

STATE AUDITOR'S OFFICE



K-20 Education Network Activity Assessment

June 30, 2011

Report No. 1005899



WASHINGTON
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STATE AUDITOR

EXECUTIVE SUMMARY

Why we did this assessment

In 1996, the Washington State Legislature authorized the state's colleges, universities and school districts to work with the Department of Information Services and other state agencies to create a high-speed, high-capacity data network exclusively for educational purposes. The K-20 Educational Network allows educational institutions to share data and video communications and provides access to the Internet for the institutions that pay for these services.

The 2010 supplemental operating budget directed the Joint Legislative Audit and Review Committee (JLARC) to select one of the result areas from the Priorities of Government budget exercise and prioritize the individual budget activities. The proviso directed the State Auditor's Office to conduct an "activity assessment" of at least one of the lowest-priority activities to determine whether it continued to merit state investment.

JLARC identified the K-20 Network as a low-priority activity. We selected the network for this assessment because of the large number of educational institutions and students it serves, and because of the possible effect of changes in information technology and telecommunications on what is a relatively mature technology program.

In response to the budget proviso, we designed the assessment to answer these questions:

- 1. Does the activity continue to serve the purpose for which it was created?**
- 2. What does the activity cost the state and what would be the effect if it were eliminated?**
- 3. Does the state have more cost-effective ways to achieve the objectives of the activity?**

How we conducted this assessment

The State Auditor's Office contracted with Macias Consulting Group to provide technical assistance with this assessment. Macias analyzed K-20 Network reports and use data to answer questions about network traffic and operating costs. The firm also surveyed representatives of participating agencies and school districts.

Key conclusions

- 1. Does the activity continue to serve the purpose for which it was created?**

Yes. The Network enables about 500 schools, community colleges, universities, and libraries to connect to each other and to the Internet. The network is used for instructional purposes and carries data for back-office functions such as registration, grades, records and payroll. It especially benefits small and rural school districts by providing access to a high-capacity, high-speed network that would not otherwise be available at a reasonable cost.

Participation in the K-20 Network is voluntary. Participants stated they choose to pay for and use the K-20 Network because of its performance, reliability, technical support and competitive price structure.

Use is increasing exponentially – data traffic alone increased 5,000 percent over the past 10 years – while program costs and user co-payments have remained relatively unchanged. The Network has significant capacity to expand to keep up with increasing use.

Recently, several of the agencies and boards that have guided and governed the Network have been identified for reorganization or elimination. Network participants are focusing on upgrades and maintenance, but we found little evidence to suggest they have adopted a shared strategic vision for the coming years.

2. What does the activity cost the state to operate, and what would be the effect if it were eliminated?

The initial two-year cost of the K-20 Network was \$42.3 million. General Fund appropriations before 2009-11 were about \$20 million per biennium. For 2009-11, the Legislature decreased the appropriation to about \$16 million per biennium. Co-payment charges for the users have remained steady at about \$7 million per biennium. Operating costs before 2009-11, were fairly steady, averaging about \$25 million per biennium.

Eliminating the Network could have the following effects:

- The transition to other systems and networks would cost participating agencies \$10 million to \$15 million.
- Since the state government network (SGN) uses the same digital backbone as the K-20 Network, eliminating the Network would shift all costs for operating the SGN and the digital backbone to the newly authorized Department of Enterprise Services.
- Most of the school districts would have to redevelop administrative and back-office functions at an estimated cost of \$15 million to \$25 million.
- Transition to new network providers could cost each school district \$200,000 to \$1 million.
- Smaller, more rural districts and some libraries that now use the Network might not be able to find comparable services at any price.
- Specialized video conferencing applications, such as video phones for students at the School for the Deaf and interactive College in High School classes, would not function over the Internet, unless they were first transmitted through the Network's video conferencing system.
- One of the Network's major users -- the University of Washington's telemedicine program -- would be forced to spend more money to gain access to a different high-capacity system.

3. Does the state have more cost-effective ways to achieve the objectives of the activity?

No. The idea of leasing out or contracting the management, operations and maintenance of the network to a telecommunication company in the private sector has been raised. However, the Network already solicits competitive bids for networking services and maintains contracts with multiple providers.

Another idea is to expand access to the network to more participants, such as hospitals and county health departments. Without careful planning, this option could increase the Network's operating costs and consume the rest of its available bandwidth.

The K-20 Network was a state-of-the-art operation when it was developed 15 years ago, and the backbone of the K-20 Network exceeds the technical requirements of the current uses. Even so, given the emergence of a competitive marketplace for some network services, its users need to set a strategic vision for the future. Participating institutions are beginning to develop cutting-edge uses of the K-20 Network's technology services, such as telemedicine. These uses can improve the efficiency and effectiveness of the delivery of educational services and improve the delivery of other services like health care.

Recommendations

Our assessment identified several opportunities to improve the K-20 Network. We recommend:

1. **The Legislature continue to support the K-20 Network** as a tool to improve educational services to K-12 schools, colleges and universities. The network should continue to ensure equal access for all participants, regardless of their size or location, to high-quality administrative services and instructional tools such as video conferencing and distance education.
2. **Universities, community and technical colleges and K-12 school districts** include technology components in their instructional plans. These plans should identify opportunities to leverage the K-20 Network to develop service delivery initiatives, such as expanded distance learning, telemedicine and video conferencing.
3. **The K-20 Network identify ways to provide technical support** to education groups that want to use the Network to improve their efficiency and effectiveness.
4. **The K-20 Network develop a strategic plan** with representatives from educational institutions, the Legislature and the Office of Financial Management (OFM). The strategic plan should contain a long-term vision for the Network and an operational plan to achieve that vision. The plan should also address the challenges the K-20 Network is likely to face and identify preferred options to address those challenges.
5. **The K-20 Network publish annual reports** on services provided, performance, use and operating costs to inform participants and state decision-makers about the value of the Network.

What's Next?

Our audits and assessments of state agencies and programs are reviewed by the Joint Legislative Audit and Review Committee (JLARC) and by other legislative committees whose members wish to consider findings and recommendations on specific topics.

Representatives of the State Auditor's Office will review this assessment with JLARC's Initiative 900 Subcommittee in Olympia. Please check the JLARC website for exact date, time, and location (www.jlarc.leg.wa.gov).

The Legislature and the agencies that operate the K-20 Network will decide whether to accept and act upon our recommendations. The State Auditor's Office conducts periodic follow-up evaluations to assess the status of accepted recommendations and may conduct follow-up audits at its discretion.

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K-20 Education Network: At a Crossroad

June 30, 2011

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June 20, 2011

Larisa Benson, Director of Performance Audits

Washington State Auditor's Office
621 8th Ave SE Suite 201
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Dear Ms. Benson,

We are pleased to present the results of our work on the K-20 Education Network assessment. The purpose of our engagement was to determine if the state should operate an education network and if so, can it be done better and more cost effectively. This report presents our results.

Many education institutions and K-20 Education Network representatives participated in this study. We would like to take this opportunity to thank the representatives and the State Auditor's Office staff who also participated in this project. Their collective interest and dedication to the subject matter greatly enhanced this report.

Sincerely yours,

A handwritten signature in dark ink that reads "Macias Consulting Group". The signature is written in a cursive, flowing style.

Macias Consulting Group

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INTRODUCTION AND BACKGROUND

The Legislature directed the Joint Legislative Audit and Review Committee (JLARC) to prioritize certain activities for the State Auditor's Office to consider for performance audits and activity assessments (Section 909 of the 2010 budget bill, SB 6444). Based on a priority-setting exercise conducted by the JLARC, the SAO selected the K-20 Education Network (K-20 Network) for this assessment. To conduct this work, the SAO engaged with Macias Consulting Group (MCG) to conduct the assessment and answer the following objectives:

1. Does the activity K-20 Network continue to serve the purpose for which it was created?
2. What does the activity K-20 Network cost the State to operate and what would be the impact if it were eliminated?
3. Are there more cost effective ways to achieve the objectives of the K-20 Network?

What is the K-20 Network?

The K-20 Network is a statewide large-scale and high-speed intranet, and is also the conduit for Internet services for education institutions. By the mid 1990's, higher education had already developed networking technology and video conferencing capabilities. Commercial and consumer networks at that time could not easily support what was known then as broadband applications. The Legislature wanted to expand that development into the remaining education sectors and potentially to other areas.

The Legislature created the K-20 Network for several purposes: to use technology to educate, to teach students how to use technology, and to connect Washington's educational institutions. The bill (1996 SB 6705) authorizing the creation of the Network recognized that up-to-date technology is a critical ingredient in the preparation of an educated and knowledgeable work force and citizenry.

In 1996, the Legislature approved funding to build a statewide education network at a cost of \$42.3 million. At the time, technology was improving and there was an opportunity to connect the main and branch campuses of higher education institutions, promote distance learning, and establish collaboration among the broad education community. The legislation (SB 6705) authorized the creation of a K-20 Education Network Board that included representatives from all levels of education in Washington State.

The K-20 Network operates on a **voluntary and cooperative model**. Unlike many government shared-services models, schools are not required to participate (and must pay to do so) and can seek alternatives at their discretion. The K-20 Network does not prioritize or enforce how the network is used; that responsibility is up to the local education institutions.

Exhibit 2 shows how the K-20 Network supports the data equipment connected at one site at a school. The K-20 Network terminates at a single location in the school district. The school district is responsible for managing and connecting its individual schools and other buildings to the K-20 Network.

Exhibit 1: K-20 Network Overview

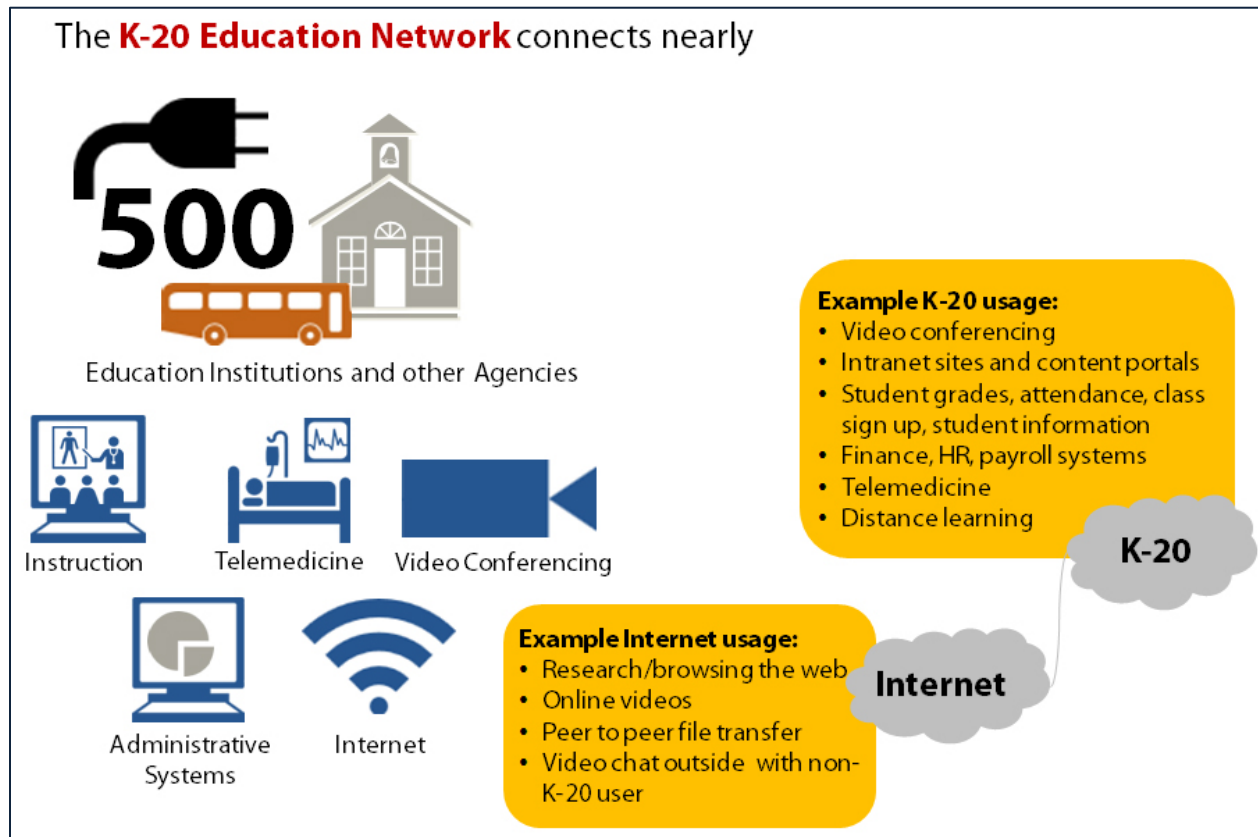
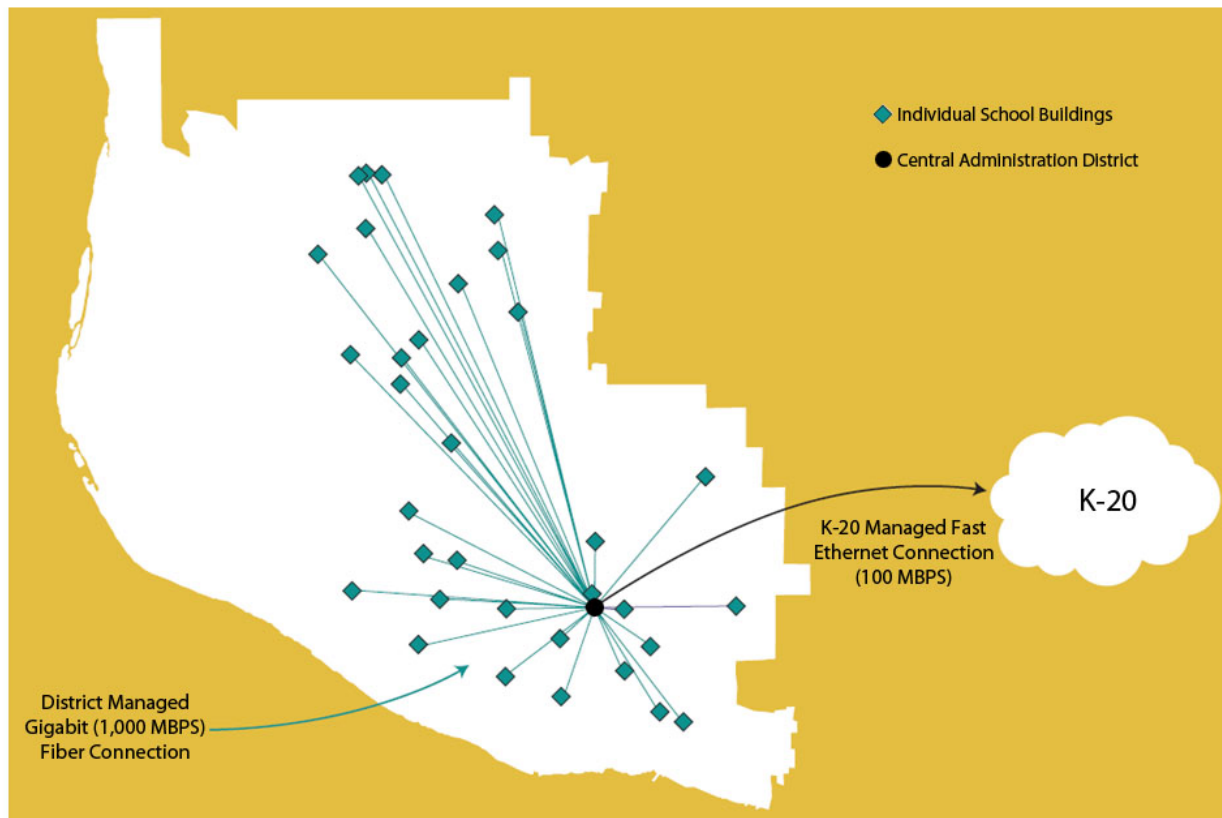


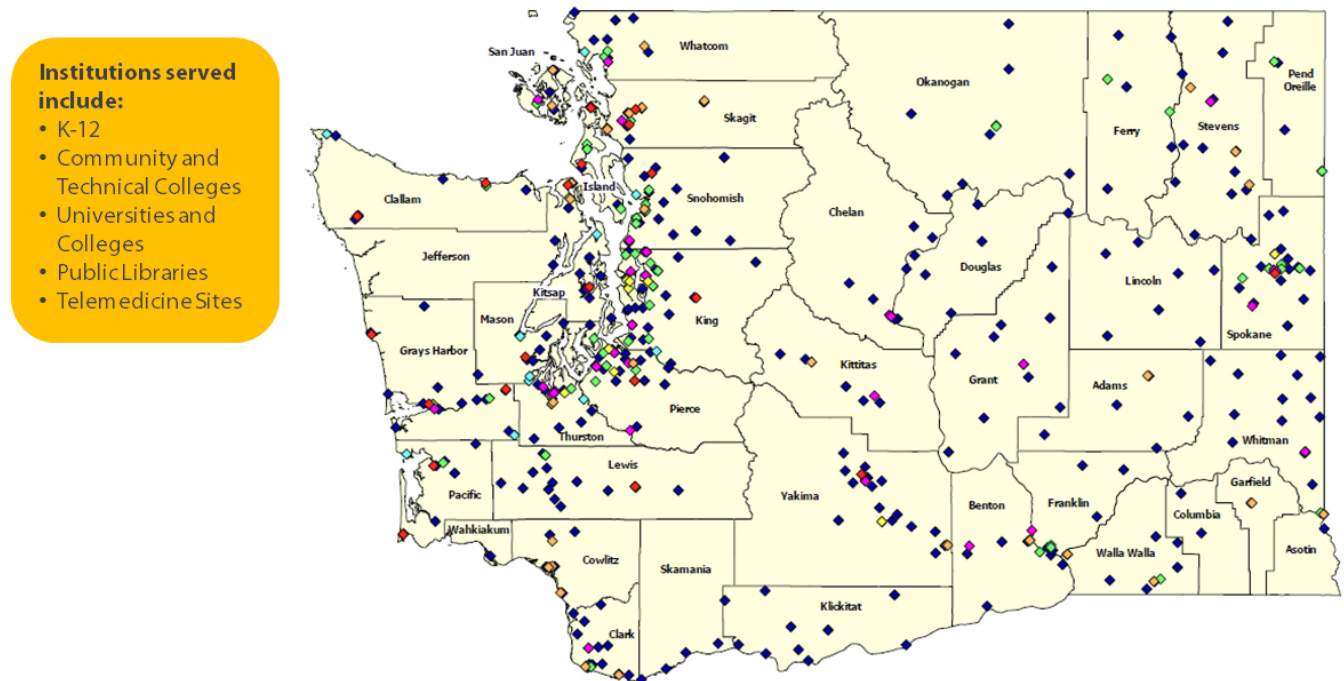
Exhibit 2: K-20 Network Connection to Vancouver School District



Source: K-20 Biennium Report, 2006.

Today, the K-20 Network connects nearly 500 education institutions throughout the state. There are connections throughout the state as shown in Exhibit 3.

Exhibit 3: The K-20 Network Connects Nearly 500 Education Institutions



Source: MCG K-20 Network Survey and K-20 Technical Working Group.

Connected institutions have access to each other for data sharing, video conferencing, and other applications. By being connected to the K-20 Network, participants also have access to Internet services provided by a University of Washington owned non-profit, Pacific Northwest GigaPOP. To the end user, this process is seamless and there is no visual differentiation between internal and external network traffic.

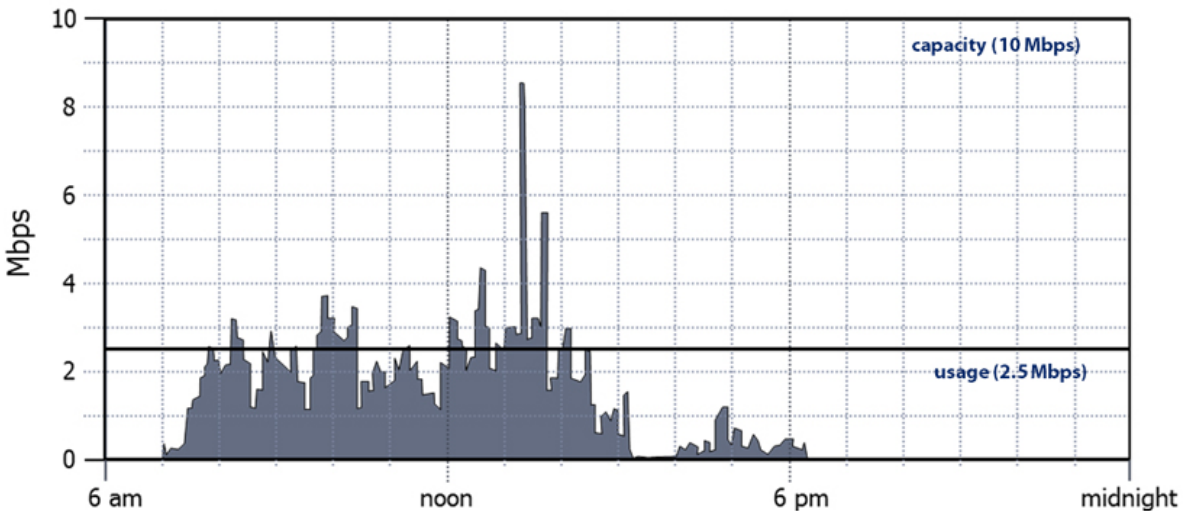
Who Pays for the K-20 Network?

The K-20 Network is financially supported both by the state and by its users. On an annual basis, the state provides about \$8 to \$10 million to help maintain the K-20 Network. Users also provide co-payments amounting to about \$3.5 million. The rest of the expenses are covered by the Federal E-rate program, a national subsidy for telecommunications and information services for education. K-20 Network participants' co-pays are billed based on their individual amount of usage regardless of geographic location or how the institution is connected to the K-20 Network.

Usage is measured by the University of Washington network operations every five minutes. There are 12 measurements per hour, 24 hours a day, and 90 days a quarter, or 25,920 measurements per quarter ($12 \times 24 \times 90 = 25,920$). The data is sorted from largest to smallest. The top 5 percent (1,296) measurements are discarded and not used in the billing calculation. Therefore, the 1,297th largest measurement is the 95th percentile usage amount.

For example, in the fourth quarter of fiscal year 2010, Aberdeen School District had peak usage of 33.4 Mbps, but had a calculated 95th percentile usage of only 9.5 Mbps. As illustrated in the example in Exhibit 4, this school has a capacity of 10 Mbps but the 95th percentile was calculated as 2.5 Mbps.

Exhibit 4: K-20 Network Co-payments Based on Usage, Set at 95th Percentile



Source: Washington Superintendent of Public Instruction, ESD 123 Washington Technology Forum

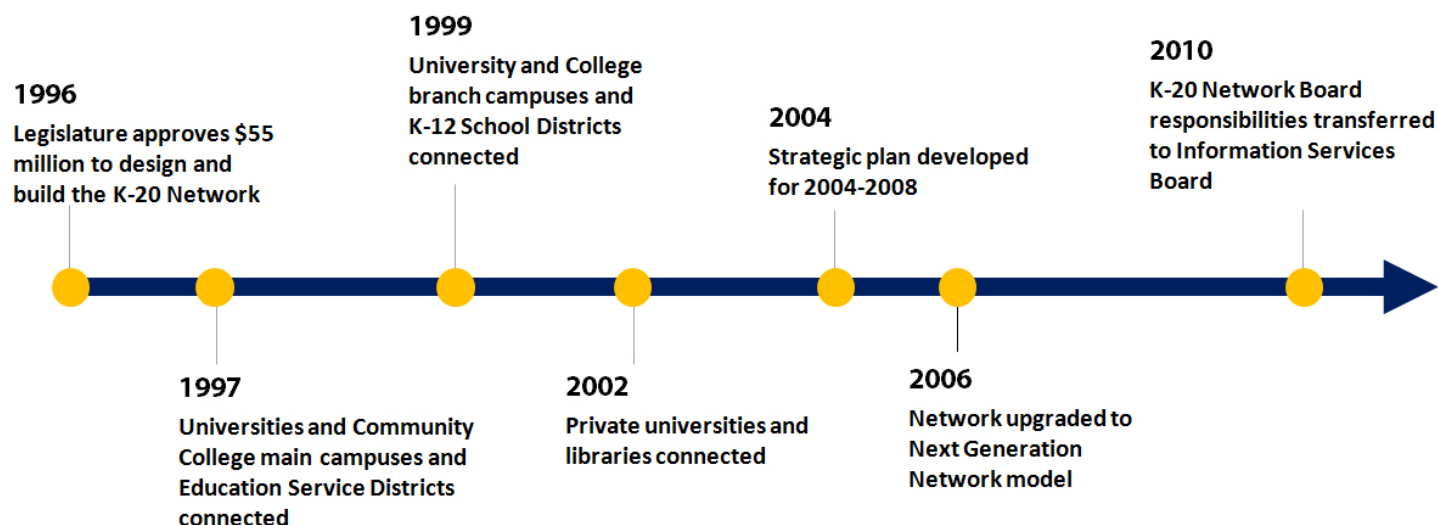
Who Oversees the K-20 Network?

For more than 15 years, the overall responsibility for K-20 Network operations rested with the K-20 Education Network Board and the K-20 Network Technical Steering Committee. These groups oversaw substantial advancements in connecting institutions throughout the State, as shown in Exhibit 5. In 2010, the Legislature (HB 2617) eliminated the K-20 Education Network Board and K-20 Network Technical Steering Committee and instead charged the Information Services Board with K-20 Network governance. The Information Services Board then delegated its responsibilities to the K-20 Education Network Technical Working Group. This 8-member board oversees the operations and budget for the K-20 Network. The Technical Working Group is made up of one representative from each of the following groups:

- State Board for Community and Technical Colleges
- Computer or telecommunications industry
- Higher Education Coordinating Board
- Superintendent of Public Instruction
- Baccalaureates, appointed by the Council of Presidents
- Department of Information Services
- Educational Services Districts
- Washington State Library

The K20 Technical Work Groups provides overall oversight and management responsibility of the K-20 Network, including the negotiation of favorable rates with vendors who support K-20 Network operations.

Exhibit 5: K-20 Education Network Timeline



Source: MCG analysis.

Scope and Methodology

We assessed the K-20 Network, focusing on the administration, operations, and use by education institutions.

To determine if there are more cost effective ways to achieve the intent of the program, we evaluated the advantages and disadvantages of three primary options, and evaluated the value of alternatives raised by K-20 Network users. The primary options include:

1. Eliminating the K-20 Network
2. Maintaining the Status Quo
3. Enhance Strategic Planning

To determine whether the K-20 Network continues to serve the purpose for which it was created, we reviewed the original legislation, reviewed board meeting minutes, and other reports created by the K-20 Network, and identified how the K-20 Network is currently being used. We surveyed all participants about their usage. Our survey efforts led to a 77 percent response rate among the nearly 500 users of the K-20 Network.

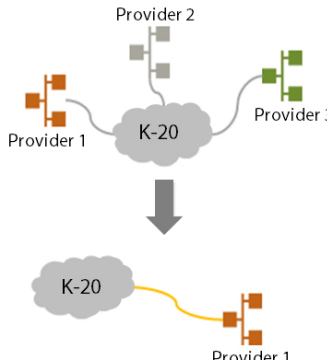
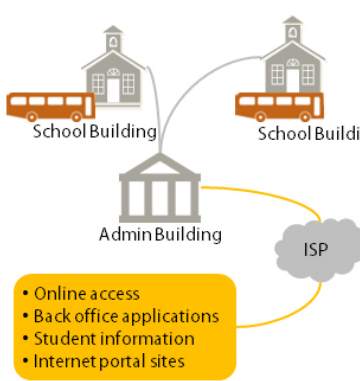
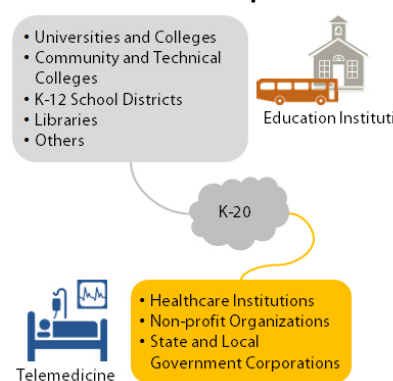
Finally, to assess the K-20 Network's cost, we obtained budget reports and financial statements. Our analysis evaluated the Network's cost from the perspective of the users, the program, and the state. We also evaluated the operational impacts to those groups if the K-20 Network were eliminated.

ASSESSMENT RESULTS

K-20 Network Alternatives

Some K-20 Network users and other reports have posed other ideas on what to do with the K-20 Network. These options include privatizing the K-20 Network, eliminating the K-20 Network and replacing it with commodity Internet access, and adding more users to the Network. Although these options have some merit, they may not offer cost effective strategies. The option to engage more participants may have most potential to compliment continued investment in the K-20 Network, but cannot be implemented without strategic visioning and planning. As part of MCG's scope of work, we evaluated three alternatives. Exhibit 6.0 summarizes the advantages and disadvantages raised by users.

Exhibit 6: Disadvantages of Alternatives Outweigh Advantages

Description	Alternative 1: Privatize the Network  <p>The K-20 Network is leased or contracted to a single vendor to manage, operate, and maintain the network.</p>	Alternative 2: Decentralized Internet Model  <p>The K-20 Network is eliminated and individual institutions procure their own Internet service. Existing systems are replaced with Internet-based applications.</p>	Alternative 3: Expand Access to More Participants  <p>Additional users are offered access to the K-20 Network at the subsidized rate or at actual cost.</p>
Advantages	<ul style="list-style-type: none"> May provide a revenue source for the state through leasing or profit-sharing agreement. Gets the state out of the business of networking. 	<ul style="list-style-type: none"> Cost savings to some schools with available alternatives. Reduces dependency on the Network and toward a more commercially available model. 	<ul style="list-style-type: none"> Provide additional revenue sources to K-20 and diversifies the user base. Spreads the cost across a larger user base.
Disadvantages	<ul style="list-style-type: none"> Geographically remote areas may be underserved. Could reduce competitive bidding with a one-provider model. Still requires state oversight and contract monitoring. Institutions may seek other alternatives if terms and pricing is not favorable. Could require subsidy to serve all areas of the state. 	<ul style="list-style-type: none"> Not all schools are ready for migration or have service providers. Carrier-class video conferencing is not possible over the Internet. Telemedicine does not have an alternative. Operations over the Internet may not always provide the level of reliability and stability necessary for certain applications. 	<ul style="list-style-type: none"> Additional users may impact network capacity or service delivery response rate if funding for operations is not increased proportionally. May not be constitutionally legal. Requires strategic planning and vision.

	Alternative 1: Privatize the Network	Alternative 2: Internet Model	Alternative 3: Expand Access to More Participants
Risks	<ul style="list-style-type: none"> Cost structure may not be equitable. State and K-20 may not take advantage of competitive bidding. The state and the education institutions lose control and management of the Network. 	<ul style="list-style-type: none"> K-12, in particular, is at higher risk of service gaps. Migration to an Internet model is technically complex. Some schools may not have the technical expertise to transition to the new model. 	<ul style="list-style-type: none"> Existing state subsidy may not be sufficient for future upgrades to accommodate growth. Program administration and support may not have the resources necessary to take on more users.
Estimated Costs	<ul style="list-style-type: none"> \$2M - \$5M annually for oversight and contract management. 25% to 75% loss in competitive pricing. 	<ul style="list-style-type: none"> \$10M - \$15M for statewide transition planning and implementation. \$15M - \$25M to upgrade back office and student information systems. \$200k - \$1M per school for transition. Variable costs for ongoing maintenance Total cost: \$225K to \$1.040 M 	<ul style="list-style-type: none"> About \$15k per additional user annually if subsidized. One additional Program Office employee for program management. One additional marketing employee at the program office at about \$100k per year.

Source: MCG analysis.

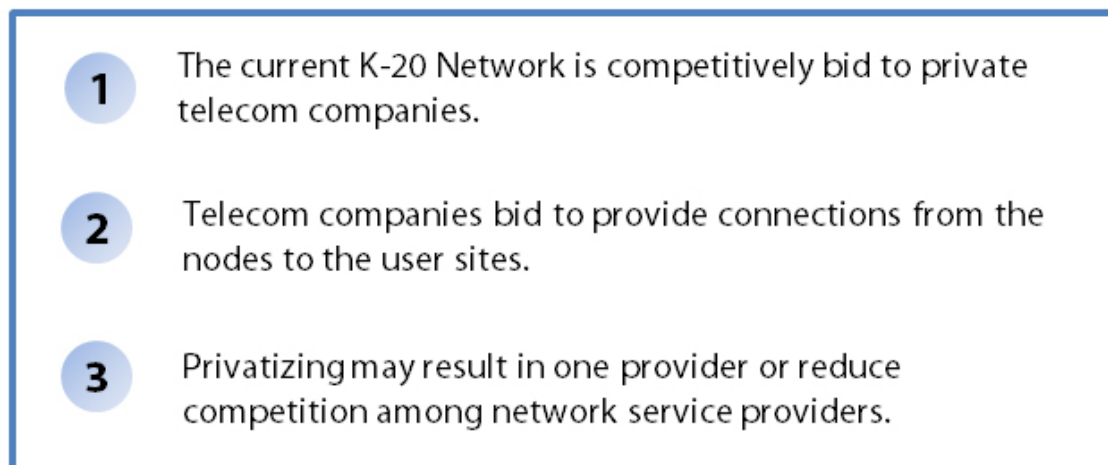
Notes: Our analysis is designed to provide information on general impacts of each alternative.

Alternative 1: Privatizing the K-20 Network May Reduce Competition

The K-20 Network is currently working with the state Information Services Board to find operational efficiencies in the operations functions. This also includes considering outsourcing some of these functions to a private provider.

The K-20 Network currently solicits competitive bids for networking services from network providers. As shown in Exhibit 7, outsourcing the K-20 Network to a single private provider may result in less competition. An advantage of the K-20 Network is the group buying power and the ability to negotiate lower rates through open competitive bidding.

Exhibit 7: Overview of Privatizing the Network Alternative



Source: MCG generated; Washington Superintendent of Public Instruction, ESD 123 Washington Technology Forum.

Competitive Bidding Reduces Costs

The K-20 Network backbone is competitively bid to providers. For example, the southern part of the backbone – from Olympia to Vancouver to Pullman to Spokane – was previously provided by Qwest with a 2.5Gbps connection for \$97,200 per month. In October 2010, the University of Washington submitted an offer to provide the same route with a 10Gbps connection for \$73,900 per month. This competition saved the K-20 Network \$279,000 per year while quadrupling the bandwidth capacity.

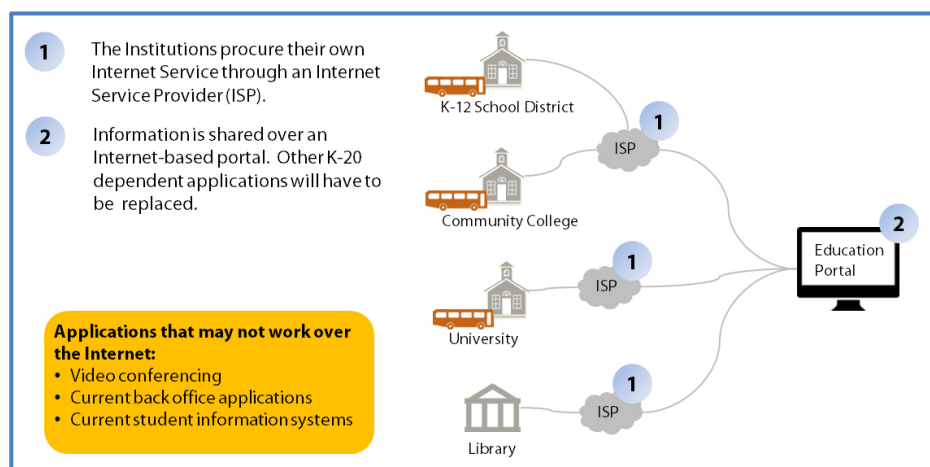
For an individual site example, in 2004, Qwest and Noanet provided a proposal to serve the Aberdeen School District with a 10Mbps fiber line for a 48-month cost of \$99,000. The cost was deemed to be too prohibitive and the K-20 Network did not order the service. In 2005, Aberdeen School District notified K-20 Network that it received more competitive pricing by Century-Tel. In response, the K-20 Network released a second tier solicitation. Qwest responded with a bid for \$43,875, half of its original quote. However, Century-Tel bid \$22,990 and received the contract. This competitive bidding saved the K-20 Network about \$76,000 over the four year contract period. A single provider model may not realize these types of savings through competition.

Alternative 2: The Internet May Not be a Suitable Replacement for the K-20 Network

It has been suggested that the K-20 Network could be replaced with ordinary Internet service connections. While home Internet can serve functions for home use and even some commercial business use, it may not provide the stability needed for high bandwidth application such as video conferencing. Additionally, many enterprise applications such as financial systems, payroll, and other student information systems may not function reliably over consumer Internet.

Exhibit 8 illustrates an Internet-based model. Individual school districts, universities, community and technical colleges, libraries, and others would obtain service through their local commercial Internet Service Provider (ISP). Our survey indicated that 28 percent of the respondents did not have access to an ISP capable of providing services currently available from the K-20 Network. To share data between schools and institution types (e.g., University to K-12), a web-based portal would have to be developed. Currently, such a portal does not exist.

Exhibit 8: How an Internet-Based Model Could Work



Source: MCG analysis

Cloud technology that uses the Internet to transmit data is an emerging trend. While it is technically feasible to migrate toward this model, the marketplace has not yet matured for government and education applications. Administrative functions such as financial systems and student records currently are transmitted through the K-20 Network on an enterprise-class backbone. Transitioning to the Internet may pose a migration risk. Furthermore, costs would include transitioning to cloud-based applications and switching a school's networking to an Internet Service Provider.

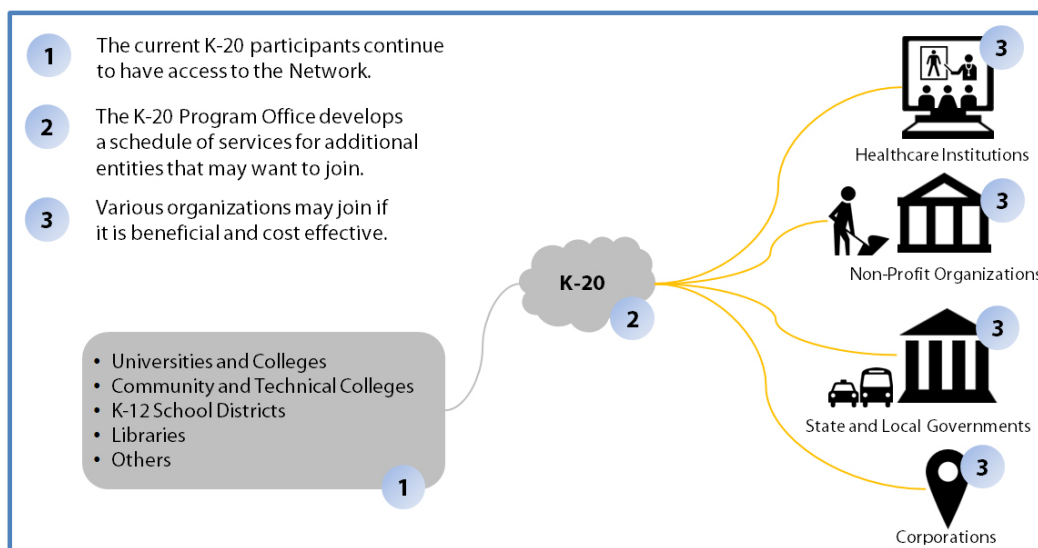
The current enterprise-class video conferencing system could not be replicated over the Internet. While Skype and Apple's FaceTime may serve home use, they do not function appropriately for large scale video conferencing. Furthermore, the K-20 Network operates an online scheduling service as well as provides Multipoint Control Unit (MCU) video services, which supports video conferencing between multiple sites. Video and audio conferencing is used for unique applications such as telemedicine and instruction for deaf and blind students.

Finally, the K-20 Network connects students to Internet2, a nationwide high speed network used for research and leading edge technological applications. The K-20 Network connects all participants to Internet2, through the connection at the University of Washington. An Internet-base model would not allow schools to connect to this research network.

Alternative 3: Expand access to more network participants

The voluntary nature of the K-20 Network is unique for a government shared-services model. Co-pays have to compete with private sector rates. Adding additional participants to the network could provide a financial benefit if users were charged actual cost plus a profit margin. Alternatively, adding subsidized users would increase costs to the state. As shown in Exhibit 9, other types of institutions could be added to the K-20 Network to promote greater collaboration.

Exhibit 9: Adding More Participants to the K-20 Network



Source: MCG analysis

Broadening the user base could diversify the participant base and spread costs across a larger pool of users. In addition to a broader user base, there are benefits to adding other institutions and organizations for collaboration. For example, the Telemedicine program at the University of Washington stated in the survey that adding healthcare institutions to the network could benefit the telemedicine program by expanding usage. However, in an absence of a long-term strategic vision and plan, there are no efforts to expand the K-20 Network usage. If the K-20 Network were authorized to pursue this option, it could spread co-pays across a larger user base and potentially reduce future co-pay increases.

K-20 Network Features Are Cutting Edge

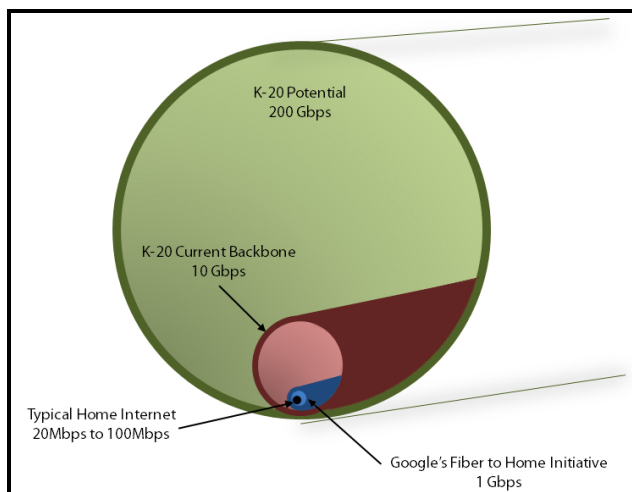
The K-20 Network is Fast and Has Room to Grow

The K-20 Network is extremely fast and expansive by today's standards. To put this speed into context, fast home Internet (e.g., cable Internet) is only about 0.8% the speed and Google's fiber-to-home project delivers only 40 percent.

The K-20 Network backbone uses the latest networking technologies including dense wavelength division multiplexing (DWDM). That means the fiber line, which carries the data, can transmit data on many different color spectrums, or wavelengths. Using this technology, more than 80 separate wavelengths can be used on a single fiber line. With each wavelength able to carry 2.5Gbps (2,500 megabits per second), the network is capable of delivering up to 200Gbps. The current backbone supports 10Gbps. Figure 10 shows the relative capacity of the K20 Network.

The K-20 network's design and technology allows the Network to increase bandwidth without significantly increasing costs. The K-20 Network also ensures access to rural Washington where similar network speed may not be available from other service providers, leveling the playing field for all participating institutions. It also makes large-scale shared-services information systems initiatives possible. The high-speed and high-capacity feature of the DWDM technology allows the backbone to be upgraded by simply adding new hardware into the networking equipment and making the appropriate configuration. As new applications are developed that require high bandwidth, the K-20 Network can expand and grow alongside the demand.

Exhibit 10: Comparison of K-20 Capacity to Other Networks

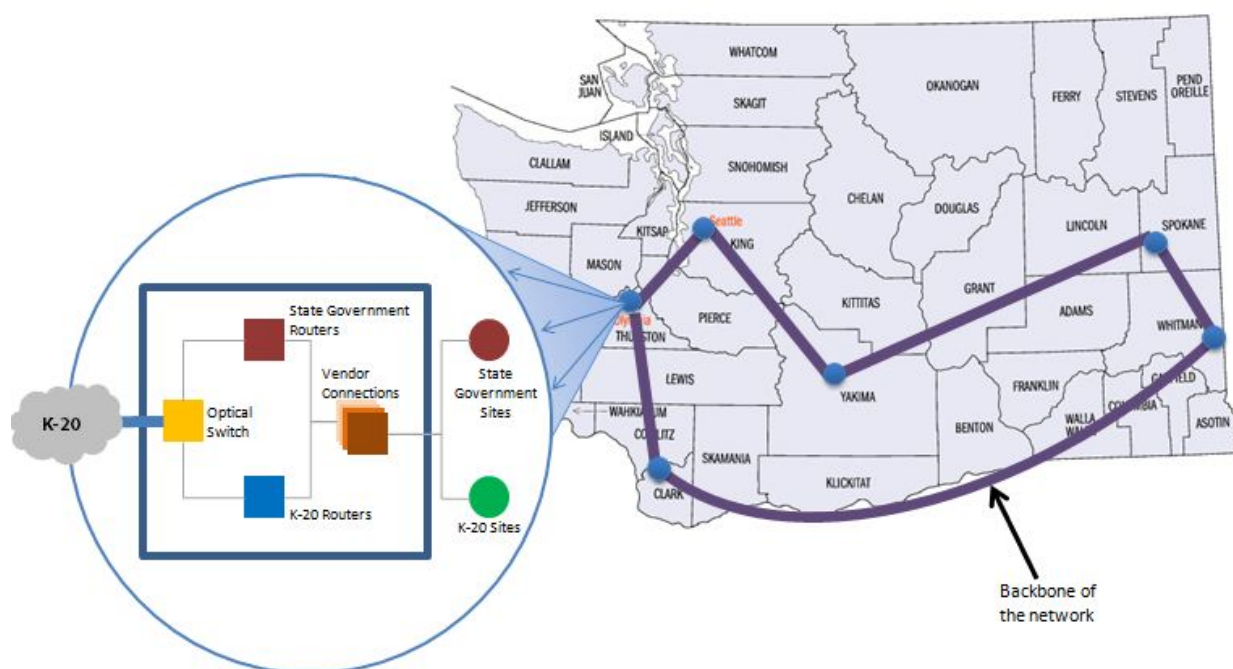


Source: MCG analysis of K-20 Biennium Report, 2006

K-20 Network and State Government Network achieve economies of scale

Features of the K-20 Network make it a model for other education networks. In particular, the K-20 Network and State Government Network (SGN) share the same optical backbone. When the K-20 Network was built, the state did not want to fund another build-out of a separate network. Instead, the K-20 Network was built in collaboration with the state Department of Information Services. At each node site, or primary networking site, the networking equipment is separated into two networks, one for the state and the other for education. While the diagram in Exhibit 11 shows that the network is separate, the site equipment, wiring, building, and staff are comingled. By sharing the same optical backbone, operators of the State Government Network and K-20 Network can take advantage of economies of scale in operations and maintenance.

Exhibit 11: K-20 Network & State Government Network Share Same Backbone

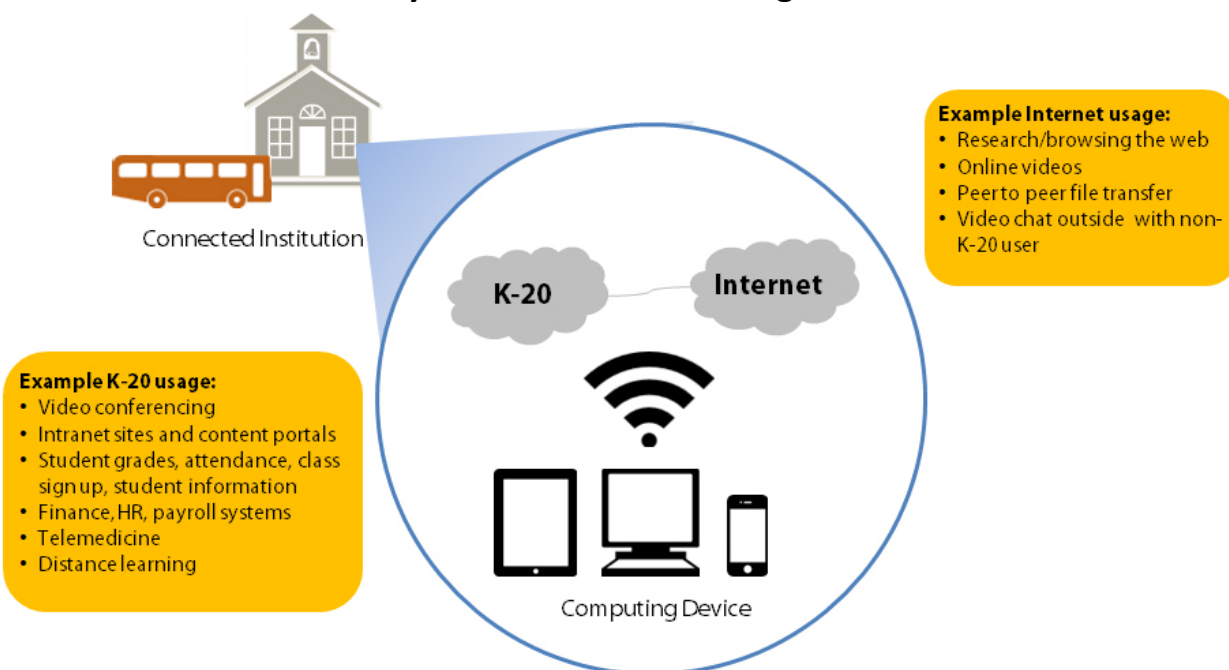


Source: Washington Superintendent of Public Instruction, ESD 123 Washington Technology Forum

K-20 Network is Seamless

Another notable feature is that the K-20 Network is founded on open communication principles. The K-20 Network provides data transport regardless of use, application, or bandwidth needs. The participants are free to use the K-20 Network for their business needs. To the end users, such as students and teachers, accessing resources on or off the K-20 Network appears to be the same. As shown in Exhibit 12, users connect to the K-20 Network and can access internal resources through K-20 or external resources through Pacific Northwest GigaPOP Internet. The University of Washington operates a non-profit Internet Service Provider, Pacific Northwest GigaPOP, which provides services to public entities in the Pacific Northwest region.

Exhibit 12: Users Seamlessly Access Resources Using the K-20 Network



Source: MCG analysis

K-20 Network was Built to Accommodate for Enterprise-wide Management

The K-20 Network was built upon the principles of enterprise-wide technical environments. An enterprise-wide environment allows the use of the same technology backbone or software applications across multiple institutions. Rather than rely on separate databases and systems for each school district and community or technical college, which is commonplace throughout the nation, the K-20 Network enables these institutions to centralize their administrative functions using the same software applications across the K-20 Network.

These applications include student information systems for processing of attendance, grades, and registration. Additionally, the K-20 Network also supports back office applications such as financial systems, human resources systems, and payroll. This centralizing effort required years of planning, coordination, and implementation when the federal government and many states focused on implementing non-enterprise-wide systems.

K-20 Network is Already Outsourced to Private Networking Companies

Finally, the majority of the K-20 Network is already outsourced through competitive bids. The hardware and equipment is purchased through competitive bids with the private sector. The network connections to the institutions are also competitively bid to private telecom companies. In 2011, nearly 30 different vendors provided services to the K-20 Network.

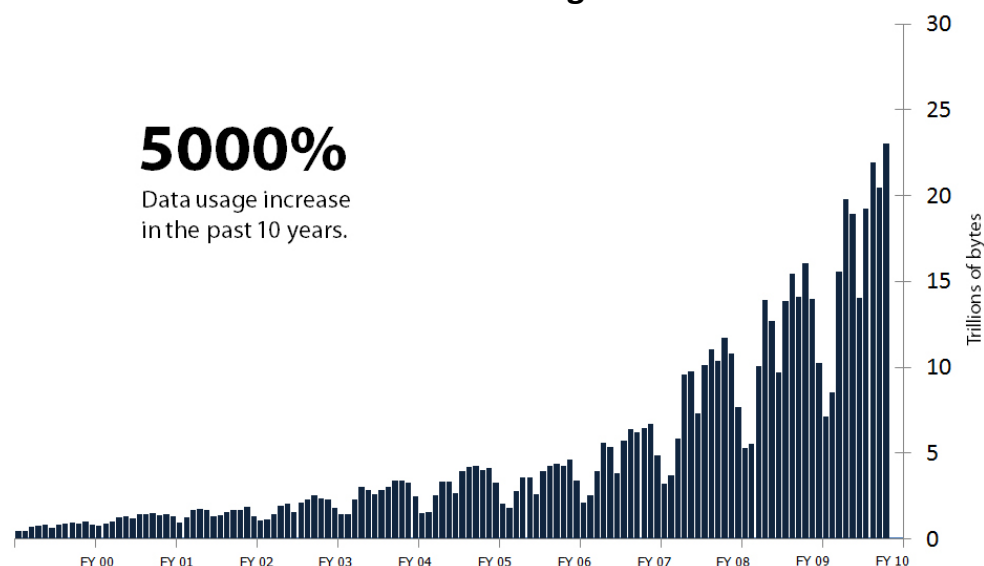
This public-private model ensures that funding is provided only to the most competitive local providers, while maintaining state oversight and management of operations.

The K-20 Network Today

K-20 Network Usage Keeps Growing

K-20 Network usage – measured by the amount of data transmitted by an institution – has increased exponentially over the past 10 years. As shown in Exhibit 13, usage of the Network increased more than 5,000 percent over the past 10 years.

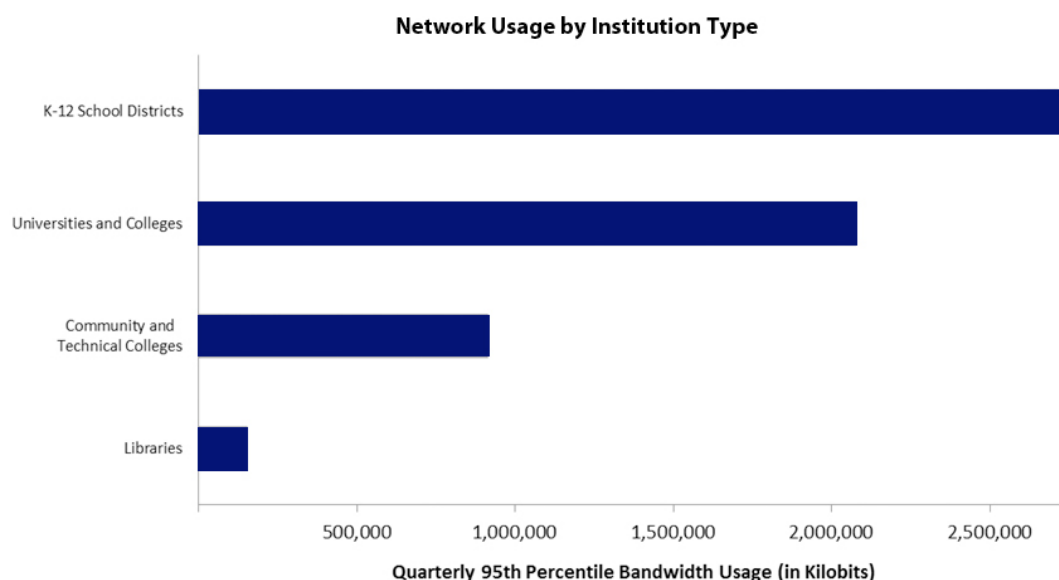
Exhibit 13: Rise in K-20 Network Usage



Source: University of Washington

Bandwidth usage varied by type of institution. Based on readily available University of Washington records, Exhibit 14 shows the bandwidth used by institution type. Differences in magnitude can be accounted by the number of connections. For example, there are nearly 300 K-12 school districts connected.

Exhibit 14: Data Usage by Institution



Source: MCG generated using University of Washington data

Majority of Institutions Use Network Services Daily

The nearly 500 participants using the K-20 Network most often use the Network for:

- Classroom instructional use
- Distance learning and online learning
- Faculty research
- Video conferencing for administrative meetings or professional development

Classroom Instruction is the Most Common Purpose for the K-20 Network. Classroom instruction, in comparison to other purposes, is the most common daily use of the Network among institutions providing regular classroom instruction, as shown in Exhibit 15. Three out of four institutions reported their institution used the Network daily for classroom instruction.

Other Common Daily Uses of the K-20 Network are Distance Learning and Faculty Research. Sixty percent of institutions use the Network for distance education and online learning with school districts, universities, and community and technical colleges providing distance learning on a daily basis. More than half of the Network's users (55 percent) primarily at the university level use the K-20 Network for faculty research.

Video conferencing for instructional delivery was the K-20 Network service least often used. However, most community and technical colleges reported daily use of video conferencing for instruction.

Exhibit 15: Use of Network Supported Services, Across All Institutions

	Daily	Weekly	Monthly	Quarterly	Not used
Classroom instructional use	76%	4%	2%	4%	12%
Teacher training programs	19%	27%	25%	16%	11%
Video conferencing (Administrative use for meetings or professional development)	10%	34%	32%	17%	7%
Video conferencing (Education - instructional delivery to students)	11%	12%	16%	27%	31%
Distance learning / online learning	60%	9%	4%	5%	21%
Collaboration with other institutions (e.g., K-12 to universities)	27%	18%	17%	14%	21%
Faculty Research	55%	11%	4%	5%	21%

Source: MCG K-20 Network Survey.

K-20 Network Provides an Opportunity for Expansion in Other Areas

The Telemedicine Program at the University of Washington reported using the K-20 Network for more advanced applications. These applications include video conferencing services for medical consultations, psychiatric consultations with the University Department of Psychiatry and Behavioral Sciences, and radiology consultations with the University Department of Radiology. The University of Washington Telemedicine Program said expanding the K-20 Network video conferencing capabilities to other health care institutions throughout the State of Washington would add great value. Such an initiative would create a true statewide Telemedicine (or Telehealth) network.

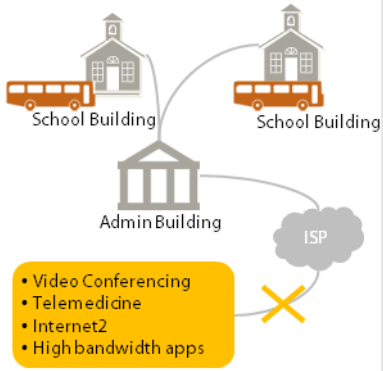
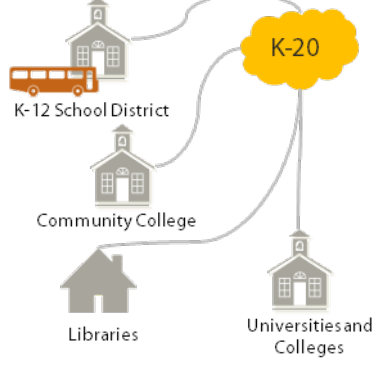

The American Telemedicine Association defines telemedicine as the use of medical information exchanged from one site to another via electronic communications. These applications can include video conferencing, transmission of still images, patient portals, remote monitoring of vital signs, continuing medical education, and nursing call centers.

The Future of the K-20 Network: Three Options

The early vision of the Legislature to connect education institutions to a statewide network to bring broadband to all regions of the state has been accomplished. The next major milestone is still unclear. MCG examined three options for consideration by the state as follows.

1. **Eliminate the K-20 Network.** Stop funding K-20 Network to save the \$8M the state now contributes to the K-20 Network. This option would require substantial new investments at the institution level to provide a comparable infrastructure.
2. **Proceed with the status quo.** Take no action on the current condition and proceed with continued operation and maintenance of the K-20 Network. Some participating institutions will choose to obtain services from alternate providers and leave the K-20 Network.
3. **Develop a vision and strategy.** Take a long-term view of the K-20 Network and leverage its capability by designing a roadmap for future development. Address challenges to the current business model by competitive providers and develop strategies to maximize state and individual institution's use of the K-20 Network.

Exhibit 16: Three Options for the Future of the K-20 Network

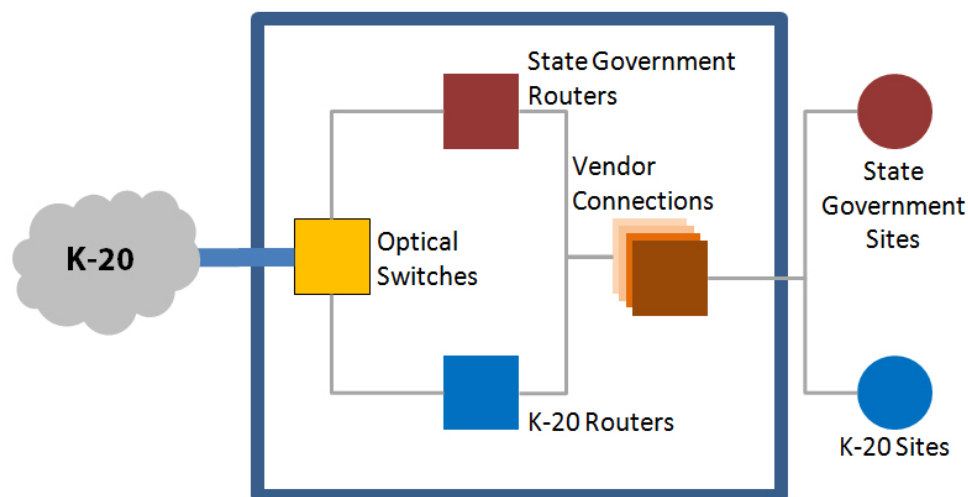
Option	1. Eliminate the K-20 Network  <p>Eliminating the network will result in individual education institutions procuring their own Internet services independently.</p>	2. Status Quo  <p>Under the current conditions, the K-20 Network needs to seek additional efficiencies because of revenue constraints.</p>	3. Develop Vision and Strategy  <p>With a vision and strategy, the K-20 Network could be a more valuable asset to the state in the future.</p>
Advantages	<ul style="list-style-type: none"> ▪ Users can build their own network to accommodate their own special needs. 	<ul style="list-style-type: none"> ▪ Maintains level of current K-20 technical support. ▪ Keeps prices competitive. ▪ Affordable to participating institutions. 	<ul style="list-style-type: none"> ▪ Allows for updating of mission and goals for the K-20 Network. ▪ Advanced applications such as telemedicine, wide usage of video conferencing, and resource sharing for education.
Disadvantages	<ul style="list-style-type: none"> ▪ Costs will shift to the State to solely support the State Intranet. ▪ Many users will need to develop new network infrastructures which may cost substantially more than the K-20 Network investment. ▪ Many users will need to fill gaps in technical resources. ▪ Video conferencing applications may not function. ▪ Service delivery adversely affected among Libraries. 	<ul style="list-style-type: none"> ▪ Advanced user needs may not be met, especially for accommodating telemedicine services. 	<ul style="list-style-type: none"> ▪ Working Group needs time to develop knowledge of user needs and to identify opportunities.

Source: MCG analysis

Option 1: Eliminating the K-20 Network Would Have Significant Impacts to State and Education Operations

1. Costs will Shift to the State. The K-20 Network shares the same optical backbone as the State Government Network (SGN). The SGN provides similar connectivity and Internet services to state and local government entities. The SGN is managed and operated by the Department of Information Systems (DIS). As shown in Exhibit 17, the State Government Network and K-20 Network share the same optical switch. The K-20 Network is allocated costs associated with the support and maintenance by the Department of Information Services. If the K-20 Network were eliminated, the K-20 portion of the personnel and operating costs shift entirely to DIS.

Exhibit 17: The K-20 Network and the State Government Network Share the Same Backbone



Source: ESD 123 Regional Technology Forum

2. K-12 and Community and Technical College Administrative Systems Would Need New Network Infrastructures. The K-20 Network enables these institutions to centralize student information systems, attendance and grade processing, and facilitate course registration. The K-20 Network also supports back office applications such as financial systems, human resources systems, and payroll. While there were variation among institution types and services, a general pattern emerged and is illustrated by the use of the Network to support Administration (e.g., attendance, grades and course registration) at these institutions. In addition, most school districts (76 percent) and community and technical colleges (68 percent) are dependent on the Network to support their administrative functions, such as human resources, payroll, and financial management.

Exhibit 18: Some Administrative Services Cannot Function Without K-20 Network

	Overall	K-12	Universities	Community Colleges and Technical Colleges	Libraries
Administration - HR/Payroll/Financial	68%	76%	31%	68%	6%

Source: MCG K-20 Network Survey

These centralized information systems allow the input, storage and analysis of data from multiple locations (schools and campuses) within the school or community college organization. Eliminating the K-20 Network would require a redesign of these systems and possibly fragment an already centralized and consolidated model which is in contrast to the state's efforts to collect more data centrally. Decentralizing administrative functions could cost up to \$25 million for one large institution.

In contrast, about half of universities (50 percent) and more than half libraries (57 percent) reported on the network survey that the elimination would have little to no impact on the Administration, as shown in Exhibit 19.

Exhibit 19: Impact on Administration from Network Elimination			
	Significant or great impact	Some Impact	Little or No Impact
Education Service Districts	89%	0%	0%
K-12 School Districts	79%	11%	8%
University	22%	28%	50%
Community & Technical Colleges	83%	0%	12%
Library	21%	14%	57%
Source: MCG K-20 Network Survey			

3. Eliminating the K-20 Network Would Create a Service Gap for One-third of its Users. For about 32 percent of all users participating in our survey, no access to an alternative option was available if the Network were eliminated, as shown in Exhibit 20. Less than one-third (29 percent) of all institutions that responded to our survey stated that they have access to an Internet Service Provider that can provide a similar level of service as the K-20 Network.

Compared to other institutions, school districts had a larger percentage of institutions without an alternative (36 percent) whereas about 20 percent of educational service districts, universities, community and technical colleges, and libraries said their institutions did not have an alternative to the K-20 Network.

Another 49 percent of institutions reported having alternative service providers available, but current services and operations supported by the K-20 Network would be affected significantly. For example, the video conferencing system is highly dependent on the K-20 Network. The student information system and financial management system are also dependent on the K-20 Network. The remaining 16 percent of institutions participating in our survey reported they either didn't know if alternative options were available to them, or if they were, their current level of services would not be affected.

Exhibit 20: Institutions With Alternative Options if K-20 Network Were Eliminated

	Yes, we would not be affected.	Yes, but our operations would be affected significantly	No, we do not have options	Don't know.	No of Institutions Responding
Education Service Districts	0%	69%	21%	1%	11
K-12 School District	5%	46%	36%	11%	209
University	25%	53%	19%	3%	12
Community & Technical Colleges	18%	56%	21%	0%	19
Library	0%	71%	14%	14%	16
Other	100%	0%	0%	0%	1
Telemedicine	0%	100%	0%	0%	1
Grand Total	6%	49%	32%	10%	269
Source: MCG K-20 Network Survey					

4. Eliminating the K-20 Network May Affect Video Services Between Institutions. The K-20 Network provides a platform to connect the education institutions together such as higher education to K-12 and to the libraries. When connected, the participants have access to carrier-class video conferencing and data sharing capabilities. Some notable applications we identified include:

- Telemedicine program at the University of Washington School of Medicine and partnering health centers use video conferencing for remote medical services.
- Video conferencing system used by the School for the Blind to connect the only certified teacher in Washington to teach math to vision impaired students. The video system enabled the teacher to observe students' braille techniques.
- Elementary school's use of the video conferencing system to teach geography by linking school districts to one another to guess "Where in Washington."

Overall, school districts and community and technical colleges more often rely on the K-20 Network for their technology-based services than universities and public libraries, with one exception. As shown in Exhibit 21, 73 percent of universities reported that their video conferencing for administrative purposes could not function without the Network. All community and technical colleges stated that they used the video conferencing system daily, weekly, or monthly.

Exhibit 21: Institutional Dependence on Network Supported Services

	Overall	K-12	Universities	Community & Technical Colleges	Libraries	Telemedicine
Video Conferencing (Administrative use for meetings or professional development)	79%	85%	73%	68%	19%	100%
Source: MCG K-20 Network Survey						

Unlike the other education institutions, Libraries primarily rely on the Network to provide Internet Access and rely less on other Network supported services. Seventy-one percent of libraries said this service could not function without the Network.

5. Institutions Are Not Fully Prepared to Use Alternatives. As shown in Exhibit 22, 56 percent of the institutions we surveyed reported having some or all of the technical capabilities (personnel or equipment) needed to use alternatives to the K-20 Network, although the level of technical capability varied across the institution types. Universities and community and technical colleges are the most prepared, with most of them reporting having some or all of the capability needed to use alternatives. In contrast, school districts and libraries reported the lowest levels of having some or all of the technical capability to use alternatives – about half of them did not have the needed technical capability.

Exhibit 22: Institutions That Have the Technical Capability to Implement Alternatives if the K-20 Network Were Eliminated

	Overall	Education Service Districts	K-12	Universities	Community & Technical Colleges	Libraries	Other	Telemedicine	Total respondents
Do not	56%	85%	51%	79%	89%	50%	100%	100%	151
Do	34%	15%	39%	13%	11%			0%	93
Not Sure	10%	0%	10%	8%	0%	21%	0%	0%	26
Source: MCG K-20 Network Survey									

Finally, Exhibit 23 shows many institutions with access to an alternative service provider do not know if the provider can offer a similar level of service is available. A majority of universities (69 percent), libraries (63 percent), and about half of community and technical colleges (53 percent) said they did not know. More than half of Educational Service Districts reported they did not know.

Exhibit 23: Institutions With Access to an Internet Service Provider that Can Provide Bandwidth and Network Speeds Similar to the K-20 Network

	Overall	Education Service Districts	K-12	Universities	Community & Technical Colleges	Libraries	Telemedicine
Yes	29%	18%	30%	23%	26%	25%	0%
No	28%	24%	32%	8%	16%	6%	0%
Don't Know	43%	58%	38%	69%	53%	63%	100%
Provided Estimate	35%	52%	31%	52%	42%	56%	0%
Source: MCG K-20 Network Survey							

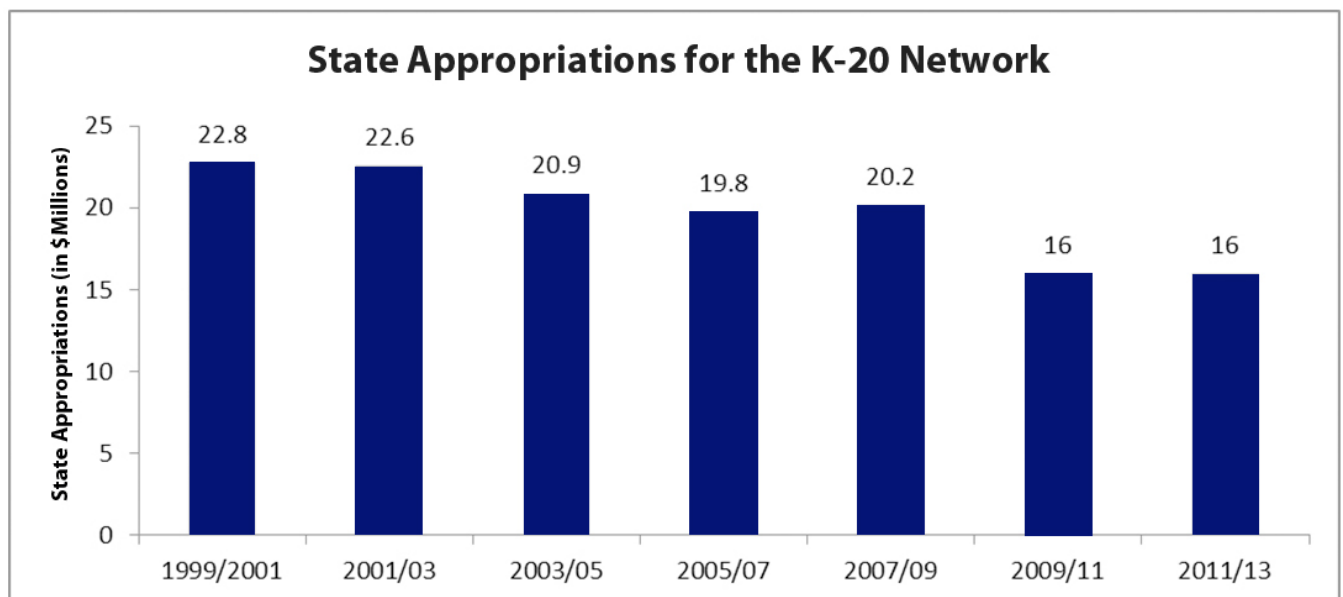
Option 2: The Status Quo Prevents the K-20 Network from Leveraging its Capability

If the K-20 Network continues with the status quo, it means the Network will continue to have advanced technical capability while institutions will continue to rely on the Network for basic connectivity. Although the K-20 Network is cost effective for many institutions in comparison to other alternatives, it may not be enough to justify continued maintenance. The benefits of pursuing the status quo allows for:

- budget certainty
- continuity of administration activities and classroom activities
- continued outsourcing to technical service providers that assist in maintaining the network

State Funding has Been Reduced in Recent Years. As shown in Exhibit 24, from 1999 to 2009, state funding for the K-20 Network has been between \$19.8M to \$22.8M per biennium. In the current biennium and projected 2011/13 budget biennium, funding has been reduced to \$16M, or an average of \$8 million per year.

Exhibit 24: State Appropriations for the Last 10 years



Source: K-20 Network financial data

Since 2000, the K-20 Network ongoing costs for maintenance and operations have been between \$12.5M to \$14.1M per fiscal year. Those costs are paid for primarily with state funding and user co-pays. Although usage has increased exponentially, expenses have been stable due to economies of scale and declining technology costs. These expenses make up four key activities as shown in Exhibit 25.

Exhibit 25: K-20 Network Expenses		
Description	Expense (in millions)	Percentage
Maintenance and Depreciation – Hardware and equipment costs are depreciated and charged to the K-20 program expenses.	\$3.73M	30%
K-20 Operations Cooperative (KOCO) – The KOCO is staffed by representatives from the University of Washington, Department of Information Services, and the State Board for Community and Technical Colleges. The KOCO provides operational support to the Network.	\$4.55M	36%
Transport – Network connections are competitively bid to private sector telecom companies.	\$3.29M	26%
Program Office – The K-20 Program Office is outsourced and manages the administrative functions of the K-20 Network.	\$1.00M	8%
TOTAL	\$12.57M	100%
<i>Sources: K-20 2009-2011 budget</i>		
<i>Note: We totaled the 2009/10 and 2010/11 fiscal year budgets then calculated the average to report the annual expenses. Actual expenses vary from fiscal year to fiscal year due to maintenance and operation plans. On an annual basis, the state provides co-payments amounting to about \$3.5 million. The rest of the expenses are covered by the federal E-rate program.</i>		

Proposals to Reduce Operating Costs Suggest Opportunities for Efficiencies

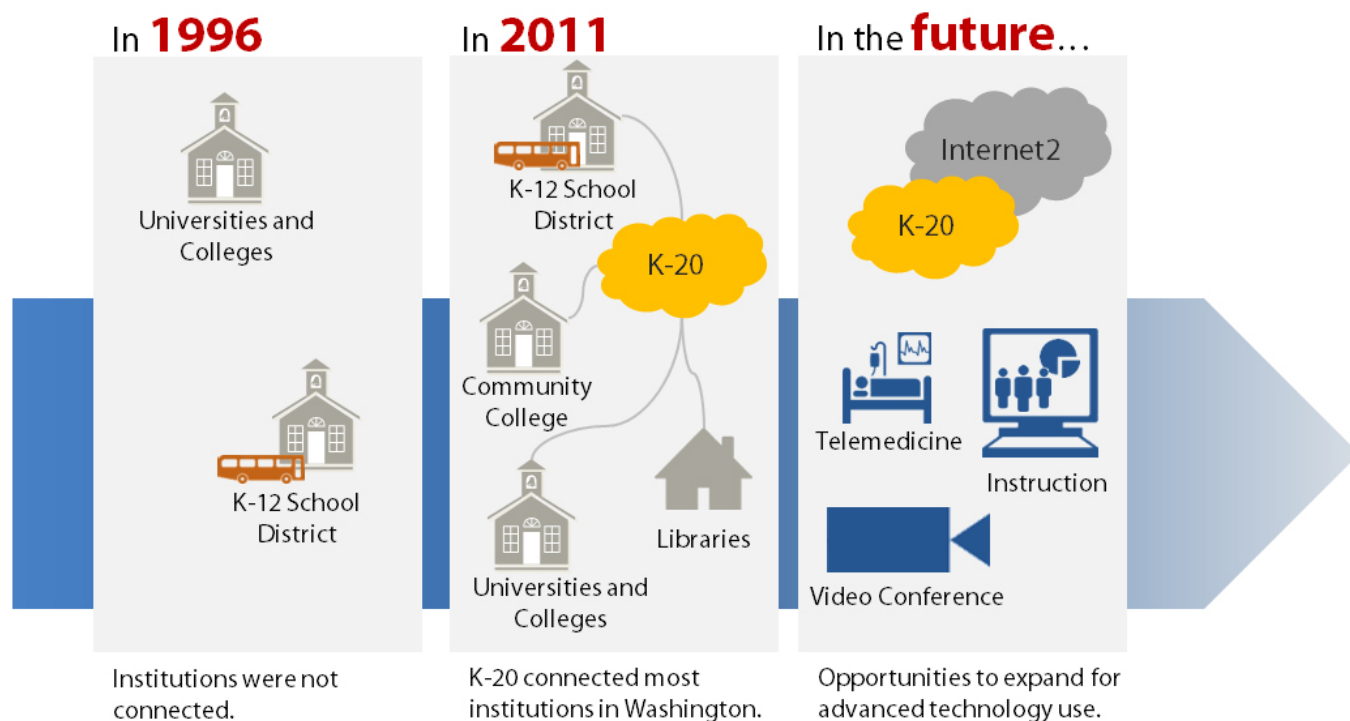
Both the University of Washington and the Department of Information Services have submitted proposals to the K-20 Technical Working Group to reduce operating costs.

- The University of Washington approach consolidates service desk functions to the University of Washington's Network Operations Center. This reduces redundant functions such as help desk and provisioning services.
- The Department of Information Services propose absorbing the budget reductions for a two year period while it seeks out other opportunities to reduce operating costs.

Both proposals indicate that there are efficiency opportunities, particularly in streamlining the operations processes.

There is a Need to Inform Stakeholders on the Value of the K-20 Network. Should the State wish to pursue the status quo, one detriment will be lack of awareness of the Network's potential and its value in advancing information sharing and learning. Providing other services, such as telemedicine can help reduce health care costs and provide for better healthcare service delivery. As shown in Exhibit 26, there are opportunities for the K-20 Network and Internet2, a nationwide network, to develop advanced educational programs.

Exhibit 26: Past, Present, and Future of the K-20 Network



Source: MCG analysis

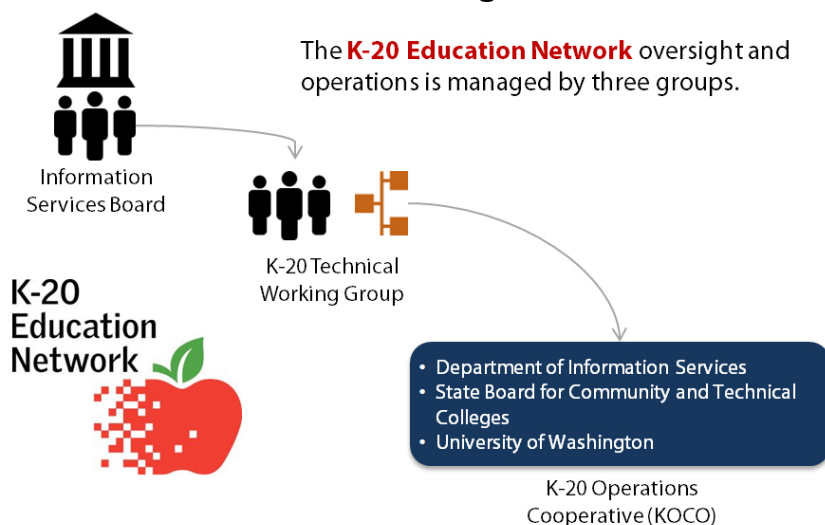
The last K-20 Network biennium report was published in 2006. Without a performance report published at least annually, network participants and the general public do not understand the unique value that the K-20 Network offers. While there is no legislative requirement to do so, we believe it is a good practice to publish periodic performance reports to inform stakeholders on the benefits and challenges of the Network. Additionally, this report, or other publication could serve to educate and inform users on potential opportunities to leverage the network for better service delivery or cost savings.

Option 3: Strategic Planning is Needed to Keep the K-20 Network Cutting Edge

Current planning efforts by the Information Services Board and K-20 Technical Working Group do not address current and future needs related to the Network. In keeping with the Network's mission, planning efforts have focused on keeping the Network's technology infrastructure "up-to-date." However, strategic and business planning is also needed to identify strategies to continue to maintain the popularity of the K-20 Network and address how traffic will be prioritized should demand ever exceed capacity. These efforts are critical, particularly when the K-20 Network is in direct competition with private offerings.

The K-20 Network Technical Working Group meets periodically to review the K20 Operations Cooperative's (KOCO) day-to-day operation of the Network. The KOCO is a consortium consisting of three organizations, including the University of Washington (UW), the WA State Department of Information Services (DIS), and the State Board of Community and Technical Colleges (SBCTC).

Exhibit 27: K-20 Network Management Structure



Source: K-20 Education Network

Recent Strategic Planning and Performance Reporting for the K-20 Network Has Focused on Improvements to the Technology Infrastructure. The Technical Working Group has not published a Network-specific strategic plan or performance report. References to the K-20 Network in the most recent Statewide IT Strategic Plan (2008-2014) focus on projects to keep the K-20 Network's technology infrastructure up-to-date. Similarly, the Information Services Board's Statewide Biennial Performance Report (2007-2009), presents a limited amount of information about the K-20 Network. Besides accomplishments related to updating the K-20 Network's technology, the report highlights the addition of more participants using the K-20 Network while expenses remained relatively constant and presented supporting data on the growth in usage compared to cost since the creation of the K-20 Network.

The K-20 Network Has Kept Pace With Advances in Technology But Has Also Created a Need to Advance the Mission. In the fifteen years since its creation, the K-20 Network has kept pace with advances in technology by updating K-20 Network infrastructure but has not similarly advanced its mission to reflect the current and potential uses of the K-20 Network and the potential gains in efficiency and effectiveness it offers to users. The K-20 Network technology available to K-20 Network participants make possible multi-modal communication and real-time interaction between educational institutions beyond simple data exchanges through email messages which were considered state-of-the-art fifteen years ago. Participating institutions are beginning to develop cutting-edge uses of the K-20 Network's technology services, such as telemedicine. These uses can improve the efficiency and effectiveness of the delivery of educational services, as well as have the potential to improve the delivery of other services like health care, in which the government also invests.

To ensure that the Network maximizes its support of these opportunities, there is a need for the K-20 Network to plan strategically to address challenges to cutting edge uses of the Network. A current challenge is that a competitive private market has developed in some geographic areas to provide comparable data and video services to educational institutions. However, planning has not taken place to determine how, if at all, to adjust the Network's business model to ensure that each dollar invested in technology services is maximized.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The K-20 Network is unique and a model for other governments that need to develop network infrastructures. Unless the K-20 Network can continue to differentiate itself with services and lower costs in comparison to the competition, education institutions may be compelled to take offers from other service providers with competitive pricing and service quality. Without unique benefits, the K-20 Network is commoditized and competes directly with other private service providers. For education institutions, participation in the K-20 Network becomes defined not by choice, a hallmark of the program, but by the availability of a competitive service provider.

The K-20 Network's technological platform and cooperative business model has the potential to serve as the foundation for additional service delivery initiatives. The value of the K-20 Network has expanded beyond basic connectivity to new and innovative applications. These could include:

- Expanding the telemedicine program to more health care institutions throughout the state to use video conferencing as a communication tool. This could allow specialists to provide services regardless of geographic location.
- Developing a statewide network of specialized teachers for distance education. This could allow students, regardless of which school they are enrolled, to have access to the same Advanced Placement (AP) teachers.
- Using the K-20 Network connection to Internet2 to promote collaboration and distance learning initiatives with other institutions across the nation.

Nonetheless, by organizational design, roles, and responsibilities, the state does not currently have a long-term vision for how it wants to use the K-20 Network in the future. While many of these initiatives and strategies belong to the education leaders, such as classroom instruction, distance education, and collaboration, the K-20 Technical Working Group has the opportunity to communicate the Network's potential for achieving those initiatives. In the absence of such a unified vision, the K-20 Network could be overdeveloped or underdeveloped. By having an end goal in place, as the legislature did in 1996 with connecting education together, the various stakeholder groups can work together to achieve that vision.

Recommendations

Our assessment identified several opportunities to strengthen and improve the K-20 Network. We recommend:

1. The Legislature continue to support technology the K-20 Network as a tool to help level the education playing field through enhanced use of video conferencing and distance education.
2. Universities, community and technical colleges, and K-12 school districts include technology components in their education plans. These plans should identify opportunities to leverage the K-20 Network to develop service delivery initiatives, such as expanded distance learning, telemedicine and video conferencing.

3. The K-20 Network identify ways to provide technical support to education groups that want to pursue innovative uses of the K-20 Network for education service delivery and improving the efficiency and effectiveness of operations.
4. The K-20 Network develop a strategic plan with representatives from educational institutions, the Legislature and the Office of Financial Management (OFM). The strategic plan should contain a long-term vision for the K-20 Network and operational plan to achieve that vision. The strategic plan should also address the challenges the K-20 Network is likely to face and its preferred options to address the challenges.
5. The K-20 Network publish annual reports on services provided, its performance (up time, bandwidth) and usage (new applications, schools connected) and provide a cost of operations analysis for the K-20 Network. These annual reports are valuable informational pieces to keep the community informed on the value of the K-20 Network.

APPENDIX A: Study Approach

To determine if the K-20 Network continues to serve the purpose for which it was created, we reviewed applicable bills, laws, and regulations from the creation of the K-20 Network in 1996 to the present day. We met with the Legislative Auditor and his staff to understand the intent of the objectives and how government activities were prioritized for purposes of this activities assessment. We then developed two surveys to collect information on the technical and operational utilization of the Network. Our surveys were based on our understanding of K-20 and its applications based on meetings with representatives listed in Exhibit 28. With these representatives, we discussed their respective institution's usage of the K-20 Network, the strengths and weaknesses of the Network, complaints about the Network, and possible alternatives.

Exhibit 28: Meetings With Select Representatives of the K-20 Network	
Stakeholder Group	
Aberdeen School District	
Education Service District 112 (Vancouver)	
K-20 Program Office	
School for the Blind	
School for the Deaf	
State Board for Community and Technical Colleges	
University of Washington	
Washington State Information Processing Cooperative	

One of the surveys gathered data on costs and services provided by institutions and the other gathered technical information about the Network. The surveys were addressed to a program administrator and a technical resource. Appendix C shows the two surveys. We sent the survey under the State Auditor's Office letterhead and email to the institutions. For K-12, the Office of the Superintendent of Public School Instruction sent the survey on our behalf. We sent reminder emails and made follow up calls with institutions to ensure maximum participation in the survey. At the close of the survey on April 27th, our overall response rate was 77 percent, as shown in Exhibit 29.

Exhibit 29: Response Rate of the Types of Institutions.			
	Contacted	Responded	Response Rate
K12	296	239	81%
Education Office (e.g., ESD, OSPI)	14	12	86%
Universities and Colleges	16	11	69%
Community and Technical Colleges	32	20	63%
Libraries	29	17	59%
Other	3	1	33%
Telemedicine	1	1	100%
TOTAL	391	301	77%

During the course of our survey, we discovered the Office of the Superintendent of Public School Instruction sent an informational guide on the K-20 Network to some school districts and



all Educational Service Districts Regional Information Technology Unit contacts. Our survey analysis showed three of 391 respondents had directly copied portions of the informational guide to respond to the open ended questions on our survey. To mitigate against any possible conflicts or biases, since the material was widely distributed, we did not include the open ended responses in our analysis.

To determine what the K-20 Network costs, we requested financial statements, financial reports, and budgetary data from the K-20 Program Office. Using that data, we identified revenues and expenses for the K-20 Network. Because many networking costs associated with school districts would occur even if the K-20 Network did not exist, we limited our scope to just the costs associated with the K-20 connection to the school building.

To determine the impact if the K-20 Network were eliminated, we analyzed the responses from our survey. We also validated our findings through interviews with key K-20 Network stakeholders and the K-20 Network Program Office. We developed and presented a list of key impacts in our report.

Finally, to determine the availability of cost effective strategies to the K-20 Network, we evaluated three potential options:

1. Eliminating the K-20 Network
2. Maintaining the Status Quo
3. Enhance Strategic Planning

For each option, we estimated pros and cons, and risks. We developed cost estimates based on our firm's experience for similar types of technology initiatives.

We conducted this work from April 2011 to May 2011.

APPENDIX B: For More Information

For more information

To learn more about the K-20 Network, please visit the following resources.

Exhibit 30: Websites Related to the K-20 Network.

Data	Source
K-20 Website	http://www.wa-k20.net/
Department of Information Services	http://www.dis.wa.gov/initiatives/k20network/
Information Services Board	http://isb.wa.gov/
Internet 2 K-20 Initiative	http://www.internet2.edu/k20/
Pacific Northwest GigaPOP	http://www.pnwgp.org/

The following are relevant reports and documentation.

Exhibit 31: Reports and documents related to the K-20 Network.

Data	Source
2004 K-20 Strategic Plan	http://www.wa-k20.net/docs/K-20_NetworkNGNArchitectureK-20BoardApproved3-14-06.pdf
2006 K-20 Biennial Report	http://www.dis.wa.gov/initiatives/k20network/biennialrpt2006.pdf
2009 ISB Biennial Report	http://isb.wa.gov/publications/2009_biennial_perf_report.pdf

APPENDIX C: Survey and Results

Program Administration Survey

K-20 Education Network: Program Administration

K-20 Education Network Usage Survey

Q1-Q4: Number of Responses – All and Unique Institutions

Institution Type	Number of Responses - All	Number of Responses - Unique Institutions
Educational Service Districts	18	12
K-12 School Districts	244	225
University	11	8
Community & Technical College	18	17
Library	14	14
Other	1	1
Telemedicine	1	1
Total	307	278

5. How frequently is the K-20 Education Network used for the following purposes:

Question 5 Sum of Weighted Responses	1 Daily	2 Weekly	3 Monthly	4 Quarterly	5 Not used
Classroom instructional use	211	12	6	11	34
Teacher training programs	53	75	70	44	30
Video conferencing (Administrative use for meetings or professional development)	27	94	89	46	20
Video conferencing (Education - instructional delivery to students)	31	34	46	74	86
Distance learning / online learning	166	24	12	15	58
Collaboration with other institutions (e.g., K-12 to universities)	75	49	47	40	59
Faculty Research	153	31	11	14	58

6. Is there a benefit the K-20 Education Network provides that cannot be accomplished in other ways?

Question 6	Sum of Weighted Responses
No	64
Yes	204

7. If the K-20 Education Network were eliminated, how would it impact the effectiveness of programs and services provided?

Question 7	1 Significant Impact	2 Great Impact	3 Some Impact	4 Little Impact	5 No Impact
Sum of Weighted Responses					
Administration - HR/Payroll/Finance	182	26	29	12	20
Operations/Communications - Intranet sites or portals over K-20	176	42	21	7	17
Video Conferencing (Administrative use for meetings or professional development)	146	51	41	15	19
Video Conferencing (Education and student instruction)	122	26	49	33	41
Educational/Distance Learning (Students)	146	21	34	22	45

8. If the K-20 Education Network were eliminated, does your institution have alternative options:

Question 8	Sum of Weighted Responses
Yes, we would not be affected	18
Yes, but our operations would be affected significantly	138
No, we do not have options	90
I don't know.	26

9. Other than co-pays, what costs are associated with using the K-20 Education Network? If cost are known, please provide in the box below and provide the time period.

Question 9	Sum of Weighted Responses
Equipment (Video Conferencing)	155
Equipment (Computers, Laptops, etc.)	142
Equipment (Networking, Routers, etc.)	165
Support Staff	146

Technical Survey

K-20 Education Network: Technical

K-20 Education Network Needs and Setup Survey

5. Which services are currently supported only by the K-20 Education Network at your institution? (Mark all that apply.)

Question 5	Sum of Weighted Responses
Administration - HR/Payroll/Financial (1)	215
Operations/Communications - Intranet Portal (2)	185
Video Conferencing (Administrative use for meetings or professional development) (3)	240
Video Conferencing (Education/Instruction) (4)	206
Educational/Distance Learning (Student use of web-based or network resources over K-20) (5)	201
Faculty/Staff Training (Other than video conferencing)	178
Other Y/N	60

6. Which services cannot function without the K-20 Education Network? (Mark all that apply.)

Question 6	Sum of Weighted Responses
Administration - HR/Payroll/Financial	184
Operations/Communications - Intranet Portal	161
Video Conferencing (Administrative use for meetings or professional development)	212
Video Conferencing (Education/Instruction)	189
Faculty and Staffing Training (Other than video conferencing)	176
Educational/Distance Learning (Student use of web-based or network resources over K-20)	138
None	17
Other Y/N	57

7. Does your institution have the technical capability (personnel and equipment) to use alternatives if the K-20 Network were eliminated?

Question 7	Sum of Weighted Responses
Yes all	57
Yes some	94
No	93
Not sure	26

8. Does your school have access to an Internet Service Provider that can provide bandwidth and network speeds similar to the K-20 Education Network? If yes, please provide a cost estimate (if known).

Question 8	Sum of Weighted Responses
Yes	77
No	74
I don't know	116
Estimate Y/N	94

APPENDIX D: Section 909, Senate Bill 6444

CORE FUNCTIONS OF GOVERNMENT REVIEW. (1) The legislature intends to evaluate whether the state agencies and activities are performing in the most efficient manner.

(2) By August 1, 2010, the joint legislative audit and review committee must select one of the priorities of government results and determine the relative priority of each activity based on the activity's contribution to the overall objectives of the priorities of government results area.

(3) The state auditor must select at least one but not more than four of the highest priority activities identified under subsection (2) of this section to be the subject of performance audits. The activities must be selected for performance audits under this subsection based on the evidence that the program or activity would likely benefit from the evaluation or review. The performance audit shall be conducted using generally accepted government auditing standards and may include an evaluation of: (a) Ways to improve performance, streamline operations, and provide cost-effective service to citizens; (b) programs and services that can be eliminated, reduced, consolidated, or enhanced; and (c) gaps and overlaps in the programs and services and recommendations for improving, eliminating, blending, or separating functions to correct gaps or overlaps.

(4) The state auditor must select at least one of the lowest priority activities identified in subsection (2) of this section to be the subject of an activity assessment. The assessment must address the following questions:

(a) Does the activity continue to serve the purpose for which it was created?

(b) In comparison to other programs and priorities, does this purpose continue to merit the use of the state's limited resources?

(c) Does this activity continue to contribute to the priorities of government identified?

(d) Are there better alternatives for the use of these resources or to accomplish the objective of the activity?

(5) The performance audits conducted under subsection (3) of this section and the assessments under subsection (4) of this section must be completed by June 30, 2011.

