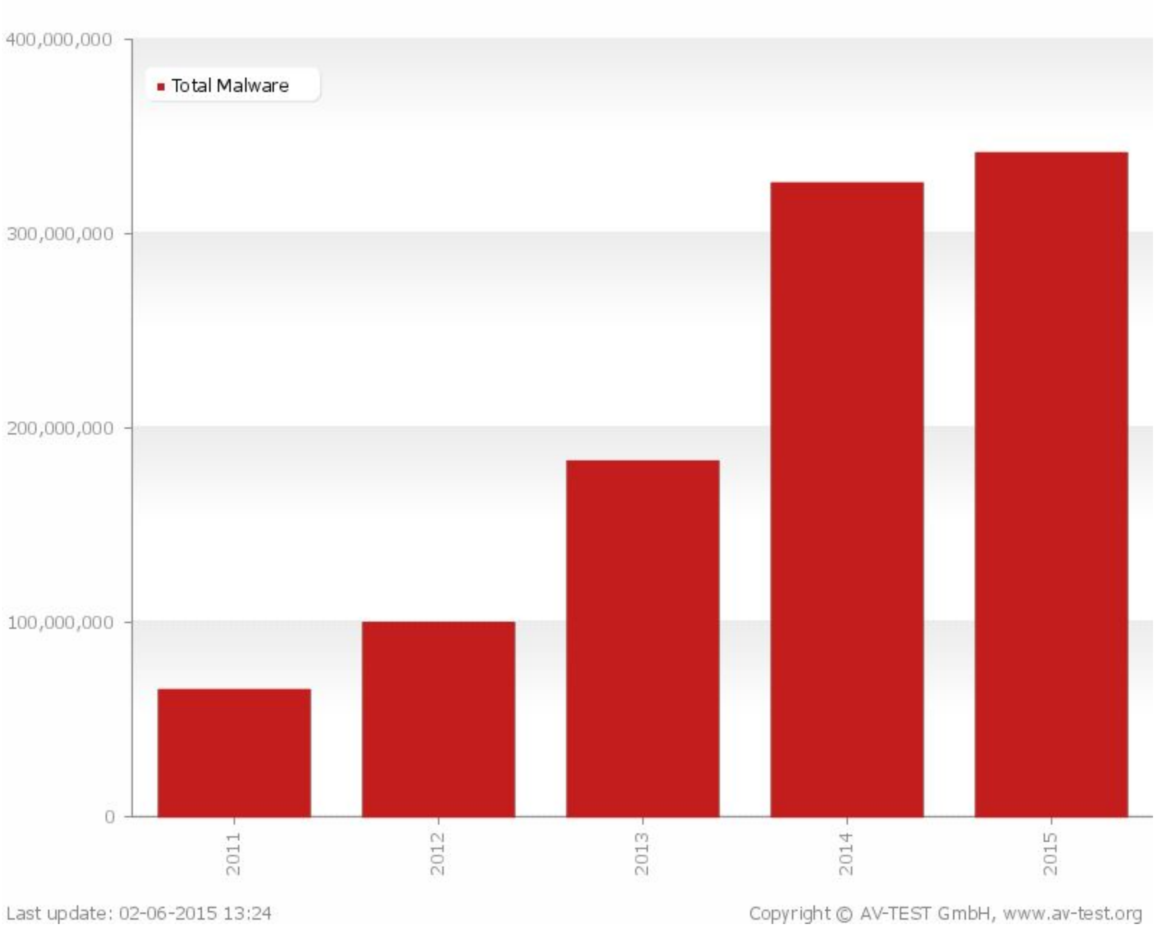
Malware

Malware Statistics



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TROJANS AND BACKDOORS

Trojan

- Is defined as a "malicious, security breaking program that is disguised as something benign"
- A computer is used to enter a victim's computer undetected, granting the attacker unrestricted access to the data stored on that computer and causing immense damage to the victim.
- Work on the same level of privileges that the victim user has
- Can attempt to exploit a vulnerability to increase the level of access beyond that of the user running the Trojan horse
- May falsely implicate the remote system as the source of an attack by spoofing

Communication part: overt and covert channels

Overt channel

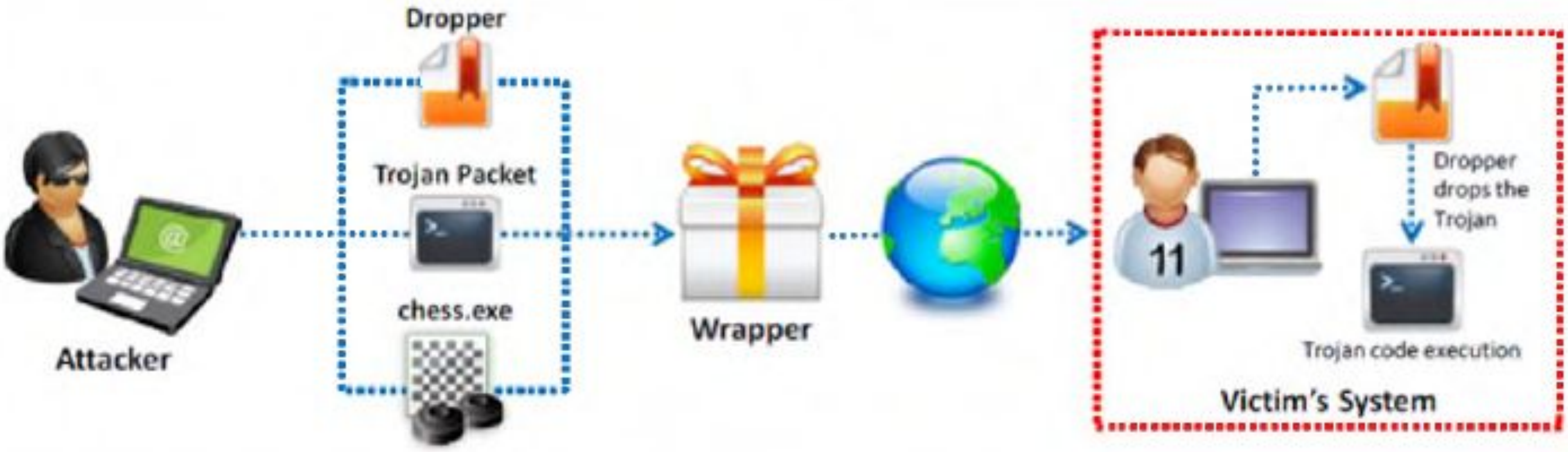
- A legitimate communication path within a computer system, or network, for the transfer of data
- can be exploited to create the presence of a covert channel by selecting components of the overt channels with care that are idle or not related

Covert channel

- A channel that transfers information within a computer system, or network, in a way that violates the the security policy
- The simplest form of covert channel is a Trojan

Trojan Infection

- Trojans are included in bundled shareware or downloadable software
- Users are tricked with the different pop-up ads
- Attackers send Trojans through email attachments
- Users are sometimes tempted to click on different kinds of files such as greeting cards, images, etc., where Trojans are silently installed one the system



Access points are used by Trojans

- Instant messenger applications (ICQ)
- IRC (Internet Relay Chat)
- Physical access
- Browser and Email software bug
- Fake programs
- “Shrink-wrapped" software
- Via attachments
- Untrusted sites and freeware software
- NetBIOS (file sharing)

Types of trojans

- VNC Trojan
- HTTP/HTTPS Trojan
- ICMP Trojan
- Command Shell Trojan
- Data Hiding Trojan
- Destructive Trojan
- Document Trojan
- GUI Trojan
- FTP Trojan
- E-mail Trojan
- Remote Access Trojan
- Proxy Server Trojan
- Botnet Trojan
- Covert Channel Trojan
- SPAM Trojan
- Credit Card Trojan
- Defacement Trojan
- E-banking Trojan
- Notification Trojan
- Mobile Trojan
- MAC OS X Trojan

Command shell trojans

- The command shell trojan gives remote control of a command shell on a victim’s machine
- The Trojan server is installed on the victim’s machine, which opens a port for the attaker to connect
- The client is installed on the attaker ‘s machine, which is used to launch command shell on the victim’s machine

TROJAN DETECTION

Scan for suspicious

- Open ports
- Running processors
- Registry entries
- Device drivers
- Windows services
- Startup programs
- Files and folders
- Network activities
- Operating system files

Scanning for suspicious processes

- Trojans camouflage themselves as genuine Windows services
- Use PEs (Portable Executable) to inject into various process
- Can bypass desktop firewall
- Use rootkit method to hide their processes

Windows automatically execute instructions in the following section of the registry:

- Run
- RunServices
- RunOnce
- RunServicesOnce
- HKEY_CLASSES_ROOT\exefile\shell\open\command “%1” %*

Hide the process:

- HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services

Scanning for suspicious startup programs

- Check the Startup folder(ProgramData,AppData)
- Check Windows services automatic started(services.msc)
- Startup programs entries in the registry
- Automatically loaded device drivers (System32\drivers)

Trojan Countermeasures

- Avoid opening email attachments received from unknown senders
- Block all unnecessary ports at the host and firewall
- Avoid accepting the programs transferred by instant messaging
- Harden weak, default configuration settings
- Disable unused functionality including protocols and services
- Monitor the internal network traffic for odd ports or encrypted traffic
- Avoid downloading and executing applications from untrusted sources

Trojan Countermeasures

- Install patches and security updates for the operating systems and applications
- Scan CDs and floppy disks with antivirus software before using
- Restrict permissions within the desktop environment to prevent malicious applications installation
- Avoid typing the commands blindly and implementing pre-fabricated programs or scripts
- Manage local workstation file integrity through cheksums, auditing, and port scanning
- Run local versions of antivirus, firewall, and intrusion detection software on the desktop

Summary

- Trojans are malicious pieces of code that carry cracker software to a target system.
- They are used primarily to gain and retain access on the target system.
- They often reside deep in the system and make registry changes that allow them to meet their purpose as a remote administration tool.
- Awareness and preventive measures are the best defences against Trojans.
- Using antiTrojan tools such as TrojanHunter and Emsisoft Anti-Malware to detect and eliminateTrojans.

VIRUSES AND WORMS

Introduction to Viruses

- A virus is a self-replicating program that produces its own code by attaching copies of it into other executable codes(programs, boot sector or document).
- Viruses are generally transmitted through file downloads, infected disk/flash drives and as email attachments

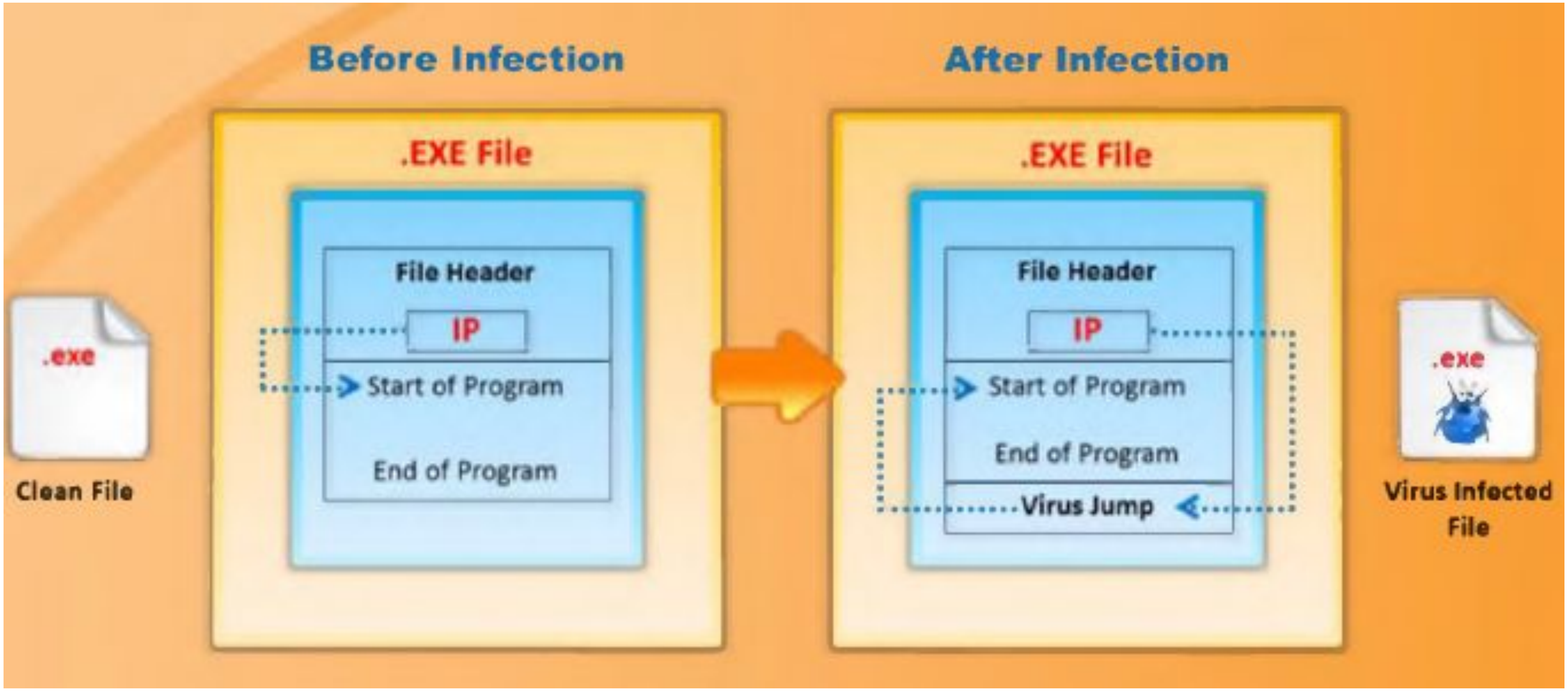
Stages of virus life

- 1.Design
- 2.Replication
- 3.Launch
- 4.Detection
- 5.Incorporation
- 6.Elimination

Sheep Dip computer

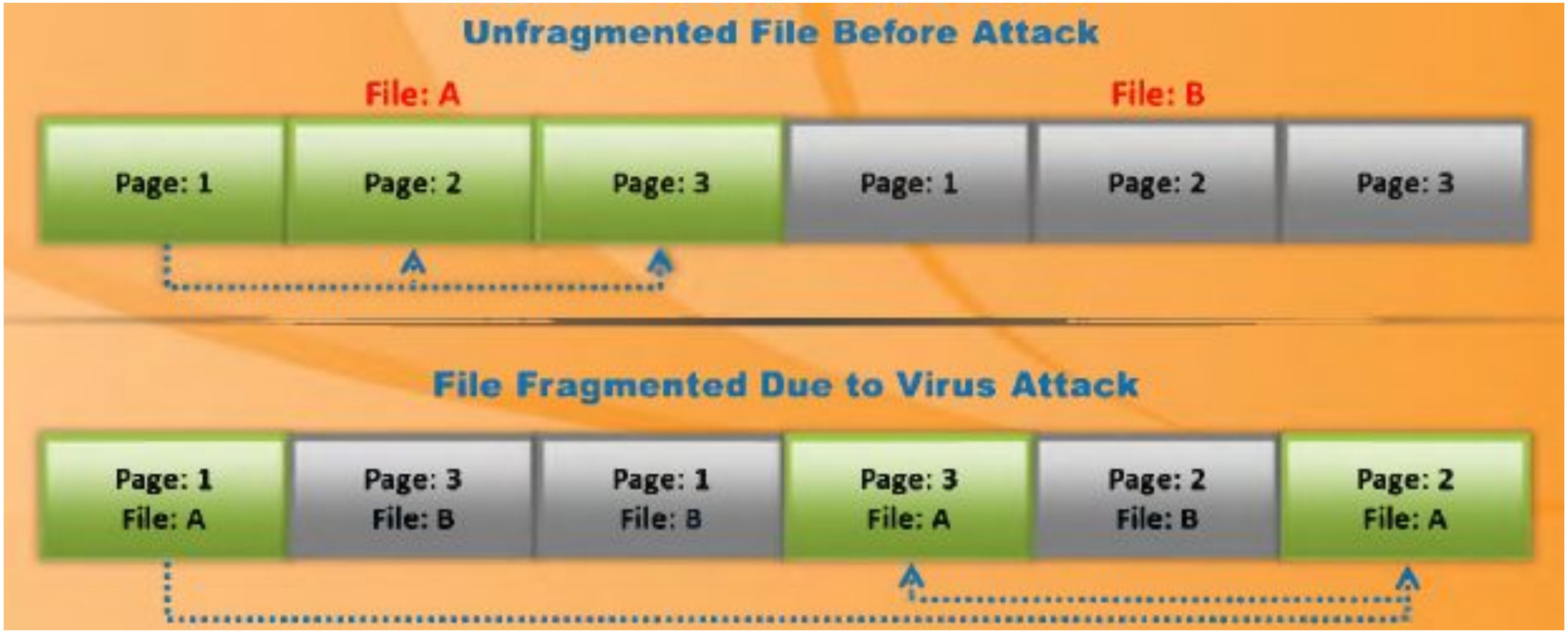
- The analysis of suspect files, incoming messages, etc. for malware
- Is installed with port monitors, files monitors, network monitors, and antivirus software
- Connects to a network only under strictly controlled conditions
- Runs
- port and network monitors
- user, group permission, and process monitors
- device driver and file monitors
- registry and kernel monitors

Infection phase



Attack Phase

- Viruses execute when some events are triggered
- Some execute and corrupt via built-in bug programs after being stored in the host's memory
- Most viruses are written to conceal their presence, attacking only after spreading in the host to the fullest extent



Indications of virus attacks

- Programs take longer to load
- The hard drive is always full, even without installing any programs
- The floppy disk drive or hard drive runs when it is not being used
- Unknown files keep appearing on the system
- The keyboard or the computer emits strange or beeping sounds
- The computer monitor displays strange graphics
- File names turn strange, often beyond recognition
- The hard drive becomes inaccessible when trying to boot from the floppy drive
- A program's size keeps changing
- The memory on the system seems to be in use and the system slows down

How does a computer get infected by viruses

- When a user accepts files and download s without checking properly for the source.
- Attackers usually send virus - infected files as email attachments to spread the virus on the victim's system. If the victim opens the mail, the virus automatically infects the system.
- Attackers incorporate viruses in popular software programs and upload the infected software on websites intended to download software . When the victim downloads infected software and installs it, the system gets infected.
- Failing to install new versions or update with latest patches intended to fix the known bugs may expose your system to viruses.
- With the increasing technology , attackers also are designing new viruses. Failing to use latest antivirus applications may expose you to virus attacks

Types of viruses (what do they infect)

- System or boot sector viruses
- File viruses
- Multipartite viruses
- Cluster viruses
- Macro viruses

Types of viruses (how do they infect)

- Stealth viruses
- Tunneling viruses
- Encryption viruses
- Polymorphic viruses
- Metamorphic viruses
- Overwriting files or cavity viruses
- Sparse infector viruses
- Companion viruses
- Camouflage viruses
- Shell viruses
- File extension viruses
- Intrusive viruses
- Direct action or transient viruses
- Terminate and stay resident viruses (TRSs)

Computer worms

- Computer worms are malicious programs that replicate, execute, and spread across network connections independently, without human interaction.
- Most worms are created only to replicate and spread across a network, consuming available computing resources; however, some worms carry a payload to damage
- Attackers use worm payloads to install backdoors in infected computers, which turns them into zombies and creates botnet; these botnets can be used to carry out further cyber-attacks.the host system.

Virus vs Worm

Virus

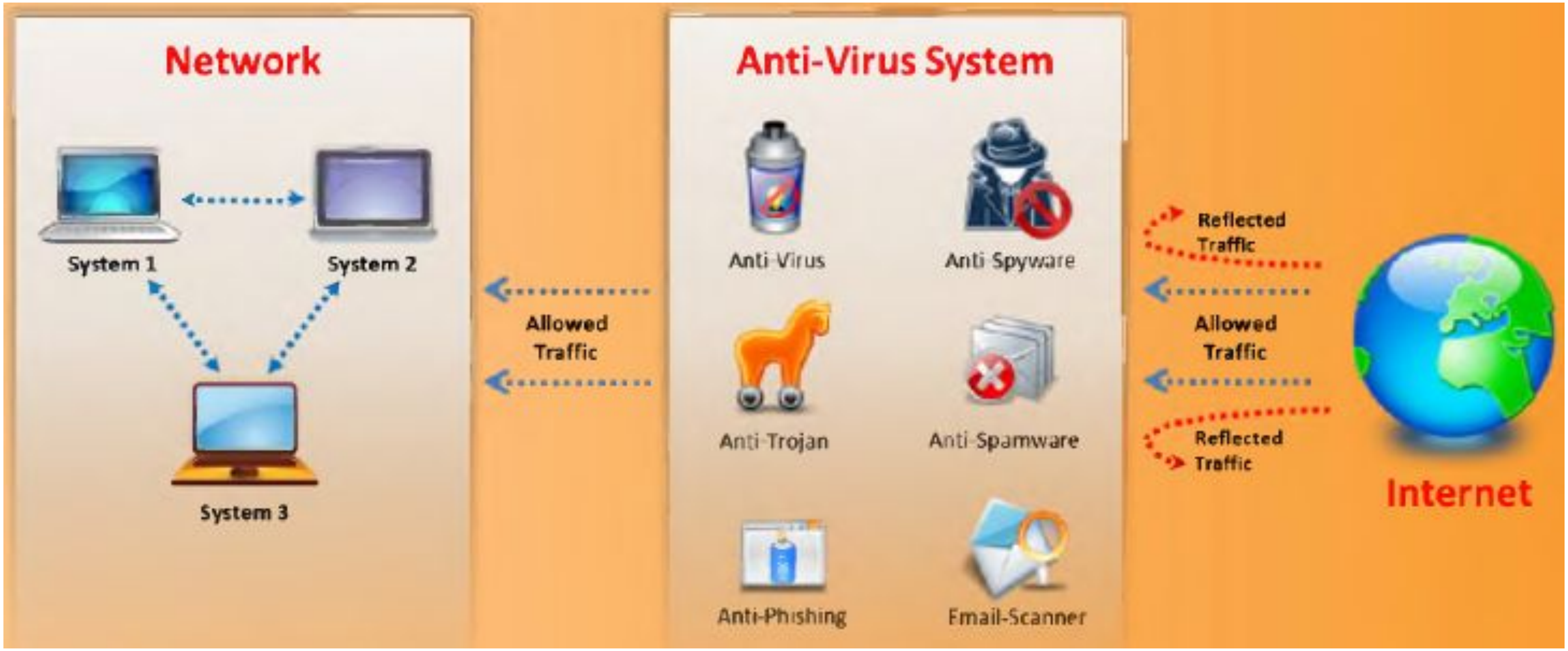
- cannot be spread to other computers unless an infected file is replicated and actually sent to the other computer
- Files such as .com, .exe, or .sys, or a combination of them are corrupted
- Cannot be easily removed from system

Worm

- after being installed on a system, can replicate itself and spread by using IRC, Outlook,etc
- A worm typically does not modify any stored programs.
- Can be easily removed from system

Antivirus sensor system

- is a collection of computer software that detects and analyzes various malicious code threats such as viruses, worms, and Trojans
- are used along with sheep dip computers.



Malware analysis

Virus detection methods

- Scanning
  - signature recognition
  - code analysis.
  - heuristic scanning
- Integrity checking

Reading and recording integrated data to develop a signature or base line for those files and system sectors

- Interception

The interceptor controls requests to the operating system for network access or actions that cause a threat to the program.

Virus and worms countermeasures

- Install antivirus software that detects and removes infections as they appear
- Generate an antivirus policy for safe computing and distribute it to the staff
- Pay attention to the instructions while downloading files or any programs from the Internet
- Update the antivirus software on the a monthly basis, so that it can identify and clean out new bugs
- Avoid opening the attachments received from an unknown sender as viruses spread via email attachments
- Possibility of virus infection may corrupt data, thus regularly maintain data back up
- Schedule regular scans for all drives after the installation of antivirus software
- Do not accept disks or programs without checking them first using a current version of an antivirus program

Virus and worms countermeasures

- Ensure the executable code sent to the organization is approved
- Run disk clean up, registry scanner, and defragmentation once a week
- Do not boot the machine with infected bootable system disk
- Turn on the firewall if the OS used is Windows XP
- Keep informed about the latest virus threats
- Run anti-spyware or adware once in a week
- Check the DVDs and CDs for virus infection
- Block the files with more than one file type extension
- Ensure the pop-up blocker is turned on and use an Internet firewall
- Be cautious with the files being sent through the instant messenger