Acronym soup

- University Corporation for Atmospheric Research (UCAR) – 501 (c) 3 not for profit
  - National Center for Atmospheric Research (NCAR)
  - Front Range GigaPoP (FRGP)
  - UCAR Point of Presence (UPoP)
  - Bi-State Optical Network (BiSON)
Front Range GigaPoP (FRGP)

- [http://www.frgp.net](http://www.frgp.net)
- 12 years of operation by UCAR NETS
- 12 members
- Covers Colorado and Wyoming
- All major public and private universities and federal research organizations
- Formal management and technical committees, but not formal board
- Partner in Western Regional Network (WRN) with CENIC, UNM, PNWGP, UH, LEARN
FRGP – Cont’d

• Cost based with minimal overhead
• 3 dedicated engineers
• Management, accounting, legal, contracts covered out of overhead currently but being revisited
• Member of the Quilt
• Support Colorado SEGP – shared funding
• Shared commodity, I2, and NLR with WRN
• Only serve non-profits
FRGP members

- Colorado School of Mines
- Colorado State University System
- National Oceanic and Atmospheric Administration (NOAA-Boulder)
- State of Colorado
- University Corporation for Atmospheric Research
- University NAVSTAR Consortium (UNAVCO)
- University of Colorado Boulder
- University of Colorado Colorado Springs
- University of Colorado Denver
- University of Denver
- University of Northern Colorado
- University of Wyoming
FRGP

- Upgraded all routing hardware to Juniper MX480s – support 10, 40, 100Gbps
- Colocation updates
  - 1850 Pearl
  - 1200 Larimer
  - 910 15th (moved colocation from 10th to 6th floor)
- Peering
  - 10G Google peering active at 910
  - Comcast - decreasing in importance
  - TR/CPS – largest single FRGP/UPoP usage
  - Akamai
  - Netflix – in progress with the help of CENIC
FRGP - DYNES

- DYNES
- UCB – pending scientific application activation
- CSU awaiting hardware and config
- http://www.internet2.edu/ion/dynes.html
UCAR Point of Presence (UPoP)

- 5 years of operation by UCAR NETS
- 21 members
- K-12s, smaller colleges, community colleges, small not for profits
- No direct voice in governance
- [http://upop.ucar.edu](http://upop.ucar.edu)
UPoP members

- ARTstor
- Auraria Higher Education Center
- Colorado Association of Research Libraries
- City of Boulder
- City and County of Denver
- Colorado Community College System
- Colorado Telehealth Network
- Community College of Denver
- Colorado Department of Higher Education
- Colorado Mountain College
- Denver Health and Hospital Authority
- EAGLE-Net
UPoP members

- Fort Lewis College
- Front Range Internet, Inc. (two school districts)
- Metropolitan State University of Denver
- Open Media Foundation
- St. Mary's Academy
- Science and Technology in Atmospheric Research (STAR) Institute
- United States Antarctic Program (USAP)
- University of Colorado Hospital
- University Information Systems (UIS)
National Ecological Observatory Network (NEON)

- Boulder HQ connection
- national build out / project
- FRGP/UPoP involvement pending fiber path
- http://www.neoninc.org/
National Renewable Energy Laboratory (NREL)

- Golden, CO headquarters
- Interactions with the University of Colorado
- FRGP/UPoP involvement pending fiber path
Bi-State Optical Network (BiSON)

- Covers northern Colorado, UW, and NWSC
  - Had to expand to integrate NWSC
  - Expanding to include Colorado School of Mines
- Fiber segments owned by multiple entities
- End of service replacement in 3-5 years
  - Building equipment fund for replacement by 2017
- Major fiber move on BiSON-owned Mcleod fiber 10/13
  - Looking at move and replacement options
  - Operate this span of fiber
Yellowstone fully operational as of 11/12
- 1.5 petaflops supercomputer
- (1.5 quadrillion operations per second)
Have had issues with InfiniBand cabling and firmware levels, but performing well now.
NCAR Wyoming Supercomputing Center
- http://nwsc.ucar.edu/
- http://www2.cisl.ucar.edu/resources/yellowstone
- http://www2.cisl.ucar.edu/resources/yellowstone/hardware
NOAA N-Wave

- 10G / MPLS backbone
  - 100G upgrade path
- Internet2 and NLR DWDM for backbone circuits
- waves on various RENs for access
- [http://noc.nwave.noaa.gov/](http://noc.nwave.noaa.gov/)
CTN

• CTN
  – http://www.cotelehealth.com/

• meetings pending on future options
  – sustainability, services, locations
  – RFP open for network operator
  – FRGP/UPoP connectivity
BTOP

- EAGLE-Net – awarded BTOP for Colorado
- In progress however on hold for environmental assessments
- $100M
- Connect 178 school districts
- Complete by 8/13
- Will provide most of CAI growth to FRGP/UPoP
Futures/Challenges

- New agreements and new algorithms in 2014
- BiSON growth, upgrade, funding
- Supporting/funding services – NET+, etc.
- Statewide coordination – leadership at state level in Colorado
- Replacing expiring fiber IRUs
- Supporting/funding 40/100Gbps
Discussion