

## Server+ CertNotes

### 1. SCSI bus width:

- For a 16-bit Wide SCSI, there are 16 possible SCSI Ids, 0-15.

SCSI 3 ultra-wide - 16 devices, 0=bootable drive, 15=controller

- A standard 8-bit SCSI can support only 8 devices (including SCSI card), the Ids allows are 0-7.

SCSI ID - 0=bootable drive, 7=controller, 1-6=any other devices

2. If the termination is not done, a SCSI devices on the bus will not function properly. This is due to reflection of the signals at the end of the bus. To prevent this, both ends of the SCSI bus need to be terminated. If one end of the SCSI bus is terminated, you may find intermittent problems. Never terminate the bus at a device connected in between.

3. LUN stands for Logical Unit Number. LUN is used to identify a logical device that is an independent functional part of a SCSI device. SCSI-2 specification allows 8 logical units for each SCSI device address. The logical unit addresses are numbered 0 to 7.

SCSI Type	Transfer speed	Bus
SCSI-1	5MBPS	8 bit bus
Fast Wide SCSI	20MBPS	16 bit bus
Wide Ultra SCSI	40MBPS	16 bit bus
Ultra2 SCSI	40MBPS	8 bit bus
Wide Ultra2 SCSI	80MBPS	16 bit bus
Ultra3 SCSI or Ultra 160	160MBPS	16 bit bus
Ultra320	320 MBPS	16 bit bus

### 4. Important Disk RAID levels:

a. RAID 0: Disk Striping without parity. Minimum 2 disks are required. RAID 0 doesn't provide any fault tolerance, but read/ write to the disk will improve

b. RAID 1: Disk Mirroring and Disk Duplexing. Disk Mirroring requires at least two partitions of same size. Each partition should be on a different physical drive. In other words, minimum 2 disks are required. For disk duplexing minimum 2 disks and 2 controllers are required. RAID 1 provides good fault tolerance, though disk access is slower compared to disk striping.

c. RAID 2: Disk Striping with Error correction.

d. RAID 3: Disk striping with error correction code stored as parity

This takes a striped array as in RAID 0, then adds a parity hard disk drive to the array. This parity information is vital if one drive fails. If a drive should fail in this situation, the parity drive can be used to restore blocks that have been broken due to data corruption.

e. RAID 4: Disk striping with large blocks allocation.

f. RAID 5: Disk Striping with Parity. Disk Striping with Parity requires at least three partitions of same size, and each partition should be on a different physical drive. In other words, minimum 3 disks are required for disk striping with parity. Fault tolerant, less expensive than disk mirroring. If more than one disk fails, data can't be recovered. You still need to depend on tape back up for multiple disk failures.

RAID 5 is similar to RAID 3, except the parity information is spread across all drives, this allows all drives to be able to rebuild the array if a drive fails. In RAID 3 parity is written to only one drive.

Note that, compared to disk striping or disk striping with parity; Disk mirroring has more overhead, as the entire disk get copied to another disk.

5. RAID 10 describes Mirrored Striping. It is a mode 0 array, plus a mode 1 array, striped. For example, if you have striped data into two drives, each drive is mirrored in RAID 10. That is a total of 4 drives.

## 6. SCSI Cables:

Types of cabling used for SCSI:

- 8-bit Internal device SCSI connection: Uses Unshielded 50 pin ribbon cable
- 8-bit External device SCSI connection: Uses DB-25 or Centronic-50 cable
- 8-bit External device Fast SCSI connection: Uses mini sub-D connector cable
- 8-bit cables are considered A-cable by SCSI-2 definition.
- 16-bit Wide SCSI uses P-cable or (A-cable + 68 pin B-cable)
- 32-bit Wide SCSI uses Q-cable plus P-cable

Cable lengths used by SCSI devices are:

- Single Ended (or un balanced) electronic signaling: 6 m Or 20ft (apx.)
- Differential signaling (HVD-High Voltage Differential): 25 m or 82 ft (apx.)
- Differential signaling (LVD - Low Voltage Differential): 12 m
- SCSI system uses the following types of terminations:

1. Passive: Uses passive resistors, not recommended usually.

2 Active: This terminator has a voltage regulator that ensures the correct termination voltage.

3. Forced Perfect Termination (FPT): A better implementation of active termination that clamps to the output of two regulated voltages.

7. Each device in a SCSI chain needs to have unique ID. For a 16-bit Wide SCSI, there are 16 possible SCSI Ids, 0-15. A standard 8-bit SCSI can support only 8 devices (including SCSI card), the Ids allowed are 0-7.

8. RAID is implemented across several platforms: SCSI, FIBRE-SCSI and IDE are the most common implementations of RAID technologies.

9. Given below are important bus types and their characteristics:

Bus Type	Data bus width	Speed	Bandwidth	Comments
ISA	16-bit	8.3MHz	15.9MBPS	Use jumpers to configure
EISA	32-bit	8.3MHz	31.8MBPS	Backward compatible with ISA, uses software/ jumpers for configuration
VESA or VL bus	32-bit	33MHz	127.2MBPS	Backward compatible with ISA cards
PCI	32-bit	33MHz	127.2MBPS	Supports Plug and Play
64-bit PCI	64-bit	66MHz	508.6MBPS	Supports Plug and Play

10. Disk swapping:

1. Cold Swap: It means that you have to power down a server before the part is replaced.
2. Warm Swap: It means that you may have to stop I/O functions corresponding to the part that need to be replaced by using appropriate commands. The server need not be powered off.
3. Hot Swap: Hot Swap allows the faulty part to be replaced without interrupting the Server or introducing any interruption in the I/O procedures.

Obviously, hot-swap allows for easy replacement of faulty part.

11. EEPROM is used to program dynamically, whereas, EPROM can be erased with ultra violet light and reprogrammed.

12. Usually, a sector contains 512 bytes. To find out the size of a hard disk, use the formula:

(# of cylinders X # of sectors X # of heads) X 0.5 KB

13. MCA architecture is a proprietary architecture.

14. Cable Select, if enabled, determines which drive is the master and which drive is the slave when there are two IDE hard disks.

15. IDE/ATA/ATAPI:

- In the ATA/ATAPI-4 standard / Ultra DMA transfer, a 80-conductor (wires) IDE/ATA cable is used. However, it does not have 80 pins on each connector, just 40. This means that the new cable is pin-

compatible with the old drive. The additional conductors(40) are introduced to reduce the cross talk / interference between the conductors and are grounded.

The old IDE/ATA cable has only 40 conductors.

- The first implementation of Ultra DMA as specified in the ATA/ATAPI-4 standard, included three Ultra DMA modes, providing up to 33 MB/s of throughput. Ultra ATA/66 refers to an interface speed of 66MB/Sec. Similarly, Ultra ATA/100 refers to an interface speed of 100MB/Sec.
- A maximum of two IDE disk drives can be connected to each IDE/ATA controller. Since most computers come with two IDE controllers, we can connect a maximum of 4 IDE hard drives.
- IDE/ATA hard disk interface does not require any external cable termination. Whereas, SCSI requires cable termination on both ends.
- IDE hard drives come with a 40 pin connector. SCSI hard drives come with different types of connectors, but not 40 pin connector.

Some of widely used SCSI connectors are:

1. Centronics type 50-pin connector (old type)
2. 50 pin high density connector
3. 68 pin high density connector

However, all ATA/IDE connectors are 40 pin.

- The disk drive designations in an ID/ATA chain is Master and Slave. These are selectable by changing the jumpers on the disk drives or can be made cable select. If both the hard disks are jumpered for Master or if both hard disks are jumpered for Slave configuration, your computer may fail to boot!

**16.** There can be a maximum of only two devices that can be connected on a single channel of an ATA/IDE system. In a SCSI bus system, you can connect 7 or 15 or more devices to a SCSI channel (excluding SCSI controller itself). The number of disks (or devices) that can be connected to an IDE channel is a major factor to be considered when planning the disk drive. SCSI allows you to attach a large collection of add-on peripherals like CD recorders, tape drives both inside and outside the case. EIDE/ATA is strictly for devices inside the PC / SERVER case.

**17. Clustering:**

- To configure a clustered server environment, at least 2 servers are required.
- All the following are true about clustering:
  - o Clustering improves the availability of the network.
  - o Processing load is distributed among the clustered servers.

- o Clustering allows for better scalability.

If one of the servers in a cluster fails, other server(s) in the cluster take over the entire load of the failed server without interruption to the services.

**18.** Intel Xeon processor can access physical memory upto 64 GB (Gig).

**19.** Two most widely used types of RAM:

1. DRAM - Dynamic RAM, and
2. SRAM - Static RAM. SRAM, being very expensive, commonly used for Cache memory. DRAM, being cheaper, is used for main memory.

**20.** SIMMs & DIMMs:

SIMMs come in both 30 pin (older 386/some 486 compatible) and 72 pin formats. SIMMs must be installed in pairs. On the other hand DIMMs can be installed one at a time. DIMMs usually come in 168 pin configuration.

**21.** SANs:

- Advantages of Storage Area Network (SAN):
- Simplified storage management,
- Flexibility, and Scalability of architecture
- Availability, and fast data access.

**22.** Processors:

- Windows 95/98 Operating system supports only one micro processor.
- Windows 2000 Professional supports up to 2 processors.
- Windows 2000 Server supports a maximum of 4 processors.
- Windows 2000 Advanced Server supports up to 8 processors.
- Windows 2000 Data Center Server supports up to 32 processors.
- Pentium III processor is compatible with Pentium II processor, hardware wise. You only need to upgrade the BIOS on the main board to use improved functionality of Pentium III processor.
- RISC processors compute simplest instructions in the shortest amount of time possible, as against CISC processors.
- Pentium Pro was the first CPU package that included the L2 cache inside the CPU package itself.

**23.** Fiber channel:

- N\_Port stands for Node Port and located at the termination (Node) end.

- F\_Port stands for Fabric Port and is located at the switch end.

Fiber Channel supports three (3) topologies:

- Point-to-Point: The Point-to-Point connection is the simplest of the three topologies with two N\_Ports (such as a Host and RAID system) connected. This topology has limited applications with no expansion capabilities but can serve as a high-speed interface between two points over long distances. The communication is full duplex so a 1 gigabit/sec link delivers 200MB/s of dedicated bandwidth. Point-to-Point configuration costs relatively less due to simplicity of architecture.

- Arbitrated Loop: Fiber Channel Arbitrated Loop (FC-AL) provides a low cost alternative that allows multiple connections without the aid of a switch. Here, L\_Port can be connected to any loop with each port sharing the bandwidth. The connection is half-duplex which means once a port arbitrates and gains access to the loop, transmission of information is in one direction only. This effectively opens a point-to-point connection utilizing 1/2 of the available loop bandwidth.

- Switched Fabric and Loop: The Fiber Channel Switch is analogous to the Router in networking, managing connections, routing requests to the proper ports, and allowing characteristics to be set on each port. A switch will also automatically configure the port for point-to-point (F\_Port) or loop operation (FL\_Port).

**24.** FC-AL supports full-duplex data-transfer rates of 100MBps and is compatible with SCSI. It is often recommended to lay the fiber for backbone, since it is immune to EMI and also can carry higher bandwidths.

**25.** Servers using RISC processors are usually designed for high end applications with high availability and larger processing power. Hence, RISC based servers are usually much more expensive than Intel processor based servers.

**26.** SDRAM is faster compared to DRAM, VRAM, EDORAM.

**27.** A fail-over describes a mechanism, where if the primary node in a cluster fails, and the secondary node takes over the load of the failed node. During a fail-over, usually the failure (or fail-over) is not noticed by the clients.

**28.** With Write-Through cache, each write operation to the cache is accompanied by a write operation to the main memory. That means, the data is written to the cache and the main memory at the same time.

With Write-Back cache, the CPU writes to the cache first. But the actual updating of main memory takes place at a later time.

**29.** EDO (Extended Data Out) memory is a type of RAM chip that will make improvements on the time to read from memory.

ECC (Error Checking and Correcting) memory means that data that is being read or transmitted will be checked for errors and, if necessary, corrected immediately.

With Registered memory, the memory chips contain registers that will re-drive the signal as it goes through the memory chip.

### 30. Processor package types:

- 8088, 8086 processors used 40 pin DIPs. 80286, 80386, 80486, and some Pentium computers (60MHz, 66MHz) used PGA (Pin Grid Array).
- Pentium chips (75 MHz and above) used SPGA (Staggered PGA). Pentium II CPUs use cartridge type mounting method, called "slot-1".

### 31. Hot swapping/ hot spare:

- A hot spare is a spare unit that is ready to take on the job of the main unit in the even of failure. Hot spare refers to the physical unit such as a disk drive or even a standby computer, such as in a clustered configuration. The failure may or may not be noticed by clients. For example, if the RAID system is configured with RAID 0, a failure may be noticed by the clients, whereas, if configured with RAID 5, the failure may not be noticed (in case of single point failure).
- Hot-Swapping is the ability to add and remove devices to a computer while the computer is running and have the operating system automatically recognize the change. Hot plugging is also called hot swapping.
- Universal Serial Bus (USB) and IEEE 1394 support hot plugging. This is also a feature of PCMCIA.

### 32. Unbuffered: Here the chipset controller communicates directly with the memory.

Buffered memory: A buffer isolates the memory from the controller chipset to minimize the load times that the chipset experiences. The load times can be bigger as the memory size increases.

**33.** Bus Mastering is a feature supported by some bus architectures that enables a controller connected to the bus to communicate directly with other devices on the bus without going through the CPU. Most of the recent bus architectures, including PCI, support bus mastering.

**34.** SDRAM is the standard used for mother boards that support 100MHz memory buses. Older DRAM technologies, such as EDO DRAM are designed for use with 66MHz memory bus.

**35.** While using Microsoft operating systems, only computers with Windows NT 4.0 or above can work as DHCP server. Any computer with Windows operating system can be a DHCP client.

**36.** The following tools are available for monitoring and optimization in Windows NT server in running in TCP/IP environment:

1. SNMP: SNMP can be used for monitoring and managing other nodes in a TCP/IP network. This include monitoring of WINS service, DHCP service, create performance counters related to TCP/IP etc.
2. Performance Monitor: This can be used to monitor several counters related to disk, memory, processor, cache etc.

3. Network Monitor: The Network Monitor monitors the data stream on the network and has access to the following information:

- a. The source and destination addresses of frames
  - b. The header information
  - c. The data being sent.
  - d. You need to enter the criteria for monitoring before Network Monitor can start monitoring the data.
4. Event Viewer: Event Viewer displays information whether all the services / applications have started or running properly.

**37. ISA, EISA, and PCI bus:**

- The two types of PCI bridges are Host-PCI bridge, and PCI-PCI bridge.
- ISA cards can go into: 1. ISA slots, 2. EISA slots, and 3. VL Bus slots.

**38. Memory chips:**

1. SRAM - Static random access memory - Uses transistors to store information
2. DRAM - Dynamic random access memory - Need to be refreshed to retain data.
3. ROM - Read only memory - Data in ROM can not be erased or changed
4. PROM - Programmable ROM - Once programmed, data can't be erased or changed
5. EPROM - Erasable PROM - Data can be erased by ultraviolet light and can be reprogrammed using a programmer.
6. EEPROM - Electronically erasable PROM - Data can be erased electrically. Chip can then be reprogrammed. EEPROMs are frequently used to store BIOS.

**39. SNMP** is a part of TCP/IP suite of protocols and used for management of network. With proper SNMP Manager, it is possible to track network events like logon/logoff, failed authentications, etc.

**40. DNS/WINS/HOSTS/LMHOSTS/DHCP:**

1. DNS (Domain Name Service) is used for resolution of domain names to IP addresses.
2. WINS, LMHOSTS is used for resolution of NetBIOS names to IP addresses.
3. DHCP is Dynamic Host Computer Protocol, which leases IP addresses and other parameters like subnet mask, default gateway to client computers dynamically.
4. HOSTS file is used like DNS for resolving Domain names, whereas LMHOSTS file is used like WINS for resolving NetBIOS names. Note that, if you are using HOSTS file for resolving Domain names, you need to load the HOSTS file on all computers on the network that need to



access the domain names. This is in contrast with DNS, which is located on a central server.

#### 41. TCP/IP utilities:

- NBTSTAT This utility displays current NetBIOS over TCP/IP connections, and display NetBIOS name cache.

- NETSTAT Displays protocol statistics and current TCP/IP connections since the server was last booted.

- TRACERT This command is used to determine which route a packet takes to reach its destination from source.

- IPCONFIG Displays Windows IP configuration information.

- NSLOOKUP This utility enables users to interact with a DNS server and display resource records.

- ROUTE This command can be used to display and edit static routing tables.

42. You have to assign the IP address for your DHCP server statically. A DHCP server can't assign an IP address to itself. Similarly, some other Servers that require static assignment of IP addresses are your DNS server, and WINS server.

#### 43. Servers:

1. Microsoft Exchange Server is an example of Mail Server. A Web Server is an HTTP Server and serves Web pages.

2. A Proxy Server usually sits in between your LAN and the external Internet. It directs all the requests to the Internet from the LAN.

3. An SQL Server is Microsoft's version of an client/server type database Server.

4. A RAS server is a Windows-based server with the RAS service installed and configured. RAS server allows RAS clients to dial into the network via the RAS server.

5. A Web Server delivers requested Web pages. When a client request a page, a web server sends it to the clients browser for viewing. Two most widely used web servers are Apache and Microsoft Internet Information Server (IIS).

#### 44. Backup methods:

There are three main Backup methods:

1. Full Backup: Backs up all data. Takes the longest time to backup, but easy to restore since all files are at one place and you don't need previous back-ups.

2. Incremental backup: Only backs up files added or changed since last backup. Quick to back up, but restore requires multiple tapes (last full backup tape plus all incremental tapes since the last full backup).

3. Only backs up files since last FULL backup. Each backup takes a little longer, but restore requires only two tapes (most recent full backup and most recent differential backup).

Both Full backup and Incremental backups reset the archive attribute on a file.

**45.** All the following parameters need to be taken care of while choosing the Server room.

1. Temperature / Humidity: Usually air-conditioned environment is suitable for the server room.

2. Anti Static precaution: Precaution need to be taken to prevent static electricity build up in your server room This can be done by choosing proper chairs/ tables, floor mats, and other anti static material.

3. The power supply need to be very conditioned. UPS of appropriate rating is a good choice.

**46.** All the following precautions you need to take while upgrading BIOS:

1. Check that BIOS upgrade is appropriate to your server by looking at the BIOS manufacturer's web site or documentation.

2. Plan for the upgrade preferably during non-working hours, as the upgrade may cause an interruption of services for short duration.

3. Observe the server events log for some time even after the successful upgrade to ensure that every thing is going smoothly.

4. Ensure that a valid backup is available, so that the system and user files can be restored in any unforeseen event.

**47.** UNIX/ Linux is usually administered by writing scripts and through configuration files. Other operating systems like Windows NT and Netware are GUI based and intuitive.

**48.** 'eDirectory' is Novell's directory platform that is cross platform and LDAP based. Similarly, 'Active Directory' is Microsoft's solution and based on the LDAP protocol. Windows 2000 Server Operating systems and NetWare are LDAP based.

**49.** DOS 3.3 or later version of DOS is required for installation of Novell NetWare 5.1.

**50.** Building a baseline of performance data is an important part of any Server management function. The baseline shows records the performance under certain normal load conditions. The data can be used as a yardstick for measuring the impact of configuration changes or for capacity planning.

**51.** NIC (Network Interface Cards) load balancing is a technology in which multiple NICs are configured to form a single virtual connection to the external switch. Two or more NICs are grouped together forming one virtual connection. The entire group will have only one IP address. But all the NICs will have individual MAC addresses. There can be more than one group in a Server.

**52.** Storage tapes:

1. DAT (Digital Audio Tape) drives are also called 4 mm DAT. DAT tape is 4 mm in width. DAT tapes can store data any where between 2 GB and 24 GB(Gig Bytes). The data transfer speed is approximately 20MB/min.

2. DLT (Digital Linear Tape) drives: DLT drives can store much larger capacity, of the order of 70GB. Transfer speeds for DLT drives can be as high as 300MB per minute.

3. Mammoth: This type of tape drive also have high data transfer capacity, and medium capacity.

**53.** In Windows NT server, event viewer can be used for analyzing what has gone wrong with the service.

**54.** Server installation check list:

1. Check for adequate power to supply to the Server,

2. Check for proper network connectivity,

3. Check for proper cabling,

4. Verify whether you are using IRQs efficiently, and all connected devices are set properly to respond at the specified IRQs.

5. Back-up: You need to have proper back-up

6. Documentation: You need to document your server installation, that it will help diagnose the problem in the event of failure or for up gradation.

**55.** The following bus types are external to the server:

1. SCSI

2. Parallel

3. Serial

4. USB

Note that Serial and parallel ports are very slow and not often used for reading or writing to mass storage devices.

**56.** An SBS (Stand By power Supply) is usually an off-line power supply. It senses the mains power and supplies power to the gear only when the mains power is lost.

On the other hand, a UPS is an on-line power supply. It draws the power from the mains and supplies conditioned power to the server. The power, usually, always flows from the UPS to the server. In the even of mains power failure, UPS continues to supply power to the server through its battery for a limited time.

**57.** Linux is a freely available operating system software. Linux is used widely on Internet. With the

help of other freely available Web servers like Apache, it can be used to host Web sites accessible on the Internet.

**58.** NDS is associated with Novell. It stands for NetWare Directory Services (NDS).

**59.** Minimum Requirements for installing Windows 2000 Server as specified by Microsoft:

- Computer/Processor: 133 MHz or higher Pentium-compatible CPU
- Memory: 256 megabytes (MB) of RAM recommended minimum [4 gigabytes (GB) maximum]
- Hard Disk: 2 GB hard disk with a minimum of 1.0 GB free space.
- CPU Support: Windows 2000 Server supports up to four CPUs on one machine

It is always better to add additional resources than what is minimum recommended for better performance.

**60.** Internet Information Server 5 is bundled with Windows 2000 Server products. Windows NT 4 supports Internet Information Server 4, which needs to be installed through an Option Pack CD.

**61.** Windows 2000 provides the following tools for monitoring resource usage on your computer:

1. System Monitor: With System Monitor, you can measure the performance of your own computer or other computers on a network.
2. View data collected either currently or previously in a counter log.
3. Performance Logs and Alerts: With this feature, you can present data in a printable graph, histogram, or report view.

**62.** 100BaseT (Fast Ethernet) uses IEEE803.2u standard which incorporates CSMA/CD protocol.

**63.** Tape Backup: Grandfather-father-son (GFS) and Tower of Hanoi are two good rotation schedules providing a long and varied history of file versions. Both provide comprehensive recovery capabilities.

Grandfather-Father-Son:

In GFS, "Son" is the incremental or differential daily back-up, "Father" is the full weekly back-up, and "Grandfather" is the monthly full back-up.

Tower Of Hanoi:

Multiple media sets are rotated through in incremental and full back-ups. It uses more media sets than GFS for increased safety.

**64.** Auto Loader: An autoloader holds ten to twelve tapes, and usually only one tape drive. This is useful when the data to be backed up is more than one tape's capacity. It allows the admin to program and attend to other important works than wait for changing the tape.

Tape Library: A Tape Library contains multiple drives in it. As a result, multiple backups can be taken

simultaneously. This is useful when you need to take huge backups in short time. However, remember that if the backups are taken across the network, the network speed limitations will come into play.

**65.** Some of the important commands useful in trouble shooting TCP/IP networks are:

I. Ipconfig: Displays TCP/IP configuration values, including IP address, subnet mask, and default gateway.

II. Ping: This command can be used to verify whether the target ip address or host name is present. You need to specify the target IP address or host name.

III. route: Displays and manipulates route information.

IV: Tracert: Determines the route packets take to reach the specified destination.

**66.** DMI is used to automate system management and is particularly beneficial in a network-computing environment where there are many computers.

**67.** All the following operating systems use TCP/IP as their default network protocol:

1. Unix/ Linux,
2. Novell Netware 5.1
3. Windows 2000

In the earlier versions of Windows, Windows NT3.51 or Windows NT4, TCP/IP was optionally installed. Whereas, in Windows 2000, TCP/IP is the default protocol.

**68.** Following are the hardware requirements recommended by Novell to install NetWare 5.1:

A server-class PC with a Pentium II or higher processor

A VGA or higher resolution display adapter (SVGA recommended)

Standard NetWare products and WebSphere Application Server for NetWare—1.3GB on volume SYS

RAM: Standard NetWare products—128MB

RAM with WebSphere Application Server for NetWare: 256MB (512MB recommended) in addition to standard NetWare products

A CD-ROM drive that can read ISO 9660-formatted disks;

A PS/2 or serial mouse is recommended, but not required

**69.** ACPI stands for Advanced Configuration and Power Management Interface. ACPI define working interfaces between the NOS (such as Windows 2000), the BIOS, and your system's hardware. The interface standard allows the Network Operating system, such as Windows 2000 to control power management.

## Acronyms:

- ISA: Industry Standard Architecture,
- EISA: Extended Industry Standard Architecture,
- PCI: Peripheral Component Interconnect, and
- MCA: Micro Channel Architecture.
- SCSI: Small Computers Systems Interface. It is pronounced as Skuzzy.
- RAID: Redundant Array of Independent Disks.
- EEPROM: Electrically Erasable Programmable ROM.
- EPROM: Erasable Programmable ROM.
- IDE Integrated Drive Electronics.
- PIO: Programmed Input / Output.
- DMA: Direct Memory Access.
- SAN: Storage Area Network
- RAM: Random Access Memory.
- DRAM: Dynamic RAM
- SRAM: Static RAM.
- SIMM: Single In-line Memory Module
- DIMM: Dual In-line Memory Module
- FC-AL: Fiber Channel Arbitrated Loop
- SDRAM: Synchronous Dynamic RAM
- RISC: Reduced Instruction Set Computing
- CISC: Complex Instruction Set Computing
- SMP: Symmetric Multi Processing.
- AGP: Accelerated Graphics Port.
- DHCP: Dynamic Host Configuration Protocol.
- SNMP: Simple Network Management Protocol.
- DNS: Domain Name Service
- LDP: Lightweight Directory Access Protocol.

- NDIS: NetWare Directory Services.
- WINS: Windows Internet Name Service.
- DMI: Desktop management interface.
- DMTF: Desktop Management Task Force.