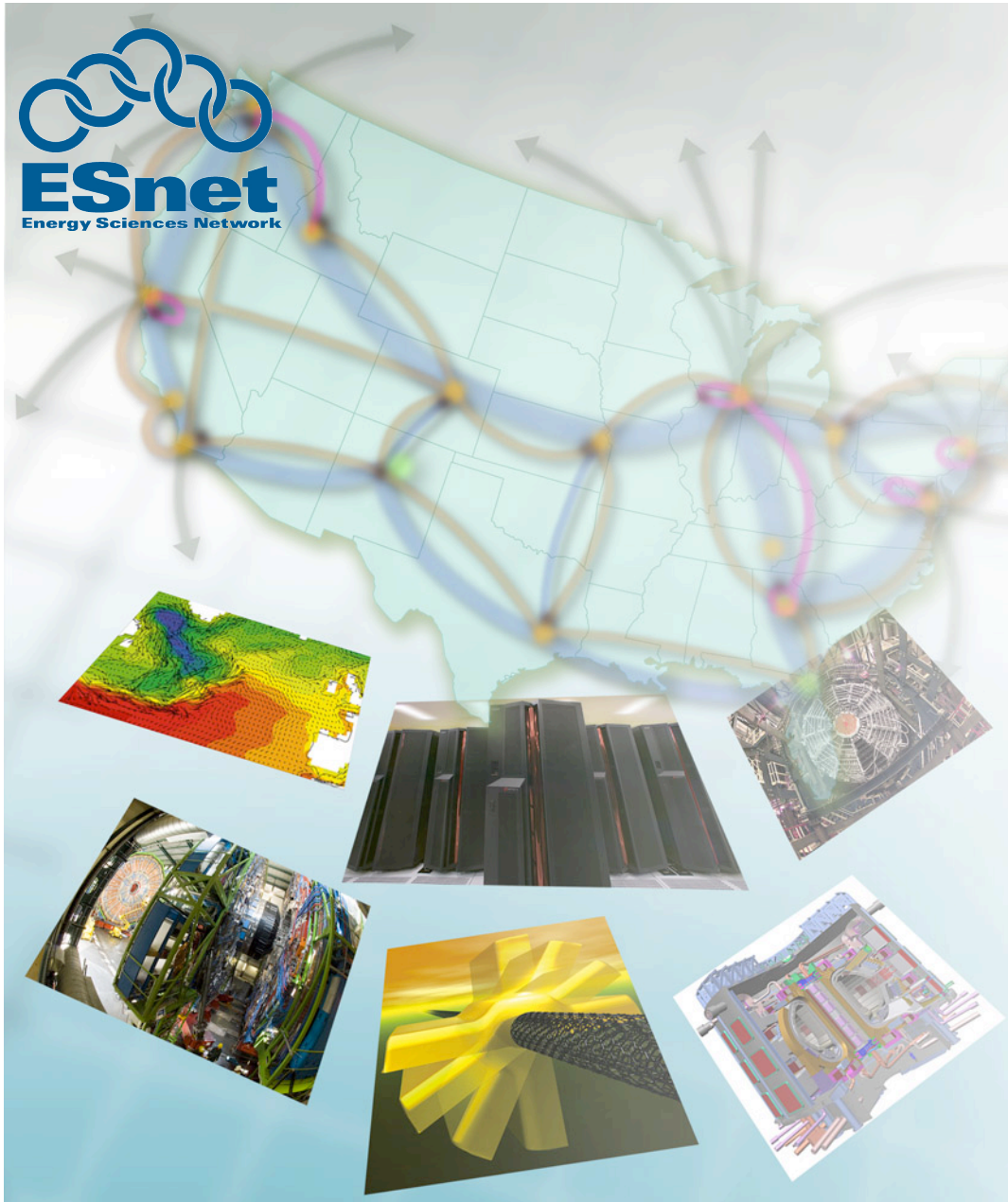

ESnet On-demand Secure Circuits and Advance Reservation System (OSCARS)

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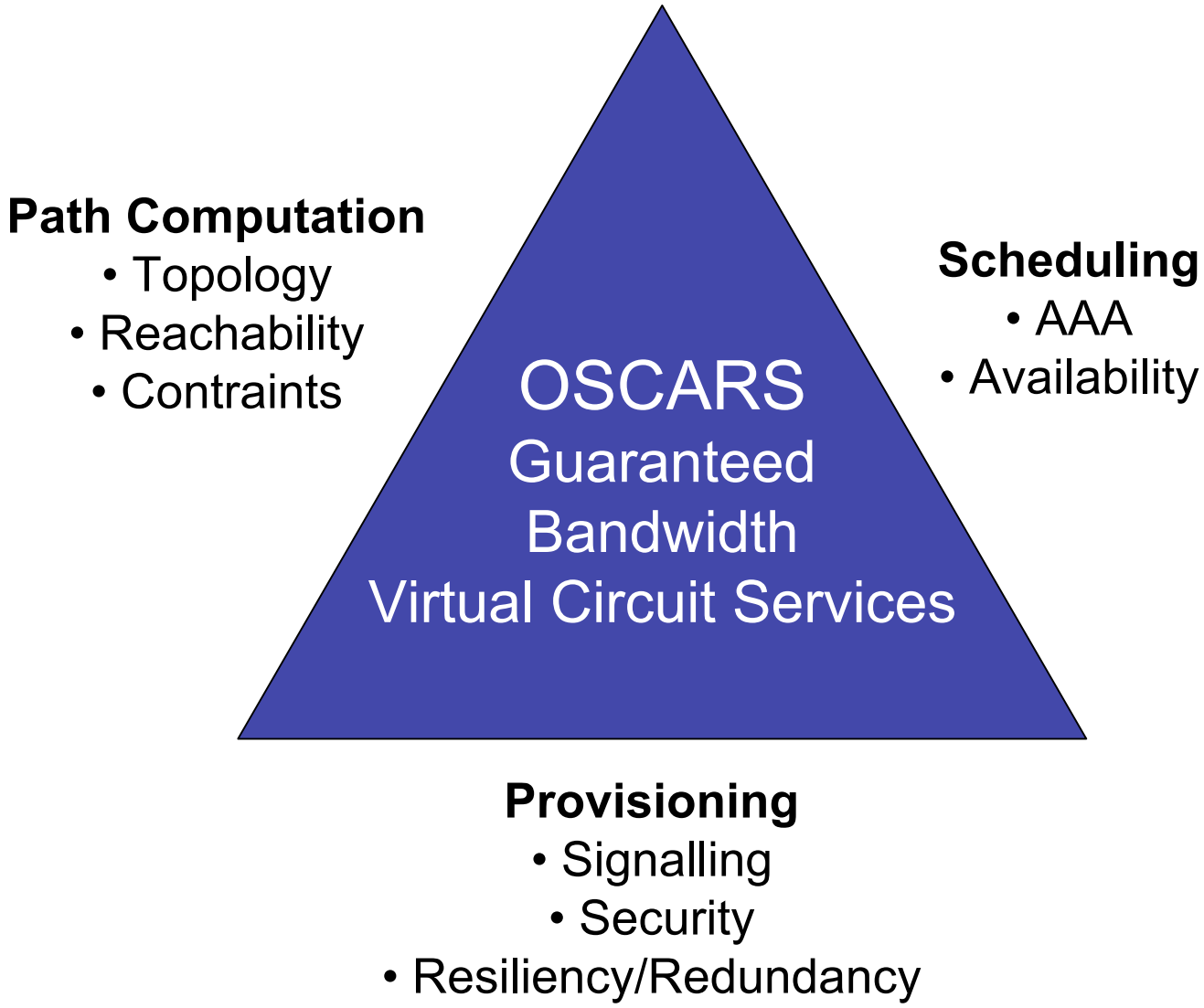
Networking for the Future of Science

Berkeley Lab

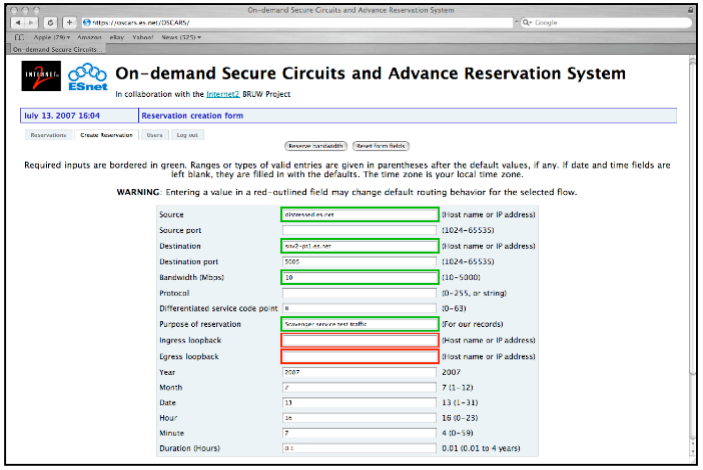
Office of Science
U.S. Department of Energy

OSCARS Overview



Using OSCARS

- Web-Based User Interface (WBUI)
  - SSL connection to server
  - Username and password login



- SOAP Messages
  - SSL connection to server
  - WSDL service description
  - Signed SOAP messages

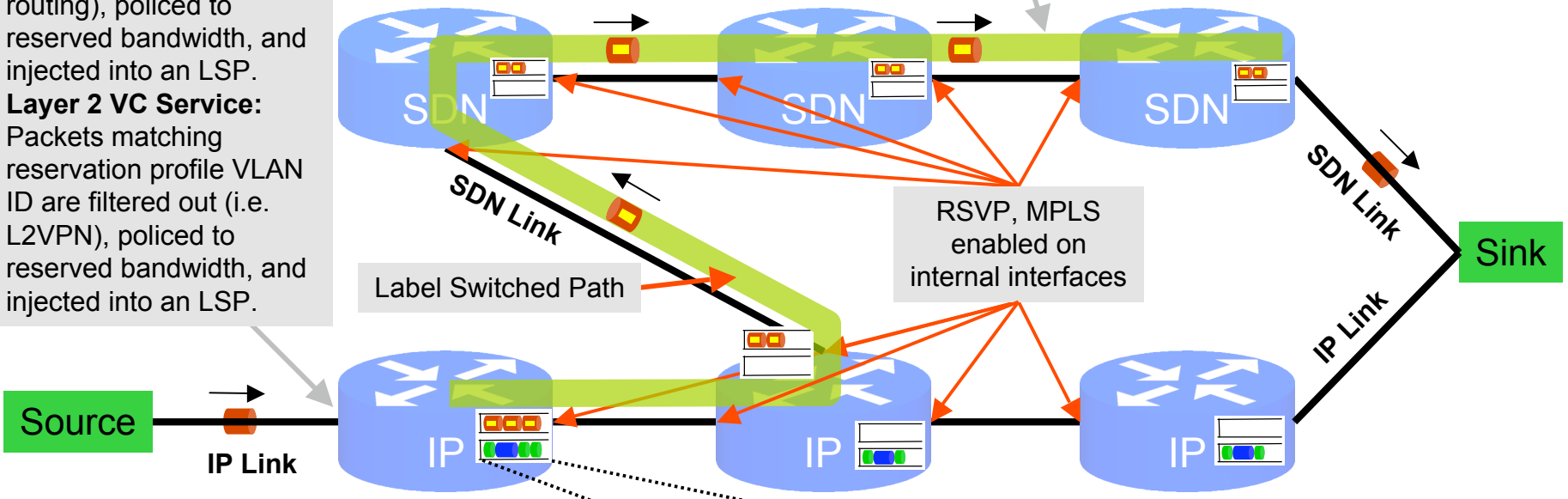
```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions name="OSCARS"
   targetNamespace="http://oscars.es.net/OSCARS"
   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
   xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
   xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap12/"
   xmlns:tns="http://oscars.es.net/OSCARS">

   <wsdl:documentation>
      This is WSDL for the OSCARS public reservation interface. These
      messages must be signed using the following WS-secuirty
      standards. The message is time stamped and includes the X.509
      certificate of the signing entity. The timestamp, certificate
      and message body are all signed. DRAFT V1.0 Nov 2006
   </wsdl:documentation>

   <!-- Element definitons -->
   <wsdl:types>
      <xsd:schema targetNamespace="http://oscars.es.net/OSCARS"
         elementFormDefault="qualified"
         xmlns:xsd="http://www.w3.org/2001/XMLSchema"
         xmlns:tns="http://oscars.es.net/OSCARS">
         <xsd:include schemaLocation="OSCARS.xsd" />
      </xsd:schema>
   </wsdl:types>

   …
```

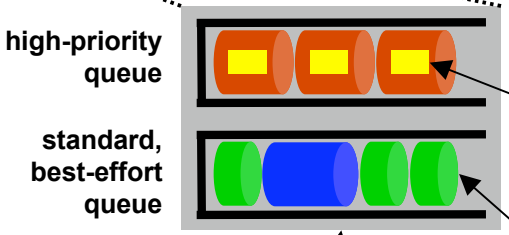
The Mechanisms Underlying OSCARS

Layer 3 VC Service: Packets matching reservation profile IP flow-spec are filtered out (i.e. policy based routing), policed to reserved bandwidth, and injected into an LSP.

Layer 2 VC Service: Packets matching reservation profile VLAN ID are filtered out (i.e. L2VPN), policed to reserved bandwidth, and injected into an LSP.

LSP between ESnet border routers is determined using topology information from OSPF-TE. Path of LSP is explicitly directed to take SDN network where possible. On the SDN Ethernet switches all traffic is MPLS switched (layer 2.5).





MPLS labels are attached onto packets from Source and placed in separate queue to ensure guaranteed bandwidth.

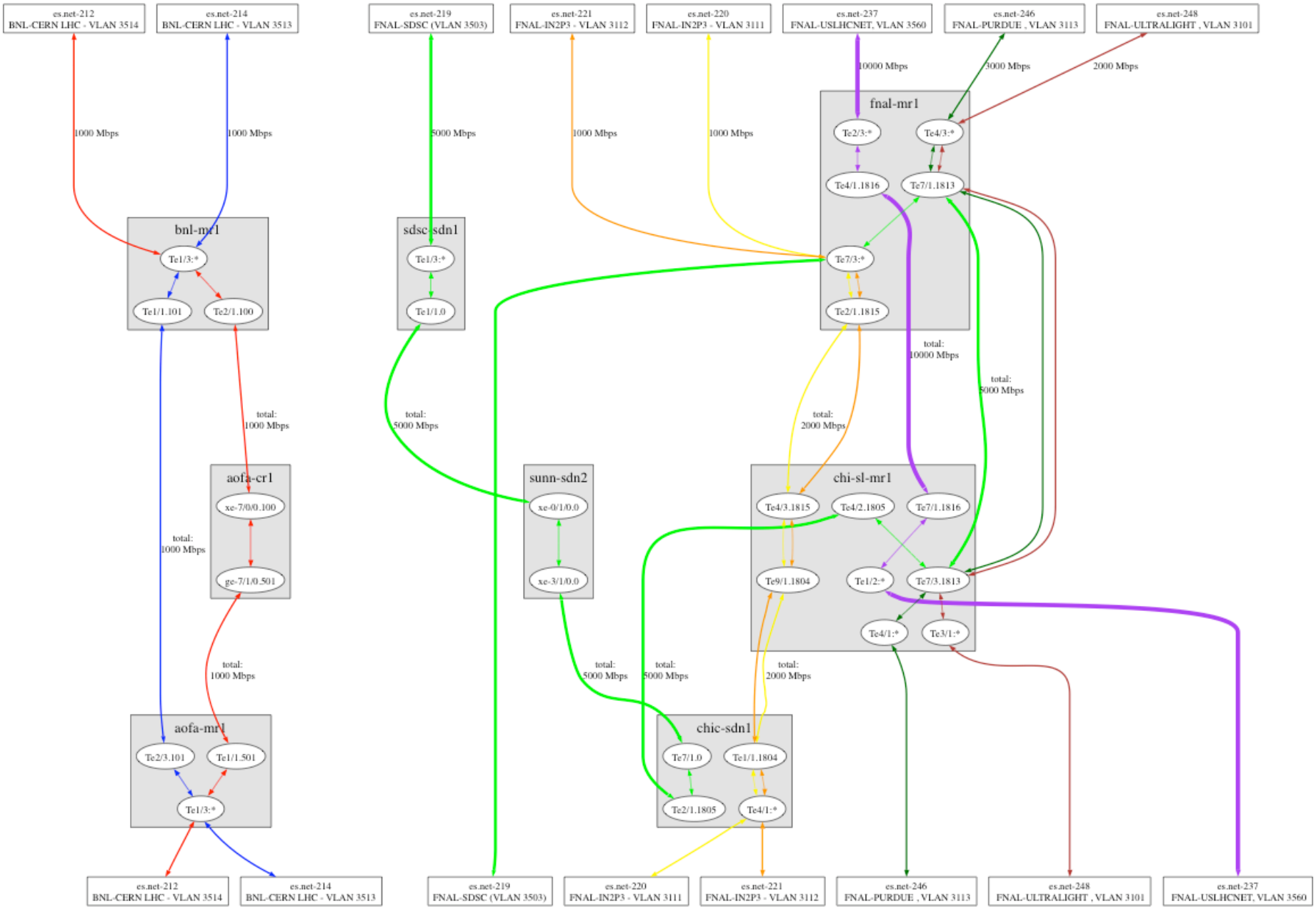
Interface queues

Regular production traffic queue.

OSCARS Status Update

- ESnet Centric Deployment
  - Prototype layer 3 (IP) guaranteed bandwidth virtual circuit service deployed in ESnet (1Q05)
  - Prototype layer 2 (Ethernet VLAN) virtual circuit service deployed in ESnet (3Q07)
- Inter-Domain Collaborative Efforts
  - Terapaths
    - Inter-domain interoperability for layer 3 virtual circuits demonstrated (3Q06)
    - Inter-domain interoperability for layer 2 virtual circuits demonstrated at SC07 (4Q07)
  - LambdaStation
    - Inter-domain interoperability for layer 2 virtual circuits demonstrated at SC07 (4Q07)
  - I2 DCN/DRAGON
    - Inter-domain exchange of control messages demonstrated (1Q07)
    - Integration of OSCARS and DRAGON has been successful (1Q07)
  - GEANT2 AutoBAHN
    - Inter-domain reservation demonstrated at SC07 (4Q07)
  - DICE
    - First draft of topology exchange schema has been formalized (in collaboration with NMWG) (2Q07), interoperability test demonstrated 3Q07
    - Initial implementation of reservation and signaling messages demonstrated at SC07 (4Q07)
  - Nortel
    - Topology exchange demonstrated successfully 3Q07
    - Inter-domain interoperability for layer 2 virtual circuits demonstrated at SC07 (4Q07)
  - UVA
    - Demonstrated token based authorization concept with OSCARS at SC07 (4Q07)
  - OGF NML-WG
    - Actively working to develop draft schema to combine work from NMWG and NDL
  - GLIF Technology and Control WG
    - In process of developing dynamic services framework

OSCARS Production Circuits (as of 20080407)



OSCARS: Guaranteed Bandwidth Service

- Funded by the DOE Office of Science
- Info URL: http://www.es.net/oscars
- Services URL: https://oscars.es.net/OSCARS/
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  - Evangelios Chaniotakis (haniotak@es.net)