Abilene Update

Steve Corbató
Director, Backbone Network Infrastructure

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2004 Abilene Financial Model Changes

Assumptions & Objectives

• Main purpose of changes is to continue to drive connectivity upgrades
  – Connection fee still depends logarithmically on bandwidth
  – Use last year’s initial 10-Gbps fee to recalibrate connection fee structure at the lower bandwidths

• Recognize ongoing emergence of Regional Optical Networks (RONs)
  – Optical fiber access & x-connects in Qwest PoPs are strategic
  – Expect RON-enabled regional aggregation of lower bandwidth connections (e.g., TX, FL) to continue
    • Peak of 53 connections (2002) to prediction of 39 by end of 2004
  – Ethernet (GigE and 10 GigE) connections supported when connector has dark fiber into Qwest PoP with Abilene router
Assumptions & Objectives

- Hopeful that Sec 271 backhaul restrictions in 14-state region will be relieved late 2003-early 2004
  - We are considering alternate solutions in the interim
  - Critical for backbone in CO and backhaul in OR, AZ, NM,…
- Financial model is based on ~5-year cycle
  - Upgrade cash flow requirements draw down reserve
    - Capital Equipment (predominantly routers)
    - Prepaid circuits and/or IRUs
  - Replenish reserve over subsequent cycle
  - 2nd generation Abilene cycle commenced in late 2001
  - Expect next upgrade to start in 2005-2006
    - Complete reevaluation of next generation architecture in interim
    - Project HOPI
### Proposed Abilene Financial Model - 2004

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Original</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC-3c (155 Mbps)</td>
<td>$110k (1998)</td>
<td>($110k)</td>
<td>($110k)</td>
</tr>
<tr>
<td>OC-12c (622 Mbps)</td>
<td>$320k (1998)</td>
<td>$270k</td>
<td>$240k</td>
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<td>Gig E (1 Gbps)</td>
<td>$325k (2001)</td>
<td>$325k</td>
<td>$280k</td>
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<tr>
<td>OC-48c (2.5 Gbps)</td>
<td>$495k (2000)</td>
<td>$430k</td>
<td>$360k</td>
</tr>
<tr>
<td>10 Gbps (SONET/Ethernet)</td>
<td>$490k (2003)</td>
<td>$490k</td>
<td>$480k</td>
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</tbody>
</table>
Proposed Abilene Financial Model - 2004

- New connection fees take effect upon...
  - Date of upgrade to higher bandwidth or
  - Annual renewal date for connection agreement
- Annual participation fees unchanged
  - Participation - $20k/member
  - SEGP - $30k + $2k x (# of U.S. House reps)
- Sponsored participation remains a member benefit
  - Increasingly utilized by several GigaPoPs (e.g., MAPGI)
Some part of Abilene reserve recently was used to provide capital for initial FiberCo dark fiber acquisition

- Separate LLC established with Internet as the only member
- Membership open to other non-profit organizations interested in advanced networking
- Timed to exploit trough in dark fiber pricing and aimed to established national scale acquisition capability (a la Quilt CIS agreements)

Already >97% of this initial investment has been covered through anticipated allocations of dark fiber to NLR and RONs

FiberCo charges a transaction fee to recover costs (e.g., legal, RFx response)
Internet2 and NLR

- Internet2 is both a founding member and an active participant in NLR
  - $10M contribution (20% of current funding) to NLR non-profit
    - Drawn from the Abilene reserve
  - Two board seats
  - One 10-Gbps \( \lambda \) over national footprint for first 5 yrs
    - Intent is to deploy for Project HOPI for at least 2 years
  - Staff member engagement in NLR
    - S. Corbato, Secretary/Treasurer
    - S. Cotter, Implementation
    - M. Pollak, Communications

- Our view is that NLR is both an experimental facility and a complex multi-dimensional experiment *in and of itself*
Abilene and the NLR/IP network

- NLR/IP network will be an experimental platform with the principal objective of facilitating network research.

- Abilene already has an established policy for collaborating with these testbed networks (e.g., DARPA Supernet):
  - Interconnection in multiple points
  - Limited peering to support interdomain experiments and demonstrations (e.g., SCxy)

- We do not anticipate a general peering relationship between Abilene and NLR/IP.
Questions?
Comments?

http://www.internet2.edu/abilene
abilene@internet2.edu