STARLIGHT[SM]

The Optical STAR TAP[SM]

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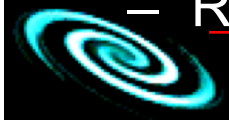
STAR TAP

- STAR TAP: 5-year-old operational cross-connect of the world's high-performance Production R&E Networks 45-622Mb ATM
- Funded by US National Science Foundation CISE ANIR, EIA and ACIR infrastructure grants to U. III. at Chicago, U. III. at Urbana Champaign, Northwestern U., and Indiana U.
- Enabling and sustaining support by Argonne National Laboratory's MCS division

The StarLight Project

- StarLight is a Gigabit Ethernet exchange *point*
- University-based research project with affiliated projects, sponsors, and global collaborators
  - International Center for Advanced Internet Research (iCAIR), Northwestern University
  - Electronic Visualization Laboratory (EVL), University of Illinois at Chicago
  - Mathematics and Computer Science Division (MCS) , Argonne National Laboratory
- Optical evolution of STAR TAP - Experimental optical infrastructure and proving ground for network services optimized for high-performance applications
  - Production Networks at 1Gb
  - Experimental Networks at 1Gb, 2.5Gb, and 10Gb
  - Research Networks at 10Gb



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StarLight is Operational

- StarLight Equipment installed:
  - Cisco 6509 with lots of GigE ports
  - Juniper M10 and M5 (with GigE and OC-12 interfaces)
  - ESnet's IPv6 Router
  - Data mining clusters
- SURFnet's Cisco 12000 GSR &15454
- Multiple vendors for GigE, 10GigE, DWDM
- Commercial Providers
  - SBC/Ameritech
  - Qwest/Teleglobe
  - Global Crossing
  - AT&T and AT&T Broadband
- All of the *StarLight* equipment (except IPv6 routers & AADS NAP) is monitored 24x7x365 by Indiana U's GlobalNOC

710 N. Lake Shore Drive, Chicago

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StarLight and Lambdas

- A *lambda* is usually defined as a fully dedicated wavelength of light in an optical network, assumed to be capable of 1 to 10Gbps bandwidth (or more).
- From an application point of view, the term *lambda* means a large and desirable unit of networking, conceptually offering the promise of end-to-end custom connectivity or allowing sufficiently massive over-provisioning of bandwidth so that the connection is guaranteed to be uncongested.
- From the StarLight engineering point of view, a *lambda* is a bandwidth-protected network path between users where packets are inspected only at the ingress and egress of the path. Intermediate equipment only looks at the number, color, and bandwidth.

Lambda Projects

- Now:
  - UIC←→StarLight←→NU←→Canada (OMNInet)
    - A test bed for all-optical switching and advanced high-speed services
    - Partners: SBC, Nortel, iCAIR at Northwestern, EVL, CANARIE, ANL
  - StarLight←→Amsterdam, CERN, Canada
- Coming:
  - UIC EVL ←→StarLight via I-WIRE
  - TeraGrid (UIUC, ANL, Caltech, UCSD)
  - National Light Rail and CA*net4

Coming soon ...

iGrid 2002

The International Virtual Laboratory

www.startap.net/igrid2002
www.igrid2002.org (COMING SOON)

24-26 September 2002
Amsterdam Science and Technology Centre (WTCW)
The Netherlands

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iGrid 1998 and 2000

- iGrid 1998 at SC ‘98 - Nov. 7-13
  in Orlando, Florida, USA
  - 10 countries: Australia, Canada, Germany, Japan, Netherlands, Russia, Singapore, Switzerland, Taiwan, USA
  - 22 demonstrations

- iGrid 2000 at INET 2000 - July 18-21
  in Yokohama, Japan
  - 14 regions: Canada, CERN, Germany, Greece, Japan, Korea, Mexico, Netherlands, Singapore, Spain, Sweden, Taiwan, United Kingdom, USA
  - 24 demonstrations

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iGrid 2002

September 24-26, 2002, Amsterdam, The Netherlands

- A showcase of applications that are “early adopters” of very-high-bandwidth national and international networks
  - What can you do with a 10Gbps network?
  - What applications have insatiable bandwidth appetites?

- To date 14 countries/locations proposing 28 demonstrations: Canada, CERN, France, Germany, Greece, Italy, Japan, The Netherlands, Singapore, Spain, Sweden, Taiwan, United Kingdom, United States

www.startap.net/igrid2002

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  - Northwestern University for providing space, engineering and management
- Argonne National Laboratory for StarLight and I-WIRE network engineering and planning leadership
- NSF/ANIR, Bill St. Arnaud of CANARIE, Kees Neggers of SURFnet, and Olivier Martin and Harvey Newman of CERN for global networking leadership;
- NSF/ACIR and NCSA/SDSC for DTF/TeraGrid opportunities
- UCAID/Abilene for Internet2 and ITN/GTRN transit; IU for the GlobalNOC
- CA*net4, CENIC/Pacific Light Wave for planned North American transport

"Bring Us Your Lambdas"

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