TLN ADVANCED TECHNOLOGY COMPETENCIES

ORIGINALLY COMPILED IN 2001
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This document was compiled to assist in the selection and further education of the technology people in our libraries. It is understood that no one person on staff is likely to know everything in this document. There may be more than one technology person on staff who is responsible for specific areas within this document. Also, not all sections covered below apply to every library—Integrated Library Systems, RFID, Time/Print Management systems for example, would mostly apply to a library with a stand-alone circulation system, RFID systems, or Time/Print Management systems.

Given that, the TLN Technology Committee has done a comprehensive study of the knowledge that the people responsible for the technology equipment in our libraries should strive for.

HARDWARE

MOTHERBOARD

- Know that there are different:
  - Sizes
  - Shapes
  - Power requirements
  - Sockets
- Know that they may or may not be compatible with each other.
- Know the function of BIOS and BIOS settings
- Know how to flash the BIOS and reset BIOS date and time settings
- UEFI
  - Unified Extensible Firmware Interface
  - Intended to replace BIOS
  - Most have support for legacy BIOS services
  - Fear that UEFI may affect loading Linux or other “free/share” OS’s
- Know the function of the CPU, the variety of performance sizes and Manufacturers
- Know the function of Memory (RAM) and that accessing the chips depends on your operating system capabilities
- Know the function of the Cable connections
- Know what the various POST beeps mean
- Know what function Jumpers perform

DRIVES

REMOVABLE

- Know the characteristics of floppy disk drives
- Know the capacity and speed capabilities of the various optical media devices
  - CD-ROM
    - CDR
    - CDRW
  - DVD
    - DVD –r
    - DVD +r
    - DVDRW
  - BluRay (BD)
    - BDRW
- Know the capacity and speed capabilities of various
- Know how to install, configure and troubleshoot the following storage devices:
  - USB 2.0/3.0 Connected Devices
    - Floppy
    - Flash
    - Hard Drives
    - CD/DVD/BluRay
  - eSata Connected Devices
    - Hard Drives
    - Backup Media
    - CD/DVD/BluRay
  - Firewire (aka IEEE 1394)
    - Hard Drives
    - CD/DVD/BluRay

EXTERNAL HARD DRIVE

- Know the capacity, benefits and features of external hard drives.
- Know the ports required by the external Hard Drive
- Know how to install, configure and troubleshoot external hard drives

NON-REMOVABLE (HARD DISK) DRIVE

- Know that the first one is Drive C and Subsequent drives are lettered to Z
- Know the different types of hard drives:
  - Normal
  - Hybrid
    - Mixture of SSD/NAND and Normal
  - SSD/NAND
    - Flash based HD, no moving parts.

NON-REMOVABLE (HARD DISK) DRIVE (CONT)

- SSD/NAND (cont)
  - Connect via SATA or SAS
  - MUCH faster than Normal

- Know the different connector types
  - SATA
  - SAS
  - SCSI
  - PATA/IDE
- Identify the hard drive size required
  - 1.8”
  - 2.5”
  - 3.5”
  - Half height
    - 1⅝” high by 5¾” wide
  - Full Height
    - 3¼” high by 5¾” wide, and up to 8” deep (old PCs)
  - 5.25”
- Know the performance issues in regards to spindle speeds
  - 5400k
  - 7200k
  - 10000k
  - 12000k
  - 15000k
- Know that the average life is three to five years
- Know that you should never change the orientation from horizontal to vertical. The drive wears in one position and changing the position can significantly shorten its life.
- Know that you should run ScanDisk, Defrag and other OS appropriate maintenance programs at least monthly
- Know that you may need to update CMOS setup any time you add, change or remove a hard drive
- Know what RAID means, and how to deal with it

INTERFACES/PORTS

- External Ports
  - Serial
    - 9 pins
    - Older connections for mice, keyboard, other peripherals
    - Mostly replaced with USB
  - Parallel
    - DB25 or IEEE 1284 (36-pin)
    - Common for Printer connections.
    - Mostly replaced with USB

INTERFACES/PORTS (CONT)

- USB (Universal Serial Bus)
    - Commonly used for all manner of peripheral connections
    - Comes in 3 separate PIN styles
        - Type A (4 pins)
        - Type B (4 pins)
        - Mini-A (5 pins)
        - Mini-B (5 pins)
        - Micro-A (5 pins)
        - Micro-B (5 pins)
    - USB 1.1
        - Original USB standard. Aka “Original USB”
        - Now almost completely replaced.
        - Peripherals with USB 1.1 connector are downward compatible with 2.0 and 3.0 ports
        - 12.1 MB/Sec
        - 1.5 to 5 Amps power
    - USB 2.0
        - 60 MB/Sec to 480 MB/sec
    - USB 3.0
        - Up to 5GB/Sec
        - 1.5 to 5 Amps power
- Firewire aka (IEEE 1394)
    - Developed by Apple
    - Can connect up top 63 peripherals
        - Firewire 400
            - 100 to 400 MB/Sec
        - Firewire 800
            - Up to 3200 MB/Sec
        - Firewire S1600 and S3200
            - Up to 1.6 GB/Sec and 3.2GB/sec
- Thunderbolt
    - Developed by Intel for Apple
    - Up to 10 GB/Sec
    - Likely use is for Video
- eSata
    - external Serial ATA
        - maximum speed of 3GB/sec
    - Know how to spot/use eSATAp
        - Power over eSATA
        - Can supply power at 5V or 12V
- VGA
    - Video
    - 15-pin

- DVI
  - Digital Visual Interface
- HDMI
  - High Definition Multimedia Interface
    - 5 types of HDMI connectors
      - Type A: 19 pins, bandwidth to support SDTV, EDTV and HDTV.
      - Type B: 29 pins, bandwidth to support up to WQUVGA (3840x2400)
      - Type C: Mini connector.
        - Intended for portable devices
        - 19 pins
        - Most digital cameras are equipped with Type C connector
      - Type D: Mini Connector
        - Intended for portable devices
        - Smaller than Type C
        - 19 pins
      - Type E: Intended for automotive use.
    - 3 Different Standards
      - 1.0 to 1.2a
        - Max resolution 1920 x 1200, 24 bit color depth
      - 1.3
        - Max resolution 2560x1600, 24 bit color depth
      - 1.4
        - Max Resolution 4096x2160, 24 bit color depth
- PS/2
  - Keyboard (Purple)
  - Mouse (Green)
- AT
  - Not compatible with XT connector, even if identical
  - Superseded by PS/2
- SCSI
  - Small Computer Systems Interface
  - Pronounced “skuzzy”
- Ethernet
- TRS
  - Tip, Ring, Sleeve
  - Commonly used for analog audio signals
  - Headphones/Speakers
- Internal Ports
  - IDE/PATA
    - Parallel ATA

- IDE/PATA (cont)
  - 40 pins
  - 16 MB/sec to 133 MB/sec
  - Connected Hard Drives, CD/DVD/BD's to Motherboard
  - Replaced by SATA in modern motherboards
- SATA
  - Serial ATA
  - 1.5 GB/Sec to 6 GB/sec
  - 7 pin data cable and 15 pin power connector
- SCSI
  - "Shugart Computers Systems Interface" or "Small Computer Systems Interface"
  - Spawns SSA (Serial Storage Architecture) and SAS (Serial Attached SCSI)
  - Common in Servers for high speed and reliability
  - Speeds vary from 5 MB/sec to 640 MB/sec
- AGP
  - Accelerated Graphics Port
  - 1.0, 2.0, 3,0 and 3.5 versions
    - Varying interfaces for each. Must identify which version before using peripheral card.
  - Exclusively used for Graphics
- PCI
  - Peripheral Component Interconnect
  - Normally 64 pins
  - Used for all manner of peripherals:
    - Video, Audio, Serial/Parallel, USB, and other expansions
- PCI Express (aka PCIe)
  - Peripheral Component Interconnect Express
  - Replaces PCI in modern Motherboards
  - PCI e x4, x16, x1 versions use different slots and energy. Must match peripherals.
  - Also note Mini PCIe versions for Laptops and other portable decvices.
- ISA
  - Industry Standard Architecture
  - Superseded by PCI
  - Nothing current uses ISA
- SIMM
  - Single Inline Memory Module
  - RAM
  - 30 or 72 pin
  - Not used in modern computers
  - Variable clock speeds and power ratings

INTERFACES/PORTS (CONT)

- DIMM
  - Dual Inline Memory Module
  - 72 to 244 pin
- DIMM (cont)
  - Varying voltage and clock speeds
  - RAM
- RIMM
  - Rambus Inline Memory Module
  - Aka RDRAM or DRDRAM
  - Clock rates from 266 mhz to 800mhz.
  - Variable power ratings
  - 184 pin
  - RAM

INPUT DEVICES

KEYBOARD

- Know the correct port for your keyboard
  - USB or PS/2 in modern computers
  - Some may use wireless or bluetooth
- Know how to clean a keyboard
- Be familiar with Ergonomic keyboards
- Know the Windows hotkeys

DESKTOP SCANNERS

- Know how to install, configure and troubleshoot Flatbed or Gravity Fed Scanners
  - Used to convert paper text and images to electronic format
  - are useful for those who need to archive or use graphical information already in paper form convert paper documents to electronic text files allow you to fax paper documents to others.

LASER SCANNER

- Know how to install, configure and troubleshoot wand and laser barcode scanners
- Know the proper format your barcodes are in
  - Most library barcodes are Codabar

MICROPHONES

- Know that they plug into your sound card to let you input sound to your system for:
  - Recording your voice to a file
  - Operating voice-controlled software

MICROPHONES (CONT)

- Know that they plug into your sound card to let you input sound into your systems for (cont):
  - Sending audio for telephone, video phone, Video Conferencing or other audio based communication systems
- Know how to install, configure and troubleshoot microphones

MOUSE

- Know the types of mice:
  - Mechanical
  - Optical
  - Trackball
  - Ergonomic
- Know that mice come in serial, PS/2, USB, Bluetooth and connect to the corresponding ports.
- Know how and when to clean the mouse

CAMERA

- Web Cam
  - Camera that feeds images (still or video) to a computer or network
  - USB or wireless connections
  - Used for Video calling and other services
- Video Cam
  - Camera that records mostly video (possibly still)
  - Connects to PC, downloads video for conversion or editing
- Still Cam
  - Camera that takes still photos
  - Saves to flash or optical media
  - Connects via USB or other

OUTPUT DEVICES

MONITOR

- Know the relevance of and how to determine the following:
  - Resolution
  - Aspect and Contrast Ratio
  - Refresh Rate (Hz)
  - Dot pitch
- Know the different monitor technologies
  - LCD
  - CRT
  - LED
  - OLED
  - Retina Display

MONITOR (CONT)

- Know the different monitor technologies (cont)
  - Projectors
- Be familiar with specialty monitors and accessories
  - Ergonomic Stands
  - Ergonomic Arms
  - PC mounts
- Projectors
- Privacy Screens/Filters

Know the following:

WARNING : THE MOST IMPORTANT ADVICE ANYONE CAN GIVE YOU ABOUT TROUBLESHOOTING YOUR CRT MONITOR IS TO RESIST THE TEMPTATION TO OPEN IT UP. THERE ARE HIGH VOLTAGES UP TO 12,000 VOLTS PRESENT IN CRT MONITORS , AND IT IS NOT WORTH THE RISK OF INJURY OR DEATH TO TRY TO WORK ON A MONITOR YOURSELF. IF YOU CAN'T RESOLVE THE PROBLEM WITH THE COVER ON, TAKE CRT MONITORS TO A PROFESSIONAL.

PRINTERS

- Know how to install, configure and troubleshoot the various types of printers:
  - receipt printer
  - ink-jet
  - laser
  - thermal printer
- Know the following characteristics of printers:
  - quality of type
  - DPI (Dots Per Inch)
  - speed
  - graphics
  - fonts
  - Know the difference between PCL 5, PCL 6 and PostScript
- Know where to obtain drivers and updates
- Standalone Printers connect to one computer via USB, Parallel or other connector
  - Can be NETWORKED by software
- Network Printers normally have a Network Interface Card
  - Installed and accessed via network connection
  - Usually have own IP address

SPEAKERS

- Know how to install, configure and troubleshoot speakers
- Know the difference between speaker types
  - 2 in 1
  - 3 in 1

SPEAKERS (CONT)

- Know the difference between speaker types (cont)
  - 5 in 1
  - 7 in 1

PROJECTORS

- Know how to determine if a projector is appropriate for the room by brightness (ANSI), ascpect ratio and contrast ratio
- Know that the projector is appropriate for its intended usage
- Know how to install, configure and troubleshoot projectors
- Know what type of connector is required
  - HDMI, VGA, DVI, and wireless (Bluetooth) are possibilities

ADD ON CARDS

- Know how to install, configure and troubleshoot the following add-on cards:
  - Sound Card
  - Video Card
  - Network Interface Card
  - Other external interface cards
    - USB, Firewire, Thunderbolt, etc

NOTEBOOK COMPUTERS (AKA LAPTOP COMPUTERS)

- Know the components unique to notebook computers such as
  - Types of Battery Packs
  - PCMCIA Cards
  - CardBus
  - Docking Stations
  - Interchangeable Media such as CD-ROM, Floppy Disk Drive, Hard Disk Drive
  - Wireless Cards
  - Software

TABLETS, SMARTPHONES, EBOOKS. EREADERS, AUDIOBOOKS AND MORE

- Know your portable devices (below is a limited list of the most popular options)
  - Tablets
    - iPad
    - Kindle Fire (Amazon)
    - Nook Tablet (Barnes and Noble)
    - Nexus 7 (Google)
    - Other Android (2.x, 3.x, 4.x)
    - Surface (Microsoft)

TABLETS, SMARTPHONES, EBOOKS. EREADERS, AUDIOBOOKS AND MORE (CONT)

- Tablets (cont)
  - Other OS
    - Playbook (Blackberry)
    - WebOS (HP)
- SmartPhones
  - Various manufacturers and Operating Systems
    - iPhone/iOS
    - Android (2.x, 3.x and 4.x)
  - Various manufacturers and Operating Systems (cont)
    - Mobile Windows
      - Windows Phone 7
      - Windows Phone 8
    - Blackberry
    - Symbian OS
- eReaders
  - Amazon Kindles
  - Barnes & Noble Nooks
  - Sony Readers
  - Apple iDevices
  - Androids
  - MP3 Players (for audio books)
  - Complete list of OverDrive® supported devices are located at the Device Resource Center: http://www.overdrive.com/resources/drc/
- Other Portable Devices
  - iPod (various models)
  - Zune
  - Nintendo 3DS
  - Playstation Vita

AUDIOBOOK AND EBOOK SERVICES

TLN maintains a contract with OverDrive®. TLN members within the Shared Automated System titled this digital library Download Destination (http://tln.lib.overdrive.com/). TLN's eContent Committee is actively responsible for this service.

File Formats

Know the various file formats that are used for audio & ebooks:

- Adobe ePub
- Adobe PDF
- Mobi
- iBooks
- Kindle

AUDIOBOOK AND EBOOK SERVICES (CONT)

Know the various file formats used for audio and ebooks:

- MP3 (audio)
- WMA (audio)

Know how to get support, when questions extend beyond internal knowledge.

Be familiar with all facets required for downloading audio books and ebooks:

Supported Devices, http://www.overdrive.com/resources/drc/

Software:

- Adobe Digital Editions
  - Must be downloaded onto the end-users computer or laptop to transfer downloaded eBooks to their eReader (required for all eReaders, except for tables & Kindles).
- Overdrive Media Console
  - Must be downloaded onto the end-users computer or laptop to transfer downloaded audio books to their mp3 player or audio player (required for all except for iPads, iPhones, iPods and Android smart phones/tablets).
    - Windows (supports WMA & MP3 Audiobooks, Music, & Video)
    - Mac® (supports MP3 Audiobooks)
  - Mobile App supports ePub eBooks & MP3 Audiobooks:
    - Android™
    - BlackBerry®
    - iOS (iPhone®/iPad®/iPod touch®)
    - Windows® Phone 7

SOFTWARE

GENERAL

- Be able to install/uninstall software and customize software for your computer environment.
- Be aware of new versions of software as they are released and the features they include.
- Be able to assist your staff in utilizing the software to meet their professional needs.
- Have some good resource books on site to assist you and your staff.

OPERATING SYSTEMS

- Be familiar with using different operating system clients, which includes navigating electronic data, organizing folders and files, and customizing the desktop environment.
- Be able to help your library staff navigate through the OS, which includes opening/closing applications, finding files and folders, and logging on/off the network.
- Be comfortable administering different operating system servers, which includes setting up new users and groups, setting/changing permissions on files/folders, and managing your network information.
- Know how to properly secure workstations for varying patron/staff usage.

OPERATING SYSTEMS (CONT)

- Depending on your library's computer environment, that may include any of the following
  - Operating Systems:
    - Windows XP (support expires 2014)
    - Windows Vista (support expires 2017)
    - Windows 7 (support expires 2020)
- Depending on your library's computer environment, that may include any of the following (cont)
  - Operating Systems (cont):
    - Windows 8 (coming fall 2012)
    - Windows Server 2003 (support expires 2015)
    - Windows Server 2008 (support expires 2018)
    - Windows Server 2012 (coming 2013)
    - Unix, GNU/Linux and Gnu/Hurd
      - Solaris (HPUX)
      - Ubuntu (Linux)
      - CentOS (Linux)
      - FreeBSD (BSD)
    - Novell Netware Client
    - OS X(Apple hardware only)
      - Based on OpenBSD model

WEB BROWSERS

- Know the security features of your Web browser so you can set them up at public Internet stations, which includes locking down the Web browser, setting a proxy, and running in proxy mode.
- Be able to customize your Web browser for your library, which includes setting the home page, setting preferences for the browser display, and setting options for helper applications like Java.
- Depending on your library's computer environment, that may include any of the following Web Browsers:
  - Internet Explorer
  - Firefox
  - Chrome
  - Public Web Browser
  - Safari
- Know how to use and obtain plugins for your web browser
- Know how to engage PRIVACY mode in your web browser

OFFICE

- Be familiar with the basic features of the MS Office applications, which includes modifying document properties for layout, modifying text properties, and inserting images, tables, and clip art into documents.
- Be able to set up these applications for use on your local network (especially email applications).

OFFICE (CONT)

- Depending on your library's computer environment, that may include any of the following Office Suite applications:
    - MS Office
    - LibreOffice
    - Wordperfect

WEB SERVERS

- Be able to set up and host your library's Web site, which includes publishing Web pages to your site, maintaining any server-side scripts used by your Web pages, and setting up permissions as appropriate for your Web pages.
- Know how to secure your Web server, which includes staying on top of security breaches, applying any necessary patches, analyzing your server logs, and locking down access to your server and your network.
- Depending on your library's computer environment, that may include one of the following Web Servers:
    - Microsoft Internet Information Server
    - Apache
    - Tomcat
        - Java Servlet/Java Server
- Know how to backup and recover the server

ANTI-VIRUS

- Be familiar with anti-virus software, which includes installing/uninstalling and solving conflicts with other software on the equipment. Anti-virus software can be server based or PC based.
- Be able to maintain anti-virus software.
- Depending on your library's computer environment, that may include any of the following Anti- Virus packages:
    - Symantec
    - Microsoft Security Essentials
    - Microsoft Forefront
    - McAfee
    - F-Secure
- TLN provides Shared System members with Symantec Endpoint (must be ordered from TLN)
- Many AV providers are introducing cloud-based solutions as well

GRAPHICS

- Be able to create and manipulate graphics documents.
- Be familiar with the basic features of these applications, which includes working with color, objects, layers, frames, text, and photo restoration and enhancement.
- Be able to set up these applications for use on your local network.
- Depending on your library's computer environment, that may include any of the following Graphics applications:
    - Adobe PhotoShop
    - Adobe Illustrator

GRAPHICS (CONT)

- Depending on your library's computer environment, that may include any of the following Graphics applications (cont)
    - Adobe InDesign
    - MS Paint
    - Gimp (GNU Image Manipulation Program)
    - Irfanview
    - Paint.Net

INTERNET

BROWSER SETTINGS

- Know the function of various preferences in web browsers.
- Have a familiarity with various versions of web browsers
- Be familiar with browser plug-ins
    - Acrobat
    - Flash
    - Java
    - Quick Time
    - Silverlight
    - Shockwave
    - Windows Media Player
    - specialized library plug-ins

WEB PAGE DEVELOPMENT

- Know the standards. Including:
    - HTML (4.x and 5.x specifications)
    - XHTML
    - XML
    - CSS
- Know how to set up:
    - Tables
    - Frames
    - Forms
    - Image maps
    - CSS
- Knowledge of basic design principles, primarily page layout, style and color schemes.
- Know how to work with and write
    - CGI scripts
        - Perl
        - Python
        - Other

WEB PAGE DEVELOPMENT (CONT)

- Know how to work with and write (cont)
    - Javascripts
        - jQuery
    - DHTML scripts
- Familiarity with web based databases
    - Access
    - MySQL
    - NoSQL
    - Postgres
    - Various versions of SQL
- Familiarity with server side includes
    - ASP
    - PHP
    - JAVA
    - XML
    - SSI
    - Perl
    - Python
- Knowledge of accessibility issues.
- Knowledge of Web graphics types (jpg, gif, etc.)
    - File sizes
    - Colors
- Knowledge of applicable web page editing software
    - Web or Cloud based solutions
    - Standalone Software Solutions
- Knowledge of applicable content management systems
    - Drupal
    - Joomla
    - Wordpress
    - Sharepoint
    - And many more

WEB SERVICES

- Knowledge of the relationship between server and end user

FOR IN HOUSE WEB SERVERS

- Know how to set up and maintain security, and server software.
- Keep usage statistics.
- Secure web pages (secure socket layer and intranet)

COMPUTER AND NETWORK SECURITY

APPLICATIONS

- Application level security protects the various programs on your computers from tampering and misuse. They also help protect other portions of your security infrastructure by removing the ability to use the applications in a malicious way.
- Be able to install, configure and maintain application level security software to protect applications by locking down vulnerable parts of the applications. Be aware of methods like "fake" proxies and kiosk modes to control the use of the computer.

APPLICATIONS (CONT)

- Be able to install, configure and maintain Internet filters used to limit access to services or content on the Internet.
- Understand the difference between workstation and server-based Internet filters and how they impact your library's Internet use.

WORKSTATIONS

- Workstation level security protects the operating system of the workstation from tampering, abuse and viruses. Protecting the operating system ensures that the workstation functions effectively.
- Be able to install, configure and maintain various desktop security products including desktop replacement software.
- Be familiar with workstation "rollback" options that allow you to return a computer to its previous configuration.
- Be able to install, configure and maintain personal firewall software to protect the workstation from being attacked over the Internet by hackers and other threats.
- Be familiar with anti-virus software options and how to install, configure, maintain and update the anti-virus software on the workstation.
- Understand operating systems policies and how they protect various components of the operating system from tampering abuse.
- Be able to create and use operating system policies to protect the workstation against various threats.
- Be familiar with the workstation BIOS and how to configure it to provide additional security for your workstations.
- Be aware of the physical security needs of your workstations and methods available to protect the physical integrity of the workstation.

SERVERS

- Be familiar with anti-virus software options and how to install, configure, maintain and update the anti-virus software on the server and network resources.
- Be familiar with how to properly configure your web services to protect against attack by various threats over the Internet.
- Understand how your server operating system protects against tampering and abuse and how to properly secure the server against those threats.

SERVERS (CONT)

- Be aware of the physical security needs of your servers and methods available to protect the physical integrity of the servers.

NETWORKS

- Understand the configuration of your network, potential risks to the network and how the network can be used to provide enhanced security.
- Be able to create, configure and implement user policies to limit the activities of users on the network.
- Understand how to configure and maintain your network firewall to protect your internal network against attacks from the Internet, control traffic over the internal network and limit access between specific workstations and servers.
- Be familiar with the configuration of your network switches and routers and how they can be configured to provide additional network security.
- Understand Network Address Translation (NAT) and how it is implemented on your network.
- Be able to develop effective password policies and implement on your network.

INTEGRATED SECURITY SYSTEMS

- Integrated security systems provide a comprehensive package of security that protects the application, workstation, server and network levels. These systems normally have centralized management to assist administrators in securing and monitoring the system security.
- Be able to configure and manage your integrated security system on both the administrative server and workstations.
- Understand how your integrated security system operates and how it interacts with other components of your network and other library systems.
- Be able to troubleshoot the various components of your integrated security system.

RESOURCES

- Be familiar with print and online resources that can provide information on a variety of security products, policies and threats.
- Be aware of online security resources that provide updated information about current security threats and countermeasures including patches, tools and other measures to maintain security.

MAINTENANCE

SOFTWARE

- Understand the importance of keeping track of all the software on your computers, including the release level and licensing information.
- Be aware of new versions of software as they are released and decide whether or not it is important or possible to upgrade.

SOFTWARE (CONT)

- Monitor the use of software applications and delete old or unused software as appropriate.
- Be able to run virus scans regularly to avoid corrupted software.
- Monitor anti-virus software results
- Utilize system tools regularly, such as Scandisk and Disk Defrag, to optimize the performance of your computers.
- Ensure Windows updates are occurring on a regular basis

HARDWARE

- Understand the importance of keeping track of all the hardware in your building, including the detailed specifications, vendor and date purchased, and warranty information.
- Be able to have your equipment cleaned regularly to optimize their performance.
- Know how to troubleshoot and diagnose hardware failure and how your library handles hardware repair or replacement in a timely fashion.

SERVERS

- Be familiar with keeping backups of the content on your servers, which includes setting up a schedule for backups, running them regularly, checking to ensure the backups are successful, and understanding how to restore when needed.
- Be able to keep your servers organized, and scan them regularly for old files that are no longer needed and can be deleted to help optimize your server's performance.
- Understand the importance of using a UPS (Uninterruptible Power Supply) to protect your servers from unexpected failure.
- Be familiar with virtualization (hardware, OS, software, storage) options to maximize server functionality.
    - VM Ware
    - MS Hyper-V
    - Oracle VM VirtualBox

NETWORK

UNDERSTANDING THE FOLLOWING NETWORKING CONCEPTS

- WAN
    - Wide Area Network
    - The majority of the libraries in TLN combine to form a Wide Area Network
    - WAN's can span the globe
- LAN
    - Local Area Network
    - All the computers within a single library or building are generally referred to as a LAN.
    - You can have several LANs within a single building.

- VLAN
  - Virtual Local Area Network
  - VLANs are generally managed through switches.
  - You can have several VLANs in one LAN
- MAN
  - Metropolitan Area Network
  - Peer-to-Peer
  - Allows users to share networked resources across multiple networked machines
- Topology
  - Linear/Bus
    - A linear/bus topology consists of a main run of cable with a terminator at each end. All nodes (file server, workstations, and peripherals) are connected to the linear cable.
  - Tree
    - Combines characteristics of linear bus and star topologies. It consists of groups of star-configured workstations connected to a linear bus backbone cable. Tree topologies allow for the expansion of an existing network, and enable schools to configure a network to meet their needs.
  - Mesh
    - At least two nodes with two or more paths between each node.
  - Fully Connected
    - Implies a direct path between any two nodes.
  - Hybrid
    - A combination of any two or more network topologies
  - Client-Server
    - A computational architecture that involves client processes requesting service from server processes
  - Terminal-Server
    - Used to serve thin clients with software.
    - Provides central control of all attached clients.
  - Internet
    - The mass collection of workstations and protocols that span the world, generally via the TCP/IP protocols
  - Intranet
    - Network resources available internally
    - Generally NOT available outside a given defined LAN
    - Security by Firewall, Directory Permissions, IP Range, or other means
  - Extranet
    - A means (hardware or software) to provide external access to Intranet resources
  - Firewall
    - A combination of hardware and software that manages network traffic for security purposes

UNDERSTANDING THE FOLLOWING NETWORK CONCEPTS (CONT)

- NAT
  - Network Address Translation
  - Masks a local area network behind a routable IP address
  - Allows non-routed IP addresses on a local area network to connect to the Internet
    - For instance, mapping the 192.168.x.x range to 198.111.167.x.

- Topology (cont)
  - DHCP
    - Dynamic Host Configuration Protocol
    - A DHCP server provides dynamic assignment of IP addresses, DNS, and other network information for DHCP clients to connect to network resources

PROTOCOLS

- HTTP
  - Hyper Text Transfer Protocol
- HTTPS
  - Secure Hyper Text Transfer Protocol
- FTP
  - File Transfer Protocol
- SFTP
  - Secure File Transfer Protocol
- Telnet
  - Telephone Network
  - Used for text based connections to Unix shells
  - Not considered secure
- SSH
  - Secure Shell
  - Secure replacement for Telnet
- SCP
  - Secure Copy
- SMTP
  - Simple Mail Transfer Protocol
  - Provides a means to send and receive email
- DNS
  - Domain Name Services or Domain Name Server
  - An Internet service that translates domain names into IP addresses
- POP3
  - Post Office Protocol
  - Normal way to provide mail server access to third party/non-server clients

PROTOCOLS (CONT)

- IMAP
  - Internet Message Access Protocol
  - Permits a client email program to access remote message stores as if they were local
  - Common methodlogy of "Web mail" services
- WINS
  - Windows Internet Naming Service
  - Provides name resolution for clients and servers on a Windows network

KNOW COMPONENTS OF A NETWORK, INCLUDING

- Router
  - A device that connects any number of LANs.
  - Routers use headers and a forwarding table to determine where packets go and they communicate with each other and configure the best route between any two hosts.
- Switch
  - Device that filters and forwards packets between LAN segments.
  - Handles traffic more intelligently than a hub.
- Bridge
  - Connects two LANs or two segments of the same LAN. The two LANs being connected can be alike or dissimilar. Bridges are protocol-independent. They simply forward packets without analyzing and re-routing messages. Consequently, they're faster than routers, but also less versatile.
- Hub
  - Uncommon/Old Fashioned connection point for devices in a network.
  - Generally not used these days. If you still have mini-hubs on your network, you should remove them.
- Wireless
  - Access Points
    - WAP (Wireless Access Point)
      - Bluetooth
      - 802.11x
        - A – 5 ghz
        - B – 2.4 ghz
        - G – 2.4 ghz
        - N – 2.4 ghz
  - Hardware
    - Wireless NICs
    - Encryption
      - WEP
        - Wireless Encryption Protocol
        - 64, 128, 256 bit
      - WPA/WPA2
        - WiFi Protected Access

        - TKIP

KNOW COMPONENTS OF A NETWORK, INCLUDING (CONT)

    - WiFi Protected Access (cont)
        - EAP
    - Technically an interim protocol
- Patch Panel
    - Numbering at Panel and Source
    - Cable Classifications
    - LAN Speeds
        - 10mb
        - 100mb
        - 1 GB

COMMUNICATIONS MEDIA

- Coaxial
- 10base-2
    - 10base-5
- Twisted Pair (Cat-3)
    - Shielded
    - Unshielded
- 10/100/1000Base-T (Cat –5 or Cat-6)
    - 100Base-T
- Optical Fiber
    - 1000Base-T

NETWORK PROTOCOLS/STANDARDS

- TCP/IP
    - Transmission Control Protocol/Internet Protocol
    - Provides connection services
- IPX/SPX
    - Internetwork Packet Exchange/ Sequenced Packet Exchange
- Novell Protocol
- NetBEUI
    - NetBios Enhanced User Interface
    - Enhanced version of the NetBIOS protocol used by some older network operating systems such as Windows NT, 2000 and XP (via an add-on).
    - Not in current use since Windows NT server

DATA TRANSMISSION PROTOCOLS

- Ethernet/Fast/Gigabit

- Token Ring
- Fiber

ALTERNATIVE CONNECTIONS

- DSL
- IDSL
    - ISDN for Digital Subscriber Line
    - ISDN line mocked up to work like a digital line.
    - Not preferred for any libraries.
        - Not enough bandwidth (144k max TOTAL traffic (meaning less like 56k OUT and 88k IN or vice versa)
- ADSL
    - Asynchronous Digital Subscriber Line
    - Varied speeds for inbound and outbound traffic
    - Example: 608k/s IN and 144k/s OUT
- SDSL
    - Synchronous Digital Subscriber Line
    - Speeds are equal in and out
    - Bandwidth does NOT vary
    - Example: 512k/s IN and 512k/s OUT
- Cable
    - Generally asynchronous bandwidth speeds up to 100MB/s
    - Bandwidth is dependent upon usage of others within group (LAN, WAN, or MAN)

UNDERSTANDING TLN'S ROLE IN HOW YOUR LIBRARY IS CONNECTED TO THE INTERNET

- Wide Area Network (WAN) solution that connects separate LAN's across a metropolitan area using a fiber backbone.
- Offering bandwidth in increments 5mb and up.
- Fiber (Opt-E-Man), and Cable Modem connections possible through multiple vendors

NAVIGATING YOUR INTERNAL LAN

- TCP/IP Network Addressing
    - TLN provides a subnetted Class C block of IP address to each site connected to its WAN.
    - Internal LAN ranges are within the following:
        - 10.0.0.0 to 10.255.255.255
            - 24-bit block
            - Subnet is 255.0.0.0
        - 172.16.0.0 to 172.16.255.255
            - 20-bit block
            - Subnet is 255.240.0.0

NAVIGATING YOUR INTERNAL LAN (CONT)

- Internal LAN ranges are within the following: (cont)
  - 192.168.0.0 to 192.168.255.255
    - 16-bit block
    - Subnet is 255.255.0.0

- Applications
  - supports application and end-user processes
- Presentation
  - provides independence from differences in data representation (e.g., encryption) by translating from application to network format, and vice versa
- Session
  - establishes, manages and terminates connections between applications.
- Transport
  - provides transparent transfer of data between end systems, or hosts, and is responsible for end-to-end error recovery and flow control
- Network
  - provides switching and routing technologies, creating logical paths, known as virtual circuits, for transmitting data from node to node
- Data-Link
  - At this layer, data packets are encoded and decoded into bits . It furnishes transmission protocol knowledge and management and handles errors in the physical layer, flow control and frame synchronization.
  - Divides into two layers:
    - Media Access Control (MAC)
      - controls how a computer on the network gains access to the data and permission to transmit it
    - Logical Link Control (LLC)
      - controls frame synchronization, flow control and error checking
- Physical
  - conveys the bit stream - electrical impulse, light or radio signal -- through the network at the electrical and mechanical level. It provides the hardware means of sending and receiving data on a carrier, including defining cables, cards and physical aspects.

NAVIGATING YOUR INTERNAL LAN

- Windows Network
  - Sharing Resources
  - Directories
  - Hard Drives
  - Files

    - Printers

NAVIGATING YOUR INTERNAL LAN (CONT)

- Using Connections and Shared Resources
    - Printers
    - CDs
    - DVDs
    - BDs
    - Files
    - External Drives
    - NAS
    - SAN
- TCP/IP Network Addressing
    - TLN provides from several class C blocks to libraries

CLOUD NETWORKING

- The delivery of computing and storage capacity as a network service
    - Three types of cloud service
        - Infrastructure as a Service (IAAS)
            - Renting use of servers from cloud provider
                - Example: Amazon CloudFormation (EC2), Microsoft Azure
        - Platform as a Service (PAAS)
            - Renting use of server and the software to use them
                - Example: Google App Engine, Microsoft Azure
        - Software as a Service(SAAS)
            - Renting software and databases. Cloud provider manages the infrastructure.
                - Example: Google Docs, Office 365
                - Sirsi Workflows and Meritmail are also technically SAAS

TIME AND PRINT MANAGEMENT SYSTEMS

- TLN maintains pricing contracts with 3M and Envisionware to provide Time and Print Management systems for providing Internet service for Public usage
- Know how Install and configure your client software
- Know how to work your server (where applicable)
    - TLN hosts a server for SAM
- Know how to use the patron functions
    - Extend time
    - add monies
    - block/unblock
    - configure time limits

    - create visitor passes
- Know how to maintain printer services (where applicable)
- Know who to contact for support

INTEGRATED LIBRARY SYSTEMS

SOFTWARE AND HARDWARE MAINTENANCE

- Be familiar with the ILS system software and hardware.
- Know the upgrade procedures and processes followed by your ILS vendor.
- Be knowledgeable of the data structures of your ILS software.
- Be able to set up and maintain system administration and customization settings of your ILS.

- Depending on your library's computer environment, that may include any of the following.
    - Upgrades to hardware and software
    - Security Levels
    - Custom report writing
    - MARC formats and tags
    - Load tables
    - Circulation tables
    - Statistics – compiling and reporting
    - Backup of data and operating system
    - Transaction Processing
    - Indexing
    - Z39.50
    - Customizations to Web OPAC
    - Client management and customization
    - System codes
    - System hours and days closed
    - Client license management
    - Circ backup software
    - Global data updates (i.e. area code or zip code changes)
    - Year end rollover of statistics and acquisitions data

SOFTWARE MODULES

- Be knowledgeable of the modules that your library uses.
- Be able to train your library staff and patrons in the use of these modules.
- Be able to troubleshoot the modules and act as liaison with the vendor to report issues that can't be corrected locally.

Depending on your library's computer environment, that may include any of the following modules:

- Circulation
- Cataloging
- Serials

- Acquisitions
- WebPac
- Community Resources

SOFTWARE MODULES (CONT)

- Bookmobile
- Self Checkout
- Telephone renewals and notification
- Homebound
- Inventory
- Proxy server
- Materials booking
- Image linking
- ILL
- Remote Patron Authentication
- Collection Agency

ILS VENDOR INFORMATION

- Be aware of the processes and procedures for working with your automation vendor.
- Be knowledgeable of new products and features available for your ILS.
- Associate with other libraries who use the same ILS system.
- Take advantage of User Groups and shared training opportunities.
- Be aware of the varying levels of depth of help desk support throughout any 24 hour period.

Depending on your library's computer environment, that may include any of the following:

- Sales contacts
- Helpdesk procedures
- Enhancement submission process
- User Group Information
- Software/Hardware Maintenance plans

THIRD PARTY VENDOR INTERFACES

- Be aware of the third party software that can interface with your ILS.
- Be able to install or set up this software to interface with your system.
- Be able to train your library staff and patrons in its use.

Depending on your library's computer environment, that may include any of the following vendors:

- OCLC and other marc record vendors/sources.
- Vendors for online subscription databases, reference books, ebooks and audiobooks.
- Time management software.
- Print management software.

- Internet filtering software/devices.
- Materials vendors ordering software (i.e. TS3 or IPage).

RFID

- Radio Frequency Identification
    - TLN maintains contracts with 3M and Bibliotheca
    - RFID installations within the TLN cooperative follow the ISO/IEC 15693 and ISO/IEC 18000-3 Mode 1 standard with the 3M tag data model.
    - This tag format will provide for optimal standardization while supporting legacy 3M libraries and will not impact each library's ability to choose a preferred vendor.
        - 3M - Due to a proprietary component in the 3M data model, libraries are asked to have settings configured to read RFID tags that do not have a 04 identifier.
- Be familiar with all facets required for RFID functionality:
    - RFID tag reader for workstation
    - Security Gates
    - Optional equipment:
        - Self Check
        - RFID/Barcode Tag printer
        - Handheld RFID Devices/Inventory Wands
        - Audio/Visual Unlockers
        - Sorting Systems
- Know the proper location of RFID tags on materials
- Ensure compatibility with your ILS
    - Consider ensuring compatibility with other TLN libraries as well