring system to notify user / peer when circuit goes down
  - Measurement information is useful to debug performance issues as well as keep audit trails (e.g. reserved vs usage)

Questions?