Workstations…

Lecture 16

Workstation

- A workstation **is a computer** that operates independently of the network.
- It **manages its own files** and processing.
- Represents the **users' primary interface** to the network and the resource on which users most rely to get their jobs done.

Workstation

- Workstations **connect to the network** for the purpose of:
  - Get access to certain services
  - Centralized management of networked resources.
  - security

Choosing Desktop Computers

- Desktop Platforms
- Reliability and Serviceability
- Price and Performance

Desktop Platforms

- Different platform available:
  - PC / Windows
  - Macintosh
  - Linux
- Better to keep the **company standardized** on a **single** desktop computer platform. This will increase overall **company productivity** and keeps **IT costs** at a reasonable level.
- Don't purchase per individual **user preferences**.

Difficulties in supporting two platforms

- Supporting two desktop platforms is more than twice as difficult as supporting one platform:
  1. maintain **expertise** in two platforms,
  2. stock more **spare parts** and expansion hardware
  3. **license** and inventory more **software** titles
  4. Increase the **complexity** of the network since servers must support two platforms.
  5. Some applications **supports only one** platform (MS Access).
  6. Inter-platform incompatibilities **cause problems** for users who must work together.

Choosing which platform to use..

- When choosing which platform to use, you should consider:

1. what the **users need** to accomplish,
2. which **applications** they need to run,
3. the platform **that best supports** those applications.
4. You need to consider the full range of **applications that the company** is likely to need, but the users' needs should be the primary driver.

Why to go with PC platform??

- They are the most **price** competitive,
- are in the **widest use**
- attract the **largest** assortment of **software** and **hardware developers**
- have much more **infrastructure to support** them.

Cost analyses to determine which platform to choose

- Costs of **new hardware and software**
- Cost of dealing with **legacy applications** or systems to which the platform must connect,
- Cost of **maintaining and supporting** the platform,
- Predicting the **viability of the platform** in one, two, five, and ten years.

Reliability of client platform

- Studies have shown that the **actual price** of a desktop computer is a **small percentage of its lifetime cost**, which includes software costs, training costs, and support costs.
- **Reliability sources:**

1. The computer uses **tested, high-quality components**.
2. Those components are **engineered to work well together**. Even the best components don't always work well together. **Top-tier manufacturers test** all the components that go into their systems and ensure that they're compatible with one another.
3. A **reliable combination of software** is used on the unit, and whenever possible, the software has been **certified** on the computer.

Serviceability of client platform

- **Serviceability** means that working on or repairing a particular computer is relatively **fast and easy.**
- Features that enhance serviceability include :
  1. **cases** that are easy to open (requiring no tools),
  2. **quickly replaceable internal components** (such as hard disks, memory, or video cards that require simple or no tools),
  3. Basic Input Output System (**BIOS**) that is **easy to update**.

Serviceability and the manufacturer

1. Does the computer manufacturer stay **current in offering updates** to its computers?
2. Does its **web site** offer a lookup that lets you **determine the configuration** of a computer based on its serial or **service ID numbers**?
3. Is **technical information** about its systems readily **available**, or does the vendor tend to gloss over any **discovered problems**?
4. How **quickly** can you get **replacement parts**?
5. Does the manufacturer include **on-site service** for a period of time that reduces your support burden?
6. **What is** the **warranty** on any given computer?
7. Is the **vendor sufficiently successful and stable** that you can expect the company to be around for the **entire useful life of the unit**?
8. What other **value-added services** are offered if problems occur?

Tips to improve serviceability

- Selecting the **top-tier computer brands** and models, taking into consideration how many computers does the maker sell? Compatibility with different software applications….
- standardize on a **particular manufacturer**:
  - Your support **team** will be **more focused** and easy to update
  - If a **problem** occurs, just **apply the solution** to many computers.
  - **Service quality** benefits when you establish a strong, **ongoing relationship** with a computer **manufacturer**.

Price and Performance

- You **shouldn't** be **penny-wise** and pound-foolish when you purchase computers.
- don't look at how well a particular configuration can handle **today's needs**; look at how well it can handle **tomorrow's needs.**
- Since IT becomes the core and the infrastructure for most business, **price** should be your **last priority**.
- Upgrade vs. replace.

Price and Performance

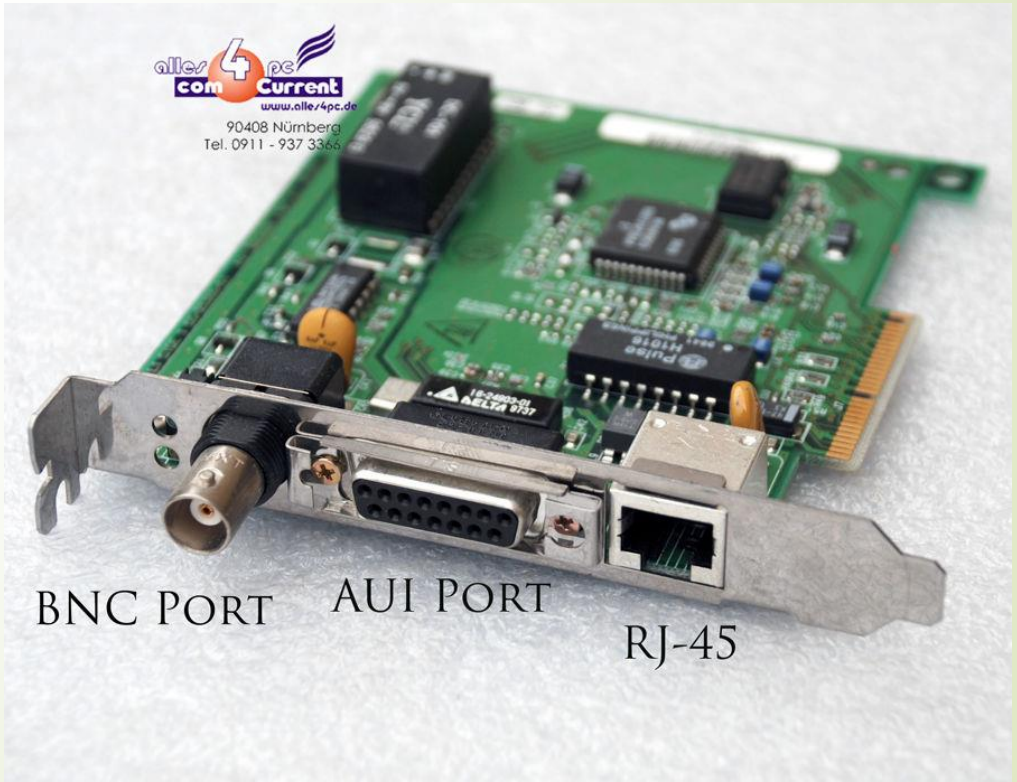
- As a rule of thumb, you can **estimate** that the demands placed on a desktop computer will **double every 24 months** or so.
- The **useful life** of a computer will change depending on:
  - the computer,
  - the software it needs to run,
  - the user who uses it,
  - and the budget available to upgrade or replace it.

Network Workstation Requirements

Network Workstation Hardware:

- Need Network Interface Card (**NIC**)to connect to the network, all modern workstations have **integrated** Ethernet NIC.
- NIC interface depends on the network media you installed;

  Some NICs also support multiple media types



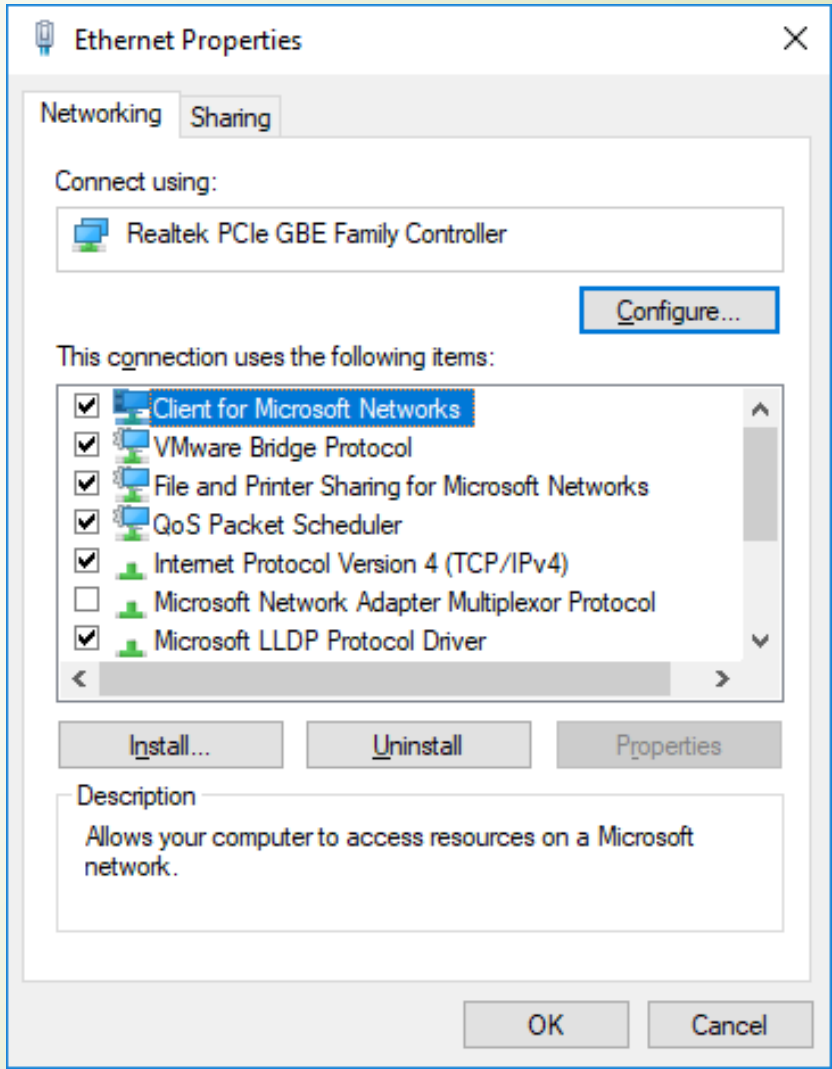
Network Workstation Requirements

Network Workstation Software

- driver for the NIC (provided by the manufacturer of NIC)
- driver software for the protocols being used, mostly included within the client platform OS.

Client Network Configuration

- **Client** You might have client software installed for **Novell networks** or **Microsoft networks**. This client software interacts with the servers to request network services.
- **Network interface** This entry represents the driver software that is installed for any installed NICs.
- **Protocols** This software adds support for any needed networking protocols, such as TCP/IP, IPX/SPX, or NetBEUI.
- **Services** Any additional network service software, such as that used for Novell eDirectory, also appears in the network Properties dialog box.



Network Connectivity

- Communication medium.
- Network interface card (NIC).
- Concentrators (HUB, Switch..).

NIC Placement

- NIC is placed on **Expansion slot** on the motherboard.
- An expansion slot: a socket that connects an **add-on circuit board** to the etched wires **on the motherboard**. This makes it possible for information to flow back and forth between the add-on circuit board and the motherboard.
- Each expansion slot is **assigned an address** on the computer's bus.
- Instructions for communicating are contained in a chip located on each network card. The chip contains software called **firmware** that manages the handshaking process. **Firmware on a network card follows the data link layer standard of the OSI Model**

Data transferring

- **A Bus:** is similar to a multi-lane **highway** that is etched into the motherboard **over which instructions and data flow to and from components**. There are at least **three** types of buses in a computer: one processes **instructions**, another **data**, and the third **interrupts**.

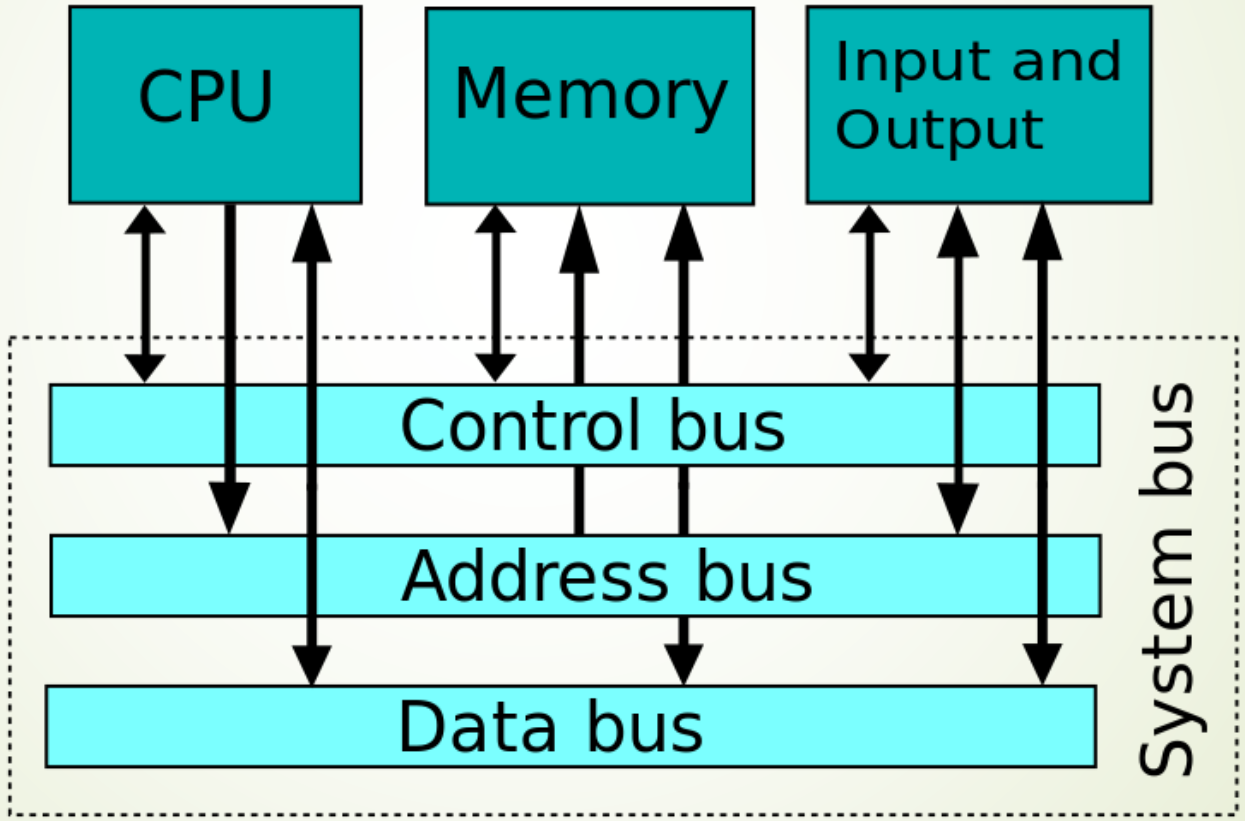
System bus

- Single computer bus that connects the major components of a computer system, combining the functions of :

1. a data bus to carry information,
2. an address bus to determine where it should be sent,
3. and a control bus to determine its operation.

- Why to use system bus?
  - to reduce costs and improve modularity.

System Bus


CPU
Memory
Input and Output
Control bus
Address bus
Data bus
System bus

- **Bottleneck**: the slowdown of packet transmission over a network.
- **Throughput**: a measurement of how many bits can be completely processed within one second.

Data Transfer efficiency

- There are two factors that influence the **efficiency** at which a **network card** can receive and process data:
  - The use of **memory** (buffer or cache)
  - The use of the **CPU**.
- **Bus mastering**: to incorporate a **CPU into NIC**. This gives the network card the hardware necessary **to process incoming data** without having to rely on the CPU in the network device.

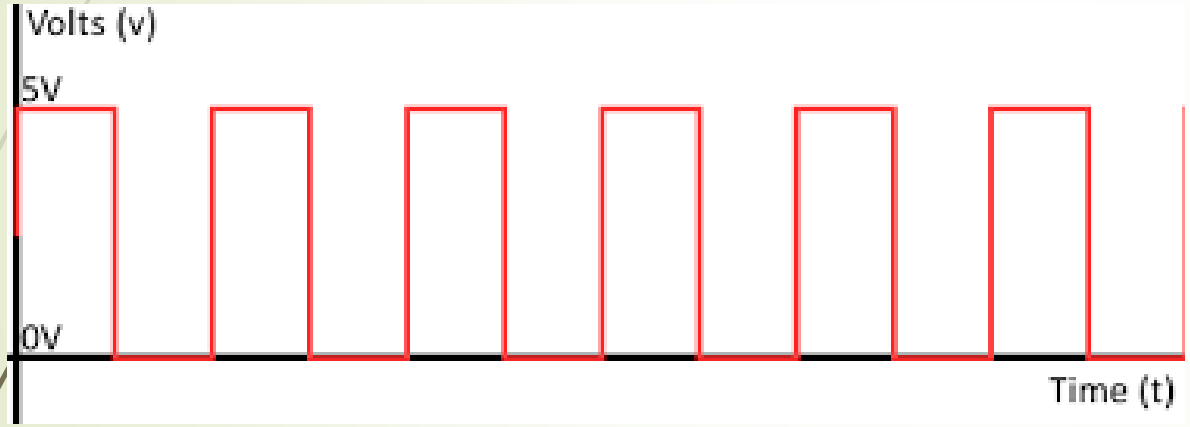
- Direct memory access (**DMA**): the capability of the network card to directly use the network device's memory.
- **RAM buffering**: a network card that contains **its own memory** that is used to temporarily **store incoming packets**.

- The base **I/O port address** is the address that identifies the location of the network card to the network device's operating system.
- The **IRQ number** is the number assigned to the interrupt line used to tell the CPU that data is received and needs to be processed.
- A **transceiver**: a component of the network card that sends and receives **signals over the network.**

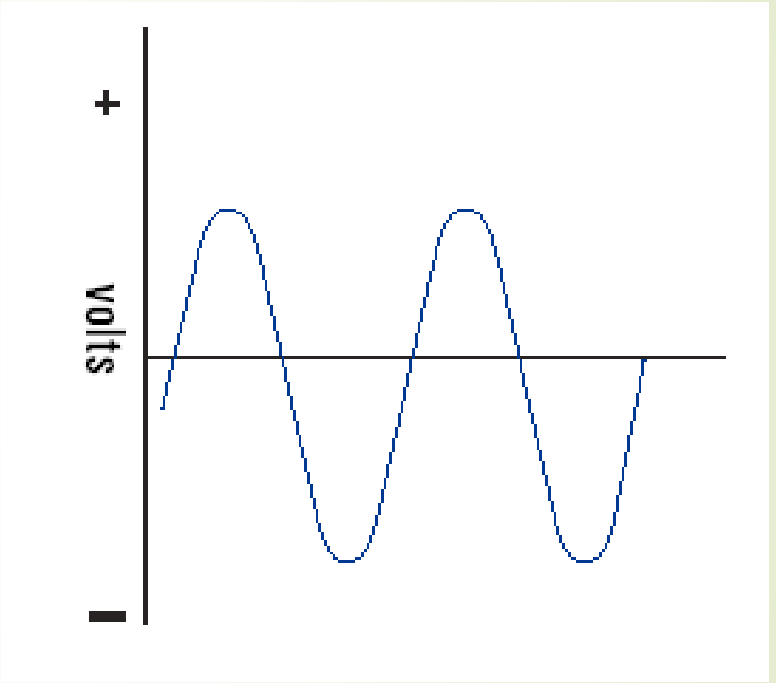
Computer Signals

- **Digital** signal and **analog** signal are the two forms in which computer signals are transmitted.
- When two computers communicate on a network, they exchange digital signals.
- Each signal or digit is represented by a distinct state.

Computer Signals



Digital Signal



An analog signal

Computer Signals

- The **presence** of an **electrical** signal is considered as '**on**,' and is represented by the **digit one**.
- The **absence** of an **electrical** signal is considered as '**off,**' and is represented by **a zero**.
- A system that uses zeros and ones is called a binary system.

Computer Signals

- A **modem** is required to convert a digital signal into an analog signal, and vice versa.
- The process of converting **digital signals into analog** signals is called **modulation**.
- The process of converting **analog signals back into digital** signals is called **demodulation**.

Questions?