Internet Access and Connectivity Enhancement
(KanREN project)

I. Introduction

The global use of the Internet and the Web continues to increase at an exponential rate. The introduction of and expectation for electronic communications and a wide variety of online services and depends on reliable, high-performing Internet connectivity. Washburn has similar requirements and is facing growing network demands as it expands its Internet presence, including the use online admissions and student services, online/distant learning, digital library resources, e-commerce, and electronic communications. This network use is not only increasing, but it is also becoming more multi-media intense as the University community exchanges large graphic-rich documents/attachments, streaming video (class materials, athletic events and campus activities), and enhanced on-line course content. Access from off-campus to internal networked resources and services continues to increase since 90% of the University’s students live off-campus. Washburn’s students, many of whom are part of the “millennium generation”, depend on the Internet for communications, education, research, entertainment, and e-commerce. Email, Twitter, RSS, and Facebook are integral parts of their daily lives. Admissions, Enrollment Management, Student Life, and other student service offices are expanding their use of Internet and web-based tools and software. The University’s Internet services also include a library partnership with the State, Internet connectivity for the Washburn Institute of Technology, services for KTWU, and online learning system (Angel) hosted off-site in Indiana.

The Washburn information technology assessment, recently completed by Kaludis Consulting, found that the growing demand for Internet access will only continue to grow. This University-wide study included input from over 360 faculty, staff, and students. A recurring complaint focused on the limitations of the University’s connection to the Internet and networked services. Future Internet demand will include uses such as education/research projects (e.g., HiPACE), high-definition video (the University’s TV studio is currently being upgraded to HD), video conferencing, virtual teaching/experimentation labs, and other Internet-based or hosted services, often referred to as cloud computing.

II. Current Internet Connectivity

The internal Washburn backbone network features a 1 Gigabit per second (Gbps) throughput capacity; this network bandwidth equal 1,000 Megabits (Mbps) or one billion bits per second. This internal network handles data and communications traffic between University buildings and is connected to the global Internet via two gateway "pipes":

- Cox (@ 30 Mbps) for $45,000 per year; contract expires at the end of July, 2010; renewable on a month-to-month basis.
- Kan-Ed (@ 30 Mbps) for $40,212 per year; contract expires mid-October, 2010

Washburn is currently running one or both pipes at capacity on a regular basis, resulting in degraded Internet performance and an unsatisfactory user experience both on and off campus, particularly at peak times. The University is already limiting residential student network traffic. The majority of network work traffic goes through these gateways as students, faculty, and staff
connect to computing resources web-based services from their offices and homes. Washburn
must increase its Internet bandwidth significantly to meet current and growing demand.

III. Proposed Internet Access Solution

On behalf of Washburn’s students, faculty, and staff, the ISS leadership team is proposing that
the University change to KanREN as its Internet access provider.

The following information was extracted from the KanREN.net web site:

KanREN is a non-profit consortium of colleges, universities, school districts and other
organizations in Kansas, organized for the purpose of facilitating communication among them,
and providing themselves with connectivity to the Internet via a statewide TCP/IP network.

- KanREN is an independent, not-for-profit Kansas corporation,
- KanREN is not primarily a network–KanREN is an educational consortium. KanREN
  operates a state-wide TCP/IP network on behalf of its member institutions.
- Membership in KanREN is open to any college, university, library, or school district in
  the state of Kansas. Other non-profit organizations may join the consortium subject to
  the approval of the KanREN executive committee.
- KanREN is not a commercial Internet Service Provider (ISP), though we do provide
dedicated Internet connectivity for most of our member sites.
- KanREN is not supported with any funding from the state or federal government.
  Though begun with funding from the National Science Foundation in 1993, today
  KanREN is completely supported by membership fees paid by its member institutions.
- KanREN is not an agency of the government of the state of Kansas.
- KanREN is an Internet2 Sponsored Education Group Participant (SEGP)
- KanREN is a Kan-Ed peering partner
- KanREN is affiliated with the Great Plains Network
- KanREN is a member of Net@EDU The policy making division of EDUCAUSE.
- KanREN provides E-rate discounts (SPIN: 143005645)

KanREN members include the following anchor institutions: University of Kansas, Kansas State
University, Wichita State University, Emporia State University, Fort Hays State University,
Pittsburg State University, University of Kansas Medical Center, Johnson County Community
College, and Kansas Board of Regents/Kan-Ed. Other college members include Baker
University, Central Christian College, and Hesston College plus five community colleges, fifteen
unified school districts, several libraries, and a few research and/or education organizations.

Washburn’s total current “to/from” Internet capacity is 60 Mbps (.06 Gbps). In comparison, the
KanREN anchor members (State universities) all have 2,000 Mbps capacity connections, except
Emporia State which has a 1,000 Mbps capacity. Washburn is proposing to switch its Internet
access gateway to the KanREN network (@ 1,000 Mbps). The actual KanREN “pipe” can
support 2.00 Gbps of traffic, if needed. Additionally, KanREN is in the process of planning an
upgrade of their deliverable Internet capacity to 10 Gbps with implementation expected in the
next few years. When that is available, we will have the opportunity to upgrade our connection
even further if needed.
IV. Costs

KanREN has provided a formal cost quotation that includes a one-time network setup fee of $40,000 that covers new equipment and assistance to design and configure the new connections. In June/July Washburn would also have the new circuitry installed at a cost of $26,186. The new Internet connection would be activated in mid-August in time for start of classes.

Our annual recurring service costs will consist of four types of charges:

<table>
<thead>
<tr>
<th>Class</th>
<th>Fee</th>
<th>Cost per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>@</td>
<td>$45,000</td>
</tr>
<tr>
<td>Service plan</td>
<td>@</td>
<td>4,000</td>
</tr>
<tr>
<td>Internet fee</td>
<td>@</td>
<td>12,000</td>
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<tr>
<td>Backbone fee</td>
<td>@</td>
<td>48,000</td>
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</tbody>
</table>

**Total cost** $109,000 per year

(Current cost = $85,212)

In order to provide this service upgrade in time for Fall semester, Washburn should sign a KanREN agreement in May 2010 and start paying the usage fees on a monthly basis when the new connection is established, in mid-August. Washburn will keep the Kan-Ed connection as backup until mid-October when that contract expires. **All proposed expenditures are available in the ISS FY10 and FY11 operating budgets; no new or additional funding is required.**

The contract with KanREN Data Communications Network should be handled as a sole source procurement due to the unique and specialized services they provide for higher education and can be processed through State of Kansas contract number. The KanREN migration schedule provides the least impact on University activities while allowing us to improve Internet services in time for the start of the Fall term. The University seeks permission to proceed with this project and to issue the necessary purchase requisitions as the upgrade project moves ahead.

In summary, it is proposed that Washburn’s Internet gateway connection be increased from .06 Gbps to 1.00 Gbps (a 1667% increase) at an annual increase cost of $23,787 (a 28% increase). The University is not merely following other Kansas colleges and universities in joining KanREN – we are growing in the magnitude, breadth, and sophistication of our Internet, web-based, and online services. Therefore, ISS leadership is proposing a proven, cost-effective, and high-capacity networking solution that meets current requirements and positions the University for future growth in this Internet age.

V. Summary:

<table>
<thead>
<tr>
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<th>Current (Cox/Kan-Ed)</th>
<th>Proposed KanREN</th>
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<tbody>
<tr>
<td>Network Capacity</td>
<td>60 Mbps</td>
<td>1,000 Mbps</td>
</tr>
<tr>
<td>Recurring/annual Cost</td>
<td>$85,212</td>
<td>$109,000</td>
</tr>
<tr>
<td>One-time expenditures</td>
<td>FY10: $40,000</td>
<td>FY11: $26,186</td>
</tr>
</tbody>
</table>

Planned expenditures for this network upgrade are covered by the existing ISS operating budget; no new funding is requested.

Approve by the Technology Steering Committee on May 19, 2010. Approved by the Washburn Board of Regents on May 21, 2010. Work completed in August 2010.