



## **NATIONAL LEADERSHIP INSTITUTE'S TOOLKIT 2005 INFRASTRUCTURE & TECHNOLOGY**

### **Summary & Tools**

#### **Chapter Summary**

##### **Objectives**

- To develop tools to assist state education technology leaders in creating and/or updating a statewide network; and
- To develop a common vision of a statewide network that focuses on how infrastructure and technology relates to eLearning and learning as a whole.

##### **Key Questions**

- What are the driving forces for eLearning within your state?
- What are some of the models of statewide networks?
- What factors are important to consider when building or updating a statewide network?
  - ◆ What are the key technology components?
  - ◆ What are the top infrastructure policy issues?
  - ◆ Who are the possible partners in such statewide networks?

## **NLI Work Group Process**

Prior to the 2004 National Leadership Institute (NLI), members of the Infrastructure and Technology (IT) Work Group participated in pre-conference planning calls to discuss the infrastructure and technology issues that states are currently facing. Based upon these planning calls, the IT Work Group identified a set of initial resources and developed a list of five guiding questions and six proposed deliverables. Upon arriving at the NLI, the Work Group had a clear idea of the issues that were going to be discussed at the conference.

Members of the group started their discussions by acknowledging that issues surrounding infrastructure and technology of statewide networks are broad and that states are at very different points in terms of expertise, implementation, leadership, and legislative policies. As a result, the group decided to focus on the strategies, policies and procedures related to building a state wide network, and not on the specific technologies necessary such as computers, software and bandwidth.

Initial discussions focused on identifying the driving forces for eLearning within the states. The answers to this question provides guidance on whether a state may be in a position to implement a statewide network to deliver content and connectivity to school districts and individual schools. The Work Group members compiled this list and shared it with the Leadership and Policies Work Group as they began to develop policy and leadership tools around each driving factor.

As a result of group discussions about these driving forces, the Work Group members were unanimous in their opinion that each state must develop a strong vision of a statewide network within each state. The Work Group members decided to take their own advice and craft a vision for state directors to consider when building or updating a network. The Work Group's vision focuses on how infrastructure and technology relates to both eLearning and student learning as a whole.

The IT Work Group members identified current models of statewide networks and decided to develop a survey to collect information that would allow them to delve more deeply into the strategies, policies and infrastructure in the model states of Indiana, Maine, Mississippi, Ohio, Utah and Washington.

The Work Group members discussed what issues are important to consider when building a statewide network. Discussions included components, content, policies, partnerships, and funding issues. Based upon these broad discussions, the Work Group members divided into four subgroups to address the following topics:

- Models of statewide networks,
- Technology components to consider for a statewide network,
- Policy issues around state infrastructure,
- Partnership needs and challenges.

The goal of each subgroup was to develop a tool to assist state educational technology directors in building or updating a statewide network. Members of the Work Group rotated through all of the subgroups to provide input and insight for that particular area. Throughout this process, the subgroups reported to the entire group on their progress, solicited questions and comments from each member, and refined the output.

### **SETDA Tools Developed to Assist States**

The IT Work Group developed the following tools to assist states in creating or updating a statewide network:

- **Vision for a Statewide Network:** A collaborative vision statement of a statewide network that focuses on the purpose of a network and its relationship to learning.
- **Various Models of Statewide Networks:** A survey to collect information from select states about their network infrastructure.
- **Components to Consider for a Statewide Network:** A matrix of technology components listing the key considerations, benefits, and justification for each component by service and function.
- **Key Infrastructure Policy Questions:** A matrix of policy questions and links to resources.
- **Partnership Talking Points:** A list of talking points, with both questions and answers that may be used as a guide during conversations with various stakeholder groups.

### **Next Steps**

- Expand the survey of statewide educational networks to collect data from all states.

## Vision for a Statewide Network

Statewide networks should

- focus on business needs, not technology
- include standards that contribute to a secure, robust network infrastructure
- utilize appropriate existing resources
- provide economic efficiencies
- build partnerships

Technology and infrastructure encompass more than e-Learning – it must be about “ALL-learning”.

Technology must support the educational community in its pursuit of educational goals, including state essential academic learning requirements, content standards, instructional curriculum, and aligned, meaningful, assessments.

The PreK-12 educational network’s needs are high quality TEACHING and LEARNING, resulting in student achievement and enrichment. Engaging content that encourages this work will be the means through which this is achieved.

## Various Models of Statewide Networks Survey Instrument

[A survey to collect information from select states about their network infrastructure]

Please attach URLs to all of the below questions that seem appropriate to help you illustrate and further define the answers.

### I. General Information

- Name of state?
- Do you have a statewide network?
- If you do not have a statewide network, what other kinds of networks do you have?

Regional     Local     Governmental     2 Year Higher Ed.     4 Year Higher Ed.     Libraries  
 Other

**IF YOU DO NOT HAVE A STATEWIDE NETWORK, THANK YOU FOR YOUR TIME. THERE ARE NO FURTHER QUESTIONS FOR YOU TO ANSWER.**

4. What is the name of your network?
5. What is the general network technology (e.g., Internet, ITV, ITFS, ETV, etc.)?
6. Who is responsible for the network and the applications which run on it? Identify agency and responsible office/persons, with email addresses and URL's.
7. Who is providing this survey information (survey respondent, including complete contact information)?
8. Who will be responsible for ongoing updates to this information (please include complete contact information)?

9. After this survey is published, to whom should people who want further information or discussion be referred (please include complete contact information)?

## II. Purpose and Uses of the Network

- What is the general purpose of the network or application? If this is a network application/resource, include a description of the primary services provided (virtual libraries will list the types and titles of databases available to user groups.)
- 2. What are the primary functions served by the network or the application/resource (e.g. administration, instruction, research)? Estimate % of use for each function.
- 3. Is this a shared network?
- 4. Who are the participants?  
\_\_\_\_ K-12      \_\_\_\_ ESDs      \_\_\_\_ 2 Yr Higher Ed      \_\_\_\_ 4 Yr Higher Eds  
\_\_\_\_ Libraries      \_\_\_\_ Tribal Schools      \_\_\_\_ Other (\_\_\_\_\_)
- 4. Who uses the network or application/resource (e.g. major groups, agencies, etc.)? Estimate % of use by each.
- 4. Characterize in some way the number of users served by the network or application/resource (access points, address space, size of primary population, etc.).
- 5. What are the major types of use (e.g. voice, data, video)? Estimate % of use for each.
- 6. What are the drivers for the network?  
\_\_\_\_ Legislation      \_\_\_\_ ERate      \_\_\_\_ Legal/Financial  
\_\_\_\_ Partnerships      \_\_\_\_ Equity      \_\_\_\_ Corporate Partners  
\_\_\_\_ Public Partners      \_\_\_\_ Data Needs      \_\_\_\_ Customer Demand  
\_\_\_\_ Security      \_\_\_\_ HQT Needs      \_\_\_\_ Distributed Computers  
\_\_\_\_ Student Needs      \_\_\_\_ Costs      \_\_\_\_ Opportunities (geography)  
\_\_\_\_ Local Control      \_\_\_\_ Content      \_\_\_\_ Cross Silo Needs  
\_\_\_\_ Cost Sharing (ROI)      \_\_\_\_ Politics  
\_\_\_\_ PR12 & HE Rules

### **III. Network Management**

- Describe how the network or application/resource is managed (i.e. under an existing agency, consortium, vendor contract, other outsource).
  2. How are policies decided?

### **IV. Network Characteristics**

- What is the general architecture of the statewide network?
  2. Describe the demarcation (i.e. point of separation) between statewide network and local facilities.
  3. Describe the telecommunications technologies and capacities deployed, including bandwidths.
  4. Briefly describe which network facilities and services are owned by the state, leased, outsourced, etc.
- Briefly describe the relationship and interfacing of the network to any other networks (e.g. Internet, Internet2, other state or regional networks)
- Is the network capable of matching video of varying transmission rates?

### **V. Funding/Costs**

1. What are the sources of funding (e.g. state legislature allocation, user budget allocations, grants, and service charges)? Estimate % for each.
2. If users are charged for services, briefly describe the basis and method of charging. (If license agreements are applicable, as they are for many network applications/resources, please describe and indicate how various levels of structured payments by the user or sponsoring agency affect services to these user groups.)
  - 3a. Are network/resource access-use charges made to other non-networked government entities or not-for-profit agencies?

- 3b. If so, can the revenue be retained to fund depreciation or enhance services?
4. How are telecommunications carrier services procured?
5. What is the approximate total annual budget for the network or application/resource?

## **VI. Staffing**

- ◆ What is the size of the central support staff?
2. Are support services provided to the user site? **Briefly describe.**
  3. What support or operations are outsourced?
  4. What support or operations are user sites expected to perform for themselves?

## **VII. Training**

1. What percentage of the total budget is earmarked for training? **Briefly describe the training.**
2. Is there a certification process for training? If so, how is it enforced?

## **VIII. Status and Plans**

1. What new significant improvements or additions have been made in your educational network or application/resource in the last 2-3 years? **Briefly describe.**
2. Does your network or application/resource have a long-range strategic plan that has been approved and will be supported by your top leadership, funding agencies and other constituencies? **If so**, briefly describe. **If not**, briefly describe how your network obtains funding and support for change and advancement.

3. Is there an approved and supported statewide networking plan that includes all statewide or regional educational networks or applications/resources within the state? If so, briefly describe. If not, briefly describe how the various networks relate to each other, if they do.
4. If not already included above, please describe significant changes expected in your network or application/resource in the near future, such as expansion, new technologies, reorganization, or new services.
  - 5a. What are the most challenging issues in planning and operating your network or application/resource?
  - 5b. Briefly describe any new or innovative approaches being taken to address these issues.
6. What are the lessons learned?

### **Components to Consider Regarding Statewide Networks**

There are a number of key components to be considered for a statewide eLearning network. While not all of these elements are essential, each has important key benefits for constituent users and should be discussed and reviewed. Due to the financial commitment required to establish and manage a statewide network, buy-in from key partners is essential. The matrix includes examples of various critical network components, key considerations, and the benefits of each component found in many statewide eLearning networks.

<b>Components To Consider For A Statewide Network</b>		
<b>Service/Function</b>	<b>Key Considerations</b>	<b>Benefit &amp; Justification</b>
<b>Content</b>		
	<p>Does the state need to consider both state and local standards?</p> <p>Does there need to be uniformity?</p> <p>Do you need a user-friendly repository to house the content?</p> <p>Do you have quality assurance policies to manage the content in the repository?</p>	<p>One benefit is that a quality assurance process is in place and instructional staff is not all creating their own version of the same content; another benefit is a larger menu of quality content.</p>
<b>Data</b>		
State Educational Association (SEA)	<p>What percentage of schools is connected?</p> <p>How is this data gathered?</p>	<p>Ease of data input and flow; ease of aggregation; the data needs to flow in both directions to meet NCLB requirements; real time opportunity for data analysis is critical.</p>
No Child Left Behind Act of 2001 (NCLB)	<p>Will all schools be able to drop in NCLB data into a state or region-wide management system?</p>	<p>See above</p>
Email	<p>How is email controlled at the state level?</p> <p>Local level?</p> <p>Is the bandwidth able to support the traffic?</p>	<p>Control of security within the email system (CIPA); statewide policies can be implemented; statewide email system could be more cost effective.</p>
Federal	<p>What are the federal data needs in addition to NCLB?</p>	<p>Measuring and reporting NCLB, AYP and Reading First easier via a statewide network.</p>

<b>Components To Consider For A Statewide Network</b>		
Web Presence	Is the web presence state, regionally or locally controlled? What are the requirements?	Benefit of statewide control would be quality of service; lower cost; adherence to standard statewide policies.
<b>Video</b>		
Video	Is video required in the state plan for networking?	Access; equity; cost; quality of service; capacity for streaming video; voice and voice over IP.
Video over IP (H.323)	Is there a cost saving over analog?	Quality of service; lower cost; network prioritization
Video Streaming	What are the bandwidth requirements? How much bandwidth will you allocate?	Quality enhancement for course work; training tool; benefit to asynchronous learning systems.
Video Conferencing	What are the bandwidth requirements? How much bandwidth will you allocate?	Travel cost saving; training tool; alternate delivery system for courses with low participation at single sites.
<b>Voice</b>		
Telephone service	What type of local and long distance services are needed? Review alternative providers for cost/benefit ratio.	Cost savings; single provider opportunity; easier to support.

<b>Components To Consider For A Statewide Network</b>		
VOIP	Is there additional equipment needs? What is the cost/benefit and quality of service?	Cost savings, single provider opportunity; easier to support; portability.
<b>Security</b>		
Hardware	Are firewalls, VPN, routers, hubs, switches, desktops secure?	Common practices and policies to enforce and maintain.
Federal Regulations.	Can Federal Regulations be applied uniformly across the network?	Meet HIPPA, CIPA, FERPA requirements.
Software	Are there common software packages that are consistent throughout the state or is that a local decision?	Common network-run software packages can provide ease of use for the end user; easier training.
Virus	<b>Are there firewall systems? Who manages them?</b>	Single virus software to maintain.
Security Policy	Is the security policy managed at a state, region, or local level?	Common policies to adhere to and support.
Integrated Data Systems	What systems and what data need to be passed back and forth? Are common formats available for data transfer?	Common data standards

<b>Components To Consider For A Statewide Network</b>		
Acceptable Use Policy	Who is responsible for developing and enforcing the AUP? State/Regional/local agency?	Common AUP
Copyright	Does the state have a copyright officer? How is eLearning reviewed for copyright compliance?	Statewide network allows for centralized copyright compliance.
<b>Bandwidth</b>		
Bandwidth	What are the bandwidth needs and expansion capacities for the state? Who will manage the system?	Design and monitor the network to ensure bandwidth adequacy and minimize bottlenecks.
Fiber	How much fiber is needed?	Unlimited bandwidth
<b>Quality Assurance</b>		
Network Management	How do we make sure the system reliability support the function intended?	Standardized network management protocols and policies.
System Support	Does the state provide helpdesk services for end users?	Common platform, lower support costs, more uptime.
Data shaping	How is data transfer prioritized?	Common set of policies and single sources control.
Review process	What is the plan for upgrading and keeping the network able to support the latest technologies?	Ensures continuance of entire network; equitable expansion.
<b>Revenue Model</b>		

<b>Components To Consider For A Statewide Network</b>		
	<p>Where does the financing come from (e.g. legislature, grants, local agencies, partners)?</p> <p>Is the funding continuous?</p> <p>Is there a sustainable process to keep the network running and expanding?</p>	Common model; single focus on meeting financial needs.
<b>Local Assets</b>		
	<p>Do local K-12 schools have an adequate technology emersion model for acquiring, implementing, and supporting eLearning?</p>	<p>Providing and supporting a rich technology emersion model for local schools to use that encompasses hardware, online content in key subject areas, assessment tools, professional development, helpdesk support; Ensures that maximum educational benefit will be derived from any statewide network.</p>

## Key Infrastructure Policy Questions

State leaders today face numerous challenges in designing, implementing, and maintaining statewide networks - from free speech to ethical standards to student records privacy to copyright. Many states find it necessary to establish policies to deal with these issues.

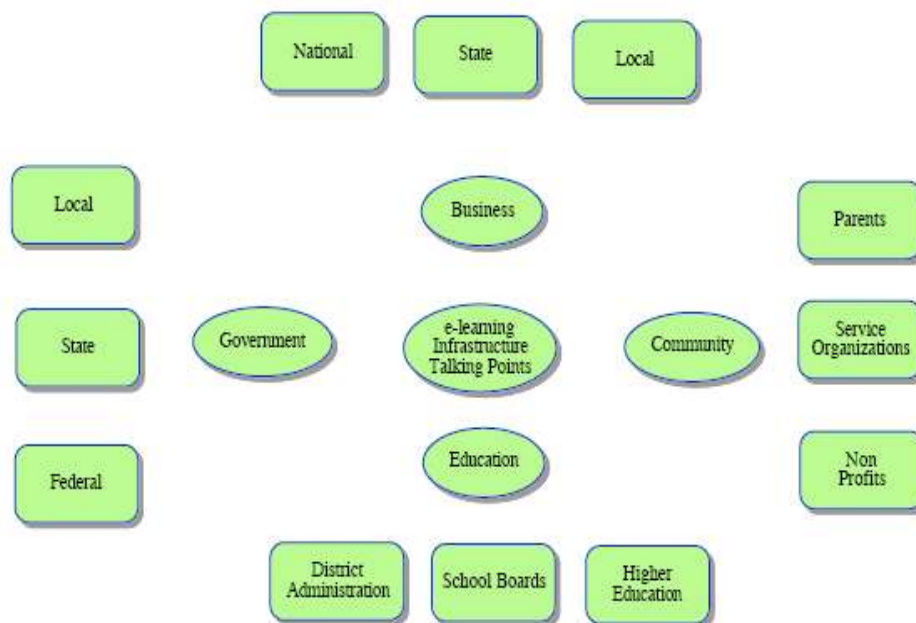
The Policy Matrix identifies five different policy areas:

- Total Cost of Ownership
- Network Use
- Security
- Procurement
- Governance

Each area includes a definition, associated essential questions, and related example policies and resources.

## Stakeholders and Talking Points

The goal of this subgroup is to encourage states to include various partners in discussions when considering the development and sustainability of a statewide network. The graphic identifies potential stakeholders and their relationship to education and e-Learning. The toolkit includes talking points, with both questions and answers that may be used as a guide during conversations with various stakeholder groups.



## **Community**

What community organizations would benefit from a statewide network?

- Recreation centers
- Home-school groups
- Museums
- Libraries
- Hospitals
- Places of worship

How can a statewide network improve the quality of life in the community?

- Connect local services with each other, i.e., connecting after school programs, recreation centers, and home-school programs
- Connect local community services with businesses
- Provide universal Internet access at public places (Library, Schools, Town Offices)
- Provide a better quality of service
- Share content and/or services with a broad and diverse audience
- Provide universal Internet access at a reduced/no cost.

How could a statewide network improve/help the local library?

- Centralized network technical support
- Reduced staffing needs for local technical support
- Centralized library automation software enabling cross library searching and sharing
- Volume purchasing
- Sharing of library resources with schools and community

## **Government**

How does a statewide network help state and local governments?

- Centralized network technical support
- Reducing staffing needs for local technical support
- Cost savings through economies of scale
- Automation of data collection
- Automation of routine processes (i.e., car registration, driver's license renewals, teacher certification, AYP data)
- Information sharing (between police, fire, etc.)

- Single data entry
- Data mining

### **Education**

How does a statewide network help schools?

- Information sharing
- Single data entry
- Data mining
- Automation of data collection
- Automation of routine processes (i.e. grade reporting, teacher certification, AYP data)
- Centralized network technical support
- Reducing staffing needs for local tech support
- Efficient use of technical staff i.e. rural areas may not have skilled staff persons to manage routers
- Centralized network services - content filtering, SPAM and Virus filtering, email and web services
- Library automation system services.
- Access to e-Learning opportunities
- Access to online resources - local and higher education libraries, etc.
- Access to collaborative learning opportunities that extend beyond the school walls
- Enable online assessment
- Encourage sharing of data between stakeholders, state DOE, etc.
- Equity

How does the statewide network help bridge K12 and higher education?

- ◆ Content sharing
- ◆ Dual credit (earn college credit in HS)
- ◆ Connect K12 and Higher Ed faculty for collaboration and communication

### **Business**

How does a statewide network impact the business community?

- Provides access to information for all stakeholders.
- Provides access to an educated workforce with the information technology skills of the 21<sup>st</sup> century
- Provides access to e-Learning opportunities

- Enhances communications with suppliers and customers through the network
  - Provides access to community and government information and data 24 hours a day
  - Provides employee access to data and information 24 hours a day, so employees can perform job functions at off-hours, if necessary.
- Customers can access information about the company at any time
- Encourages new business development in dynamic environment

## State Examples

The IT group began from the premise that many contextual forces specific to each state affect whether a state may be in a position to implement a statewide network to deliver content and connectivity to school districts and individual schools. The breadth and depth of the issues and details involved in creating the infrastructure and technology needed for statewide networks has resulted in many states being at very different points in terms of expertise, implementation, leadership, and legislative policies. The IT Work Group identified four exemplar states that have developed statewide networks:

- Ohio: <http://www.osn.state.oh.us/go/onenet>
- Mississippi: <http://www.mde.k12.ms.us>
- Washington: <http://www.k12.wa.us/K-20/>  
<http://www.dis.wa.gov/k20/>
- Utah: <http://www.uen.org>

## Next Steps

- Expand the survey of statewide educational networks to collect data from all states.

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