

Memo

To: Charlie Glaes, Steve Goss
From: Steve Miller, Don Puckett
Date: May 12, 2010
Re: 2010 – 2011 Network Upgrade Proposal

Background:

Vicksburg Community Schools maintains over fifty Ethernet switches for network distribution. The age of this equipment varies from two to ten years and most of the equipment is no longer under warranty. VCS's network infrastructure has not gone through a major upgrade in approximately ten years. As a result, we are experiencing many breakdowns and/or slow downs throughout the day. In addition, our curriculum and application programs require more speed (bandwidth). Currently, the network provides a backbone of 1GB connectivity to each of our buildings. Once the network enters each building the connectivity drops to 10-100 MB to the classrooms, offices and computer labs.

Proposal:

This proposed network upgrade would provide 10 GB connectivity to every building except the VAB and a 1 GB to every computer station in those buildings. Potentially, that is up to ten times the speed we currently have. There would be a 2 GB connectivity going into the VAB and a 1GB to each of those computers.

The proposed network upgrade includes:

- A 10GB backbone to each building. 2 GB to the VAB.
- 1 GB connectivity to every desktop
- Preparation for VOIP (Voice over IP)
- Preparation for video streaming
- Preparation for IP security cameras
- The ability to control the bandwidth across the network to give priority to voice, video and data (Quality of Service)
- Enough bandwidth across the network for voice, video and data.

Justification/Rationale:

The network infrastructure of a 1 GB Ethernet backbone and 10-100 MB connectivity to each user has served the needs of the Vicksburg school district very well. However, as we look into the future and we add more functionality and capacity (voice, video, video/audio streaming, classroom to classroom conferencing, access control, increase Internet usage, security, etc.) to the network infrastructure, bandwidth becomes too slow to handle all of this additional traffic. VCS's infrastructure must be able to take on the continued convergence of voice, data, and video as utilization begins to increase. Current equipment; 1) does not support higher network speed, Quality of Service, and other advanced network features, 2) is at an age that will cause more and more trouble calls, downtime and slow downs for each building, and 3) is running out of ports (space) to add additional network devices. Also, VCS must be ready for wireless distribution and to take on the additional traffic from all wireless devices deployed within the district as wireless technology becomes more secure, connectivity speed increases and prices drop. As we continue to rely on our network infrastructure for our technology needs (curriculum, software applications, management, services, etc) we'll continue to need the speed (bandwidth) over our network. This bandwidth will be needed regardless of whether we use services and applications on our servers or servers across the internet. In an attempt to stay "one step ahead" and to meet the needs of new, emerging technologies and, to take advantage of any technologies that provide available cost savings, VCS needs to upgrade their existing network infrastructure.

Benefits To The District:

This network upgrade will give Vicksburg Community Schools the IT infrastructure it needs to meet these growing expectations.

- IP telephony that would also support the district’s wireless phones while in each building;
- Building-wide deployment of wireless access points for administration, staff and students;
- Continued network reliability and quality of service requirements;
- Bandwidth intensive applications deployed on the network;
- District-wide security with IP security cameras, keyless entry, etc;
- Classroom technology automation with video and sound;
- Increased Internet usage that embraces both streaming video and audio as well as increased instructional use to review, maintain or enrich student learning;

Network Upgrade (HS, MS, VAB, Transportation) Costs:

• High School		\$98,126.00
o MDF Equipment Room	switches & other core equipment	39,242.00
o Computer Labs	switches	7,965.00
o Hallways	switches	35,788.00
o UPS Battery Backup		11,291.00
o Cabling		3,840.00
• Middle School		\$40,472.00
o MDF Equipment Room	switches & other core equipment	19,980.00
o Hallways	switches	14,705.00
o UPS Battery Backup		5,787.00
• VAB		\$12,195.00
o MDF Equipment Room	switches	8,696.00
o Cabling		1,651.00
o UPS Battery Backup		1,848.00
• Bus Garage		\$970.00
o MDF Equipment Room	switch	970.00
• Spares		\$4,439.00
• Installation and Configuration		\$12,970.00
• Misc Items		\$6,000.00
	Total	\$175,172.00

Re-Cabling - Elementary Buildings

Considerable work at each Elementary building needs to be completed in order to support this proposed upgrade. Currently, fiber runs to each elementary classroom. At the time of this installation, over nine years ago, it was thought that fiber would provide larger bandwidth and faster speeds across our network to each Elementary classroom. Recent technology has created faster speeds and larger bandwidth across copper wire using CAT 5e or CAT 6 cable at lower costs than with fiber. Although fiber would provide equal bandwidth, equipment costs and material supplies outweigh the benefits. At this time, a transceiver and a switch is needed in each classroom to convert the signal from fiber to copper and run the signal to the computers. In the future, as we look at installing other peripheral equipment on the network such as IP phones or IP security cameras, we would need not only a copper connection but also a power supply for each piece of equipment. Copper, CAT5e, can carry the necessary power to each piece of equipment eliminating the need for a power supply and an electrical source while fiber can not. The cost of a transceiver, switch, and power supplies in each classroom adds up to more than the cost to install copper cable to each classroom.

- Sunset Elementary \$48,932.44

NOTE: The cost shown only includes cable to each classroom. Building network switches would be an additional cost.

Network Upgrade 4 year Proposal

Year 1

Approximate Cost = \$250,000

- Replace staff computers
- Replace servers and upgrade network software

Year 2

Approximate Cost = \$237,000

- Replace network core switches at the High School (MDF) and Middle School (MDF)
- Replace all High School and Middle School intermediate switches (IDF) – 28 switches.
- Replace network switches at the VAB and Bus Garage

Year 3

Approximate Cost = \$150,000

- Re-cable the Elementary buildings replacing the fiber that goes to all classrooms with cooper.

Year 4

Approximate Cost = \$197,000

- Replace the network core switches (installed in year 2) at the High School (MDF) and relocate that equipment to the elementary buildings (MDF)
- Replace all Elementary intermediate switches (IDF) – 16 switches

Year 5

Approximate Cost = \$160,000

- Replace the phone system

Note:

In order to get to the \$200,000 to \$250,000 cost level each year we have not included the following in this proposal:

- Wireless capability throughout the district - \$75,000
- Network tape backup - \$50,000
- UPS battery backup - \$20,000
- Faster and higher end network switches
- Higher end servers
- Additional network storage
- Classroom technology equipment i.e. projectors, document cameras, classroom clickers, DVD's, etc.
- Additional computer labs to meet student demands

Comparative Price List

QTY	Part #	Description	Secant		REMC		OSCCN	
				Sub-Total		Sub-Total		Sub-Total
16	C2960S-STACK	FlexStack hot-swappable stacking module	740	11840	990	15840	1027	16432
1	C3KX-NM-10G	Catalyst 3K-X 10G Network Module Spare	1234	1234	1650	1650	1559	1559
4	C3KX-NM-1G	Catalyst 3K-X 1G Network Module Spare	247	988	330	1320	346	1384
1	C3KX-PWR-350WAC	Catalyst 3K-X 350W AC Power Supply	247	247	330	330	348	348
1	C3KX-PWR-715WAC	Catalyst 3K-X 715W AC Power Supply	494	494	660	660	665	665
8	GLC-LH-SM	GE SFP, LC connector LX/LH transceiver	491	3928	656	5248	657	5256
31	GLC-SX-MM	GE SFP, LC connector SX transceiver	247	7657	330	10230	369	11439
3	SFP-10G-LR	10GBASE-LR SFP module	1972	5916	2636	7908	2592	7776
2	WS-C2960S-24PS-L	24 PORT 10/100/1000 PoE+ ENET 4PORT	1972	3944	2636	5272	2706	5412
1	WS-C2960S-24TS-L	24 PORT 10/100/1000 ENET 4PORT	1478	1478	1976	1976	2031	2031
10	WS-C2960S-48FPS-L	48 PORT 10/100/1000 PoE+ ENET 4PORT	3699	36990	4946	49460	5078	50780
1	WS-C2960S-48TD-L	48 Ethernet 10/100/1000 ports 2 Ten Gigabit Ethernet SFP+ or 1 Gigabit Ethernet SFP ports	3452	3452	4616	4616	4739	4739
10	WS-C2960S-48TS-L	48 PORT 10/100/1000 ENET 4PORT	2465	24650	3296	32960	3384	33840
1	WS-C3560-8PC-S	CATALYST 3560 8 10/100 POE + 1 T/SFP STANDARD	965	965	989	989	1025	1025
12	GXT3-1500RT120	Liebert UPS	807	9684	1024	12288	847	10164
4	GXT3-2000RT120	Liebert UPS	1066	4264	1350	5400	1155	4620
3	WS-C3750X-24P-S	Stackable 24 10/100/1000 Ethernet PoE+ ports, with 715W AC Power Supply, 1 RU, IP Base feature set	3603	10809	4818	14454	4995	14985
1	WS-C3750X-24T-S	Stackable 24 10/100/1000 Ethernet ports, with 350W AC Power Supply, 1 RU, IP Base feature set	3208	3208	4290	4290	4563	4563
1	WS-C3750X-48T-S	Stackable 48 10/100/1000 Ethernet ports, with 350W AC Power Supply, 1 RU, IP Base feature set	5675	5675	7590	7590	7867	7867
Total				\$137,423		\$182,481		\$184,885

Labor	\$13,000
Maintenance	\$7,000
Cabling	\$4,000
Spare Equipment	\$5,000
Software	\$6,000
UPS/Batteries additional	\$3,000