Protecting Your PC and Your Data, Part II

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The Not-So-Blessed Trinity

- **Trojan horse** – A program that appears harmless but contains harmful code designed to exploit or damage the host system.
- **Worm** – Uses self-propagating malicious code that can automatically distribute itself from one computer to another through network connections.
- **Virus** – Uses code written with express intention of replicating itself. A virus attempts to spread itself from PC to PC by attaching itself to the host system

Target Environments

- **Devices** – PC, Macintosh computer, PDA, cellular phones.
- **Operating Systems** – MS-DOS, Windows 9*x*, Windows NT/2000/XP, Mac Classic OS, Mac OS X, Linux, FreeBSD, Unix, Be OS, etc. Cherobyl virus (CIH) of late 1990s only attacked Windows 9*x*.
- **Applications** – Certain app must be installed
  - LFM.926 of 2002 could only attack if Shockwave Flash (.swf) files could execute on a target system;
  - **Alternative Browser Strategy** Using Mozilla, Opera, or Netscape Communicator instead of Microsoft Internet Explorer. IE currently has 98% of the Windows market.

Carrier Objects

- **Executable files** - .exe files, but also includes .com, .sys, .dll, .ovl, .ocx, and .prg files
- **Scripts** – VB Script, JavaScript, AppleScript, Perl. Extensions: .vbs, .js, .wsh, .prl
- **Macros** – Microsoft Office macros (Word, Excel, Outlook), Lotus Ami Pro
- **Boot Sector** – Master Boot Record (MBR) or DOS boot record

Transport Mechanisms

- **Removable media** – floppy diskettes. This used to be the preferred method.
- **Network shares** – The new preferred method for attacks: Windows File and Printer Sharing
- **Network scanning** – IP port scanning
- **Peer-to-Peer Networks** – Napster, Kazaa, WinMX
- **E-Mail** – Second most popular transport method
  - **Mailer** – Uses mail client; SMTP server
  - **Mass Mailer** - Searches for address books
- **Remote Exploit** – Often seen in worms. The infamous Slammer worm took advantage of a vulnerability in MS SQL Server 2000.

Payloads

- **Backdoor** – Frequently use FTP, Port 21, or Telnet, Port 23.
- **Data corruption or deletion** – Trigger mechanism is to delete hard disk. This is why it is important to disconnect the network cable immediately when attacked.
- **Identity theft**
- **Information theft**
- **Denial of Service (DoS)**
- **Distributed Denial of Service (DDoS)**

Denial of Service Attacks

- **System shutdowns**
- **Bandwidth flooding**
- **Buffer overflow**
- **Network DoS** – SYN Flood Attacks
- **DNS Spoofing**
- **Service disruption** – Zero transactions per second mean big $$$ losses for online businesses.
- **“Five Nines”** – The goal of maintaining a system uptime of 99.999% per year.

The Reality of “Five Nines”

Availability	Downtime Per Year (3651/4 x 24)
99.9999%	32 seconds
99.999%	5 minutes, 15 seconds
99.99%	52 minutes, 36 seconds
99.95%	4 Hours, 23 minutes
99.9%	8 Hours, 46 minutes
99.5%	1 day, 19 hours, 48 minutes
99%	3 days, 15 hours, 40 minutes

Trigger Mechanisms

- **Manual execution**
  - Social engineering – email spoofing with tempting subject fields.
- **Semi-automatic execution**
- **Automatic execution**
- **Time bomb** – MyDoom.B was set to attack Microsoft.com on Feb. 3, 2004 and SCO on February 1, 2004.
- **Conditional** – “Logic bomb,” based on keystrokes, the existence of a certain file, launching a certain application, etc.

Defense Mechanisms

- **Armor** - Detecting debuggers or other tools for analysis
- **Stealth** – Attempts to hide itself
- **Encryption** – Encrypts itself to a payload. Popular with keystroke loggers. Uses static routine, not polymorphic.
- **Polymorphic** – Uses unlimited number of encryption routines to avoid detection. Mutation engine.
- **Oligomorphic** – Similar to Polymorphic, but uses a *limited* number of encryption routines to avoid detection.

Other misdeeds…

- **Easter Eggs** – Programmers love to put secret commands in programs. Example: Type “volcano” in 3D Text screensaver of Windows 9*x*.
- **Man-in-the-Middle** – Using *spoofing* to intercept traffic, examine or modify it, and then relay it to the intended recipient.
- **Phishing** – Impersonating legitimate Web sites for the purpose of identity theft
- **Retro Virus** – A virus that disables anti-virus software, bars access to the Registry Editor, Windows Update, etc.
- **Zapping** – Code that tries to bypass security systems, avoid IDS, detect honeypots, etc.

Other misdeeds…

- **Didling** – Data integrity, non-repudiation
- **E-Mail Jokes** – Waste bandwidth; email distribution lists can disclose otherwise confidential email addresses.
- **E-mail Hoaxes** – Harmless and not-so-harmless
- **E-mail Scams –** Nigerian fortunes, chain letters, etc.
- **SPAM**
- **Spyware**
- **Adware**
- **Cookies**

Adware / Spyware

- **Is it Legal?** Adware is a legal Trojan horse program, but spyware sometimes crosses the line. Examples: Ad Hijacking; Cookie Harvesting
- **Freeware?** A program is “free” as long as you agree to be monitored. Privacy issues; performance issues
- **User Consent?** Most users don’t know that they have agreed to be monitored. Relies on the fact that few people bother to read the EULA.
- **Easily Removable?** The monitoring component of the program is **always active** and does not go away, even after the host program is uninstalled. Spyware is not always listed in Control Panel | Add/Remove Programs.

Elements of Computer Security

- **Authentication** - Badges, passwords, biometrics
- **Authorization** - SAM, ACL, LDAP, Kerberos, Microsoft Active Directory, Novell eDirectory, Sun iPlanet
- **Confidentiality** – Encryption (EFS and IPSec)
- **Data Integrity** – Hash Algorithms, PKI, PGP
- **Software Defenses** – Anti-Virus Software, Anti-Spyware Software, Anti-SPAM Software, Personal Firewalls, Intrusion Detection Systems (Snort)
- **Physical Defenses** – Networks, Locks, Alarms
- **Fault Tolerance** - Surge Protectors, UPS
- **Data Recovery** – Backups, RAID

Multi-Factor Authentication

- **What You Know** – Username, Password, PIN
- **What You Have** – Smart Card, ATM Card
- **What You Are** – Retina Scan, Biometrics
- **What You Do** – Open Bank Account at Participating Banking Institution, activate card by telephone, insert ATM Card, input PIN, etc.

Most Transactions Today Still Rely on Single-Factor Authentication.

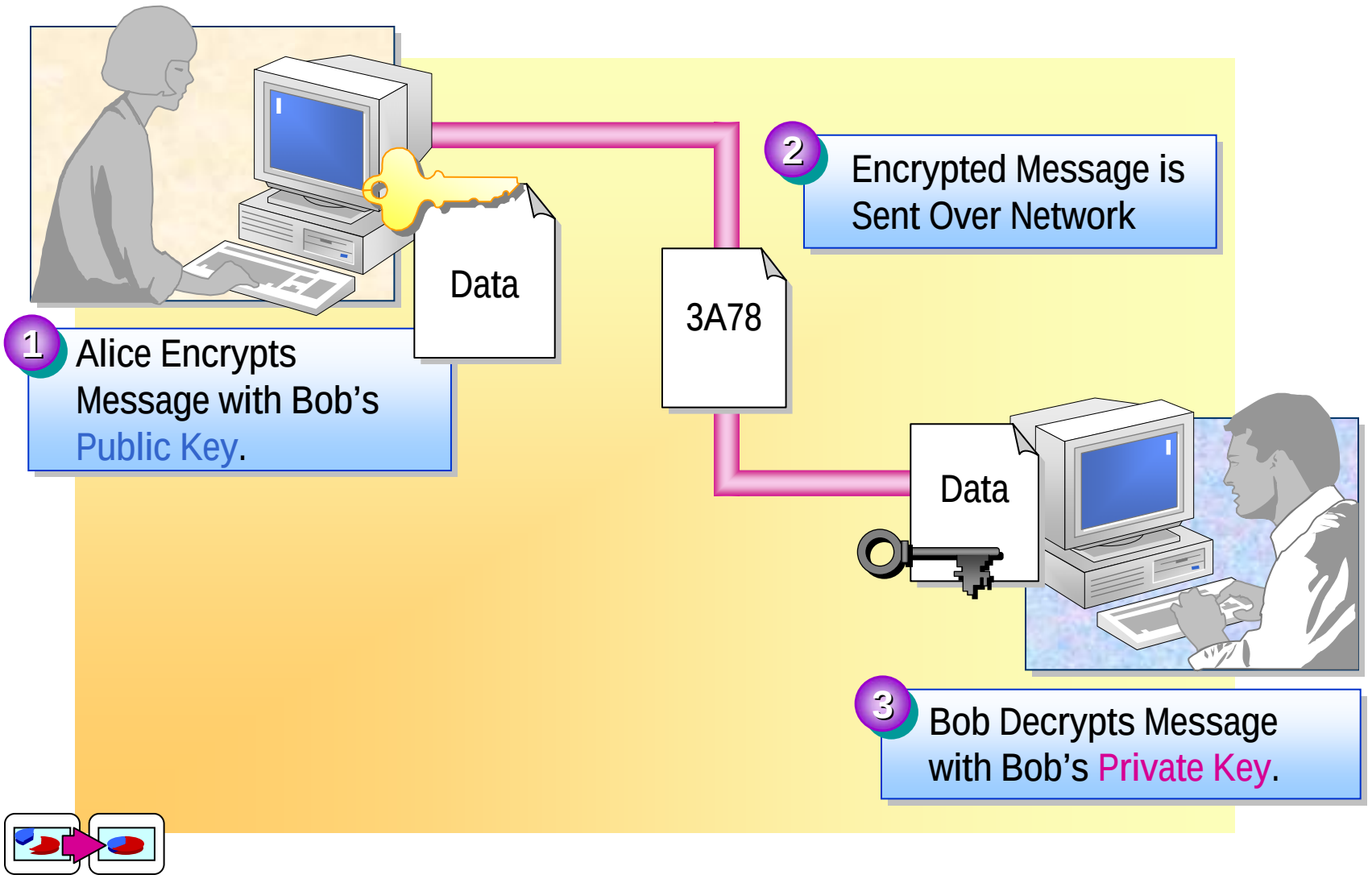
Coming Soon: More Encryption

- **Encryption** - scrambling of messages to protect privacy, can be decrypted by receiver using a “key.”
- **EFS -** Encrypt files stored on local hard disks; stolen laptops
- **IPSec -** Encrypt data in packets as they traverse the Web; prevents “sniffing”

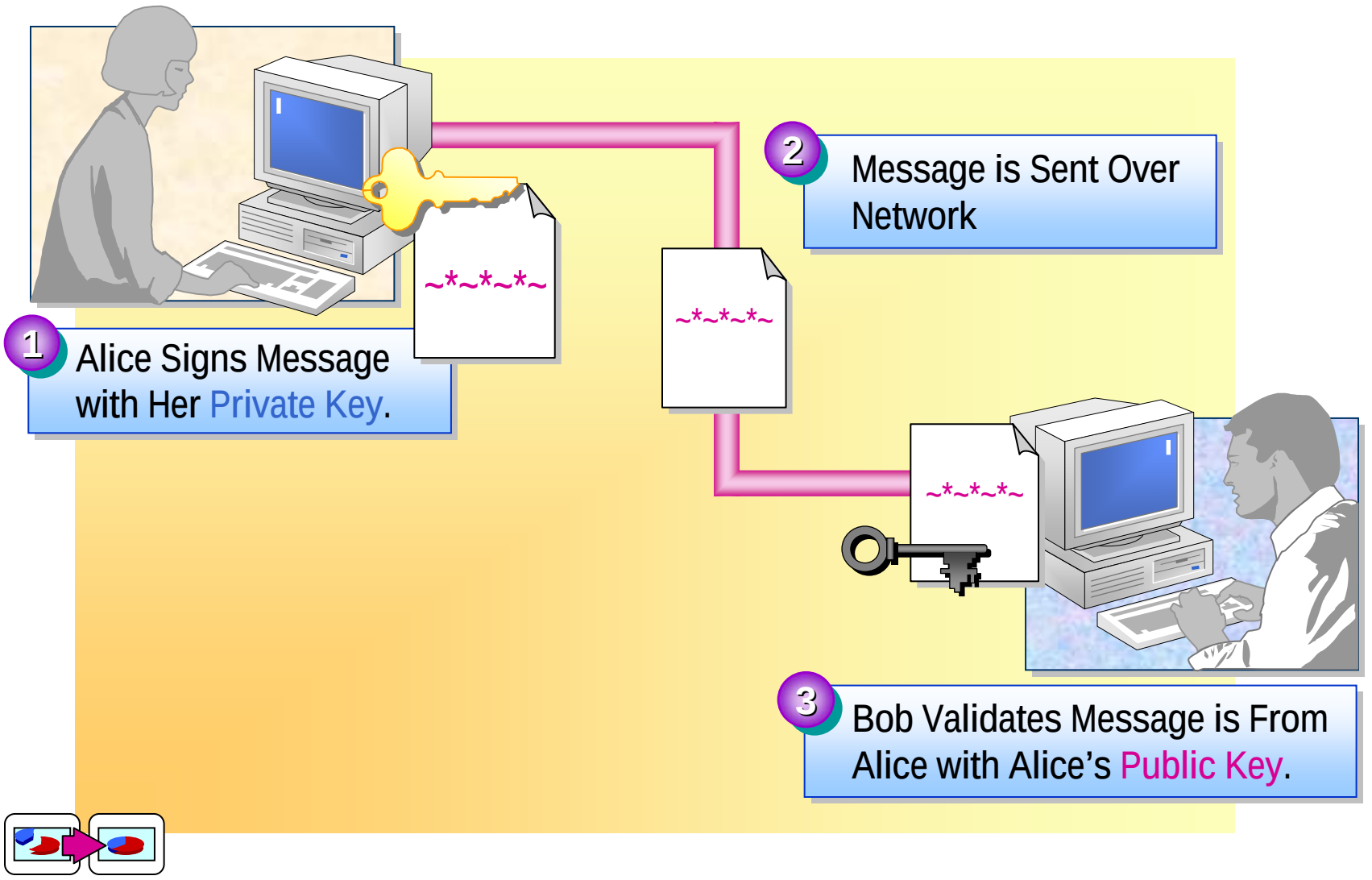
Coming Soon: More PKI

- **Public Key Infrastructure (PKI)** – Public and Private Keys (asymmetrical keys) used in combination with symmetrical keys (shared secret)
- **Certificate Authorities** – 3P rely on a commercial CA: Thawte, Verisign, etc.
- **Self-Signing CA** - Microsoft Windows Server Operating Systems, PGP

Public Key Encryption



Public Key Authentication



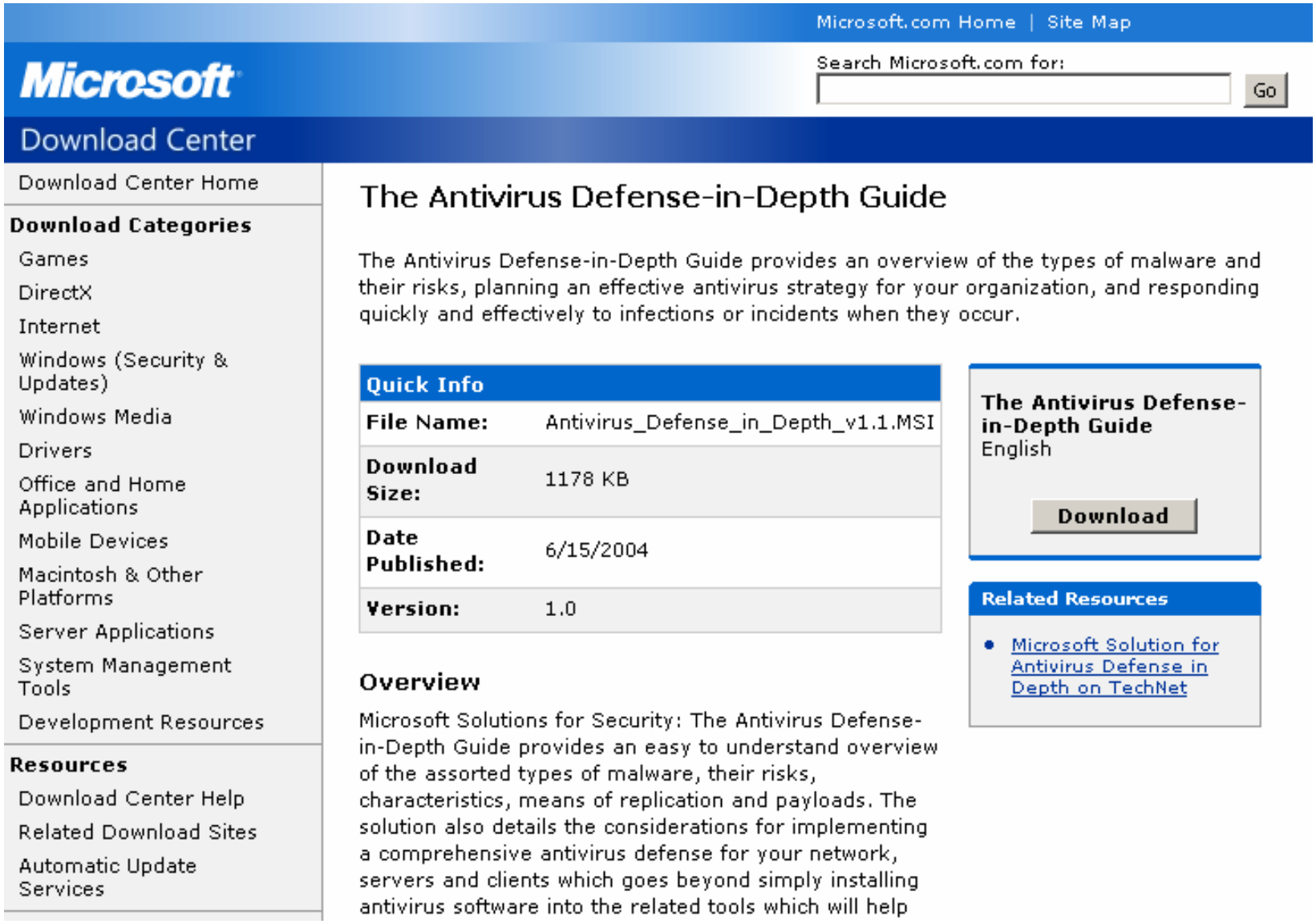
Eliminating Junk E-mail

- White-List Filters - Qurb 2.0
- Black-List Filters - I Hate SPAM, SPAM Assassin, Outlook Express
- Heuristic Filters
- Bayesian Filters
- Laws – CANSPAM Act of 2003
- Verify Senders: MS Caller ID; DomainKeys (Yahoo and Sendmail); Sender policy Framework (SPF)
- Assign a cost for sending e-mail? Bill Gates says “make them solve a puzzle.”

Microsoft®

- Windows XP Server Pack 2
  - *Windows Security Center in Control Panel*
  - *Pop-up Ad Blocker in IE (enabled by default)*
  - *Windows Update v.5 (enabled by default)*
  - *Windows Firewall (formerly Internet Connection Firewall)*
- *Microsoft Office 2003: Windows Rights Management*
- *Hotmail: SmartScreen Anti-Spam Filter*
- Coming Soon: Windows Update Services / Baseline Security Analyzer 2.0
- Coming Soon: Sender ID (formerly Caller ID)
- Coming Soon: WinFS (New File System)
- Coming Soon: Windows Anti-Virus Software?

MS TechNet: Overview of the Types of Malware and Risks



http://www.microsoft.com/technet/security/guidance/avdind_0.mspx

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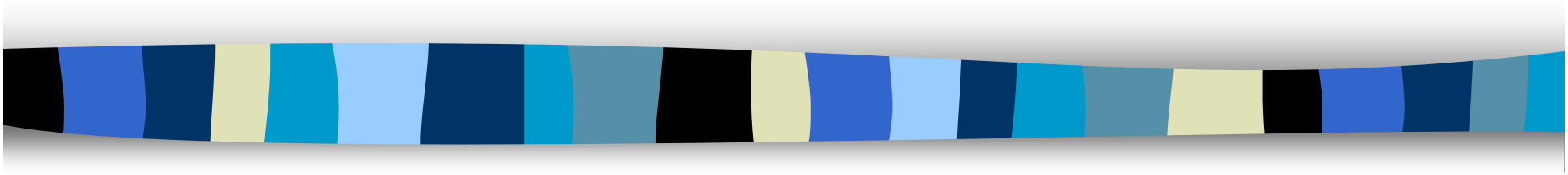

“Why is my computer so slow?”

Using System Monitor and Task Manager

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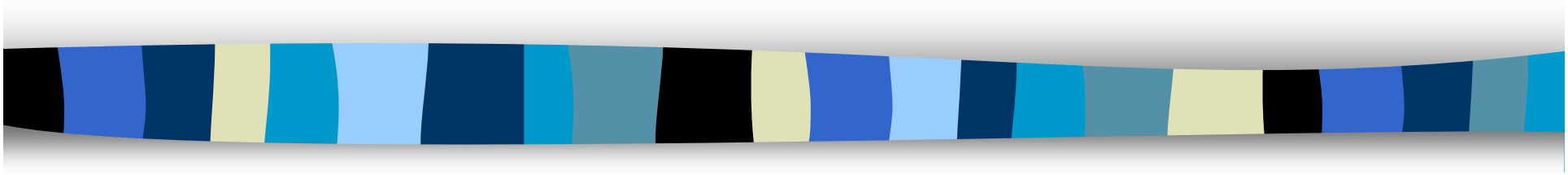

Spyware Shootout

- **Lavasoft Ad-Aware 6.0 Build 161 (FREE)**
- **Spy Bot Search & Destroy (FREE)**
- **Webroot Spy Sweeper 3.0 ($39.95)**
- **HiJackThis! (FREE)**

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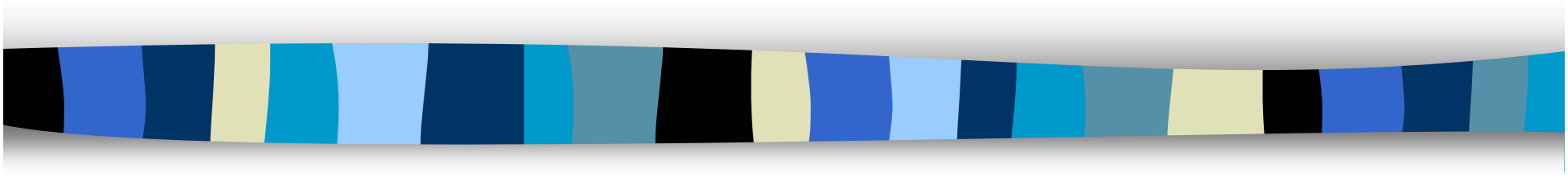

FREE DNS Tool

Blighty Design Sam Spade

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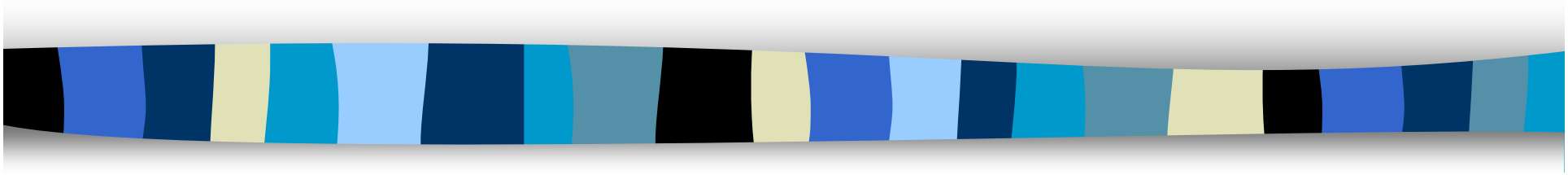

FREE Virus Removal Tool

Trend Micro Housecall

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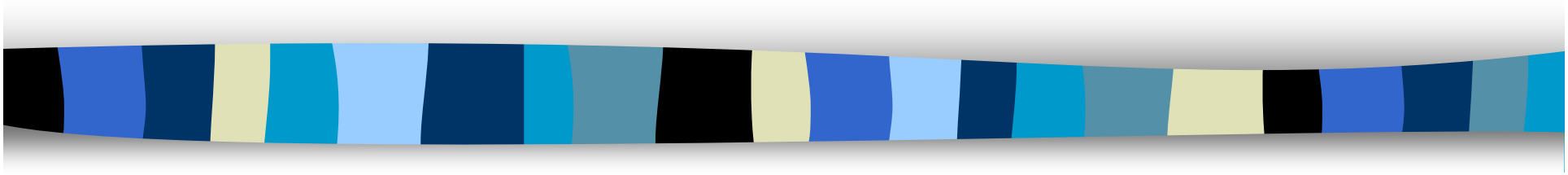

FREE Virus Removal Tools

McAfee AVERT Stinger

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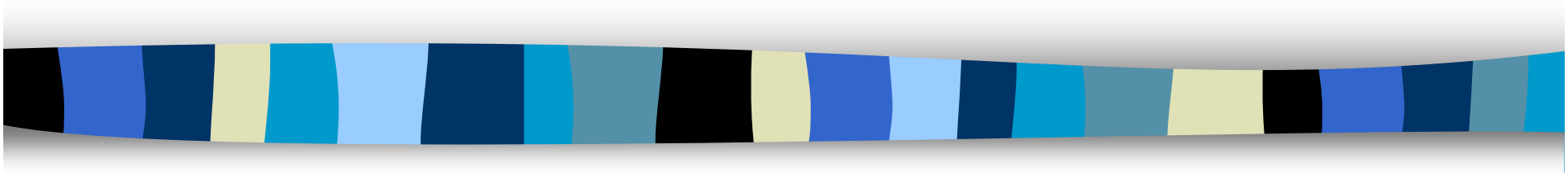

FREE Real-time Anti-Virus Software

AVAST! 4 Home Edition
BitDefender Free Edition v.7
AntiVir Personal Edition

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FREE Windows Security Checkup

Microsoft.com Security

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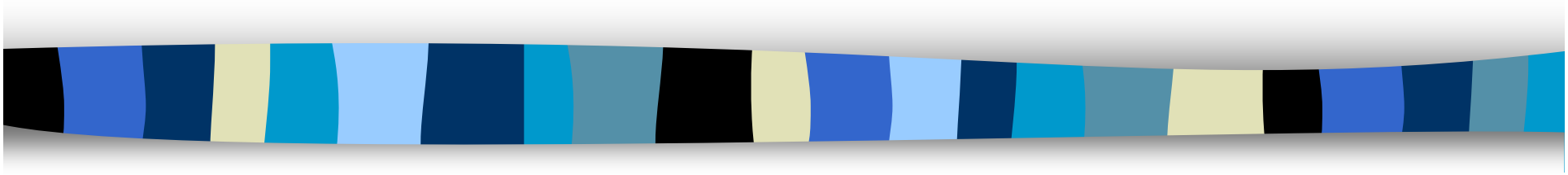

Sometimes It Feels Like Somebody's Watching Me…

Perfect Keystoke Logger

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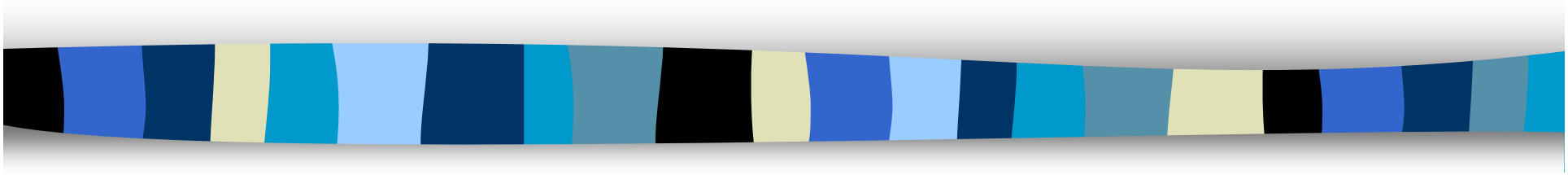

FREE IP Ping Sweeper

Foundstone SuperScan4

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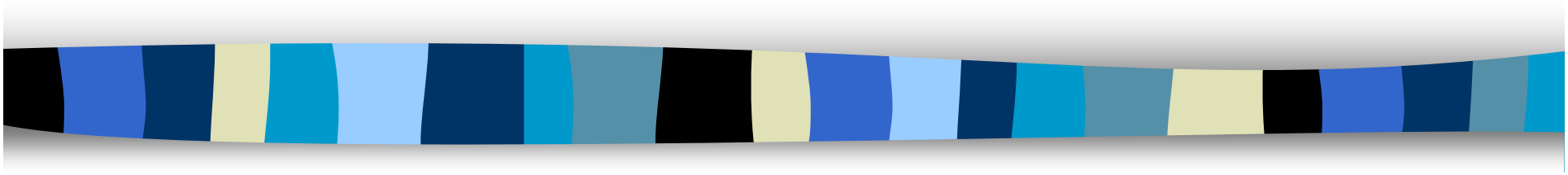

FREE TCP/UDP Port Listener

Foundstone Attacker

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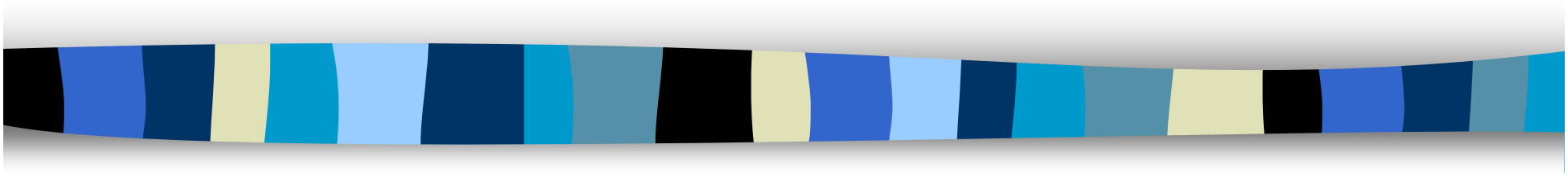

FREE Protocol Analyzer

Ethereal

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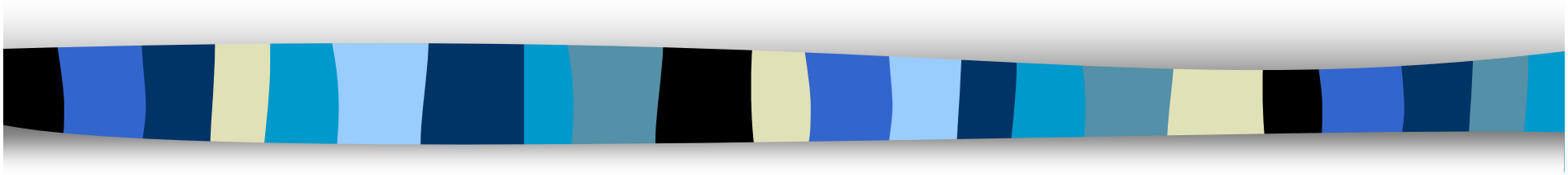

Commercial System Analyzer

SISUtilities Sandra

Thank You!

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