

Information Systems in Healthcare – Michel Kana, PhD – Homework

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1. Provide a comparative overview of computer data storage technologies.
 - RAM and ROM memories
 - IDE, SATA, eSATA, USB hard disks
 - CD, DVD disks
 - Network-attached storage (NAS)
 - Redundancy with RAID

RAM and ROM memories

ROM (Read-only memory) is a form of data storage in computers and other electronic devices. ROM stores the program required to initially boot the computer. It only allows reading. Data stored in ROM cannot be modified.

RAM (Random Access Memory) is a form of computer data storage. A random-access device allows stored data to be accessed directly in any random order. RAM allows the computer to read data quickly to run applications. It allows reading and writing.

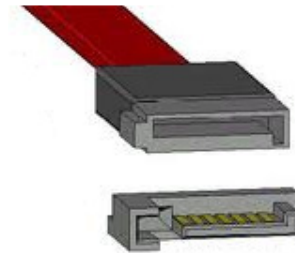
IDE, SATA, eSATA, USB hard disks

IDE (Integrated Drive Electronics) is a standard electronic interface used between a computer motherboard's data paths or bus and the computer's disk storage devices. IDE interface does not support hot plugging, data transfers at the rate of up to 133Mb/sec



IDE style connector [2]

SATA (Serial Advanced Technology Attachment) is a computer bus interface that connects host bus adapters to mass storage devices such as hard disk drives and optical drives. SATA host adapters and devices communicate via a high-speed serial cable over two pairs of conductors. SATA interface supports hot plugging, data transfers at the rate of 150Mb/sec to 6Gbits/sec



SATA style connector [1]

eSATA (External Serial Advanced Technology Attachment) is an external interface for SATA technologies. It uses a more robust connector, longer shielded cables, and stricter electrical standards. The protocol and logical signaling are identical to internal SATA.



eSATA style connector

USB hard disks - Most external hard drives support the IDE interface. You just plug the drive into your desktop or laptop via a USB. USB hard drives commonly use the USB 2.0 interface because it supports data transfer rates of up to 480 Mbps. USB 1.1 only supports transfers of up to 12 Mbps.

CD, DVD discs

CD - is a digital optical disc data storage format. Computers can read CDs, but cannot write on them. Capacity: 700 MB.

DVD - is a digital optical disc data storage format. DVDs offer higher storage capacity than CD while having the same dimensions. Capacity: 4.7 GB. The recorded data can not be changed.

Network-attached storage (NAS)

Network-attached storage (NAS) is a dedicated hard disk storage device that is set up with its own network address and provides file-based data storage services to other devices on the network. NAS systems are networked appliances which contain one or more hard drives. A network-attached storage device is attached to a local area network and assigned an IP address.

Redundancy with RAID

RAID is a storage technology that combines multiple disk drive components into a logical unit for the purposes of data redundancy and performance improvement. Data is distributed across the drives in one of several ways, referred to as RAID levels, depending on the specific level of redundancy and performance required. RAID allows you to store the same data redundantly in a balanced way to improve overall storage performance.

2. Suggest 5 scenarios where a client-server architecture is used (e.g. your web browser Firefox and the web server www.google.com)
 - Which protocols are used on the application level?
 - Which IP addresses are used?
 - Through which network nodes are data packets routed between client and server?
- Message transfer agent
 - protocols which are used: SMTP, POP3, IMAP
 - IP address: 213.180.147.145
 - network nodes:
 - gw.sh.cvut.cz
 - r1sh-sush.net.cvut.cz
 - r1kn-r1de.net.cvut.cz
 - cvut-r92.cesnet.cz
 - Pionier-R96.cesnet.cz
 - poznan-gw1.gw1-gw3.rtr.pionier.gov.pl
 - z-poznan-gw1.Krakow-COM.rtr.pionier.gov.pl
 - z-cyfronetu.onet.pl
 - ruc-CR2.z.ruc-BR2.net.onet.pl
 - ruc-agg1.z.ruc-agg2.m5r2.net.onet.pl
 - sdr1.m5r2.z.ruc-agg1.net.onet.pl
 - smtp.poczta.onet.pl

- Web server facebook.com
 - protocols which are used: http, https
 - IP address: 173.252.110.27
 - network nodes:
gw.sh.cvut.cz
r1-pm-tun.ipv6.cesnet.cz
ae14.bb01.fra2.tfbnw.net
ae4.bb01.cdg1.tfbnw.net
ae6.bb01.lga1.tfbnw.net
ae19.bb02.iad2.tfbnw.net
ae9.bb04.frc1.tfbnw.net
ae40.dr02.frc1.tfbnw.net
po1021.csw13c.frc1.tfbnw.net
edge-star6-shv-13-frc1.facebook.com

- File Server ftplive.com
 - protocols which are used: FTP
 - IP address: 93.188.160.99
 - network nodes:
gw.sh.cvut.cz
r1sh-sush.net.cvut.cz
r1kn-r1de.net.cvut.cz
cvut-r92.cesnet.cz
prag-b3-pos4-0.telia.net
win-bb2-link.telia.net
ffm-bb2-link.telia.net
ash-bb4-link.telia.net
cha-b1-link.telia.net
cco-ic-150436-cha-b1.c.telia.net
ahvl.immedion.charter.com
67.23.161.141
67.23.161.135
ashv1.main-hosting.com
93.188.160.99

- Secure Shell
 - protocols which are used: SSh
 - IP address: 93.188.160.99
 - network nodes:
gw.sh.cvut.cz
r1sh-sush.net.cvut.cz
r1kn-r1de.net.cvut.cz
cvut-r92.cesnet.cz
prag-b3-pos4-0.telia.net
win-bb2-link.telia.net
ffm-bb2-link.telia.net
ash-bb4-link.telia.net
cha-b1-link.telia.net
cco-ic-150436-cha-b1.c.telia.net
ahvl.immedion.charter.com
67.23.161.141

67.23.161.135
ashv1.main-hosting.com
93.188.160.99

- Server www google.com
- protocols which are used: http, https
 - IP address: 173.194.44.225
 - network nodes:
gw.sh.cvut.cz
2001:718:2:f00::1
2001:718:2:1f00::1
r1-pm-tun.ipv6.cesnet.cz
nixcz-v6.net.google.com
2001:4860::1:0:4ca2
2001:4860::8:0:5039
2001:4860::8:0:3097
2001:4860::2:0:6e0
bk-in-x65.1e100.net

[1] <http://msoftware.blogspot.cz/2011/04/external-serial-advanced-technology.html>

[2] <http://www.thoseguyspcrepair.com/definition-sata-serial-advanced-technology-attachment/>

[3] wikipedia.org

[4] <http://www.diffen.com>