National/Regional Networking: Quilt, I2, WRN, FRGP/BiSON, WINS

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NCAR/UCAR/FRGP/BiSON
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Acronyms

- University Corporation for Atmospheric Research (UCAR; http://www.ucar.edu)
- National Center for Atmospheric Research (NCAR)
- Front Range GigaPoP (FRGP)
- Bi-State Optical Network (BiSON)
- Western Regional Network (WRN)
- Women in IT Networking at SC (WINS)
- Internet2 (I2) Inclusivity Initiative (I2I)
Front Range GigaPoP (FRGP)

- [http://www.frgrp.net](http://www.frgrp.net)
- Research & Education Network (REN) serving Colorado and Wyoming
- 31 participants, in discussions with
  - Jefferson County Public Safety Fiber Optic Network (“J-FON”)
    - Serving multiple cities fiber optic requirements
    - Metropolitan fiber assets along light rail paths
  - Western State and Region10
    - Western Area Power Authority (WAPA) fiber
  - US Air Force Academy (USAFA)
FRGP participant and service connection overview

Level3 colocation
910 15th Street

Level3 colocation
1850 Pearl Street

Level3 (commodity)

Energy Sciences Network (es.net - peering)

Bi-State Optical Network (BiSON-North)

CoreSite Any2 (e.g., Apple, Microsoft - peering)

Google (peering)

Telia Sonera (commodity)

BiSON-Golden and BiSON-South

frgp.net (info/stats)

Akamai (caching)

Comcast (peering)

Internet2 (national R&E)

Western Regional Network (WRN)

NOC (24x7)

Level3 colocation
1200 Larimer Street

TransitRail/Commercial Peering Service (TR/CPS - peering)

Netflix (caching)
Current FRGP voting participants: 11

- Colorado School of Mines
- Colorado State University - Fort Collins
- National Oceanic and Atmospheric Administration - Boulder
- State of Colorado
- University Corporation for Atmospheric Research (UCAR/NCAR)
- University of Colorado - Boulder
- University of Colorado - Colorado Springs
- University of Colorado - Denver
- University of Denver
- University of Northern Colorado
- University of Wyoming
FRGP participants – non-voting: 20

- Auraria Higher Education Center
- Colorado College
- Colorado Community College System
- City of Boulder
- Colorado Department of Higher Education
- Colorado Mountain College
- Colorado State University - Pueblo
- Colorado Telehealth Network
- Community College of Denver
- Educational Access Gateway Learning Environment Network/Zayo
- Education Networks of America (ECBOCES/NEBOCES)
- Johnson & Wales University
- Internet2 on behalf of USDA
- Jefferson County Schools
- Metropolitan State University of Denver
- CU University Information Systems
- NEON
- NREL
- State of Wyoming
- University NAVSTAR Consortium (UNAVCO)
FRGP Services

- Peering and local content distribution
  - Commercial Peering Service (TR-CPS) via Internet2
  - Google - 4x10G PNI at diverse colo
  - Netflix CDN - 2x10G - working on expanding
  - Akamai CDN - 8 x 1G servers
  - Coresite Any2 – 2x20G
  - IX Denver - 10G
  - ESnet - 20Gbps - upgrading to 100Gbps

- Real-time 95th percentile and uptime stats
- 24x7 Monitoring and NOC - funding 10/1/17
- Perfsonar testing nodes, mesh, deployment advice
- Engineering resources with focus on WAN routing
- Emphasis on both availability and performance
- Exploring DDoS service
FRGP Projects

- Level3 100Gbps
- Telia 100Gbps
- BiSON converted 1850-1200 span to DWDM
- Grad student working on cricket statistics replacement
- Continuing to improve security by implementing BCP38
  - Reduce DDoS based on source spoofing
FRGP Projects

• Fiber and WDM design and construction for SH 93 BiSON segment to improve access and resiliency for Boulder and Golden partners
  – ½ spliced
  – Agreement pending CDOT signature
• SC 17 Juniper Alien Wave demo
• Populating PatchManager for fiber, segment, and lambda documentation
• NSF CC* support and letters of commitment
FRGP Projects Cont’d

• Westnet unwinding project in full swing
  – https://docs.google.com/document/d/1n7v8rmpGQjWiS2t7RodinNGM0MzyKalBZaAzSkz2cJk/edit?usp=sharing
  – Next steps
    • Edit the letter to be sent
    – Identify party that will approve transfers - agreed - Marla will approve
      • Draft transfer of authority letter to be sent to ARIN
  – Discuss unused space
Western Region Network

WRN

- 100G Layer 2 on top of Internet2 wave services
- LA, Sunnyvale, Seattle, Denver, Chicago, and Albuquerque
- 100G Internet2 access in LA, Seattle, and Chicago
- 100G to Level3 in Denver and Seattle
- Pacific Wave expanded to include WRN
  - Link to Guam in-progress
  - PRP/NRP meeting in August 2017
- Designing move to Layer 3 routed network (route server versus traditional routers)
Westnet Education and Research Consortium (WERC)

- Formal charitable 501c3
- Board of directors
  - Marla Meehl - President
  - Scott Baily - Vice President
  - Michelle Bennett - Treasurer
  - Kelly McDonald - Secretary
  - Chad Burnham
  - Derek Masseth
- Working on funding opportunities
- Developing project plan: scholarships, proposals, partnerships, etc.
The Quilt

• Quilt continues to grow
  – The Quilt now at 46 members
    • 36 participants
    • 12 affiliates

• Ongoing advocacy

• Joint Quilt and NSF PI meeting again in October

• CIS renewal in process
SC 17 Conference and WINS

• SC was in Denver this November 12-17
  – 5 NETS staff will participate on SCinet teams
• Women in IT Networking (WINS) discussed earlier
Internet2

- [www.internet2.edu](http://www.internet2.edu)
- The US national Research and Education Network (NREN)
- Facilitates high performance networking
- Provides an optical platform for other networks like NOAA, ESnet, etc.
- Supports support for community software in the federated authentication space - eduroam, Shiboleth
- Supports Perfsonar toolkit
- Engages in education and outreach
- Upgrade of network hardware and MPLS/SDN overlay in progress
- **New CEO named:** Howard Pfeffer
- **Staffing changes**
Internet2 Inclusivity Initiative (I2I)

- Community Outreach & Dialogue
  - Monthly Calls with Steering Committee
  - Marla Meehl and Laurie Burns-McRobbie Co-chairs

- Collaboration
  - National Center for Women & Information Technology (NCWIT)
  - EDUCAUSE
  - WINS program
  - SWE@Internet2 Community

- I2I Scholarships at Global Summit & TechEx Events
  - Funded two WINS attendees to TechEx
  - Internet2 Inclusivity (I2I) Initiative: Being a Successful IT Worker Doesn’t Mean You Have to Give Up the Banjo
  - SCinet: Advanced Training and Professional Development for Network Engineers - The WINS Experience

I2I Steering Committee

Laurie Burns McRobbie, Indiana University (co-chair)
Marla Meehl, Front Range Gigapop (co-chair)
John Kolb, Rensselaer Polytechnic Institute
Jen Leasure, The Quilt
Scott Midkiff, Virginia Tech
Lucy Sanders, NCWIT

Internet2 Staff
Florence Hudson (left I2)
Ana Hunsinger
Gail Krovitz
Emily Nichols
Linda Roos
Gigi Youngblood (left I2)
Discussion/Questions