Golden LEAF Rural Broadband Initiative and the Future of MCNC/NCREN

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NCPLDA
MCNC Operates NCREN

A high speed optical backbone for Community Anchor Institutions (K12, Community Colleges, Universities, Libraries, Public Health and Safety, non-profit hospitals, etc). Intranet and Internet.
Advantages of a backbone

- Aggregate Demand for Internet Bandwidth
- Flexibility to peer with high demand sites
- Adjust quickly to “bursty” needs
- Optimum performance for high bandwidth apps
Serve today

- 17 UNC System Institutions
- 24 of 36 independent colleges and universities
- 58 Community Colleges
- 115 Local Education Agencies
- 15 Charter Schools
- Library System
  - Mecklenberg
  - Cumberland
  - Pitt
  - Triangle Research Libraries
Financial example – what we try to do

- Rural Facility (Small LEA)
  - Before NCREN
    - Circuit Cost: $2800/Month (redundant T1)
    - Bandwidth at 10mbps: $1200/Month
  - NCREN
    - Circuit Cost: $1900/Month
    - Bandwidth at 100mbps: $600/Month
    - Leased Router/Router Mn’t: $500/Month
    - Backbone Charge: $850/Month
NCREN – Applications at the high end

Zones denote increasing importance of premium connectivity:
1. Basic connectivity is sufficient
2. Premium connectivity is helpful
3. Premium connectivity is critical

- Desktop Video chat
- Cloud Computing / Virtual Desktop
- HD /Room Videoconferencing
- Real-Time Simulation / Education
- Database / Content Access
- Streaming Video
- File Sharing / Transfer
- VoIP
- Web Browsing
- Email
- Instant Messaging

Quality of Service Requirements

Speed Requirements

3/24/2011
NCREN – No Contention to run this traffic

<table>
<thead>
<tr>
<th>Service</th>
<th>Nominal Speed</th>
<th>Actual Throughput</th>
<th>Contention Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSL / Cable Modem @40:1</td>
<td>10 Mbps</td>
<td>0.25 Mbps</td>
<td></td>
</tr>
<tr>
<td>DSL / Cable Modem @20:1</td>
<td>10 Mbps</td>
<td>0.5 Mbps</td>
<td></td>
</tr>
<tr>
<td>R&amp;E Network @2:1</td>
<td>10 Mbps</td>
<td>5.0 Mbps</td>
<td></td>
</tr>
<tr>
<td>R&amp;E Network @1:1</td>
<td>10 Mbps</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ILUSTRATIVE

Nominal Speed
Actual Throughput

Contestation Ratio
<table>
<thead>
<tr>
<th></th>
<th>Lease</th>
<th>Ownership IRU</th>
<th>Permanent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Use</td>
<td>$85,360,000</td>
<td>$23,839,000 Providers would not allow</td>
<td>$39,900,000 (Capital, O&amp;M and refresh)</td>
</tr>
</tbody>
</table>

**Cost Avoidance**
Federal Stimulus

- ARRA provides $7.2B to enhance broadband access
  - $4.5 B to Commerce BTOP
  - $2.7 B to Agriculture RUS (ATMC $16M)
  - All Capital Funds – No Operating Funds

- Why did MCNC apply?
  - Limited fiber available in rural NC – we were already partnered with the willing
  - Ensure NCREN’s capacity to provide efficient service and maintain low cost to our public schools, Universities and Community Colleges
  - Assist state with implementation of Healthcare Information Exchange with ITS.
  - Bring middle mile closer to underserved consumers and small businesses – Help still needed to reach last mile in some areas.
MCNC and BTOP

- 2 Rounds of Funding - Part of ARRA
- $146M total, Including $42M in private match
  - Uses no State Funds
  - $7.7M From MCNC Endowment
  - $24M Golden LEAF (Golden LEAF Rural Broadband Initiative)
- 82 mostly rural Counties – 69 fully or partially underserved
  - 2500 miles of middle mile fiber
  - 4000 Community Anchor Institutions
  - Partner for Rural Last Mile
  - ATMC
For Rural Broadband

- This is middle mile—not last mile
- Need to build public/private partnerships to reach areas like Graham, Jackson, Transylvania
- MCNC will have the fiber assets to help but we need to be part of a plan, not the entire solution
- Have to work with private sector
  - Can’t scale to meet consumer market
  - Not our mission
NCREN at the end of the BTOP Build

MCNC 4218: Current, BTOP1, BTOP2
With Community Anchor Institutions

- BTOP2
- BTOP1
- MCNC Current Network
- Proposed Optical Transport Node at CAI location
- Community Anchor Institution
Counties in round 1 & 2

Encompass 32,597 square miles or 67% of NC's total square miles

Advantages to NCREN Connectors

- Stable costs through owned “dark fiber”
- 170 Community Anchor Institutions – Direct Fiber
- Non profit model reduces costs
- Intranet performance for latency sensitive applications and research
Critical Success Factors

- Stable operating funds from NCREN Connectors
- Last mile public/private partnerships
- Statewide help from all levels of government and all agencies to facilitate build
Follow the Progress of the Build

Fastest progress of any BTOP award that involves major construction – over 30% complete

http://www.mcnc.org/btop/progress


http://www.twitter.com/GLRBI
Next Step with Libraries

- Demand Aggregator
- Pricing determinations
- Can we better what you have?
  - We will be forthright