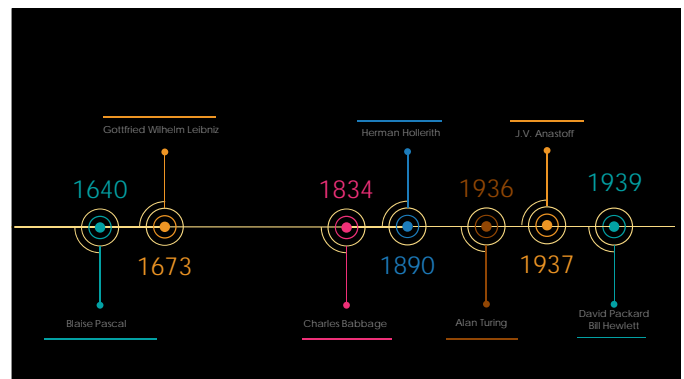


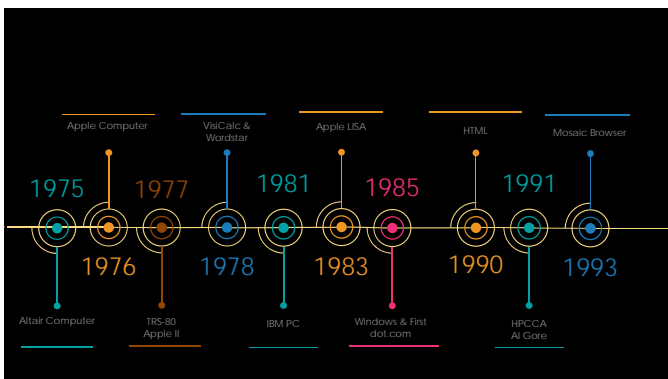
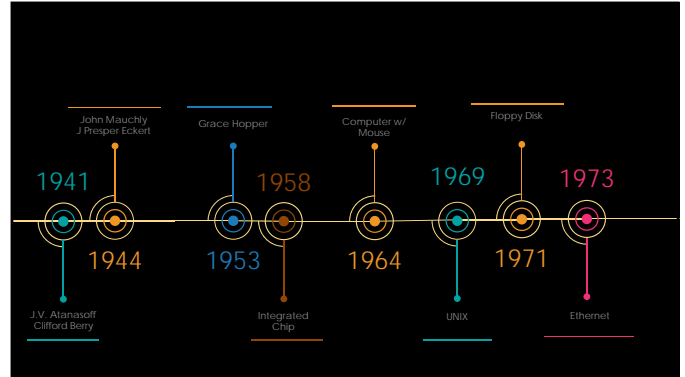
## Objectives

- How did we get here?
  - Understand the history of computers and networks
- Where is here?
  - Understand network terminology
  - Review systems in use today
  - Understand basic network concepts that affect our day to day responsibilities
- Where are we going?
  - What is the cloud, exactly?
  - What does it mean for me?

## Disclosure

- CEO ZapIT! Medical





### Ada Lovelace - Imagination

It is the Combining faculty. It brings together things, facts, ideas, conceptions in new, original, endless ever-varying combinations. . . . It is that which penetrates into the unseen worlds around us, the worlds of Science

### Ada Lovelace - Analytic Engine

..... act upon other things besides number, were objects found whose mutual fundamental relations could be expressed by those of the abstract science of operations

### Information Technology

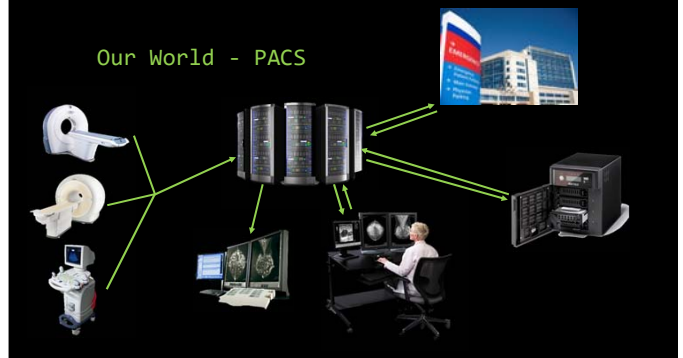
- Storing
- Retrieving
- Transmitting
- Manipulating

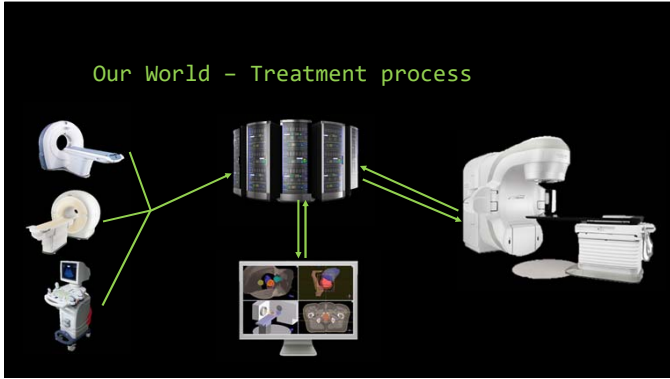
Data  
Through networks

### Networked

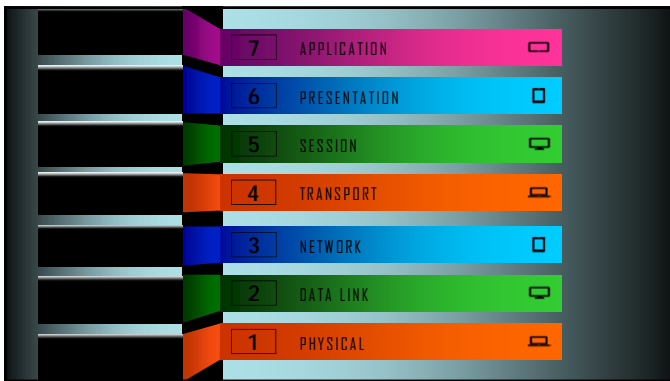
- High Capacity
  - Lots of Information
    - DICOM Images
    - Plans
    - Treatment Records
    - Documents
- Reliable
- Responsive
- Cost Effective

### Our World - PACS





Open Systems Interconnection Model



**Physical**

- Structure
- Transmission and reception of the raw bit stream over the physical medium
  - Cables
  - Hubs
- Application
  - Data encoding
  - Physical medium attachment
  - Transmission technique (broadband, baseband)
  - Electrical impulses

## Physical Layer Risks

- Disruption of service
  - Power interruption
  - Disconnection
  - Physical damage
  - Outright theft

## Data Link

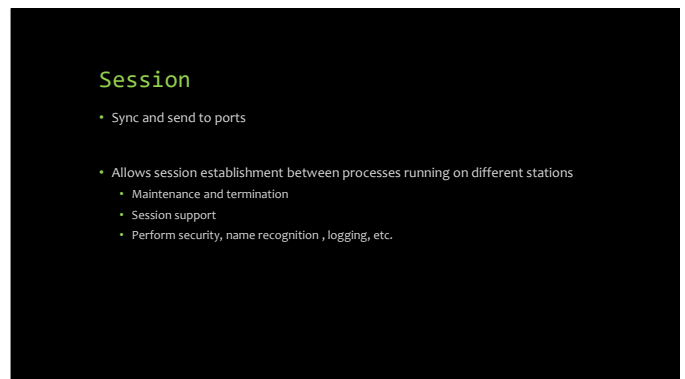
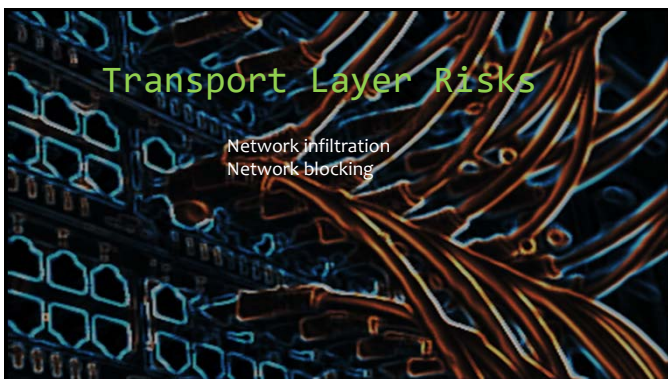
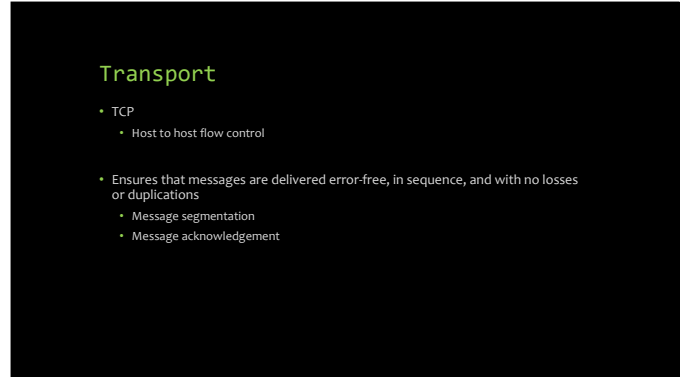
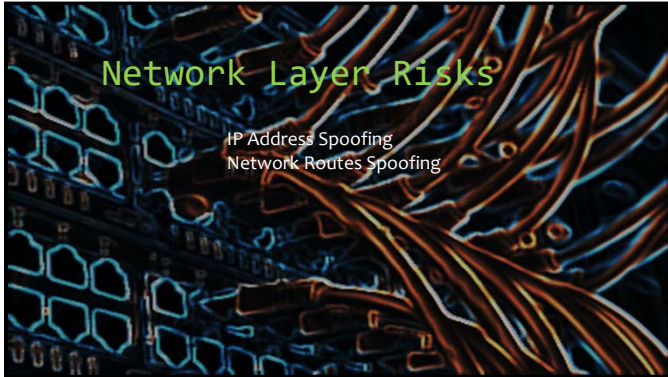
- Frames - "envelopes"
- Error free transfer of data frames from one node to another over the physical layer
  - NIC card → Switch → NIC card
- MAC address
- Logical Link Control (LLC)

## Data Link Layer Risks

MAC address spoofing  
VLAN circumvention  
ARP cache poisoning

## Network

- Packets - "Letter"
  - Contains IP address
- Controls the operations of the subnet, deciding which physical path the data takes
  - Routing
  - Subnet traffic control
  - Logical-physical address mapping



## Session Layer Risks

Password spoofing  
 Authentication spoofing  
 Brute force

## Presentation

- Syntax Layer (Translator of the network)
- Formats the data to be presented to the application layer.
  - Character code transition
  - Data conversion
  - Data compression
  - Data encryption
  - Translation

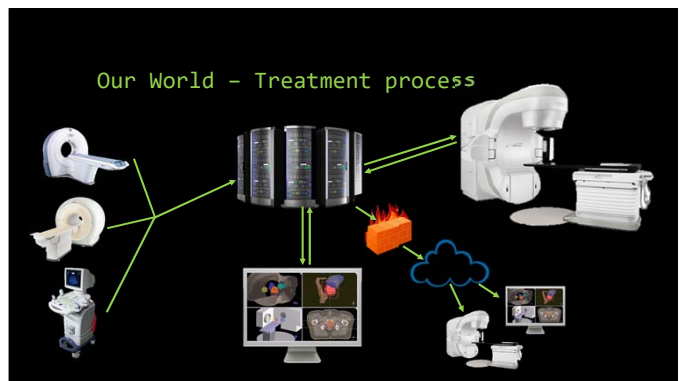
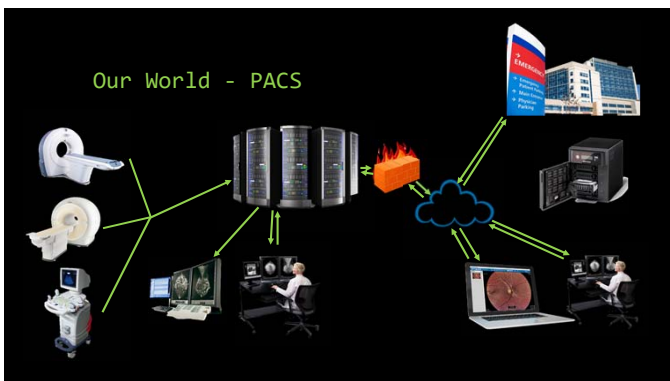
## Presentation Layer Risks

Unicode vulnerabilities  
 Unexpected input

## Application

- End User Layer
  - Program that opens what was sent or prepares what is to be sent
- Serves as the window for users and application processes to access the network services
  - Resource sharing
  - Remote file access
  - Directory services
  - Network management









- ### Cloud computing
- IT Management easier
  - Disaster management easier
  - Software versioning easier
  - Storage not a problem
  - Cost reduction
  - Green computing
  - Data more accessible
  - Scalability

