Presentation Objectives

• Network Overview
  – Benefits
  – UA Network Growth & Investments FY05-FY10
  – Monitoring Mechanisms and Data
  – Network Expenses
• Identify Efficiencies and Cost Containment
• Compare Urban and Rural Costs
• Provide Analysis of Utilization
  • When, where and how to upgrade bandwidth?
  • How do Community Campuses fit into the mix?
• Summarize Managed Growth Plans FY12-FY15
Network Benefits

• **Prospective Students & the Public**
  Discover & obtain information via the network about the University of Alaska

• **Enrolled Students**
  Register for classes, complete financial aid applications, find housing assignments, access progression to degree and course information, access distance education via video or Blackboard tools, perform online research, access social networks and correspond with other UA students

• **Faculty**
  Administer academic instruction, video conferencing and elearning (e.g. UAF/UAA Joint Psychology PhD, Nursing, School of Education, etc.), capture lectures live for later use by students, utilize online access 24x7, conduct research, publish, collaborate

• **Researchers**
  Collect, analyze and store research data, access and transfer to global research partners

• **Staff**
  Access wired or wireless student, conduct University business, communicate, collaborate, participate in education and training online and via video conferencing
UA WAN
Expense Overview & Investments

• Network service areas include the following primary categories:
  • **Intrastate**: UA Core WAN (between FAI – ANC – JUN) and Community Campus connectivity
  • **Interstate**: Internet2 Research Network fees and Commodity Internet

<table>
<thead>
<tr>
<th>Annual Network Costs</th>
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</thead>
<tbody>
<tr>
<td>FY13 UA Wide Area Network Telecommunications Costs</td>
</tr>
<tr>
<td>Interstate</td>
</tr>
<tr>
<td>Internet2 Fees</td>
</tr>
<tr>
<td>Commodity Internet</td>
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<tr>
<td>Interstate Total</td>
</tr>
<tr>
<td>Intrastate</td>
</tr>
<tr>
<td>Community Campuses</td>
</tr>
<tr>
<td>(rural &amp; urban)</td>
</tr>
<tr>
<td>Core WAN services</td>
</tr>
<tr>
<td>Intrastate Total</td>
</tr>
<tr>
<td>Grand Total Inter and Intrastate</td>
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• UA Community Campus connectivity is significantly more expensive when campuses are not on the road system or must use satellite connectivity

• UA OIT received State of Alaska increments specifically for WAN upgrades and network infrastructure in FY07 ($700K) and FY10 ($550K)

Gifts donated to UA have added capacity and reliability to the UA network for a fraction of the cost
• GCI bandwidth gift in FY09 valued at $30M (10 yr. term) up to 10 GB capacity
• Space in & bandwidth to an ACS facility in Oregon for disaster recovery valued at $6.8M (5 yr. term)
The OIT WAN Weather Map is a dynamic, live, network traffic monitoring tool. The data displayed within this tool can be used to make operational changes to traffic routing or to inform strategic plans for capacity growth or change. The weather map is online at: http://weathermap.sw.alaska.edu
• Trends indicate a fairly consistent WAN expense over time while utilization of the FAI – ANC (most heavily used) circuit has steadily increased indicating changing technology market conditions and better rates = better bang for the buck!
• As of October 2009, heavy use on the FAI-ANC circuit has begun to register as greater than 50% of the use on the entire network, although infrequent so far, this may indicate a need for planning efforts to increase capacity for this circuit
The GCI bandwidth gift necessitated corresponding increase in Internet2 fees (Interstate) in FY10.

Optical circuit (OC) capacity between FAI & ANC will increase over time.

Community Campus connectivity is heavily impacted by satellite rate increases in the current WAN contract while urban connectivity is progressively more affordable (even as bandwidth increases).
Cost Containment: A Measure of WAN Efficiency

- **FY06-FY10 Contract**
  - 155 Mbps Capacity for UA Core: FAI – ANC – JUN
    - $304/Mbps for 155 Mbps
  - 210 Mbps Capacity for Commodity Internet
    - $420/Mbps for 210 Mbps

- **FY11-FY15 Contract**
  - 200 Mbps Capacity for UA Core: FAI – ANC – JUN
    - $80/Mbps for 200 Mbps
    - 74% Savings/Mbps
    - AND
    - 29% Capacity Increase
  - 300 Mbps Capacity for Commodity Internet
    - $41/Mbps for 300 Mbps
    - 90% Savings/Mbps
    - AND
    - 43% Capacity Increase

Reference 56
Bandwidth Breakdown by Service: What is UA using the network for?

- Administrative Use is defined as customer network services at Statewide.
- Academic Use is defined as customer network services at MAU locations.
- Video Conferencing is defined as services labeled specifically for video services.
- Commodity Internet is defined as services labeled specifically as commodity internet.

Breakdown of UA Network Services by Type:
- Administrative Use: 9%
- Academic Use: Research and Teaching: 41%
- Video Conferencing & Distance Education: 48%
- Commodity Internet: 2%

Estimated Core vs. CC Total UA Use Distribution:
- Community Campus Use: 9%
- FAI - ANC - JUN Core: 91%
Community Campus Bandwidth

Urban vs Rural
Terrestrial vs Satellite

<table>
<thead>
<tr>
<th>Campus</th>
<th>Bandwidth (Mb)</th>
<th>Annual Cost</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenai</td>
<td>45</td>
<td>$75,000</td>
<td>Terrestrial</td>
</tr>
<tr>
<td>Mat-Su</td>
<td>45</td>
<td>$73,000</td>
<td>Terrestrial</td>
</tr>
<tr>
<td>Valdez</td>
<td>45</td>
<td>$75,000</td>
<td>Terrestrial</td>
</tr>
<tr>
<td>Ketchikan</td>
<td>45</td>
<td>$148,698</td>
<td>Terrestrial</td>
</tr>
<tr>
<td>Bethel</td>
<td>5</td>
<td>$110,000</td>
<td>Satellite</td>
</tr>
<tr>
<td>Nome</td>
<td>5</td>
<td>$110,000</td>
<td>Satellite</td>
</tr>
<tr>
<td>Kotzebue</td>
<td>5</td>
<td>$139,000</td>
<td>Satellite</td>
</tr>
</tbody>
</table>
Currently, a move to terrestrial based network for our rural campus is cost prohibitive and would represent a 5-fold increase in network costs to those campuses.
UA Network
Operational Planning FY12-FY15

• FY12
  • Upgraded UA core to have an additional 45 Mbps between each MAU
  • Upgraded CI to have an additional 90 Mbps for Fairbanks & Anchorage
  • Upgraded Commercial Service from Pacific Northwest GigaPop (PNWGP) an additional 100 Mbps

• FY13
  • Upgraded CI to have an additional 90 Mbps for each MAU
  • Upgraded Commercial Service from PNWGP an additional 100 Mbps
  • Upgraded GCI Bandwidth gift from OC-12 to OC-24

• FY14
  • Upgrade UA core to have an additional 45 Mbps between each MAU
  • Upgrade satellite community campus service to 10 Mbps
  • Upgrade CI to have an additional 90 Mbps for each MAU
  • Upgrade Commercial Service from PNWGP an additional 100 Mbps
  • Explore Disaster Recovery (DR) options; renew ACS DR Facility gift if available

• FY15
  • Upgrade CI to have an additional 90 Mbps for each MAU
  • Upgrade Commercial Service from PNWGP an additional 100 Mbps
  • Upgrade GCI Bandwidth gift from OC-24 to OC-48
WAN Strategic Planning

• Rural Connectivity-UA rural connectivity is limited for some locations to satellite only; most locations are 5 Mbps, at an increased cost over that of urban campuses
  – Where available and affordable, bring Community Campuses onto Terrestrial connectivity

• Explore options for redundancy and data storage by pursuing gift extensions through GCI and ACS respectively upon expiration

• Disaster Recovery-Expand UA enterprise systems located in the ACS DR facility to include improved business continuity and backup

• Encourage the addition of fiber connections to and across Alaska

• Explore network consortia where applicable and beneficial to UA
Conclusions & Recommendations

- Demand for network bandwidth continues to grow at a steady rate

- New applications with rich media and large data sets continue to be developed and drive bandwidth demand

- UA will continue to be at a disadvantage as Lower 48 Networks increase in speed and capacity

- New fiber to the State will drive competition, expansion and new economic opportunities for Alaska
Questions & Comments