About the Great Plains Network

Great Plains Network
September, 2013
This Presentation

- GPN History & Current Status
- How GPN Delivers Value to Campus Members
- How GPN Delivers Advanced Networking
- How GPN Fosters Collaboration & Innovation
- How GPN Advances Regional Cyberinfrastructure
1. GPN History & Current Status

GPN Background
Major Milestones
Framework
Organization
Strategic Plan & Directions
GPN Background

- Founded by researchers and for researchers
- Initially funded by the National Science Foundation
- One of the largest aggregators for Internet2
- While the topology of the GPN physical network has changed over time, the GPN membership has grown because of a shared commitment to maintain an organization that sustains a collaborative and interdisciplinary focus among the membership.
# GPN Major Milestones

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Why a Consortium?

- Success with MidNet (NSFnet partnership)
- Huge geographic area with excellent institutions
  - More spread out than either coast
- Strength in numbers
  - Gives us a voice we would not otherwise have
- Leverage existing regional relationships on behalf of the community
- Importance of sustainability
GPN Framework
GPN At a Glance

Membership
- 22 Regular Members in 7 States
- 3 University Affiliates
- 3 Corporate Affiliates

Governing Bodies
- Executive Council
- Institutional Representatives

Staff
- Bill Mitchell
- Greg Monaco
- Kate Adams

Standing Committees
- Network Program Committee
  - Network Technical Advisory Committee
- CI Program
- Research Advisory Board
GPN Governance: Executive Council

- 1 representative per state containing a GPN Regular Member
  - Arkansas: David Merrifield, ARE-ON
  - Kansas: Bob Lim, University of Kansas
  - Missouri: Gary K. Allen, D.V.M., Ph.D., University of Missouri
  - Nebraska: Michael Ruhrdanz, University of Nebraska
  - Oklahoma: James Deaton, OneNet
  - South Dakota: Claude Garelik (Chair), South Dakota Board of Regents
GPN Regular Members

- Arkansas
  - Arkansas State University
  - University of Arkansas
  - University of Arkansas at Little Rock
  - University of Arkansas for Medical Sciences

- Kansas
  - Kansas State University
  - University of Kansas
  - Wichita State University

- Missouri
  - Missouri University of Science and Technology
  - University of Missouri - Columbia
  - University of Missouri - Kansas City
  - University of Missouri - St. Louis

- Nebraska
  - University of Nebraska – Lincoln

- Oklahoma
  - Oklahoma State University
  - University of Oklahoma
  - University of Oklahoma Health Sciences Center
  - University of Tulsa

- South Dakota
  - Black Hills State University
  - Dakota State University
  - Northern State University
  - South Dakota School of Mines & Technology
  - South Dakota State University
  - University of South Dakota
GPN Affiliate Members

- University Affiliates
  - Iowa State University
  - University of Minnesota
  - WiscNet, Wisconsin's Research & Education Network

- Corporate Affiliates
  - Adva Optical
  - Ciena
  - Fujitsu
GPN Strategic Partners

- **State Networks**
  - ARE-ON
  - KanREN
  - MOREnet
  - Network Nebraska
  - OneNet
  - REED (SD)

- **Organizations**
  - Greater Western Library Association (GWLA)
  - Internet2
  - MCBIOS
  - Quilt

- **High Performance Computing (HPC) Centers**
  - Arkansas HPC Center (UAF)
  - Institute for Computational Research in S&E (KSU)
  - Holland Computing Center (UNL)
  - UM Bioinformatics Consortium
  - OSCER (OU)
  - OSU HPC Center
  - SDSU HPC Center
  - Tandy Supercomputing Center at the Oklahoma Innovation Institute
  - WSU HPC Center
**GPN Strategic Plan**

**Vision:** GPN is a community of research and education professionals using advanced technologies to enhance the missions of their institutions and the region.

**Mission:** GPN advances the efforts of the community by convening, informing and ensuring that networking (both technical and people) resources are available to its members.
1. Advance the spirit of community - communication, - professional development - partnerships with other organizations.

2. Provide leadership in advanced networking... regionally & nationally...on behalf of the membership.

3. ... build a regional community of practice in the application and use of CI...to enhance the competitiveness of the region.
2. How GPN Delivers Value to Campus Members

GPN Working on Behalf of Campus Members
GPN at the Nexus
GPN Meetings
Benefits to Individual Campuses
GPN at the Nexus

GPN

You & Your Campus

National & Regional Organizations

State Networks

Non-GPN Campuses

National Partnerships

Other GPN Members Regional Partnerships
GPN Working On Behalf of Members

- Facilitate multi-institution collaborations
- Form Partnerships on Behalf of GPN Memberships
  - MCBIOS – MidSouth Bioinformatics Consortium
  - GWLA – Greater Western Library Alliance
  - GLOBUS – University of Chicago/Argonne
  - XSEDE Campus Champion Program
- Communicate Latest Developments
  - Website, Weekly News by Kate Adams
GPN Working on Behalf of Members

- Annual Conference
  - Unique combination of research, library and IT/network attendees
  - Plenary session speakers from I2, NSF, NIH
  - Numbers
- GPN Professional Development Program
- GPN Summits: CI, Big Data
- Teleconferences for Communities of Interest
- CIO Roundtable
- Internet2 Meeting with GPN Members
Bringing It All Together

CIOs

Faculty & Researchers

Graduate Students

Technical Staff

Library Staff

Corporate Sponsors

Emerging Partnerships

National Leaders

GPN Annual Meeting
3. How GPN Delivers Advanced Networking

Networking Milestones
How It Looks, Today
Philosophy
Priorities
## GPN Networking Milestones

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<td>National LambdaRail Formed</td>
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<td>2006</td>
<td>GPN Connection - 1G</td>
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<tr>
<td>2007</td>
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<td>I2 DCN/ION Service Begins</td>
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<td>2008</td>
<td>GPN Connection - 10G</td>
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<tr>
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<td>GPN Connection - 2 x 10G</td>
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<tr>
<td>2012</td>
<td>GPN Equipment Upgrade</td>
<td>Internet2 Launches 100G Network</td>
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GPN Network
GPN Network ‘Philosophy’

- **Quick to Respond**
  - GPN should be ready to implement new services as they become available, balancing current investments to be ‘ready’, while not buying earlier than needed.

- **Value-based decisions**
  - Decisions should be based on delivering value to our membership, with a solid cost/benefit analysis.

- **Example of this philosophy in action**
  - Purchased core network replacement equipment with 100g capable gear. Allows us to rapidly deploy 100g connections when requested.
GPN Network Program Priorities

- Full deployment of 100 Gig Connections to I2
- Develop & implement long-term solution for space/power at KC PoP
- Implement Netflix servers in KC & Tulsa
- Revisit OmniPoP Backup Agreement WRT100g
- Cost/benefit analysis for creating a GPN PoP in the Midwest Internet Hub and Collocation Facility (1102 Grand, KCMO)
Network Facilities

- Kansas City PoP at 1100 Walnut (Level 3)
  - Co-located in I2 Suite
  - NLR access
  - GPN NOC operated by MOREnet
    - 24x7x365 monitoring & management

- Tulsa PoP at 18 W Archer (Level 3)
  - Co-located in NLR Suite
  - GPN Tulsa NOC operated by OneNet
    - 24x7x365 monitoring & management

- State-based connection strategy
  - Individual institutions can connect as an Affiliate Member

- Each GPN Connector gets 2 x 10g and 1 x 1g Port
  - Additional ports available at a fee
Network Services

- 2 x 100g bandwidth to I2
  - Shared Service for Research and Education Traffic
  - Dedicated Bandwidth Reservation Service
    - Dedicated optical paths between end-points up to 10 Gig
  - CPS – Commodity Peering Service
- WiscNet Commodity Peering Service
- ESnet 2x10g Peering Connection
- GpENI – Great Plains Environment for Network Innovation
- GPN Peering Exchange – Keeps Member Traffic ‘Local’
- Access to I1 providers
GPN Bandwidth to Internet2

155 Mbps

1998

1999

2000

2001

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

1 Gbps

2 x 10 Gbps

2 x 100 Gbps
Internet2 Connectors
Internet2 Sponsored Education Group Participants Program - SEGP

- Allows expanded access to the Internet2 Network for state and regional education networks
- There are thirty-nine state K20 networks participating.
- 6 GPN states participate
4. How GPN Fosters Regional Collaboration & Innovation

Timeline
Funded Research
Cyberinfrastructure
Meetings
How GPN Connects You
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<td>Research collaboration emphasized</td>
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<td>2003</td>
<td>GPN Administration moved from KU to MU</td>
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<td>Sun Microsystems Award</td>
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<td>First Affiliate Members join, partnership with MCBIOS</td>
<td>NSF GENI Project Office Awarded</td>
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<td>GENI Award, CI Summit</td>
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<td>2009</td>
<td>Bridges Collaborative Workshop</td>
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<td>2011</td>
<td>Data Management working group formed, partnership with GWLA</td>
<td>Data Management as national issue</td>
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GPN Collaborative Work

Successful Regional Collaborations

Tools (Cyber-infrastructure)

People (Communities of Interest)

Facilitation
GPN Communities of Interest Since 2004 (Funding Source)

- Network Infrastructure
- Mediated Learning
- Water Resource Management
- Bioinformatics
- Collaborative Middleware (EDUCAUSE – NSF subaward & MIDnet)
- Grid Computing (Sun Microsystems)
- Human Language Technology (NSF)
- Networking Research – GENI (NSF)
- Cyber-physical Systems (NSF)
- K20 Interactive Distance Learning
- Data Management for Research Projects (IMLS)
2006 – 2007  formed an interest group among Internet2 Sponsored Education Group Participants in the Region

2007
Visit to an Ice-Age Cave on November 7

2008
Emergency Preparedness: Lessons from Greensburg, Kansas March 11
Chinese Autumn Festival September 17

2009
Brown v Board of Education Interactive Distance Learning Event February, 2009
National Park Service Panel December, 2009

2010 First Annual National Park Service IDL Events
Homestead National Monument, Beatrice, NE Monday, April 19
Brown vs. Board of Board of Education, Topeka, KS April 20th
Knife River Indian Villages, Stanton, ND April 21
Minuteman Missile, Wall, SD April 22, 2010
5. How GPN Advances Regional Cyberinfrastructure

CI Expertise in the Region
GPN CI Program
Successes
Ongoing Support
CI Expertise in the Region

- Networking
  - State Networks
  - Network Researchers

- High Performance Computing Centers
  - AHPCC: Arkansas High Performance Computing Center (UA-F)
  - ICRES: Institute for Computational Research in Science & Engineering (KSU)
  - Holland Computing Center (UNL)
  - UMBC: University of Missouri Bioinformatics Consortium
  - OSCER: University of Oklahoma Supercomputing Center for Education & Research
  - Oklahoma State University High Performance Computing Center
  - South Dakota State High Performance Computing Center
  - Tandy Supercomputing Center at the Oklahoma Innovation Institute
  - University of South Dakota High Performance Computing Center
  - HiPeCC: Wichita State University High Performance Computing Center

- Content Areas
  - genomics,
  - life sciences,
  - library science

- The challenge is to harness it in support of the entire region
GPN Cyberinfrastructure Program

- To deliver high value services to GPN Membership
  - 2 Members per State, one per Affiliate Member
  - Rick McMullen, University of Arkansas, Chair

- Working Groups
  - Computing Infrastructure & Services (Dan Andresen, Kansas State University, Chair)
  - Data Storage (Gordon Springer, University of Missouri, Chair)
  - Education, Outreach & Training (Jeff Pummill, University of Arkansas, Chair)
  - Networking Research (Deep Medhi, University of Missouri, Kansas City)
Priorities for Regional CI Support
- Computation
- Data storage services
- Networking services
- Education and training
- Collaboration
- Communication
- Help
- Expertise and resource referral
CI Program Successes

- GPN Dropoff
  - Service to permit transfer of files too large to email
- Professional Development Program
  - Eight to ten speakers on timely CI topics
- Shared Storage for Research Projects
  - Can be allocated to and managed by a researcher (PI). That researcher can administer the allocation among colleagues
- SC13 Booth
CI Program Successes (cont.)

- InCommon Participation
- Federated Identity Management for GPN Members
- Membership in Identity Ecosystem Steering Group
The End

- Bill Mitchell, bill@greatplains.net
- Greg Monaco, greg@greatplains.net
- Kate Adams, kate@greatplains.net