

Project Business Case

Project Name: STAGEnet Upgrade

Project Short Name: STAGEnet Upgrade

Agency: Information Technology Department

Business Unit/Program Area: Telecommunications

Type of Project: Major enhancement/upgrade

Date: April 30, 2009

Version: 1.1

Project Description:

The state deployed STAGEnet in 2001 delivering a state of the art network system for K12, Higher Ed, state government and political subdivisions. In 2006-2007 the state bid out and upgraded the core backbone creating new core hub sites in Minot and Grand Forks, in addition to upgrading the Bismarck and Fargo sites. Our vendor was the one who actually upgraded equipment. In order to keep costs down, the state just reconfigured much of the state owned equipment and put back into service. This upgrade improved the overall bandwidth available to all of the state entities using it and provided a redundant loop in the core infrastructure. However, the "last mile" was still restricted to the older ATM (mostly T1) technology. Many of those endpoints, especially in the K12 area, were running out of capacity in that link to the backbone. In addition, the core components that run 24x7x365 are reaching their end of life. Failure in this equipment can cause a significant outage in the network, possibly impacting hundreds to thousands of users.

Recent negotiations with our provider (Dakota Carrier Network) have provided an opportunity to significantly increase the bandwidth to those endpoints with only a very slight increase to the overall monthly cost. In addition, those negotiations also offered the state the opportunity of increasing our core bandwidth for a significant decrease in monthly cost.

This project will deliver a much need equipment refresh to the K12 endpoints. It will also refresh the equipment in the Higher Education sector and update some of the core network equipment. This equipment will allow us to significantly increase the bandwidth available to the K12 and Higher Education facilities.

Business Need/Problem:

ITD faces several issues:

- The endpoint equipment in most of the K12 locations is 7-8 years old.
- The endpoint equipment in most of the K12 locations uses older (ATM) technology.
- Many of the K12 locations have reached the capacity limit of their bandwidth and the cost to increase capacity using ATM technology is prohibitive.
- The endpoint equipment in most of the Higher Education locations is also 7-8 years old.
- The endpoint equipment in most of the Higher Education locations uses older (ATM) technology, albeit at a higher capacity level than K12 for the most part.
- Many of the Higher Education locations have also reached the capacity limit of their bandwidth and the cost to increase capacity using ATM technology is prohibitive.
- Much of the state-owned core backbone equipment is 7-8 years old. This equipment has an increasing chance of failure. Failure of one of these components could have a significant impact to ITD's customers.

Solution (as described in Proposed Solution):

This project will refresh much of the existing STAGEnet hardware. Because of the requirements of K12 and Higher Education, much of the work for this project must take place between June 1st and August 14th. The next available window would be during the Christmas break.

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The project will replace the existing ATM T1s in most K12 locations to a 10MB Ethernet system. This will provide a bandwidth capacity increase of 7.5 times. This will impact approximately 173 locations across the state. In addition about 16 other locations will get an equipment only upgrade. (They are already using newer technology for other reasons, e.g. the major metro areas.) Even then, three of those 16 locations will receive an increase in bandwidth capacity.

The project will also replace the ATM endpoint equipment at the Higher Education locations. They will be able to access increased bandwidth at a cost effective price.

The project will upgrade STAGEnet backbone hardware as well. This will help minimize failures due to age. This will also increase the backbone capacity to handle the increased traffic from all the endpoints.

Finally, the project will also upgrade the tribal and library locations, providing similar benefits as the K12 and Higher Ed locations will receive.

Consistency/Fit with Organization's Mission:

ITD's Mission Statement is "To provide leadership and knowledge to assist our customers in achieving their mission through the innovative use of information technology." Our Vision is to be "the trusted partner and preferred IT provider for strategic services within government and education." STAGEnet is a core service for ITD. A key component of that service is to provide our customers the capacity they need in a cost effective manner. In today's world, our customers expect the network to always be there. This project will allow us to cost effectively provide increased bandwidth and maintain the reliability of the network.

Cost Benefit Analysis

Anticipated Benefits:

K12 – As noted above, the K12 system will receive significant benefit with this project. Replacing the infrastructure will improve the reliability. Teachers enter grades and parents look at their children's grades at all hours of the day. Access to those systems requires a strong network. The increased bandwidth will provide better overall performance for most schools and allow them add concurrent video classes.

Higher Education – The Higher Education system will also receive improved reliability and increased bandwidth. This will also allow them to offer more concurrent on-line courses and meet the increasing demands for bandwidth that the current generation of students requires.

Other Entities – The libraries, political subdivisions and tribal entities connected to the state infrastructure will also receive the benefit of improved bandwidth, reliability and security. All entities, including state government will receive the benefits of a more reliable backbone and increased backbone capacity.

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Cost Estimate:

This budget does not contain any allocated costs. All costs are being reallocated from the current budget.

	Direct Project	Staff Transfer	Total
Project Costs			
K12 Endpoint Hardware	\$304,000		\$304,000
HECN Endpoint Hardware	\$146,000		\$146,000
Library Endpoint Hardware	\$43,000		\$43,000
Tribes Endpoint Hardware	\$36,000		\$36,000
Misc. Endpoint Hardware	\$35,000		\$35,000
Core Hardware	\$1,516,727		\$1,516,727
Core Software	\$52,811		\$52,811
Initial Software Support	\$18,411		\$18,411
Training	\$60,000		\$60,000
Project Management		\$13,000	\$13,000
Provisioning Staffing	\$36,000		\$36,000
Install Staffing	\$14,400		\$14,400
Staff-ITD		\$544,320	\$544,320
Travel	\$3,000		\$3,000
Miscellaneous			
Training Discount	(\$60,000)		(\$60,000)
Risk Contingency	\$30,000	\$82,000	\$112,000
Management Reserve	\$42,000		\$42,000
Sub-Total	\$2,277,349	\$639,320	\$2,916,669
Non-Project Costs (Operations)			
Increased General Fund costs (Annual) - K12	\$21,386		\$21,386
Increased General Fund costs (Annual) - HECN	\$13,848		\$13,848
Sub-Total	\$35,234	\$0	\$35,234
Total	\$2,312,583	\$639,320	\$2,951,903
Bars Request	N/A		
Total Cost of Project	\$2,916,669		
2YR Cost of Ownership	\$2,969,520		

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Cost/Benefit Analysis:

The increasing demand for capacity and necessity for reliability is the primary purpose of the project. This project improves the reliability of the system with new hardware and significantly expands the capacity of the network with a minimal increase to on-going costs.

Project Risks:

There are some significant risks associated with any change to the network. Most are related to customer outages. Some specific examples include:

- A missed line in the provisioning could mean a site is disconnected until the error is found.
- A setup does not work as expected and causes a full outage. One mitigation step would to have a rollback plan in place for each step in the process. Another is to update core equipment one quadrant at a time.
- Outages may last longer because staff may not be able to troubleshoot issues as quickly being less familiar with the new equipment. A mitigation would to ensure staff has adequate training on the new equipment.
- Additional upgrades to the backbone in Minot and Grand Forks to improve bandwidth would take an additional \$60,000. In order to support this, Higher Education would need to agree to support the funding. At this time, they have not agreed, however, as session closes and budgets are finalized they could change their mind. If Higher Ed makes this decision before June 1st, the tasks could be incorporated into the schedule without significant impact to the overall schedule. However, if the decision is after that date, there would likely be significant impact to the schedule or the upgrade would have to be delayed until the Christmas break.

There are also risks to not doing this project.

- We see an increase of outages as equipment fails. While ITD does have some in-stock spare equipment for this type of event, it still takes time to provision, travel to the failed site, and replace the equipment. Much of this effort would constitute overtime. Meanwhile customers like schools with video classrooms would be without service.
- Schools will continue to struggle with network capacity issues which could limit their participation in some programs such as PowerSchool or limit their ability to provide more class offerings via video.