Installation and Maintenance of Health IT Systems

Unit 1b

Elements of a Typical EHR System

Typical Server Elements

Types of servers:
- Application server: computer on which the EMR/PM application resides
- Database server: computer on which the database software resides
- Citrix or terminal server: computer that supports thin client network
- Application, database, and terminal services may reside on the same computer for small installations (less than 10 users)

Server Software Elements of the EHR

- 8 Core Components (IOM)
  - Health Information and Data
  - Results Management
  - Order Entry/ Management
  - Decision Support
  - Electronic Communication/ Connectivity
  - Patient Support
  - Admin Processes
  - Reporting/ Pop. Health Management

EHR Clients

- EHR systems make medical records available to multiple simultaneous users. Tablets, laptops and PCs allow instantaneous access for the healthcare staff who move around in the health centers.
- Clients use application software to securely connect to and poll the EHR server to fulfill user requests

EHR Hardware - Defined

Hardware consist of the physical components that make up a computer system.

These objects are needed to make the computer work and run properly.

EHR Hardware - Defined

Types of hardware most often affiliated with EHR systems include…

- Servers
- Workstations
- Laptops
- Tablets
- PDAs / Smartphones

- Flat Panel Monitors
- Scanners
- Printers
- Storage and Backup
- Shredders
- Medical Diagnostic and Treatment Items

EHR Hardware - Servers

The server(s) are the "Home base" of the core EHR system components Including:

- Storing the Patient Database (Index)
- Real-time, dynamic compilation of patient information from varied sources
- Parsing user requests
- User Management tools
- Customization tools

EHR Hardware - Servers

Picking the right server is extremely important!

- You should consult your Information Systems staff, hardware vendor, and/or consultant to determine the hardware specs required for your organization. Consult with your EHR vendor as well.
- Important items to consider include:
  - Reliability
  - Performance
  - Scalability

EHR Hardware - Servers

- Storage requirements dependent on EHR/PM application, volume of scanned documents
- Rule of Thumb: 5 GB per year per provider (check with your EHR vendor)

EHR Hardware - Servers

- Brand (i.e. Dell vs. "white box")

- Operating system (i.e. Windows 2003)

- Processors (e.g. 2.4 Hz Xeon)

EHR Hardware - Servers

- RAM (i.e. 1 GB)

- Hard drive configuration (i.e. RAID 5)

- Network Card (e.g. 1 GB per second)

- Requires: monitor, keyboard, CD/DVD drive, UPS (un-interrupted power supply)

EHR Hardware - Servers

Internal vs External (hosted) Solutions

- Cost
  - Internal - Higher initial costs
  - External - Monthly fees
- Management
  - Internal - Staff needed to implement and manage the server(s) and perform software and hardware maintenance and backup duties
  - External - The customer is at the mercy of the vendor for scheduled maintenance
- Power
  - Internal - Your organization is capable of utilizing the full power of the server
  - External – Hosted solutions often share resources
- Connectivity
  - Internal – You control the speed and connectivity to the server(s)
  - External - All locations are remote, and connectivity means may be shared with other customers, reducing the speed available to you

EHR Hardware - Clients

- Workstations
  - Connected to your server via a wired network
  - Strategically positioned throughout the work environment to facilitate convenient access
  - Most commonly used and often already in place
  - Economical

EHR Hardware - Clients

Tablets / Laptops
- Laptops – portable computers
- A Tablet PC is a computer system that enables data entry and navigation with a stylus or electronic pen.
  - Booklets
  - Slate
  - Convertible
- Can connect Wirelessly to the server
- Uses rechargeable Batteries

EHR Hardware - Clients

Tablets / Laptops
- Advantages
  - Allow additional mobility compared to workstations
  - Saves time
  - Can be cheaper if additional infrastructure such as ports are needed
- Disadvantages
  - Typically more expensive than PCs
  - Subject to theft
  - Easily broken
  - Require additional support, cleaning, and maintenance

EHR Hardware - PDAs

Personal Digital Assistants (PDAs) are devices that combine computing, telephone/fax, and networking features

- Like Tablets, most PDAs begin as pen-based, using a stylus rather than a keyboard for input.
- Allow users to remotely access patient data from any location with connectivity
- Similar advantages/ disadvantages to Tablets/ Laptops
- May require additional hardware/ infrastructure recourses to adapt

The Network

A network is a collection of computers and devices connected by communications channels that facilitates communications among users and allows users to share resources with other users.

- Important Terms
  - Ethernet
  - LAN (Local Area Network)
  - WLAN (Wireless Local Area Network)
  - WAN (Wide Area Network)
  - Bandwidth
  - VPN

The Network - Assessing Usage

- Your network must be able to support the data requirements of your EHR application.

- Insufficient network capabilities will degrade application performance and increase the risk of user rejection.

The Network - Assessing Usage

- How many users will need simultaneous access to the network?

- What are the bandwidth requirements of the EHR system (vendor)?

- Special bandwidth needs of scanning equipment or other medical equipment

- Sufficient connectivity between the internal resources and remote resources such as satellite facilities

The Network - Assessing Usage

- Conduct a wireless connectivity Survey

- Explore remote connectivity options including VPN (Virtual Private Networks)