**Information Technology (IT)**

**Lampeter-Strasburg School District (L-S)**

**IT @ L-S**

**2011/2012**

**Goals:**

Recruit and Develop Highly Skilled Staff

Install Superior Infrastructure Technology

Deliver the Best Instructional and Administrative Technology Available

**Motto:**

“Deliver Professional Responsive Quality Service”

“If it is not exceptional, then it is not acceptable”

**Vision:**

To provide the best instructional technology available to create environments that motivate each student to acquire knowledge, skills, and values to become a responsible, productive citizen.

To provide teachers with professional development opportunities and technology resources that can be incorporated into the curriculum to engage students and enhance learning.

To implement a solid infrastructure environment that can effectively support and deliver the best instructional and administrative technology, by selecting enterprise-level solutions, using industry standard products and services, from tier one vendors.

**Guiding Philosophy:**

Understanding that to deliver effective **instructional and administrative technology**, a school district must implement a solid framework of **infrastructure technology**. At Lampeter-Strasburg School District, we work hard to apply “**Best Practices**” while implementing **enterprise level solutions** in each major area of our infrastructure technology using **industry standard products and services** from **tier one vendors**.

**Summary:**

Lampeter-Strasburg School District has approximately

* 65 servers
* 2,000 staff and student end-user computers
* 3,330 students (K to 12)
* 485 staff
* $45,000,000 annual budget
* 7 buildings (5 instructional and 2 non-instructional)

**IT @ L-S**

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**NOC Electricity and Air Conditioning**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

Basic and essential yet very critical components of a NOC (Network Operations Center) are both electrical power and air conditioning and humidity. Recognizing the importance of having management and monitored power and air in the NOC, Lampeter-Strasburg School District chose APC (American Power Conversion) environmental equipment as outlined below.

Our NOC (Network Operations Center) power and air conditioning is handled by an **APC InfrastruXture UPS System** for power protection and an **APC InRow AirFlow System** for cooling.

The entire power grid for the NOC is connected to a 40 KVA APC InfrastruXture UPS Unit, which is connected to a diesel Motor Generator for total power backup. The APC InfrastruXture UPS Unit provides power protection, power backup, power distribution, and power management and includes redundant PDUs, inverters, and (16) batteries. When this system was implemented, APC wrote a case study on our implementation.

We installed two, 10-ton APC InRow AirFlow Units for efficient cooling. The InRow AirFlow Units create a “hot air/cold air isle” and cool the air at the server where the heat is generated. With the two units, we have built-in backup and redundancy.

The above APC equipment is connected to an APC Environmental Management system that monitors temperature and humidity in six different locations in the NOC for high and low thresholds and fluctuation tolerances, with e-mail and cell phone notification of any exceptions.

APC has nearly 10,000 employees with corporate offices located in West Kingston, Rhode Island, and sales offices and manufacturing facilities around the world. Founded in 1981, APC is a leading provider of global, end-to-end AC and DC based back-up power products and services, which include surge suppressors, uninterruptible power supplies (UPS), power conditioning equipment, power management software, and DC power systems, as well as precision cooling equipment and professional and consulting services for Nonstop Networking. APC, known for “Legendary Reliability”, sets the standard for quality, innovation, and support for power protection solutions from desktop systems to data center operations to entire facilities. Known for its quality, innovation, and industry leading service and support, APC has perhaps the longest list of accolades in its industry. Not satisfied with this, APC is working diligently to achieve its corporate mission of creating delighted customers by improving the manageability, availability, and performance of information and communication systems through the rapid delivery of innovative solutions to real customer problems.

**Server Farm, Servers, Storage, and Backup**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

Our philosophy of implementing enterprise level solutions in each major area of our infrastructure technology and using industry standard products and services from tier one vendors was applied in a big way with servers, storage, and backup. **Dell** was selected as our vendor to standardize with servers, and all servers that were purchased since 2005 were Dell PowerEdge servers. Likewise, when evaluating storage vendors, **EMC** was selected as our vendor of choice for enterprise level, high capacity, and high performance storage. Additionally, after evaluating over 12 venders that provide backup systems, we choose **CommVault** to handle our backup, deduplication, and replication needs. In the end, CommVault was our preferred backup system vendor because of their ability to backup a virtual server/storage environment and to deliver deduplication and replication functionality that outperformed the other vendors.

***Dell*** *- Dell has a solid story around servers and end-user computers, and since 1984, Dell has been making technology more accessible to people and organizations around the world. Dell ships more than 110,000 systems every day to customers in 180 countries. As of January 2011, Dell has over 96,000 employees, with annual revenue of $15.4 billion. Dell has a clear focus on the education market through its “*[*Connected Classrooms*](http://content.dell.com/us/en/k-12/connected-classroom-main.aspx) *and* [*Virtual Labs*](http://circ.ziffdavisenterprise.com/creative-services/dell_ed_ss-050510/virtuallabs.html)*” initiatives, designed to help administrators, teachers, and students harness the power of technology to advance learning. This focus has resulted in more school districts and universities than ever deploying Dell education-specific technology solutions, making Dell the top provider of laptops and desktops to schools in many major markets around the world. Overall Dell is the number one technology vendor in the public sector, medical field, and large enterprise and does business with 98 percent of the Fortune 500 corporations.*

***EMC*** *- EMC employs approximately 40,000 employees and is the leading provider of enterprise infrastructure storage. EMC has received an unprecedented number of awards and recognition for being the leader in enterprise storage and has enjoyed a major market share of enterprise storage systems.*

***CommVault*** *- Founded in 1996 with over 12,000 employees, CommVault was one of only two data management software companies to receive the highest rating bestowed by Gartner in their 2008 Enterprise Backup/Recovery Software MarketScope. Many leading technology companies have formed strategic partnerships with CommVault, including Dell, Microsoft, VMware, Oracle, HP, and others. CommVault understands the importance of data (information) and is the leader in meeting the growing storage needs of the data center. CommVault is very aggressive in its approach to staying ahead of the curve with new technologies, such as compatibility with Vmware and VMDK in a virtualized server and storage environment, as well as deduplication and replication functionality.*

With a specific plan and a strategic strategy, Lampeter-Strasburg School District built a NOC/Server Farm/MDF that will support our current and future needs and allow us to deliver to the desktop data, audio, video, television, and voice traffic. By consolidating all of our servers and all of our storage for our voice, data, and video systems in a single room (NOC), we were able to leverage significant savings in many areas and take full advantage of virtualization. We have implemented several VMware vShpere 4 Enterprise Plus ESX server clusters allowing us to consolidate over half of our nearly 60 servers and save approximately $200,000 over two years. These server clusters and fibre channel (SAN) storage has positioned us to fully implement a virtual desktop/thin client computer environment and move forward with a private and public cloud computing strategy. With this infrastructure in place, we are able to look at how we can potentially embrace a new set of student computing devices, such as cellphone computers, tablet computers, netbook computers, and handheld computers all in a monitored, managed, and secure environment that is CIPA and eRate compliant.

With the high degree of dependency on technology, there is an incumbent need to have a backup system that meets the needs of today and tomorrow and is reliable and scalable. In our case, the amount of raw disk storage needed for nearly 4,000 staff and students quickly made tape backup an undesirable option. The amount of data we need to backup forced us to look at new technologies, such as deduplication, to shrink the backup disk storage capacities. CommVault’s backup software called Simpana performs a nightly backup and an efficient deduplication, as well as replicates the data to an off-site location. With this backup strategy, Lampeter-Straburg School District benefits from a disk-to-disk-to-disk backup, deduplication, and replication. This results in a nightly backup of our data, retaining the data for four months and having it stored on-site and off-site. This strategy meets our backup needs and our disaster recovery needs and eliminates the use of any tape. A nightly process is performed automatically with no operator intervention or the need to deliver tape(s) to an off-site location. The backup system gives us the capability to easily restore files that are inadvertently deleted, lost, or corrupt. We can restore files for staff within minutes, saving multiple days of work it could take to recreate the file(s) manually. Finally, this backup system satisfies the requirements of our auditors and goes a long way in meeting the needs of a huge component of our disaster recovery requirements.

The off-site location of our backup is at Lancaster-Lebanon Intermediate Unit 13 and is leveraged over the network connection from the WAN Service. Below, under Matador Backup System, is a description of the components of this backup strategy:

***Dell Servers*** *- Our server farm of approximately 60 servers is built with server class Dell PowerEdge Servers. The newest servers are R710 model servers, and many are 2950 model servers. Most of our servers are virtualized with VMware vSphere 4 Enterprise Plus. The only servers that are not virtualized are servers running applications that cannot be virtualized, such as VoIP servers, Lightspeed Rocket Appliance Servers, Matador CommVault Appliance Servers, etc.*

***EMC SAN*** *- Our data storage system is an EMC CX300 Fibre Channel Storage Area Network (SAN) with four enclosures fully populated with 60 hard drives that provide us with over 22 TB of raw storage capacity. This advanced storage technology fibre channel SAN installation includes multiple server and battery backup units within the SAN array itself.*

***Matador Backup System (Dell/CommVault)*** *- Our data backup system is an appliance called Matador from Dell, Inc., and CommVault, Inc., that utilizes Dell DL2100 Servers and Dell MD1000 disk arrays with CommVault Simpana 8.0 software. This data backup system allows us to perform nightly backups of our data, disk-to-disk-to-disk (primary storage to backup storage to off-site storage at IU13). This nightly process involves backup, deduplication, and replication technologies. Files that are inadvertently deleted, lost, or corrupt can be restored quickly.*

***Avocent*** *-* We use a 42 server KVM Switch to share a single server console (Keyboard, Video Display and Mouse) across all the physical servers.

***Group Logic*** *-* ExtremeZ-IP from Group Logic is used to mange file and print services across our multi-platform environment. When this system was implemented, we presented a national webinar on this product with Group Logic, Inc. and had a case study written on our implementation.

**Network, Internet, Filtering, and Security**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

Enterprise level products and services are seen throughout our network infrastructure. The network at Lampeter-Strasburg School District is built around three names that are synonymous with networking, Cisco, Motorola, and Comcast. Cisco is the worldwide leader in networking and transformed how people connect, communicate, and collaborate, and because of their dominance in the market, they have become the defacto standard with networking electronics and associated protocols. Cisco has long been the “Gold Standard” and has consistently delivered top quality products and services. Likewise, Motorola has been known for it superior product line in the world of wireless communications, and Comcast has grown to become one of the largest communications companies having more fiber optic cable in more places than any other company does.

**Network Internet, Filtering, and Security Services:**

**Comcast** - Our Wide Area Network (WAN) is a fiber connection to Comcast through IU13, which is part of a 400 MB link for Internet access and I2 Internet traffic.

**Motorola** - In addition to the six buildings on our main campus, we have one school building six miles away that is connected to the NOC on our main campus through a high-speed (300 MB) point-to-point wireless link using a Motorola Canopy Wireless System.

**Network** - Our Local Area Network (LAN) consists of seven buildings (four school buildings, an administration building, and a maintenance building on a single campus) all connected via dark/private fiber optic cable. Ninety-six strands of fiber optic cable are used to connect each building to our NOC (24 fiber strands to each building made up of a hybrid bundle of 12 multi-mode and 12 single-mode). This network infrastructure allows us to have a LAN backbone between buildings of 2 GB, 100 MB to the desktop, 100 MB dedicated to IU13, and 400 MB shared (with set guaranteed and busted rates) to the Internet. Our NOC and MDF/IDF distribution across our seven buildings is as follows:

* 1 MDF Administration and Maintenance Buildings
* 1 NOC, 1 MDF and 4 IDFs in Lampeter-Strasburg High School
* 1 MDF and 2 IDFs in Martin Meylin Middle School
* 1 MDF and 2 IDFs in Hans Herr Elementary School
* 1 MDF and 1 IDF in Lampeter Elementary School
* 1 MDF in Strasburg Elementary School
* Over 90 Distribution and Edge Switches
* Over 5,000 data jacks district-wide

**Cisco** - Our network is built predominantly with Cisco network equipment using Cisco network security features, with a Cisco 6509 (fully redundant) Core switch to Cisco Distribution Switches, POE Switches, a Cisco Wireless System, and a Cisco VoIP System. This switch supports our network security, wired and wireless connections, and Voice over IP. Installed with our Cisco 6509 Core Switch, we also installed a Cisco 5520 ASA (Adaptive Security Appliance) providing world class network security features, such as firewall, unified voice/video communication security, SSL, IPsec, VPN, and IPS. Our 6509 Core Switch is configured with the following components:

* Cisco Catalyst 6509-E Core Switch
* WiSM Blade (300 WAP controller)
* Two 24 Port SFP Blade
* Two 48 Port Copper Blade
* Redundant Supervisor 720 Blades
* Redundant Power Supplies

**Cisco Wireless System** - We have installed an enterprise level wireless system to provide data wireless access in each building as follows:

***Lampeter-Strasburg High School -***

* 71 Cisco Wireless Access Points (APs) and 238 Total Antennas
	+ 48 APs each with four Antennas (two “G” Antennas and two “A” Antennas - 192 Antennas Total). Each of the 38 CFF Classrooms has its own AP with two “G” Antennas and two “A” Antennas for maximum coverage and maximum density.
	+ 23 APs each with two Antennas (two “G” Antennas - 46 Antennas Total)

***Martin Meylin Middle School -***

* 29 Cisco Wireless Access Points (APs), each with two “G” Antennas

***Hans Herr Elementary School -***

* 3 Cisco Wireless Access Points (APs) , each with two “G” Antennas

***Lampeter Elementary School -***

* 25 Cisco Wireless Access Points (APs) , each with two “G” Antennas

***Strasburg Elementary School -***

* 2 Cisco Wireless Access Points (APs) , each with two “G” Antennas

**IP Based Voice System** - We have installed a Cisco VoIP (Voice over Internet Protocol) Phone System to service the majority of the school district. This allows us to leverage our data network infrastructure and use it to deliver voice and data. Using Cisco Call Manager and Unity Voicemail System, this new system integrates voicemail with e-mail presenting your voicemail messages in Outlook with your traditional

e-mail messages.

**IP Based Clock/Bell/Speaker/Intercom System** - We are using a Cisco approved (SingleWire/Berbee) IP based Clock/Bell/Speaker/Intercom System, which interfaces with the Cisco VoIP System by using the phone handset as the microphone for the intercom/speaker system. This Cisco-based network handles all of our wired/wireless, data, voice, and video traffic, as well as clock, bell, speaker, and intercom communications. Voicemail and e-mail are integrated in a single end-user client via Microsoft Outlook. We are now able to leverage data, voice, video, clock, bell, intercom, and speaker communications over a single IP based network. TV signal is our next communications media to distribute or deliver over IP.

**Network Filtering and Security** -We have three dedicated appliance servers running **Lightspeed Rocket TTC** (Total Traffic Control). The Rocket TTC product suite from Lightspeed Systems, Inc., handles all of our Web filter, e-mail filter, SPAM filter, antivirus protection, message journaling, client desktop security, client content management, and client bandwidth management. The major components of our Rocket TTC appliances are as follows:

* Mail and Web Content Filtering
* In-Line Filtering for Best Performance
* “Internal” and “External” Network Interfaces
* Three Web Filter Policy Levels: Student, Staff, Administrative/IT
* MS SQL Server 2005 Required for Each TTC Server
* In-Line Installation
* TTC 8.0 Console
	+ Remote Deployment of Security Agent
	+ “One Stop Shop” for Managing Antivirus Scans and Client Updates
	+ Active Directory-Integrated User, Group, Computer Lookup Functionality
	+ Security Agent
	+ Desktop Antivirus Protection with Scheduled AV Scans and Definition Updates
	+ Zero Client Configuration
	+ Correctly Resolves AD Group Membership and Usernames

**Network Performance Monitoring and Management** -We use **PRTG Enterprise** to monitor our network traffic and network performance.

**Server and Desktop Virtualization**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

**Virtualization (Server and Desktop):**

Virtualization is thought by many industry leaders to be the most significant technology ever. Maintaining the philosophy of building an enterprise-level infrastructure and implementing industry standard products and services, Lampeter-Strasburg School District has virtualized both servers and desktop computers utilizing “Best Practices” from tier one vendors (Dell, VMware, and Citrix). This virtualization project has allowed us to implement “GREEN” technology strategies that provided us with immediate and long-term savings, with many direct and indirect benefits. Lampeter-Strasburg School District developed its initial virtualization project by virtualizing many of the application servers first, followed by virtualizing desktop computers.

***VMware, Inc.*** *understands the importance of helping companies maintain a competitive edge by providing the best virtualization infrastructure solution. VMware has been offering server virtualization solutions since 2001 and is the world's leading server virtualization provider, offering the best and most trusted solution for transforming today’s IT environment into a more flexible, automated cloud infrastructure, helping companies reap cost savings and productivity benefits.*

**Server Virtualization (Dell and VMware):**

In 2008, Lampeter-Strasburg School District’s Network Operations Center (NOC) was nearing capacity with available server rack space needed to add additional servers, available KVM (Keyboard Video Monitor) ports needed to add additional servers, UPS battery load and battery backup time, air conditioning units, and available floor space in the room needed to add additional server racks and/or network racks to accommodate any growth. It was clear that the solution to this capacity issue was to virtualize our servers.

VMware, Inc., was the obvious choice when selecting the server virtualization software company, as they have a majority of the market share and have the most mature server virtualization product. Our initial server virtualization implementation had immediate benefits for us as it eliminated the need to purchase new physical servers, another KVM switch, an additional rack of batteries, additional air conditioning, an additional server rack, and to make modifications to the physical space in the NOC. Virtualization allowed us to continue to grow and expand with new technologies without the direct impact on space needs, electricity loads, and cooling needs as we had in a purely physical environment. These cost savings were approximately $200,000 over a two-year period.

Our server virtualization implementation involved building a cluster of three identical physical **Dell** PowerEdge servers that run **VMware** vSphere 4 Enterprise Plus ESX Operating System. These three physical servers now run over 30 virtual servers. We are able to add servers, as needed, without the traditional process of specing, quoting, ordering, waiting for shipping, racking, connecting, and installing software and applications. This traditional four to eight week process is eliminated saving time and money. We have been able to collapse/reduce the number of physical servers significantly, saving energy costs (electricity, heat/air conditioning) and bring our battery backup and battery load back to acceptable thresholds.

Dell and VMware helped us achieve our goal of reducing energy costs, physical server purchases, server complexity and more. Server virtualization has truly been huge cost savings initiative.

We have worked hard to virtualize as many of our servers as we could and have virtualized over half of our servers. The following servers are running as virtual servers:

* Cisco Secure Access Control Server
* Citrix Desktop Delivery Controller
* Citrix Desktop Delivery Controller
* Apache HTTP, MySQL, MOODLE PHP
* Citrix Provisioning Server
* Citrix Provisioning Server
* LunchBox Cafeteria Application - Apache, SQL Services
* Domain Controller for PIONEERS domain
* Domain Controller for ROOT domain
* Exchange Server - Mailbox Database
* Exchange Server - Hub Transport, Client Access Server
* CSIU Financial Accounting – Fox Pro Database, Terminal Services
* FileMaker Pro Database
* Student File Server - Windows file sharing service, ExtremeZ-IP for AFP
* Student File Server - Windows file sharing service, ExtremeZ-IP for AFP
* Staff File Server - Windows file sharing service, ExtremeZ-IP for AFP
* EMS Facilities Scheduling
* Follett Destiny Library System - SQL Database
* Lab Volt - Middle School Tech Ed Application Server
* Network Management - TFTP, Nagios, Cacti
* Network Management - PRTG, TFTP, Syslog, Avaya Phone System
* PowerSchool Student Information Service - Oracle DB Services
* PowerSchool Student Information Service - Task Master App Node, Apache Tomcat
* PowerSchool – PowerTeacher
* PowerSchool Student Information Service Test Server - Oracle DB Services, Apache Tomcat
* Microsoft SharePoint Enterprise 2010
* EduLog Transportation Application
* ProCare Server Child Care Management System
* Cisco Wireless Controller System
* Secondary Web Services - Apache HTTP, PHP
* Windows Software Update Server 3.0

**Desktop Virtualization (Citrix and WYSE):**

Virtual Desktop/Thin Client Computer is really the process of shifting the desktop computer operating system and application software to the server and having a cluster of servers run a software program that delivers and manages pools of desktop images to end users wherever they login on the network.

*Citrix, Inc., was born from the idea of unlocking applications from data centers and employees from the office - creating new ways for people and IT to work. Today, this is the promise of virtual computing, and Citrix is at the epicenter. More than 230,000 organizations worldwide rely on Citrix to help them build simpler and more cost-effective IT environments enabling virtual work styles for end-users and virtual data centers for IT. Citrix, Inc., was founded in 1989 and has annual revenues of $2 billion.*

Desktop virtualization is very different from server virtualization largely from the standpoint that there are many more desktop computers than servers with individual end users often having individual needs. In our case, we have approximately 60 servers and nearly 2,000 end user computers. Because of the different demands and requirements with desktop virtualization versus server virtualization, we had a different set of project criteria and vendor qualifications when selecting the vendor and product. **Citrix, Inc.,** was the vendor of choice because of the large market share, longevity as a company, and maturity of their product(s). Citrix XenDesktop 5.6 HDX Enterprise and Xen App 6.5 are our virtual desktop products used to manage and deliver desktop images and applications to students and staff computers. As with server virtualization, there are many immediate and long-term benefits with desktop virtualization.

As it implies, desktop virtualization involves the end user computer. The end user computer can be a Thin Client Computer, a regular computer, also referred to as a “fat” client. A Thin Client Computer does not have any moving parts, no power supply with fan or hard drive with a spinning spindle, making this device a very energy (heat and electricity) efficient device. Without a hard drive, the setup and install process is quick and easy. The built-in firmware boots the device and points it to the server for the operating system and application software image and the end users data files. In a similar way, a regular “fat” client computer is converted to Thin Client Computer from a processing perspective. The fat client computer would still have the power supply and hard drive, but shift processing to the server, resulting in a much faster computer (Fat to Thin PC). With virtual desktop technology, we are able to extend the life of aging computers and boost their performance significantly. Therefore, there are immediate and long-term benefits including cost savings to using Thin Client Computers and/or Fat to Thin PCs.

***WYSE, Inc.,*** *was quickly identified as the company of choice for Thin Client Computers as they have dominated this space claiming a majority of the market share and demonstrating a mature and superior product line. Founded in 1981 in San Jose, California, WYSE, Inc., currently boasts of annual revenue of approximately $1 billion. Because of our implementation of WYSE Thin Client Computers at Lampeter-Strasburg School District, we were asked to participate in a case study on the use of Thin Client Computers in education. This case study is posted on the L-S IT Web site under case studies.*

***Thin Client Computers - Virtual Desktop:***

* cost approximately 1/3 the cost of a regular computer
* last three times longer than a regular computer
* boots much faster than a regular computer (less than 60 seconds)
* shuts down much faster than a regular computer (less than 15 seconds)
* run applications much faster than a regular computer
* uses very little electricity as there is no power supply with fan or no other moving parts
* generates very little heat as there is no power supply with fan or no other moving parts
* setup is simplified as there is no hard drive to have software installed (OS, applications, and data are all stored on and accessed from the server)
* support is a totally different model than traditional computers as software support is handled from the Technology Department office remote to the end-user

***Fat to Thin PC - Virtual Desktop:***

* Extends the life of aging PCs by only using the monitor, keyboard, and mouse from the aging PC and rely on the virtual image from the server as with the Thin Client Computer to run applications
* Performs much faster than it did as a regular “fat” PC
* Runs applications faster than it did as a regular “fat” PC

We are now able to add virtual desktop computers in any building at a significantly lower cost than the traditional “fat” client computer and provide a much faster computer for students and staff. With over 260 virtual desktop computers currently in use at L-S, we have been able to save approximately $50,000 and are able to leverage the initial investment with even greater saving as more Thin Client Computer/Virtual Desktops are added.

Over the past five years, we have built a technology environment that can now be leveraged to deliver true virtual server and virtual desktop computing and has positioned us to take advantage of true cloud computing with a plethora of end user device options. In summary, our Server and Desktop Virtualization technology environment consists of:

* Server Hardware for Virtual Application Server Cluster - 3 Dell PowerEdge 2950 Servers with 64 GB of RAM in each
* Server Hardware for Virtual Desktop Server Cluster - 3 Dell PowerEdge R710 Servers with 144 GB of RAM in each
* Server Storage - EMC CX300 Fiber Channel Storage Area Network with 4 fully populated enclosures/trays 60 Hard Drives total
* Network - Cisco 6509 Core Switch and Cisco Distribution and Edge Switches
* Server Operating System - VMware vShpere 4 Enterprise Plus ESX (6 licenses for Virtual Application Server Cluster and 6 licenses for the Virtual Desktop Server Cluster)
* Virtual Desktop Software - Citrix XenDesktop 5 HDX
* End-User Device - WYSE V10L and R10L Thin Client Computers (200)
* End-User Device - Fat to Thin PC extending the life of aging PCs (60)

In addition, I have had the privilege to write an article on virtualization that was published in The PASBO Report, make presentations on virtualization at NetworkWorld IT Roadmap Conference, PASBO Conference, Tech Talk LIVE, PETE&C, IU 8 Annual Leadership Conference, as well as present a PASBO Webinar, and, as stated above, participate in a case study.

**Infrastructure Software, Administrative Software, and Instructional Software**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

*updated March 22, 2012*

The philosophy of maintaining an enterprise level technology environment at Lampeter-Strasburg School District was maintained throughout our software selection process. Each software application from server to desktop was strategically chosen and tested for our environment. With Microsoft’s market share dominance and maturity as a company, many of our software applications are from Microsoft. Our server Operating Systems (OS) and major infrastructure enterprise software systems are from Microsoft, from our directory service - Active Directory (AD) to our e-mail system - Exchange/Outlook/OWA to Windows Server Enterprise 2008, Windows XP, Windows 7 and Office Professional 2007 and Office Professional 2010 (Word, Excel, PowerPoint, Outlook, Publisher, Access, InfoPath, OneNote, and SharePoint). In addition, we addressed each of the major technologies, such as blogs wikis, social networking, Web 2.0 etc., with education-approved software for our students and teachers to use in a secure and protected environment.

**Infrastructure Software:**

***Microsoft Active Directory (AD) 2008*** - In August 2006, we installed Microsoft Active Directory 2003 and in August 2011 we upgraded to Microsoft Active Directory 2008 giving us an enterprise level network login and authentication system allowing us to manage end-user access and resource allocation. The migration to Microsoft AD was a huge step in building a network and server environment that gave us the ability to manage hundreds and even thousands of end-users. In our case, we have nearly 475 employees and nearly 3,300 students making AD an excellent directory service choice.

***Microsoft Exchange Server 2010*** - In August 2007, we installed Microsoft Exchange Server 2007, and in January 2011, we upgraded to Microsoft Exchange Server 2010. Our Exchange environment includes multiple servers that give L-S an enterprise level e-mail, calendaring, unified messaging, and journaling system. With Exchange Server 2010, we are able to support remote access to e-mail with an updated version of OWA (Outlook Web Access) via an Internet browser. All L-S employees use Outlook when they are on the L-S LAN (Local Area Network) and OWA via a browser when they are accessing e-mail remotely. This has enabled us to deliver a common uniform, fully functional, feature-rich, e-mail/ calendaring system that offers many productivity benefits to the end-user.

***Microsoft Enrollment for Education Solution (EES) formerly known as Campus Agreement*** - In August 2010, Lampeter-Strasburg School District joined many other school districts in making available to all of its students and staff members an unprecedented list of Microsoft software that includes the following:

* + - Microsoft Windows Desktop/Laptop Operating System (XP, 7)
		- Microsoft Office Outlook 2007 and 2010
		- Microsoft Office Word 2007 and 2010
		- Microsoft Office Excel 2007 and 2010
		- Microsoft Office PowerPoint 2007 and 2010
		- Microsoft Office Publisher 2007 and 2010
		- Microsoft Office Access 2007 and 2010
		- Microsoft Office InfoPath 2007 and 2010
		- Microsoft Office OneNote 2010
		- Microsoft Office Communicator 2010
		- Microsoft Lync Enterprise 2010
		- [Microsoft Advanced Group Policy Management (AGPM)](http://www.microsoft.com/windows/enterprise/products/mdop/agpm.aspx)
		- [Microsoft Asset Inventory Service (AIS)](http://www.microsoft.com/windows/enterprise/products/mdop/ais.aspx)
		- [Microsoft Diagnostics and Recovery Toolset (DaRT)](http://www.microsoft.com/windows/enterprise/products/mdop/dart.aspx)
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		- Microsoft [Virtual Desktop Infrastructure](http://www.microsoft.com/windows/enterprise/solutions/virtualization/improve-flexibility.aspx)
		- Microsoft DirectAccess
		- Microsoft BranchCache
		- Microsoft Federated Search
		- Microsoft BitLocker and BitLocker To Go
		- Microsoft AppLocker
		- Microsoft ForeFront Security Suite
		- Microsoft Windows Rights Manager
		- Microsoft Windows Rights Manager CAL
		- Microsoft Office Communications Server Standard and Enterprise
		- Microsoft Office Communications Server Standard and Enterprise CAL
		- Microsoft Windows Server 2003, 2008 (Standard, Enterprise, and Datacenter)
		- Microsoft Windows Server CAL
		- Microsoft Windows Enterprise Upgrade
		- Microsoft Windows Enterprise CAL
		- Microsoft System Center Operations and Configuration and Manager
		- Microsoft System Center Operations and Configuration and Manager CAL
		- Microsoft Exchange Standard and Enterprise Server
		- Microsoft Exchange Standard and Enterprise Server CAL
		- Microsoft SharePoint Server Standard and Enterprise
		- Microsoft SharePoint Standard and Enterprise Server CAL
		- Microsoft SharePoint and Windows External Connectors

***Classrooms For the Future (CFF) Grant*** -Lampeter-Strasburg School District was a recipient of the Classrooms for the Future (CFF) grant 2007-2008, 2008-2009, and 2009-2010 with a grant total of $507,187. The CFF grant provided all mathematics, science, social studies, and language arts classrooms in Lampeter-Strasburg High School with 38 Promethean Activboards, 38 Epson projectors, 493 ThinkPad Laptop Computers, 15 Computer Carts, 38 speaker systems, 72 wireless Access Points with 240 antennas, 5 color printers, 5 web cams, 5 digital video cameras, and 5 still digital cameras. We continue to build on what this grant provided our high school. In addition to this list of hardware, an impressive list of over 40 software programs (see list later in this report) came with these 493 computers.

**Administrative Software:**

The following software systems are in place for each of the business applications at Lampeter-Strasburg School District.

* ***PowerSchool Premier*** student information system (Oracle version 6 running on a cluster of three virtual servers) - During July and August 2008, we migrated from PowerSchool Professional to PowerSchool Premier. This was a major upgrade of our student information system to a version of the product that was developed in an industry standard programming language, Oracle. PowerSchool Premier includes a new teacher gradebook program, ***PowerTeacher Gradebook*** (PTG). All grades (K to 12) in all levels (elementary schools, middle school, and high school) throughout the school district are now using one student information system (PowerSchool Premier) and one teacher grade book (PowerTeacher Gradebook - PTG).
* ***PIMS*** (Pennsylvania Information Management System) - PIMS is a student and staff reporting system for PDE. PDE has developed a state-wide system to improve data capabilities. PIMS enhances school districts’ capacities to meet student-level data reporting requirements and provides decision support tools. PIMS is based on open internet standards that enable sharing among diverse, otherwise incompatible systems and includes safeguards for data quality and security. PIMS primary objectives are to:
	+ Establish enterprise-wide systems and processes to streamline data management and utilization.
	+ Provide multi-year longitudinal data to help teachers and administrators address individual student needs.
	+ Empower teachers with data analysis tools to improve individual student achievement.
* SunGard ***Performance Tracker*** - student data driven decision making data analysis system.
* 4***Sight*** - student testing system.
* ***IEP Online*** - special education system.
* Follett ***Destiny*** - library system.
* Penn Center ***LunchBox*** - cafeteria system.
* ***Edulog*** - transportation system.
* ***CSIU*** Budgetary Accounting System.
* ***CSIU*** Census/Tax Billing System.
* ***CSIU*** Payroll/Human Resources System.
* ***CSIU Employee Portal –*** electronic/paperless pay stub system
* ***AESOP*** - substitute teacher system.
* ***Health eTools*** by InnerLink, Inc., for Physical Education Teachers and nurses medical records
* ***Team Prepared*** by InnerLink, Inc., for Emergency Management System
* ***Principalm*** by Life Touch, Inc., for Handheld, iPhone app, student emergency, scheduling, and demographic data
* ***AlertNow*** by Blackboard, Inc. - mass notification system
* ***EMS*** (Event Management System) by Dean Evans and Associates, Inc., for facilities scheduling of rooms, fields, and vehicles
* ***Edline*** - Lampeter-Strasburg School District’s Web site is powered by Edline software, meaning that the design/layout and functionality are driven Edline software. Edline has 20,000 schools nationwide (over 50 in Pennsylvania) using their web site design software, making them the largest web services company. Edline focuses strictly on the education market and has created a hybrid product/service called LCMS **(Learning Community Management System)** combining CMS (Content Management System) and LMS (Learning Management System). LCMS **connects students and parents with teachers and administrators with teachers and the community, creating communication with all stakeholders. Edline seamlessly integrates with PowerSchool, our Student Information System, and leverages this by combining multiple students in the same family in a single search.  Parent logins, student logins, and teacher logins give each unique access and a set of functionality that improve communication between parents and their school.**
* ***MyLearningPlan*** - system to track and submit ACT 48 hours for professional staff (staff with PPID Professional Personnel Identifier numbers) when taking qualified training.
* ***Learning Focused Schools Power Curriculum Tool*** – curriculum development tool
* ***PA Educator from Alleghany Intermediate Unit –*** job application submission system
* ***CommVault Simpana 9 –*** data backup system
* ***Paessler PRTG –*** network monitoring software
* ***Visual PST -*** Visual object report editor for PowerSchool
* ***Informacast –*** IP based Clock/Bell/Speaker/Intercom System software
* ***Cisco VPN –*** Cisco Virtual Private Network software used to remotely connect to the L-S network
* ***Cisco Smartnet –*** Cisco network warranty plan
* ***ExtremeZ/IP –*** cross platform print management software
* ***Lightspeed Rocket Total Traffic Control –*** Filtering, anti-virus, network authentication, and network management software
* ***Entrust SSL Certificates –*** network access security certificates
* ***VMware vSphere 4 Enterprise Plus –*** virtual server software
* ***Citrix XenDesktop 5.6 HDX Enterprise and XenApp 6.5 –*** virtual desktop software
* ***WYSE WTOS –*** WYSE Thin Operating System

**Major Software Technologies:**

* ***Teacher Web Site/Learning Management System with MOODLE*** (Modular Object-Oriented Dynamic Learning Environment) - MOODLE continues to be our standard LMS (Learning Management System). Moodle is also referred to as a course management system or a virtual learning environment. It is a free Web application that many educators use to create effective online learning sites. It has become very popular among educators around the world as a tool for creating online dynamic web sites for students. Many institutions use it as a platform to conduct online courses, while some use it simply to augment face-to-face courses. Many love to use the activity modules (such as forums, databases, and wikis) to build rich collaborative communities of learning around their subject matter, while others prefer to use MOODLE as a way to deliver content to students and assess learning using assignments or quizzes. Having used MOODLE for many years at Lampeter-Strasburg School District, most of our teachers have their own MOODLE site. MOODLE integrates with Microsoft Office for Windows, allowing teachers to use Microsoft Office to produce content for MOODLE, with an Office add-in that allows you to open Word, Excel, and PowerPoint documents directly from MOODLE and also to save your documents straight back into your course files area, bypassing the MOODLE Web interface completely.
* ***Blogs with WordPress*** - Lampeter-Strasburg School District has its own internal Blog Server. We are using a program called “WordPress” as our Blog application. Many teachers and staff have created blog sites for their own building and/or department blog site on our Web site to enhance the communications both internally and externally. WordPress is an open source content management system (CMS), often used as a blog publishing application. It has many features including a plug-in architecture and a template system. Used by over 2% of the 10,000 biggest websites, WordPress is the most popular blog software in use today, and as of September 2009, it was being used by 202 million websites worldwide. WordPress started as just a blogging system, but has evolved to a full content management system offering thousands of plug-ins, widgets, and theme.
* ***Student E-Mail with Exchange 2010/OWA*** - Lampeter-Strasburg School District has implemented student e-mail accounts through Microsoft Exchange and OWA. Students are setup with e-mail accounts and use them to sign up for a particular Web 2.0 application. Exchange transport rules are used to limit e-mail capability to specific applications and teachers.
* ***Staff and student document sharing and collaboration with GoogleApps*** - Google is known for its Internet search, e-mail, online mapping, office tools, social networking, and video sharing services. GoogleApps can be used for many things from searching tools, to maps, to documents, to email, to news, to videos, to feed readers, to sites, to groups, and more (GoogleApps, GoogleSurvey, GoogleEarth).
* ***Staff document sharing and collaboration with SharePoint 2010*** - SharePoint is being implemented at Lampeter-Strasburg School District as a platform to create, share, and collaborate with each other, documents and systems, both internally and externally. SharePoint is a Microsoft application that is more of a framework to build and deliver intranet and extranet services. Examples of how we plan to use SharePoint are to share and deliver documents to the School Board, to share and deliver Human Resources documents to employee and to make other documents available to the general public.
* ***Social Networking with MyBigCampus*** - MyBigCampus is a free product included in our Lightspeed Systems, Inc., product suit and is an excellent social networking product that has all the functionality of other social network products such as Facebook and MySpace. MyBigCampus is an online learning environment where teachers can initiate class discussions and set up online learning activities for students. It is a secure social network designed specifically for educational purposes. All activity can be carefully monitored. Everything that is posted/created/uploaded can be recorded and can be seen and printed at any time by system administrators and teachers. Students also have the ability to “flag” anything they read/view that they feel is inappropriate. Students need to be made aware that they have this capability, and doing so is part of being a responsible digital citizen.
* ***YouTube Videos with Educational Video Library (EVL)*** - Educational Video Library (EVL) allows teachers to safely select YouTube videos related to classroom instruction and make them available to students. TTC (Total Traffic Control), from Lightspeed Systems, Inc., is our Web content filter, which actually does much more than traditional Web filtering entails. EVL acts as a portal and bypasses the filter for video content you select. Video content posted on EVL can also be linked to directly from MOODLE or any other Web site. It is accessible from inside and outside of our network so that, even with full network access that a student may have at home, the student is still not being bombarded with “related content” or spurious comments on the YouTube page.
* ***Student Portfolio System with Mahara*** - Lampeter-Strasburg School District has installed a Mahara Server designed to maintain student portfolios of student projects and student work throughout their years at the school district. This system offers a clean way to save and manage the work of a student and then have it accessible to them beyond high school. Mahara’s architecture and design follows the modular, extensible architecture of MOODLE allowing Mahara and MOODLE to be networked together, supporting a single sign on with the two systems. Mahara is an open source e-portfolio system with a flexible display framework. Mahara, meaning 'think' or 'thought' in Te Reo Māori, is a user centered environment with a permissions framework that enables different views of an e-portfolio to be easily managed. Mahara also features a weblog, resume builder and social networking system, connecting users and creating online learner communities. Teachers can use Mahara to provide a tool for wider reflection on teaching and learning activities that take place in your classroom and on any existing institutional systems such as MOODLE. Students can use Mahara to work in a student-centered and personalized space to bring together formal institutional learning activity and informal learning experiences. Mahara can help students reflect upon their achievements, their ambitions, what they need to get there, and how learning can help them do that.
* ***Teacher Research Tool using Thinkfinity*** - PDE has teamed with Verizon to support and promote Thinkfinity as an education specific search tool/resource. Thinkfinity can be viewed as a replacement for netTrekker d.i. as PDE has not renewed the license to continue offering netTrekker d.i. to Pennsylvania school districts. Thinkfinity has received high visibility over the last several years at such education technology conferences as PETE&C.
* ***Teacher Instructional Projects shared with iTunes U* (iTunes University)** - iTunes U is a Web-based resource providing education with instructional content. Apple is the founder of iTunes U and is working with intermediate units in Pennsylvania to develop managed content. IU13 has a contract with Apple, and Lampeter-Strasburg School District has, in turn, signed an agreement with IU13 to develop content for iTunes U. Teachers are being encouraged to submit creative, innovative, and interesting instructional content that other teachers would benefit from using. iTunes U is designed to be a rich resource for teachers submitting content for other teachers.
* ***View and monitor student computers with Vision*** - Vision has long been the top choice of teachers, for software that helps manage classroom computers. From a single computer teachers can monitor a group of student computers and intercept activity if necessary.

**Instructional Software:**

Lampeter-Strasburg School District has worked closely with its teachers to select instructional software applications that would support our curriculum and engage students.

* ***Microsoft Office*** - Standard software throughout the school district with staff and students is Microsoft Office Professional 2010 that includes Word, Excel, PowerPoint, Outlook, Publisher, Access, OneNote, SharePoint, and InfoPath.
* ***Brainchild, Inc., WebAchiever* -** Mathematics for Grades 6, 7, and 8 - WebAchiever is a Web-based FCAT and a state standard aligned mathematics instructional system. The product contains hundreds of grade-appropriate (grades 3 to 8) lessons that prepare your child for assessments, such as the FCAT, state, and standardized tests. Additionally, the product provides instructional activities that are related to regular classroom performance.
* ***Suntex, Inc., First In Math*** - Mathematics for Grades 7 and 8 - First in Math complements any curriculum in any learning environment. Middle school teachers have embraced this product.
* ***Learning A-Z***, Six (6) Modules - Unlimited for K through 5 and All Special Education -
	+ **Vocabulary A-Z**: Teachers can build hundreds of customized vocabulary lessons with Vocabulary A-Z. All vocabulary building lessons are automatically generated online for printing.
* **Writing A-Z**: Writing A-Z empowers teachers with instant access 24/7 to hundreds of leveled, downloadable writing resources.
* **Science A-Z**: Science A-Z is a dynamic Web site offering a customizable collection of downloadable lessons and materials in four scientific domains: life, earth, physical, and process science.
* **Reading A-Z**: Reading A-Z offers thousands of printable teacher materials to teach guided reading, phonemic awareness, reading comprehension, reading fluency, alphabet, and vocabulary.
* **Reading Tutor**: Reading Tutor offers simple tutor lesson plans and developmentally appropriate student reading resources for effective tutoring sessions (books, lesson plans, worksheets, games, graphic organizers).
* **RAZ Kids**: RAZ Kids helps students improve their reading skills by listening for modeled fluency, reading for practice, recording their reading, and checking comprehension with quizzes. Students choose books in the [bookroom](http://www.raz-kids.com/main/BookRoomMenu) or log in to get books and quizzes assigned by their [teachers](http://www.raz-kids.com/main/ViewPage/name/teachers_public).
* ***World Book Online***, Unlimited District-Wide Access (Including a Version for K to 5) -With content from the award-winning World Book Student Discovery Encyclopedia, the site offers simpler navigation, thousands of colorful illustrations, diagrams and maps, and dozens of activities tied to national curriculum standards.
* ***Kidspiration***, Version 3 - 250 Licenses for HH, LE, and ST - Created for K-5 learners, Kidspiration develops thinking, literacy, and numeracy skills using proven visual learning principles. In reading and writing, Kidspiration strengthens word recognition, vocabulary, comprehension, and written expression. With new visual math tools, students build reasoning and problem-solving skills.
* ***Inspiration***, 750 Licenses for MM and HS - Inspiration is the essential visual thinking and learning tool students rely on to plan, research, and complete projects successfully. With the integrated Diagram and Outline Views, learners create graphic organizers and expand topics into writing. This powerful combination encourages learning in multiple modes. As a result, students gain and retain a better understanding of concepts and demonstrate knowledge improving their performance across the curriculum. Students build graphic organizers, including [concept maps](http://www.inspiration.com/Parents/Visual-Thinking-and-Learning/ConceptMaps), [webs](http://www.inspiration.com/Parents/Visual-Thinking-and-Learning/Webs), and [idea maps](http://www.inspiration.com/Parents/Visual-Thinking-and-Learning/IdeaMaps) in Inspiration.
* ***Study Island***, for Grades 3 through 11, HH, MM, and HS - Study Island is completely Web-based; students can use it at school or at home and can study and learn at their own pace. With dynamic content, there are several thousand questions in the Study Island program, but each question is also constantly changing. The answers to the multiple choice questions are continuously changing position, and the numbers in the math questions are randomly chosen. This causes the students to learn the concepts, not just memorize the answers.
* ***Type to Learn*** - Version 4 Network Version, for Grades 3 through 8, HH and MM - Type to Learn is an award-winning keyboarding program used by more than 15,000,000 students. Type to Learn features a space theme, fun games, and an opportunity to become familiar with American Sign Language.
* ***Finale*** - Finale 2011 offers all of our Music Department staff the flexibility, freedom, and power to create any music you can imagine, from lyrics and staff layout to many different sounds and fonts.
* ***TI SmartView*** - This easy-to-use software program is used by the High School Math Department to complement graphing calculators, letting the educator project an interactive representation of the calculator’s display to the entire class. It is an ideal demonstration tool for leading classroom instruction of math and science concepts.
* ***Hot Dog Stand Top Dog The Works*** - Shows kids how the business world operates and students manage their own concession stand in a sports stadium. Students make daily business decisions, such as deciding whether to operate the stand on a given day depending on the weather forecast; deciding the quantity of items to order; and choosing prices. Following stadium events, players check their results and address any areas of the business that may need adjustments before the next event, such as pricing and types of foods to sell.
* ***Calculus In Motion*** – Helps teachers and students explore the study of movement and change through dynamic animation.
* ***Promethean ActivInspire/ActivStudio*** -ActivInspire is the software that makes the Promethean Activboard (Interactive White Board) come alive. Designed for use in the classroom, it enables teachers to lead the lesson on an interactive whiteboard, create new lessons filled with rich, powerful activities, and support Assessment for Learning tasks with students, groups and the whole class. ActivInspire gives teachers the ability to access a wealth of teaching activities, tools, images, sounds and templates, with a world of additional resources available on Promethean Planet in 36 different languages.
* ***Discovery Streaming*** – video resource for teachers and students
* ***Culture Grams*** is a subscription service that is included in our annual IU13 Instructional Media Services membership fee and is available to all Lampeter-Strasburg School District teachers.
* ***NoodleTools*** is a powerful note-taking software program that promotes critical thinking and creativity combined with the most comprehensive and accurate bibliography composer on the Web.
* **Various other Web 2.0 tools** are being discovered and used, such as Glogster, VoiceThreads, Prezi, etc.
* **Classrooms For the Future (CFF) Grant software** - The following is a list of the 40+ software programs that were installed on the 493 CFF teacher and student computers in the high school.
	+ Microsoft Word 2007
	+ Microsoft Excel 2007
	+ Microsoft PowerPoint 2007
	+ Microsoft Access 2007
	+ Microsoft Publisher 2007
	+ Microsoft Movie Maker
	+ Microsoft Media Player 11
	+ Microsoft Outlook 2007
	+ Microsoft InfoPath
	+ Microsoft Communicator
	+ Microsoft Internet Explorer
	+ Adobe Acrobat 8 Professional
	+ Adobe Photoshop
	+ Adobe Illustrator
	+ Adobe InDesign
	+ Adobe Version Cue
	+ Adobe Bridge
	+ Adobe Stock Photos
	+ Adobe Dreamweaver
	+ Adobe Flash
	+ Adobe Flash Player
	+ Adobe Shockwave Player
	+ Adobe Acrobat Connect
	+ Adobe Device Central
	+ Skype
	+ Inspiration
	+ Audacity
	+ GIMP
	+ ACTIVStudio
	+ Bluetooth for Activboard
	+ Lightspeed Total Traffic Control
	+ Picasa 2
	+ Quicktime
	+ iTunes
	+ RealPlayer
	+ NVU
	+ Firefox
	+ ooVo
	+ Google Earth
	+ PowerTeacher Gradebook
* ***Adobe Software*** - Lampeter-Strasburg School District has standardized on Adobe software for staff and students and has 250 end-user licenses of Adobe Creative Suite 5 Design Premium Bundle which includes:
	+ **Photoshop CS5 Extended** software is the ultimate solution for advanced digital imaging, delivering all the editing and compositing capabilities of Photoshop CS5 plus breakthrough tools that let you create and edit 3D and motion-based content.
	+ **Indesign CS5** software provides precise control over typography and built-in creative tools for designing, preflighting, and publishing documents for print, online, or to mobile devices. Include interactivity, animation, video, and sound in page layouts to fully engage readers.
	+ **Illustrator CS5** software provides precision and power with sophisticated drawing tools, expressive natural brushes, and a host of design time-savers.
	+ **Acrobat Professional 9** software lets you deliver professional PDF communications. Create and edit PDF files with rich media included, share information more securely, and gather feedback more efficiently.
	+ **Flash CS5 Professional** software is the industry standard for interactive authoring and delivery of immersive experiences that present consistently across personal computers, mobile devices, and screens of virtually any size and resolution.
	+ **Dreamweaver CS5** software empowers designers and developers to build standards-based websites with confidence. Design visually or directly in code, develop pages with content management systems, and accurately test browser compatibility.
	+ **Fireworks CS5** software enables you to create expressive, highly optimized graphics for the web or virtually any device from smartphones to kiosks to embedded displays. Produce Web sites, user interfaces, and rich prototypes that are editable in both vector and bitmap modes.
	+ **Flash Catalyst CS5** software is an approachable new interaction design tool. Transform Adobe Photoshop®, Illustrator®, and Fireworks® artwork into expressive, fully interactive projects without writing code, and leverage the reach and consistency of the Adobe Flash Platform.
* **Adobe Software continued** - Not included in the Adobe Creative Suite 5 Design Premium Bundle but available to Lampeter-Strasburg School District staff are the following three additional Adobe products.
	+ **Adobe PhotoShop Elements 9** software delivers powerful options that make it easy to create extraordinary photos, quickly share your memories in Online Albums and unique print creations, and automatically organize and help protect all your photos and video clips.
	+ **Adobe Premiere Pro 5** software offers [breakthrough performance](http://www.adobe.com/products/premiere/performance/) for video production, enabling you to work dramatically faster thanks to the revolutionary native 64-bit, GPU-accelerated [Adobe Mercury Playback Engine](http://www.adobe.com/products/premiere/performance/). Work natively with the video formats you want and accelerate production from scriptwriting to editing, encoding, and final delivery.
	+ **Adobe Captivate 5** software enables you to do screen capture while creating documentation to easily show how tasks are done and achieve superior results in fewer steps thanks to an intuitive user interface, collaboration workflows, and a multitude of timesaving features. Easily integrate your content with eLearning applications and leading SCORM- and AICC-compliant Learning Management Systems to deliver content virtually anywhere.
* ***Safari Montage –*** Safari Montage is a premier video resource system for education,. This system offers more instructional video content than any other single system and gives the teachers many options to enhance their daily curriculum.
* ***Polycom Video Conference –*** A Distance Learning Video Conference Room is installed in the high school in room 216. Along with the Polycom high definition video conference equipment in this room there are multiple cameras, ceiling mounted speakers, microphones, projectors, and interactive white board, etc. This stationary video conference room complements our mobile video conference unit and offers teachers access to multiple video conference options as teachers seek ways to enhance and improve the delivery of instruction for students.
* ***CAD Software (Autodesk and LabVault) –*** Synergis Autodesk Design Academy 2012 software for computer aided design classes in the high school. LabVault software is used in the middle school for similar instruction.
* ***Performing Arts Center Software Applications and Programs –***
	+ Cast WYSIWYG Design - Stage Lighting Design Software
	+ LX Free - Stage Light Plotting Software
	+ Sennheiser Wireless System Manager - Wireless Microphone Management GUI
	+ BIAMP NEXIA - Public Address (PA) System Speaker Infrastructure GUI
	+ Show Cue Systems - Theatrical Sound Cueing Software
	+ Yamaha M7 Studio Editor
	+ Theater TEK DVD - Professional DVD Playback Software
	+ VLC Player - MEDIA Player
	+ Cooper Tools WD Monitor - Monitors Soldering Iron Tool Set
	+ National Instruments - Measurement and Automation Software

**Peripherals, Distance Learning, and Video Distribution**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

**MFP (Multi-Function Peripheral):**

In July 2010, Lampeter-Strasburg School District renewed a copier contract with Conestoga Business Solutions, Inc., and all copiers were replaced with MFPs. Twenty new MFPs were installed throughout the School District. An MFP functions as a copier, printer, fax, and scanner (scan to e-mail). Depending on the model, some or all of these features are available on the new MPFs. The MFPs have printing capacities that are up to four times faster than our HP laser printers. Many of the MFPs print 60 or 90 pages per minute. The cost to print on an MFP is approximately four times less than the cost to print on our HP lasers printers. Many of the MFPs we installed have finishing features, such as collate, staple, hole punch, etc. All the MFPs at a minimum, except one, copy and print, most also scan, and five have fax capabilities. A huge feature is the ability to send print jobs to a print queue and only have it print when you swipe your card at an MFP. This feature, called “Follow Me” printing, prevents your output from becoming intermingled with someone else’s output or from having your output inadvertently picked up with someone else’s output. This feature also allows a person to work for long periods of time sending various reports to the printer and then, at a convenient time, printing all the reports together.

The 20 MFPs have been strategically located in each building to provide access to all staff. All of the MFPs are Lanier MFPs, and the model numbers we installed include Lanier 907EX, 906EX, LD360, LD117, LD040, LP540, and RZ390,

**Distance Learning Room/Video Conference Room:**

Lampeter-Strasburg School District was awarded specific funds from the ACT 183 Grant, which allowed us to install the necessary equipment to support a Distance Learning environment. The classroom in the Lampeter-Strasburg High School Media Center, Room 216, has been designated as the Distance Learning Room/Video Conference Room. A complete PolyCom 8000 HDX System was installed and is set up and configured to send and receive live audio and video and support multiple cameras. The ACT 183 grant funds were appropriated in August 2010, and in October 2010, the installation was completed. Numerous demonstrations of the capabilities of this room have been given to such groups as a select group of administrators, the Academic Committee of the School Board, the Technology CIA Committee, the Media Center specialists, as well as various high school teachers. Identifying resources for teachers and developing documentation for teachers on the use of this equipment is our current focus.

**Safari Montage** - *a total solution for digital curriculum management and presentation:*

I am delighted to announce that Lampeter-Strasburg School District has installed and trained a core group of staff on a product called Safari Montage. Safari Montage is a fully integrated system offering unparalleled quality and performance of educational video content to the classroom giving teachers and students resources that heretofore were either unavailable or were of lesser quality. This system has much to offer, and as training on each new module is made available, it will undoubtedly quickly become a system that is relied upon by many to deliver high quality education to our students. The components and modules of this system include:

* Outstanding **educational content** from most of the major publishers consisting of nearly 10,000 videos and over 15,000 images are available and are filtered by age and grade appropriateness. Publishers include PBS, Schlessinger Media, Disney Education, Sesame Street, National Geographic, BBC, History, Bio Channel, Scholastic, Cerebellum, and many more.
* **Digital Curriculum Presenter** supporting closed caption and multiple languages.
* **Classroom Presentation** with plug-in media player, Web cam, and iPod/iPad integration.
* **Creation Station** allowing teachers to create and publish their own digital media content, assign meta-tags, and apply digital rights management to the content.
* **Managed Home Access** making Safari Montage services available at home or on the road for teachers and students.
* **LIVE Presentation** delivering interactive video conferencing on-demand to the desktop.
* **Face-to-Face Video Call** offering a person-to-person video call.
* **Video Streaming** offing managed video streaming resources that are delivered to the classroom.
* **Local Motion Portal** allowing for published content to be made available to anyone in the world.
* **Distance Learning** offering functionality to support Distance Learning.
* **Pathways** offering management and control of other devices, such as projectors, DVD players, etc., allowing the ability to remotely power on/off, if desired.
* **WAN Manager** offering enterprise digital media management and security for system administrator.
* Intuitive User Interface.
* **Advanced Search** capabilities offing endless drill down to very specific or very broad searches.
* **PA Standards Integration** tying each video to the appropriate PA instructional standard(s).
* **Teacher Resources** offering endless resources for teachers to develop and deliver engaging instruction.
* **Interactive White Board Integration** offering seamless integration with Promethean Activboard, Smartboard, and others

See product overview at - <http://smflash.safarimontage.com/execOverview/executiveOverviewVideo.html>.

The Technology Department along with the Media Center Specialists at each level will be working together to rollout, support, and train others on Safari Montage.

**Discovery Education Streaming Including Streaming Plus (formerly known as United Streaming)** is a subscription service that is included in our annual IU13 Instructional Media Services (IMS) membership fee. Discovery Streaming will continue to be available to all Lampeter-Strasburg School District teachers

**Professional Development and Training Opportunities**

***Lampeter-Strasburg School District***

***Information Technology Department***

***Lester S. Stoltzfus***

***Director of Technology***

**CFF Training** - The 42 high school teachers in the four major subject areas of mathematics, social studies, science and language arts, as well as special education, completed professional development courses over a two-year period on:

* 21st Century Skills - The Need for Change Involving 21st Century Skills
* Teaching Authentic Math in the 21st Century Classroom for Math Department
* Teaching Authentic Science in the 21stCentury Classroom for Science Department
* Teaching Authentic Social Studies in the 21st Century Classroom for Social Studies Department
* Teaching Authentic Language Arts in the 21st Century Classroom for Language Arts Department

**VTC Online University** - Online/Self Study Training - Lampeter-Strasburg School District has purchased three licenses for VTC Online University through IU13 for membership in their online training service. All VTC Online University training materials are hosted by VTC and available 24/7 online to its paid subscribed members from any Internet connected computer. In-depth training on hundreds of today's most sought-after applications, with over 55,000 narrated QuickTime tutorials are available for many of the most recent and archived versions from the major software companies, such as Microsoft, Cisco, Adobe, AutoDesk, FileMaker, and others, along with certification tutorials for those wanting company authorized certification.

**Quick Reference Guides** - Quick Reference Guides are free and available on many different subjects. Quick Reference Guides are available from Custom Guide at k12.customguide.com and can be printed for easy access for such applications as Windows XP, Outlook 2007, Word 2007, Excel 2007, PowerPoint 2007, Publisher 2007, etc.

**Common Craft** - Technology in Plain English - Common Craft is a Web site that has short videos that explain various technology tools and applications in plain English. Go to [www.commoncraft.com](http://www.commoncraft.com).

**Vendor Training** - Throughout the school year, many teachers receive vendor training to support the installation of new systems or upgrades of existing system.

**Teacher In-Service and After-School Sessions** - Many one-on-one training sessions offered to teachers often revolve around such items as RSS feeds, GoogleApps, Blogs, Wikis, MyBigCampus EVL, etc., to support the new tool set that is available for teachers. Technology training sessions are also frequently offered on Windows XP and Office 2007 Productivity Tips and Tricks