

# Internet Security and Confidentiality



# SECURITY AND CONFIDENTIALITY

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- Security and confidentiality, on the Internet, are issues that are important for both the individual and organisations
- In this unit we will examine the following:
  - Virus protection
  - Filtering software
  - Firewalls
  - Encryption
  - Digital signatures
  - Cookies

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•Computers are used to break laws as well as uphold them

•Computer crime involves:

- Theft by computer

- Software piracy and intellectual property laws

- Software sabotage

- Hacking and electronic trespassing

# COMPUTER CRIME

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- .Computer crime is defined as any crime accomplished through knowledge or use of computer technology
- .The typical computer criminal is a trusted employee with no criminal record

# THEFT BY COMPUTER

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- .Theft is the most common form of computer crime
- .Computers are used to steal:
  - .Money
  - .Goods
  - .Information
  - .Computer resources

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- Computer crime has led to a need to protect computer systems
  - Computer security attempts to protect computers and the information they contain
  - Computer security protects against unwanted access, damage, modification, or destruction

# COMPUTER SECURITY: REDUCING RISKS

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- A variety of security techniques are used to protect computer systems:
  - Physical Access Restrictions
  - Passwords
  - Firewalls, Encryptions, and Audits
  - Backups
  - Law, Management, and Ethics

# COMPUTER VIRUS

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- A **computer virus** is a computer program that can copy itself and infect a computer without permission or knowledge of the user
- The original virus may modify the copies, or the copies may modify themselves, as occurs in a metamorphic virus
- A virus can only spread from one computer to another when its host is taken to the uninfected computer, for instance by a user sending it over a network or the Internet, or by carrying it on a removable medium such as a floppy disk, CD, or USB drive



# VIRUS PROTECTION

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- In connecting to the Internet, your computer may become infected by computer viruses in either of two ways:
  - An infected file downloaded from the Internet to your computer
  - An infected file sent, as an e-mail attachment, to you

# VIRUS PROTECTION

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## •Symptoms indicating infection:

- Unusual messages or displays on your monitor
- Unusual sounds or music played at random times
- Your system has less available memory than it should
- A disk or volume name has been changed
- Programs or files suddenly missing
- Unknown programs or files being created
- Some of your files become corrupted or suddenly don't work properly

# VIRUS PROTECTION

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.Software programs that will check your system for known viruses, scan incoming files and warn you before any infected files are let in are called:

- .Virus protection software
- .Anti-virus software
- .Virus checks

.There are many different programs on the market, some can be downloaded free off the Internet

# VIRUS PROTECTION

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- Virus protection software is only as good as their database of known viruses
- New and different viruses are being introduced all the time
- Anti-virus database needs to be updated all of the time
- Download available updates from the company's web page
- Downloads also come with the software included in the initial fee

# VIRUS PROTECTION

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- Most popular anti-virus software products available are:
  - McAfee Anti-Virus
  - Norton Anti-Virus
  - AVG

# VIRUS PROTECTION

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.If your computer does not have virus protection software:

- .Install one of these programs
- .Scan your hard drive and your memory stick
- .If any viruses are detected it will offer you the option of repairing the file
- .In most cases the file can be 'cleaned' by your virus protection software
- .Always keep back-ups of files in case your infected files can't be 'cleaned'

# FILTERING SOFTWARE

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- A term for software designed and optimised for controlling what content is permitted to a reader, especially when it is used to restrict material delivered over the Web.
- Programs which prevent access to objectionable information on the Internet
- Software can prevent the user from downloading or sending information:
  - containing certain words,
  - address details,
  - credit card details, as well as
  - audio, picture or video files

# FILTERING SOFTWARE

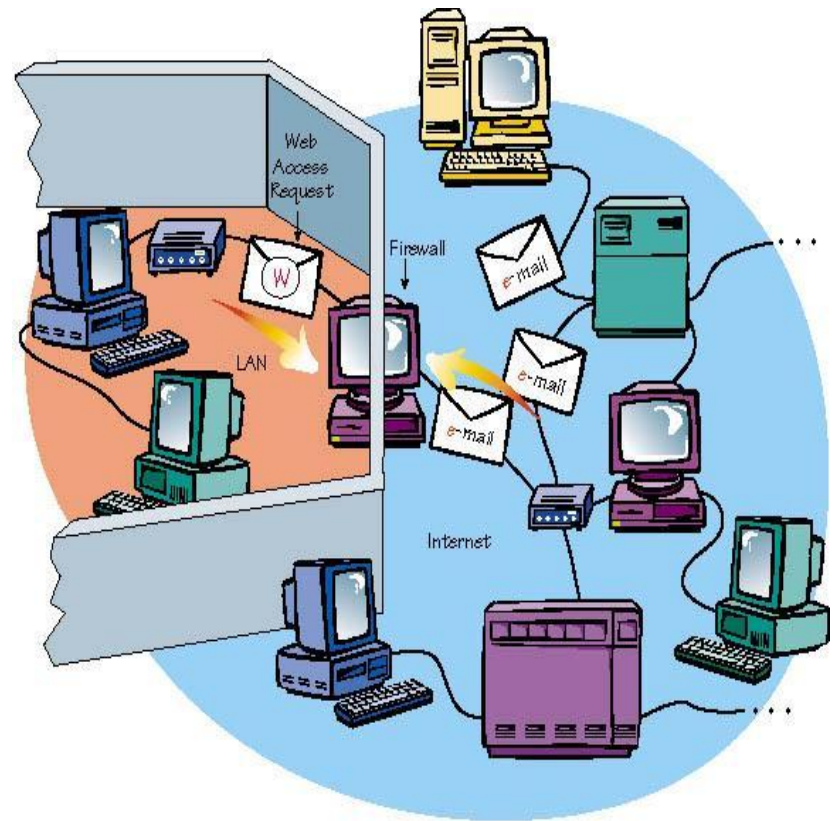
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- Can also prevent users from accessing specific sites by maintaining a list of forbidden URLs, newsgroups, and addresses
- Popular software products include:
  - Cyber Patrol ([www.cyberpatrol.com](http://www.cyberpatrol.com))
  - Net Nanny ([www.netnanny.com](http://www.netnanny.com))
  - Smart Parent ([www.smartparent.com](http://www.smartparent.com))
  - Surf Watch ([www.surfwatch.com](http://www.surfwatch.com))
  - Xstop ([www.xstop.com](http://www.xstop.com))



# FIREWALLS

- A combination hardware and software buffer that many companies or organisations have in place between their internal networks and any outside network including the Internet
- Allows only specific kinds of messages from the Internet to flow in and out of the internal network
- Protects the internal network from intruders or hackers who might try to use the Internet to gain access to those systems



# FIREWALLS

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- Configured to protect against unapproved interactive logins from the 'outside' world
- Some firewalls permit only e-mail traffic through them, protecting the network against any attacks other than attacks against the e-mail service
- Other firewalls provide less strict protections, and only block services that are known to be problems
- Some elaborate firewalls block all traffic from the outside to the inside, but permit users on the inside to communicate freely with the outside

# ENCRYPTION

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- A way of coding the information in a file or e-mail message
- If a 3<sup>rd</sup> party intercepts the encrypted file or message as it travels over a network it can't be read
- Only the people with the appropriate decoding software can decode or unscramble the message

# ENCRYPTION

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•Some of the encryption methods available are:

- PGP – Pretty Good Privacy is used to make e-mail messages private
- ROT13 – Rotate 13 is used to make newsgroup messages private
- SHTTP – Secure Hypertext Protocol is used for security on the web
- SSL – Secure Sockets Layer is used for security on the Internet and the web

# DIGITAL SIGNATURES

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- A code that can be attached to an electronically transmitted message that uniquely identifies the sender
- Used to guarantee that the individual sending the message is who they claim to be

# DIGITAL SIGNATURES

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- Important in E-commerce
- Key component of most authentication schemes
- Encryption techniques are used to guarantee the security of digital signatures

# HOW DO DIGITAL SIGNATURES WORK?

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- Software creates a matched pair of keys
  - One is a ***private key***:
    - Installed on your computer
    - Used only by you
    - Required in the signing process
  - The other is a ***public key***:
    - Available for use by anyone wishing to authenticate documents you sign
    - Will 'read' digital signature created by private key
    - Verify authenticity of documents created with it
- Similar to a safety deposit box

# COOKIES

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- Cookies are used for authenticating, session tracking, and maintaining specific information about users, such as site preferences or the contents of their electronic shopping carts.
- Cookies are very small files
- Purpose:
  - To identify visitors to a website and prepare customised web pages for them
  - Example, personalised greetings



# WHY USE COOKIES?

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- Helping with on-line sales/services, e.g, Amazon books or Microsoft
- Tracking popular links or demographics
- A cookie cannot be used to:
  - Transmit viruses to your computer
  - Access your hard drive
  - Ascertain your e-mail address

# COOKIES

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- Firefox and Microsoft have measures in place that limits the number of cookies that will be saved on your hard disk at one time
- These measures make it impossible for cookies to fill the hard disk of your computer
- Microsoft save cookies into the Temporary Internet Files folder
- Can be used in conjunction with web servers as a 'tracking device' to build a profile of an individual's surfing and buying habits

# COOKIES

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- To disable cookies:
  - In your Internet browser go to:
    - Tools
      - Internet Options
        - Privacy