Analytical® Infotech

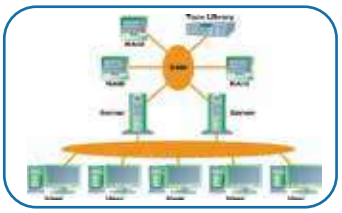
A Division of **Analytical Technologies Limited**

IT INFRASTRUCTURE

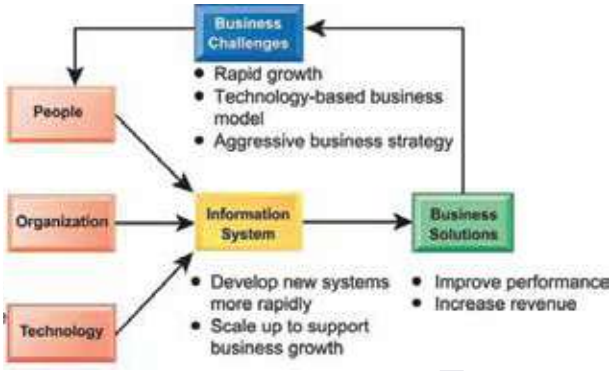
Software

Network

Hardware



IT Infrastructure: Computer Hardware



- Formulate business straregy
- Make IT infrastructure investments
- Align IT infrastructure with business goals
- AlignIT with business processes
- Replace legacy systems and outdeted technologie
- Standardize IT infrastructure on IBM platform
- Adopt SOA

Infrastructure Components

» **IT Infrastructure**
  - Provides platform for supporting all information systems in the business.

» **Computer hardware**
» **Computer software**
» **Data management technology**
» **Networking and telecommunications technology**
» **Technology services**

IT Infrastructure Components

» **IT infrastructure is composed of hardware, software, data management technology, networking technology, and technology services.**

Types of Computers

» **Computers come in different sizes with varying capabilities for processing information.**
  - FLOPS (Floating point operations per second)

» **Smartphones, netbooks, e-book readers**
» **PCs**
» **Workstations**
  - More powerful mathematical and graphics-processing capabilities than a PC

» **Servers**
- Type of midrange computer.
- Support computer network, sharing files and resources.
- Provide hardware platform for e-commerce.
- Store and process shared data and perform network management activities.

» **Mainframes**
- Large-capacity, high-performance computer that can process large amounts of data very rapidly
- E.g., used by airlines for thousands of reservations per second

» **Supercomputer**
- More sophisticated computer used for tasks requiring extremely rapid and complex calculations with thousands of variables, millions of measurements.
- Used in engineering, scientific simulations, military/weapons research, weather forecasting

» **Grid computing:**
- Power of geographically remote computers connected into single network to act as "virtual supercomputer"

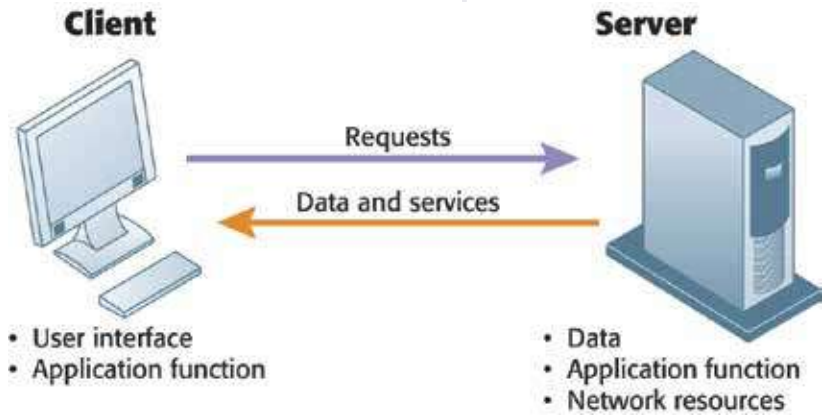
» **Client/server computing:**
- Form of distributed computing
- Splits processing between "clients" and "servers"

» **Clients:**
- User point of entry

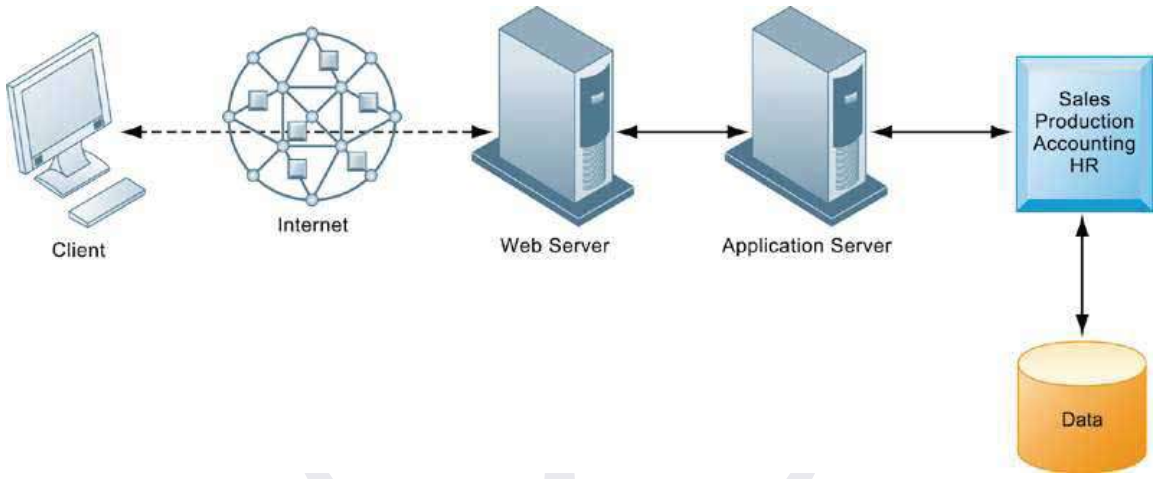
» **Client/server computing (cont.):**
- Two-tiered client/server architecture
- Uses two types of machines
- Multitiered client/server architecture (N-tier)
- Balances load of network over several levels of servers
- E.g., Web servers and application servers

Client/Server Computing

» **In client/server computing, computer processing is split between client machines and server machines linked by a network. Users interface with the client machines.**



A Multitiered Client/Server Network (N-Tier)



» **In a multitiered client/server network, client requests for service are handled by different levels of servers.**

Storage, Input, and Output Technology

» **Primary secondary storage technologies**

» **Magnetic disk:**

- Hard drives, USB flash drives
- RAID: can package hundreds of drives for massive storage requirements

» **Optical disks**

- CD-ROM, CD-RW, DVD

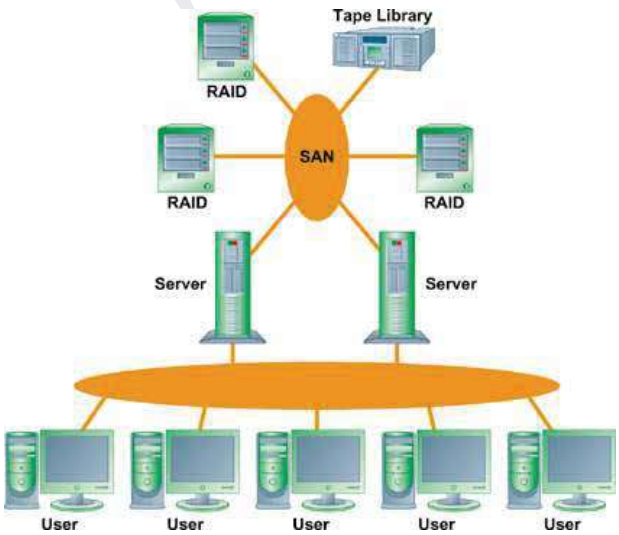
» **Magnetic tape**

» **Storage networking: SANs**

- Connect multiple storage devices on a separate high-speed network dedicated to storage

A Storage Area Network (SAN)

» **A typical SAN consists of a server, storage devices, and networking devices, and is used strictly for storage. The SAN stores data on many different types of storage devices, providing data to the enterprise. The SAN supports communication between any server and the storage unit as well as between different storage devices in the network.**



Storage, Input, and Output Technology

» **Input devices:**
» **Gather data and convert them into electronic form.**

- Keyboard
- Computer mouse
- Touch screen
- Optical character recognition
- Magnetic ink character recognition
- Pen-based input
- Digital scanner
- Audio input
- Sensors

Storage, Input, and Output Technology

» **Output devices:**

- Display data after they have been processed.
- Monitor
- Printer
- Audio output

» **Information systems collect and process information in one of two ways.**

- Batch processing: transactions stored for predefined amount of time, then processed as group
- Online processing: transactions processed immediately

Contemporary Hardware Trends

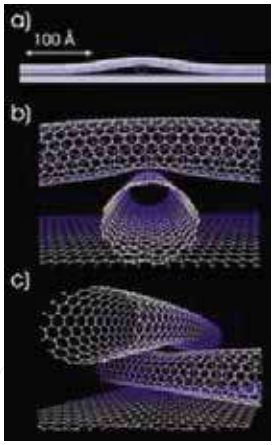
» **The emerging mobile digital platform**

- Based on new handheld hardware like cell phones, netbooks, and tablet computers. A new “platform.”
- Wireless communications through 4G cell networks and Wi-FI
- New software apps.

» **Nanotechnology**

- Creating computer chips and other devices thousands of times smaller through manipulating individual atoms, molecules.

Examples of Nanotubes



- **Nanotubes are tiny tubes about 10,000 times thinner than a human hair. They consist of rolled up sheets of carbon hexagons, have potential uses as minuscule wires or in ultrasmall electronic devices, and are very powerful conductors of electrical current.**

Contemporary Hardware Trends

- **Cloud Computing:**
  - A model of computing in which firms and individuals obtain computing resources over the Internet
  - Cloud infrastructure as a service
  - Cloud platform as a service
  - Cloud software as a service
- **Autonomic computing:**
  - Development of systems that can configure themselves, heal themselves; e.g., self-updating antivirus software

Contemporary Hardware Trends

- **Virtualization**
  - Process of presenting a set of computing resources so they can be accessed in ways that are unrestricted by physical configuration or geographic location
  - Server virtualization: running more than one operating system at the same time on single machine.

Contemporary Hardware Trends

- **Multicore processors:**
  - Integrated circuit with two or more processors
  - Enhanced performance, reduced power consumption, and more efficient simultaneous processing of multiple tasks

Blade Enclosure / Chassis

The PowerEdge Modular Blade Enclosure is the rock-solid foundation for blade server architecture, providing an extremely reliable, flexible and efficient platform for building any IT infrastructure. Designed for data centers in need of maximum density, efficiency and manageability, the PowerEdge M series integrates servers, storage, networking and management into a single chassis to deliver greater simplicity, efficiency and versatility.

Blade Server

Rack Server

Running a data center of any significant size usually Dell PowerEdge Rack Servers | Flagship Technologies | Flagship Tech | Flagshipmeans using servers mounted in racks to make more efficient use of the available space. Like other brands, Dell PowerEdge rack servers are measured according to the height each one occupies in a rack. This “footprint”, so to speak, is measured in “Us”. The most popular Dell rack servers measure 1U and 2U while larger servers of 4U, 5U and larger are also available. Typically, the larger the server, the more expansion opportunities available.

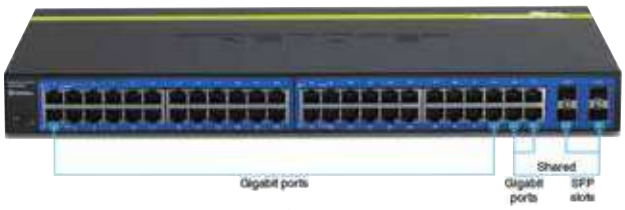
Server Access Switch

The Extreme Networks 800 Series is a highly reliable Fast Ethernet and Gigabit Ethernet family of edge switches that provides scalable, flexible, wire-rate performance supporting the bandwidth-intensive and delay-sensitive requirements of today’s demanding business applications. The 800 Series is comprised of ten models (four 10/100 switches and six 10/100/1000 switches) so this cost-effective and flexible solution can adapt to any network edge requirements.

The 800 series standalone switch family comprises of ten models to provide the ultimate in versatility. This cost-effective solution allows up to eight switches to be interconnected, creating a virtual switch that can be managed with a single IP address.

48 Port Switch

The 2610-48 switch includes two 10/100/1000BaseT ports and two mini-GBIC slots for Gigabit uplink connectivity. An optional redundant external power supply is also available to provide redundancy in the event of a power supply failure. With static routing, robust security and management features and free software updates, the 2610 series is a cost-effective solution for customers who are building converged enterprise edge networks.



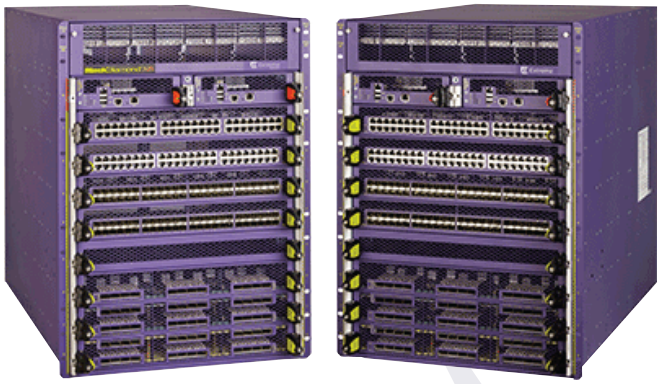
24 Port Switch

The is a 24-Port Gigabit Switch that delivers power, performance, and reliability in one cost-effective, space-saving design. Increase the speed of your network server and backbone connections, or make Gigabit to the desktop a reality. The versatile and compact 1RU height design of the DGS-1024D enables the device to be rackmounted in a standard 19-inch rack while conserving valuable rack space.

16 Port KVM Console Switch

The D-Link PS2/USB Combo KVM Switch is a high-performance local remote management solution designed for small to medium server rooms that require access and control of multiple servers. Additional KVM switches can be cascaded allowing control of up to 512 (KVM-440) or 4096 (KVM-450) servers from a single console. The switch supports both USB and PS/2 platform servers and is fully compatible with all the major operating systems.

Server Management Switch



Simplify, virtualize, and converge cloud-scale data center networks with our flagship modular data center solution.

The fits well at the edge of the most demanding enterprises switching Voice-over-IP (VoIP), video, wireless, and data traffic.

72 Port Switch

Cost-effective Gigabit Ethernet standalone switches that provide essential network edge/access connectivity solutions for branch offices, enterprise edge and small and medium businesses.

Family of economical, managed Gigabit Ethernet switches which address the wired connections of PCs, servers and storage devices in addition to PoE to power wireless APs and IP phones. The family can also be flexibly managed via ExtremeCloud, ExtremeManagement, web client or industry-standard command line interface (CLI).

Extreme Industrial Switches provide continuous uptime, manageability and operational efficiency. With full PoE+ power per port, each switch offers the performance needed for todays power-hungry CCTV devices and WLAN access points.

The Half-Duplex to Full-Duplex Converter can be used in conjunction with full-duplex switches to provide 10/100 Mb half-duplex connections to older Ethernet devices.

SAN Switches

Firewall

The Dell SonicWALL TZ is an affordable, yet high-performing, line of enterprise-level firewalls designed for small and medium-sized businesses, remote and branch offices, and retail point-of-sale locations. SonicWALL TZ series offer these use cases an abundance of protection features as well as advanced security services that leverage on-box and cloud-based anti-malware, antispyware, intrusion prevention system, and URL filtering. Dell's new line of firewalls are also specced to handle encrypted attacks as it is equipped with the processing punch needed to inspect encrypted SSL connections against the most recent threats.

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Windows Server

Tap Library

Rack

18U " Depth IT Free Standing Server Rack Cabinet Enclosure BONUS Free!!! Cooling fan, Casters, LED-Screen, PDU and other accessories included. 18U Server Rack Cabinet Sysracks SRW-Series is a fully equipped unit with all necessary components and accessories. Casters with "brake" option, Cooling fan, 8-Way PDU, Fixed Shelf, Mounting Hardware. Beatify the design of your working space, housing priceless equipment in professional Server Racks Sysracks.

Rack Monitor With Track Pad

Gateway Router

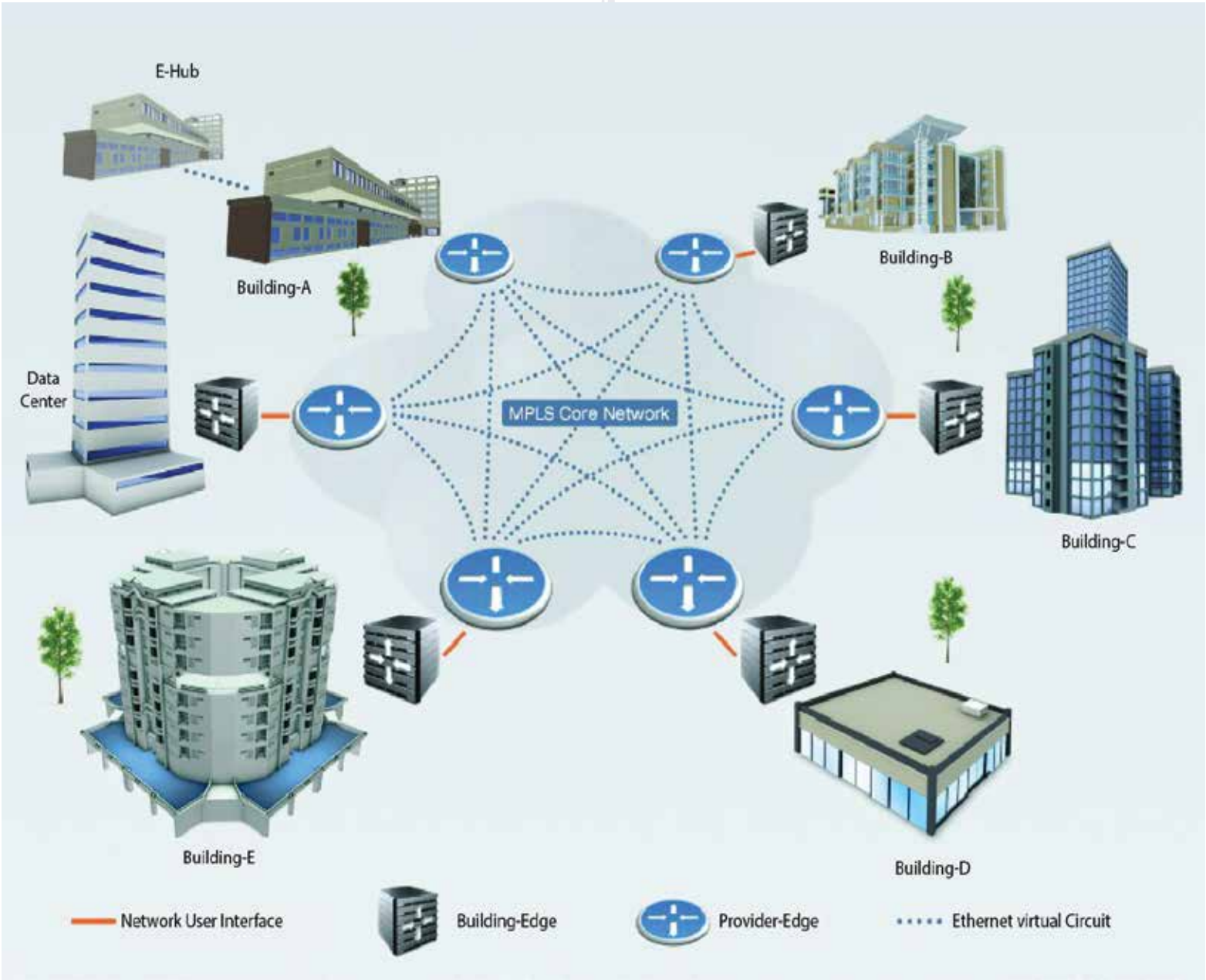
The gateway communicates directly with our sensor terminals, including the transmitter with sensor clamps, sensor plug sockets and RF switches. Our gateway allows the user to monitor or control local sensor terminals via internet or android web application. The gateway also supports LAN monitoring and control via Ethernet and WIFI connection.

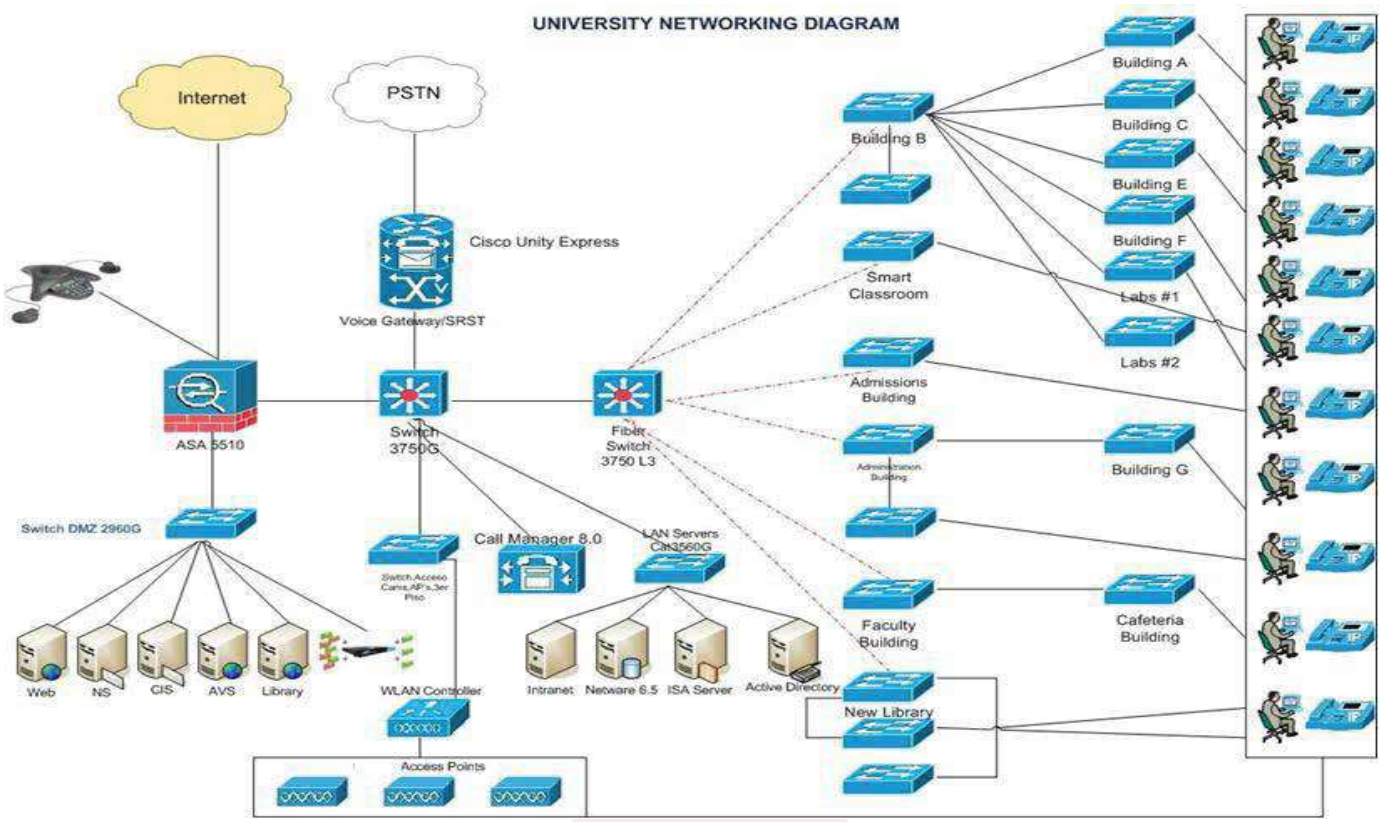
UPS

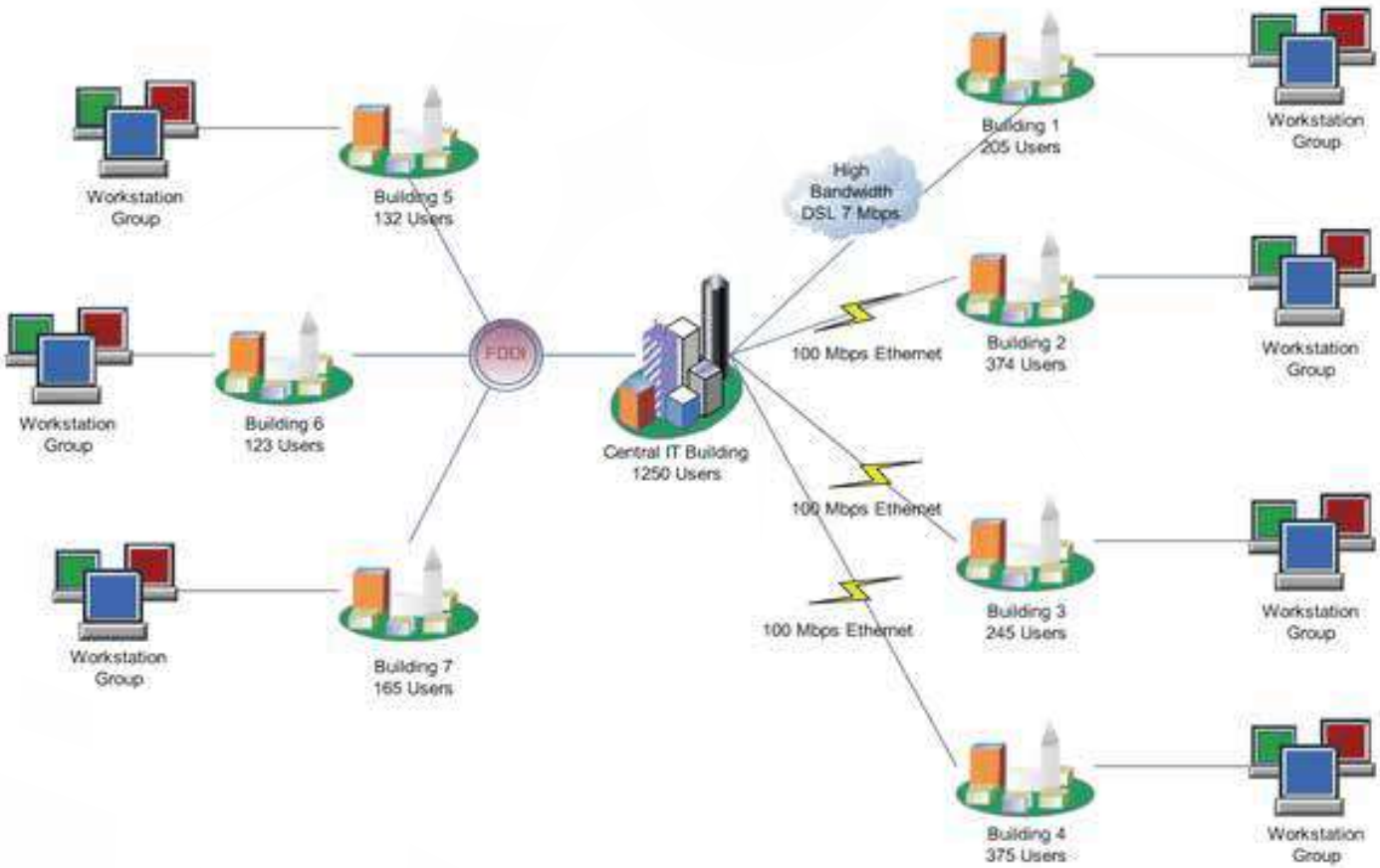
The gateway communicates directly with our sensor terminals, including the transmitter with sensor clamps, sensor plug sockets and RF switches. Our gateway allows the user to monitor or control local sensor terminals via internet or android web application. The gateway also supports LAN monitoring and control via Ethernet and WIFI connection.

IT Infrastructure: Computer Network

IT Infrastructure For University

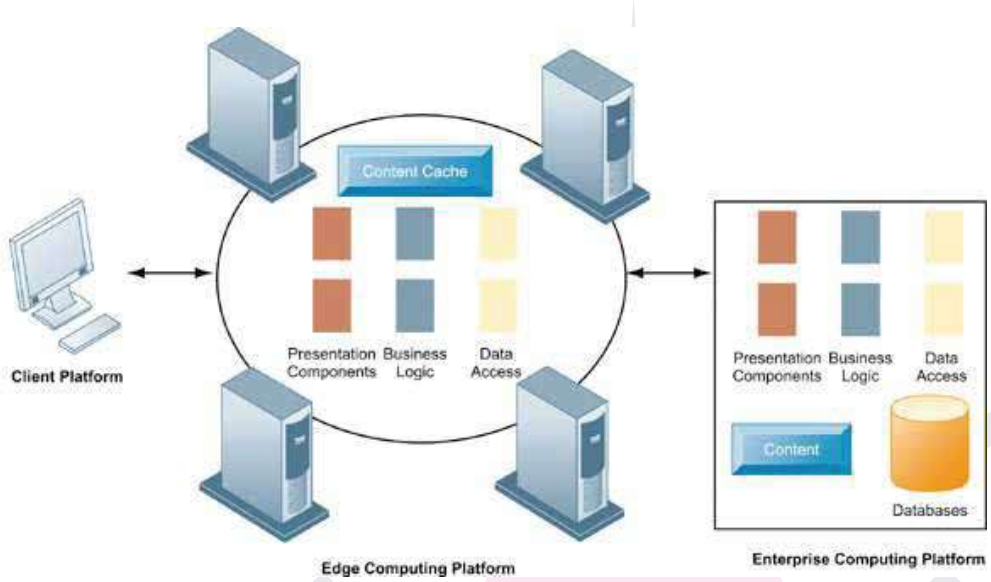



UNIVERSITY NETWORKING DIAGRAM
Internet
PSTN
Cisco Unity Express
Voice Gateway/SRST
ASA 5510
Switch 3750G
Fiber Switch 3750 L3
Switch DMZ 2960G
Call Manager 8.0
LAN Servers CM3560G
Web
NS
GIS
AVS
Library
WLAN Controller
Intranet
Netware 6.5
ISA Server
Active Directory
Access Points
Building A
Building C
Building E
Building F
Labs #1
Labs #2
Building B
Smart Classroom
Admissions Building
Building G
Faculty Building
Cafeteria Building
New Library

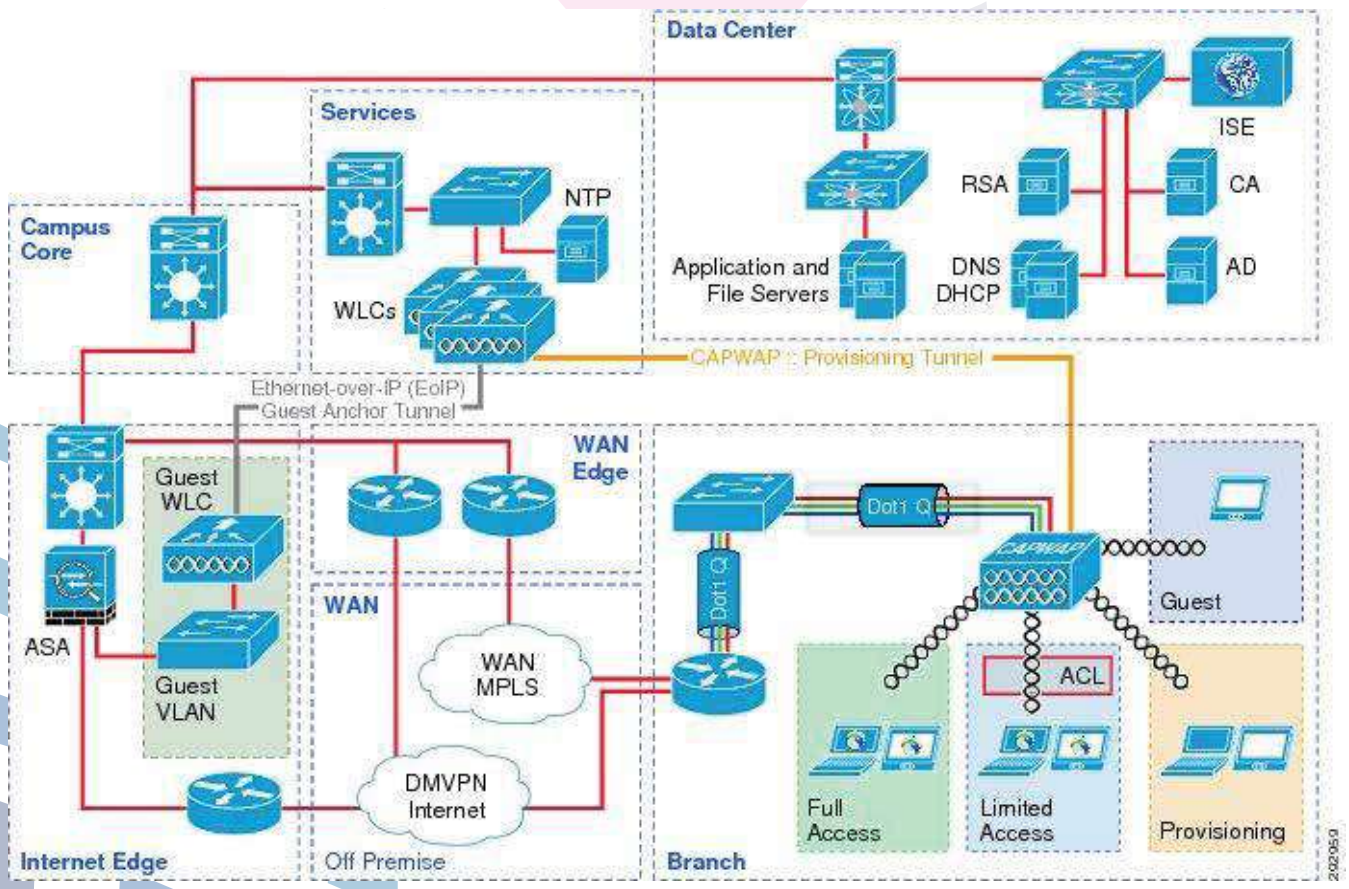

Workstation Group
Building 5
132 Users
Workstation Group
Building 6
123 Users
Workstation Group
Building 7
165 Users
FDDI
Central IT Building
1250 Users
High Bandwidth DSL 7 Mbps
100 Mbps Ethernet
100 Mbps Ethernet
100 Mbps Ethernet
Building 1
205 Users
Building 2
374 Users
Building 3
245 Users
Building 4
375 Users
Workstation Group
Workstation Group
Workstation Group
Workstation Group

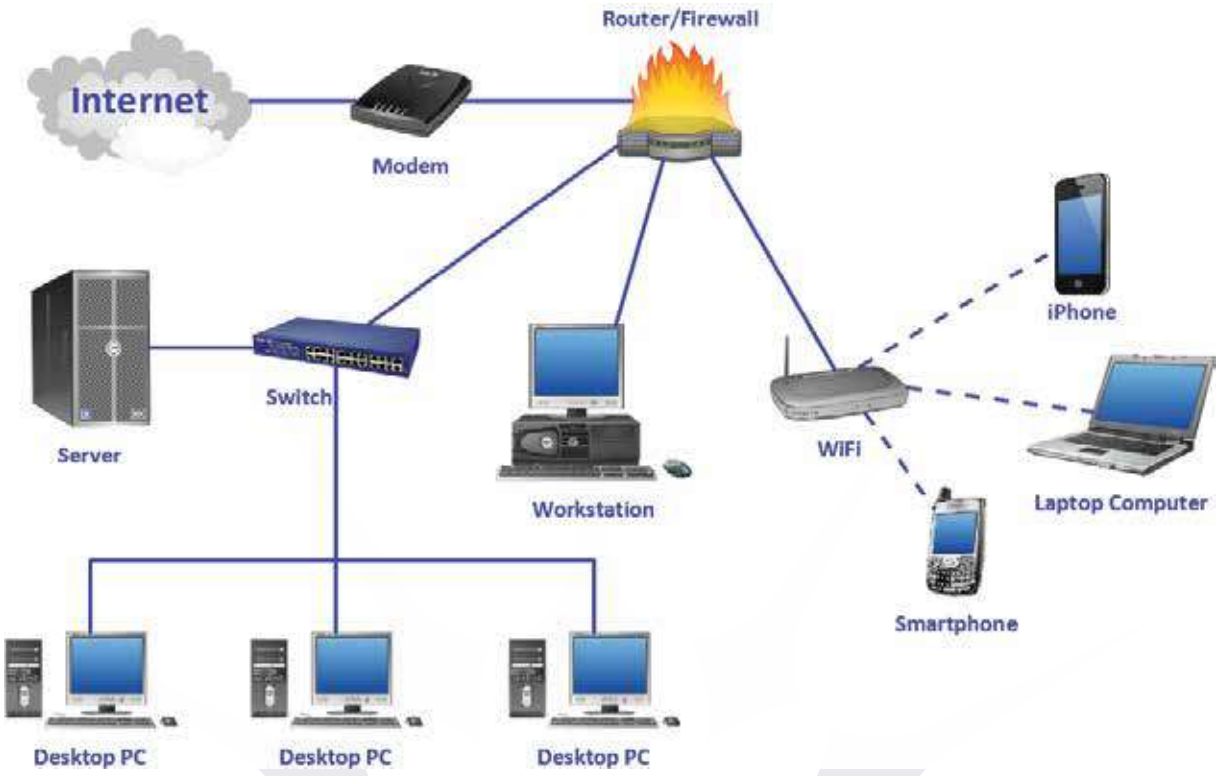
IT Infrastructure: Hardware Software & Networking

Edge Computing Platform

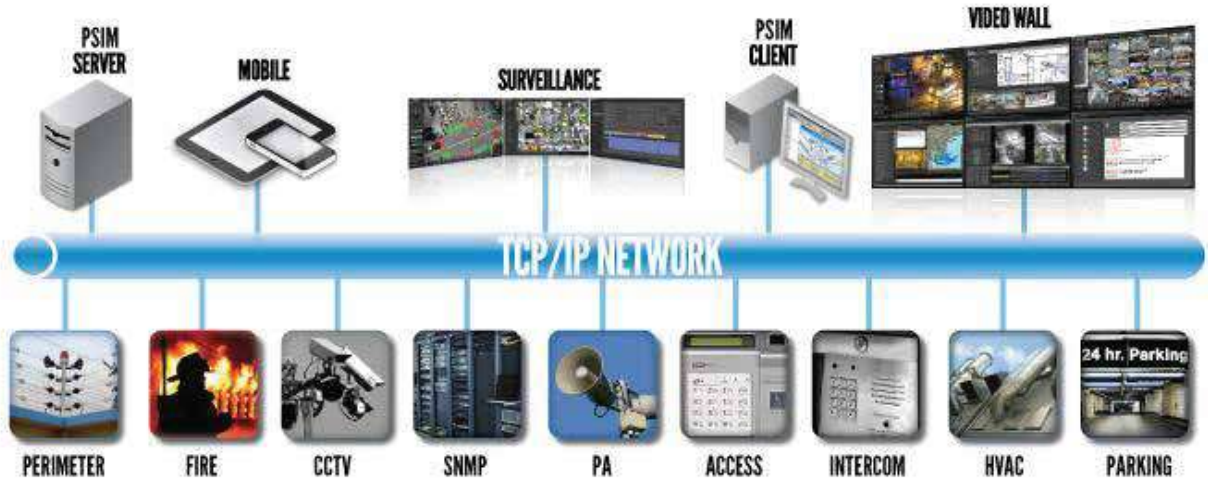


- Edge computing involves the use of the Internet to balance the processing load of enterprise platforms across the client and edge computing platform.




Router/Firewall
Internet
Modem
iPhone
Server
Switch
WiFi
Workstation
Laptop Computer
Smartphone
Desktop PC
Desktop PC
Desktop PC


Wireless Router Network Diagram
Internet
MP3 Player
HDD
Cable Modem
WEB Camera
Printer
Wireless router
Desktop PC
Media PC
IP Camera
Digital Camera
Wireless Media Player
Smartphone
Laptop
Entertainment System



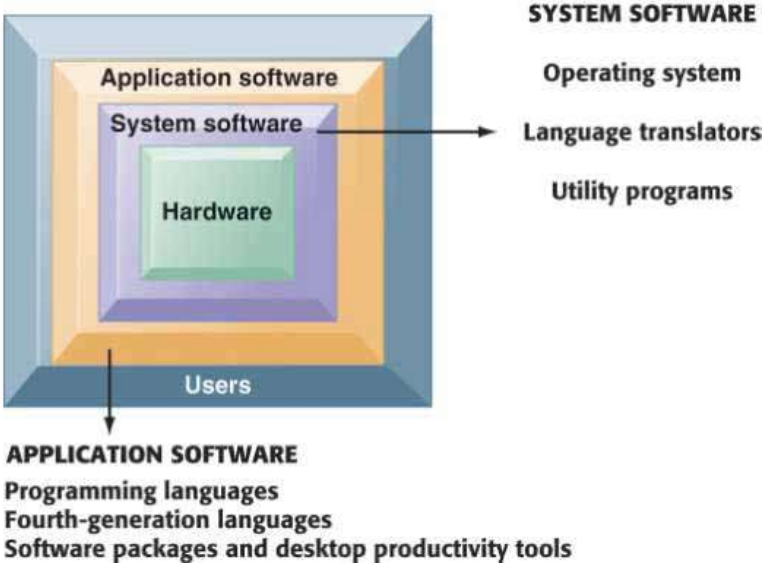
IT Infrastructure: Computer Software

Operating System Software

- The software that manages and controls the computer's activities
- PC operating systems and graphical user interfaces
- GUIs
- Windows 7, Windows 8 & 8.1, Windows 10 and Windows Server 2014 & 2016
- UNIX
- Linux
- Open-source software

The Major Types of Software

- The relationship among the system software, application software, and users can be illustrated by a series of nested boxes. System software— consisting of operating systems, language translators, and utility programs—controls access to the hardware. Application software, including programming languages and "fourthgeneration" languages, must work through the system software to operate. The user interacts primarily with the application software.



Application Software and Desktop Productivity Tools

- **Application programming languages**
  - COBOL
  - C, C++
  - Visual Basic: Visual programming language
  - Java, Android
- **Fourth-generation languages**
  - Software tools that enable end-users to develop software applications.

Categories of Fourth-Generation Languages

Tool	Description	Example
PC software tools	General-purpose software packages for PCs	WordPerfect Microsoft Access
Query language	Languages for retrieving data stored in databases or files	SQL
Report generator	Specialized tools for creating highly customized reports	Crystal Reports
Graphics language	Display data from databases in graphic format	SAS Graph Systat
Application generator	Preprogrammed modules to generate entire applications	FOCUS QuickBase
Application software package	Software programs that eliminate need for custom, in-house software	Oracle PeopleSoft HCM mySAP ERP

Application Software and Desktop Productivity Tools

- **Software packages and desktop productivity tools**
- **Word processing software**
- **Spreadsheet software**
- **Data management software**
- **Presentation graphics**
- **Software suites**
- **Web browsers**

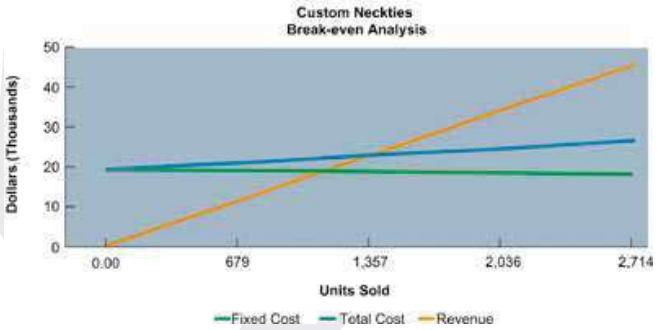
Spreadsheet Software

- **Spreadsheet software organizes data into columns and rows for analysis and manipulation. Contemporary spreadsheet software provides graphing abilities for a clear, visual representation of the data in the spreadsheets. This sample break-even analysis is represented as numbers in a spreadsheet as well as a line graph for easy interpretation.**

Total fixed cost	19,000.00
Variable cost per unit	3.00
Average sales price	17.00
Contribution margin	14.00
Break-even point	1,357

Custom Neckties Pro Forma Income Statement

Units sold	0.00	679	1,357	2,036	2,714
Revenue	0	11,536	23,071	34,607	46,143
Fixed cost	19,000	19,000	19,000	19,000	19,000
Variable cost	0	2,036	4,071	6,107	8,143
Total cost	19,000	21,036	23,071	25,107	27,143
Profit/Loss	(19,000)	(9,500)	0	9,500	19,000



Software for the Web: Java, AJAX, and HTML

- **Java**
  - Operating system-independent, processor-independent, object-oriented programming language.
- **AJAX**
  - Operating system-independent, processor-independent, object-oriented programming language.
  - Allows a client and server to exchange data behind the scenes to avoid reloading a Web page after each change
- **Hypertext markup language (HTML)**
  - Page description language for specifying how elements are placed on a Web page and for creating links to other pages and objects.

Web Services

- **Web services:**
  - Software components that exchange information with one another using universal Web communication standards and languages
  - **XML** (extensible markup language)
  - **SOAP** (simple object access protocol)
  - **WSDL** (Web services description language)
  - **UDDI** (universal description, discovery, and integration)
  - Service oriented architecture **(SOA)**

Software Trends

- **Open Source Software**
  - Linux, Apache
- **Cloud Computing**
  - Google Apps, Office Web Apps
- **Mashups**
  - Faceforce, ZipRealty, BidNearBy
- **Widgets**
  - Apple Dashboard, Yahoo! Weather

IT Infrastructure: Hardware, Software & Networking

Managing Hardware and Software Technology

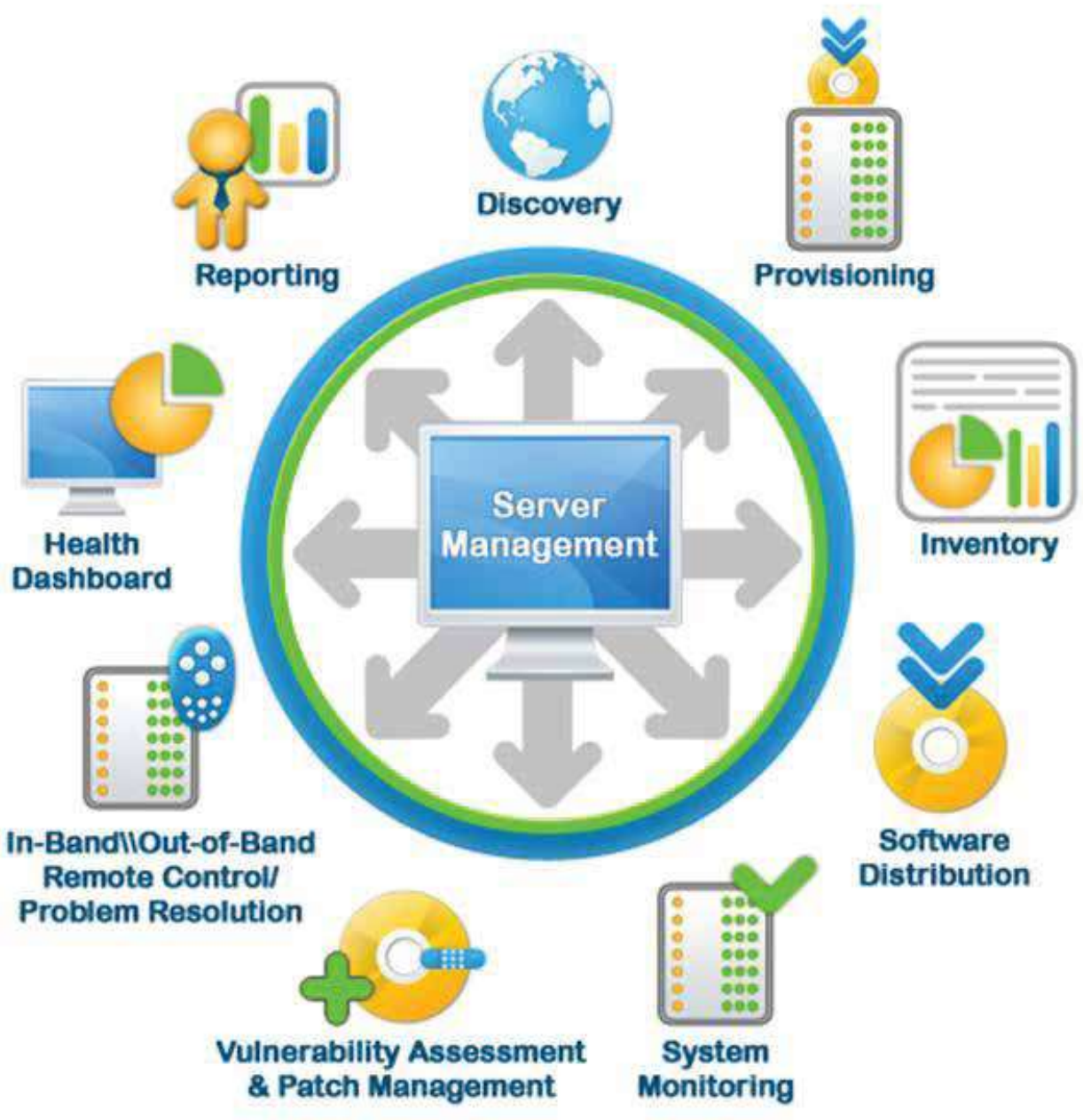
- **Capacity planning**
- **Process of predicting when hardware system becomes saturated**
- **Ensuring firm has enough computing power for current and future needs**
- **Factors include:**
  - Maximum number of users
  - Impact of current, future software
  - Performance measures
- **Scalability:** Ability of system to expand to serve large number of users without breaking down.
- **Total Cost of Ownership (TCO) model**
  - Used to analyze direct and indirect costs to help determine
  - Direct costs: hardware, software purchase costs
  - Indirect costs: ongoing administration costs, upgrades, maintenance, technical support, training, utility, and real estate costs
  - Hidden costs: support staff, downtime, additional network management
  - TCO can be reduced through increased centralization, standardization of hardware and software resources.
- **Using technology service providers**
- **Outsourcing**
  - Using external provider to:
  - Run networks.
  - Host, manage Web site(s).
  - Develop software (offshore software outsourcing)
  - Manage IT infrastructures.
  - Requires Service Level Agreements (SLAs)

Managing software localization for global business

- Local language interfaces
- English not typically standard at middle, lower levels
- Interfaces are complex: menu bars, error messages, online forms, search results, and so on
- Differences in local cultures
- Differences in business processes
- All of these factors add to TCO of using technology service providers

IT Infrastructure: Hardware, Software & Networking

Server Management



Regulatory compliances

Corporate Social Responsibility

Analytical Foundation is a nonprofit organization (NGO) found for the purpose of:

1.Research & Innovation Scientist's awards / QC Professional Award : Quality life is possible by innovation only and the innovation is possible by research only, hence ANALYTICAL FOUNDATION is committed to identify such personallities for their contributions across various field of Science and Technoligy and awarding them yearly. To participate for award, send us your details of research / testing / publication at Info@analyticalfoundation.org

2. Improving quality of life by offering YOGA Training courses, Work shops / Seminars etc.

3. ANALYTICAL FOUNDATION aims to DETOXIFY human minds, souls and body by means of yoga, Meditation, Ayurveda, Health Care, Awards, Media, Events, Camps etc.

Reach us @

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