# Computer Virus: Their Problems & Major attacks in Real Life

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**Abstract**— *Today's enterprise networks are distributed to different geographical locations and applications are more centrally located, information represents the most important asset. With the growing number of data communication services, channels and available software applications, data are processed in large quantities and in a more efficient manner. This technological enhancement offers new flexible opportunities also measure security threats poses in the networks. These threats can external or Internal, external threats divided as hacking, virus attack, Trojans, worms etc.*

*There are thousand and thousand of different viruses these days which improve every day. Although the wild spread of new and strong viruses, it still infects and spread only with user's permission. This research paper highlights the phases of computer virus, computer virus, history of worst computer attack, type of computer virus with effect on computer & few examples of virus on their types, working of computer virus, and problem occur due to virus in computers.*

*Keywords*— Network, Virus, Security threats, Hacking, Attack of Computer Virus, Major attacks & Life Cycle of Computer Virus.

## I. INTRODUCTION

Today enterprise networks are distributed to different geographical locations and applications are more centrally located. Every company's data is most valuable asset and must be treated as such. With the ever growing number of malicious threats; such as Viruses, Spyware and Hackers, it has become mandatory to protect yourself against them. The most powerful way for communication and data transfer is internet, because the speed of internet goes increased day by day. People can transfer large amount of data within few minute from one location to another location worldwide. Computers are used extensively to process the data and to provide information for decision making therefore it is necessary to control its use. Due to organizational cost of data loss, cost of incorrect decision making, and value of computer software hardware organizations suffer a major loss therefore the integrity of data and information must be maintained.

There are thousand and thousand of different viruses these days which improve every day. From these virus performance of computer goes slowly, entire disk will be crashed, programs are modified and more.

## II. INFORMATION ABOUT VIRUS

A computer virus is self replicating program containing code that explicitly copies itself and that can infects other program by modifying then or their environment Harmful program code refers to any part of program code which adds any sort of functionality against the specification. A virus is a program which is able to replicate with little or no user intervention, and the replicated program(s) are able to replicate further. Malicious software or malware for short, are "programs intentionally designed to perform some unauthorized - often harmful or undesirable act." Malware is a generic term and is used to describe many types of malicious software, such as viruses and worms. A typical structure of a computer virus contains three subroutines. The first subroutine, infect-executable, is responsible for finding available executable files and infecting them by copying its code into them. The subroutine do damage, also known as the payload of the virus, is the code responsible for delivering the malicious part of the virus. The last subroutine, trigger-pulled checks if the desired conditions are met in order to deliver its payload. The structure of Computer Virus can be divided in to four phases;

- **Mark** cans prevent re-infection attempts.
- **Infection** Mechanism causes spread to other files.
- **Trigger** is conditions for delivering payload.
- **Payload** is the possible damage to infected computers.

**Evolution of the cybersecurity threat**

In 2013 the new form of ransomware started with the CryptoLocker virus. There have been many new versions of this virus including Locky and WannaCry, as well as Petya (not the latest version). The original CryptoLocker virus infected about half a million computers in its original version. Some of these clones, such as TorrentLocker or CryptoWall, were specifically designed to target computers in Australia.

This year we have had virus attacks which spread very fast: WannaCry and NotPetya. Both of these viruses used a security hole within the protocol Windows users to access files over the network (SMB). This security hole, named EternalBlue, was made public by a Hacker group called "Shadow Brokers", who stole it from the US National Security Agency (NSA). Although Microsoft released a patch for this vulnerability in March 2017, the number of systems worldwide based on obsolete/unsupported software, or that had not yet applied the latest updates, allowed WannaCry to gain a strong foothold through a phishing email attack. WannaCry infected around 200,000 computers across 150 countries before the "Kill switch" was discovered and stopped the virus from spreading further.

More recently, NotPetya exploited the same security hole. It was not delivered through email however, and therefore only had a limited reach. At first it was assumed that this virus might be an upgraded version of Petya, a CryptoLocker type ransomware. In fact, NotPetya was distributed as an updated version of a Ukrainian tax accounting package called MeDoc, and from there, it started spreading through internal networks of multinational companies with offices in Ukraine. It would encrypt all files on a computer as well as the master file table of a hard drive, preventing the computer from booting. NotPetya had a very basic payment system, compared to other ransomware type viruses. This led to the general opinion that the Petya part of the virus was a just a decoy and recovery of the files proved impossible.

## Protecting yourself against the unknown

As new viruses are released, Anti-Virus software manufacturers apply new tools to fight them. It is a constant cat and mouse game.

Most of the ransomware type viruses cannot be detected with a classic Anti-Virus, so cyber security companies have started to conduct behaviour monitoring to detect them. It is just a matter of time, however, until there is a new virus that finds a way around each new detection method and the whole process begins again.

When the risks are always changing, the best steps to help you stay safe remain the same – constant vigilance to combat phishing email and fraudulent websites as the most common means of infection:

- Do not open emails and email attachments, when you are not 100% certain that they are legitimate.
- Do not click on links in emails or their attachments unless you were expecting to receive them. Remember, email accounts can be spoofed or hacked, so although a message may appear to come from a legitimate source, if the content is not what you expect from that sender it may not be trustworthy.
- Keep your computer up to date with the latest software updates and security patches.
- Check for spelling or grammar mistakes – this includes in the URL of websites you visit as well as the body of emails. For example, mistaking **ofice.com** for Microsoft's **office.com** will take you to a known malware site.

- Make sure you report any suspicious emails or unusual system behavior as soon as possible. Check out this Sentrian #AMA post for instructions on how to forward a suspicious email as an attachment to the Service Desk for investigation.

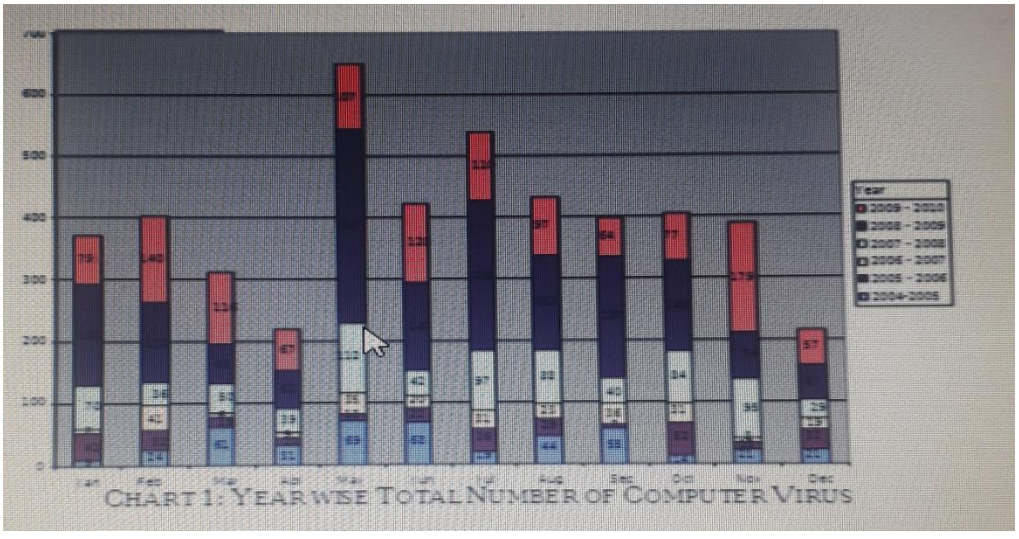
## III. HISTORY OF COMPUTER VIRUS

There are thousand and thousand of different viruses these days which improve every day. However, there is much software released every day to detect and avoid these viruses. Although the wild spread of new and strong viruses, it still infects and spread only with user's permission. There are endless arguments about the "first" virus.

There were a number of malware attacks in the 1970s and some count these among the virus attacks. The description of the malware, however, would indicate these were worms and not viruses by general definition. Just to be complete, however, the questionable entries from the 1970s are included here with that Computer Knowledge considers virus history to start in 1981. And in year 1995 to 2000 the total number of computer virus are created. And in 2001 to 2010 them are increases up to 1221 number of newly create computer virus. The new computer virus are created from year 2005 to year 2010 are shown in table 1. The table shows that for every month computer virus are created[7]

Table 1: Year Wise Total No. Of Virus

| **Year** | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2004-2005 | 9 | 24 | 61 | 31 | 69 | 68 | 19 | 44 | 55 | 14 | 21 | 21 |
| 2005-2006 | 42 | 32 | 15 | 11 | 12 | 22 | 36 | 29 | 7 | 52 | 12 | 32 |
| 2006-2007 | 8 | 41 | 6 | 9 | 35 | 20 | 31 | 23 | 36 | 31 | 8 | 19 |
| 2007-2008 | 70 | 36 | 50 | 39 | 112 | 42 | 97 | 88 | 40 | 84 | 95 | 29 |
| 2008-2009 | 162 | 130 | 63 | 62 | 316 | 143 | 245 | 152 | 197 | 148 | 74 | 57 |
| 2009-2010 | 79 | 140 | 116 | 67 | 107 | 126 | 110 | 97 | 64 | 77 | 179 | 57 |




From the above chart 1 showing in year first and last four month less number of computer viruses is created. In remaining four month computer virus are created much more as compare to first and last four month of every year.

# IV. TYPES OF COMPUTER VIRUS

There are thousands of different kinds of viruses but they form distinct groups. They all operate differently and affect our computers and the information contained on them in different ways. From the Table [Table: 2 Types Of Computer Virus] shows that the different types of computer virus, what it does, how a particular computer virus are get affected with some example of commuter virus.

Table 2: Types of Computer Virus

| Virus Type | What it Does | How it Affects our PC | Example of Virus |
|---|---|---|---|
| Residence Viruses | To live as a resident in the RAM memory | It interrupt all of the operations executed by the system | Randex, CMJ, Meve and MrKlunky |
| Program or File Virus | Infects executables such as EXE, BIN, COM, SYS) | Destroys or alters programs and data. | Sunday and Cascade |
| Boot sector virus | Infect boot sectors on hard and floppy disks | Destroy or alters programs and data | Disk Killer, Stone virus |
| Multipartite Virus | A hybrid of a program and boot sector virus | Destroy or alters programs and data | Invader, Flip and Tequila |
| Macro Virus | Triggers on a command in | Commonly affects | DMV, Nuclear word concept |
| Stealth Virus | Uses various tactics to avoid detection | Destroy or alters programs and data. | Frodo, Joshi, Whale |
| Polymorphic Virus | Uses encryption to foil detection, so that it appears differently in each infection | Destroy or alters programs and data | Involuntary stimulate, Cascade, Phoenix, Evil, Pround, Virus 101 |
| Email Virus | If the recipient open the e-mail attachment, the word macro is activated then | Spread only with the opening of the attachment in the email | Melissa, ILOVEYOU, Love Bug |
| Spyware | It makes unnecessary alternations to your PC & changes your experience of it. | A computer system is causing it to slow down | 7FAaSSt, Elf Bowling |
| Trojan Horses | Programs that do things that are not described in their specifications | It allows other computer users to take control of your PC over the internet | A2KM.Nitrogen, 91 Cast, 8sec!Trjan |
| Worms | Negative effects on your system, they are detected and eliminated by antivirus | It replicate themselves as stand-alone programs | Lovgate.F, Trile.C, Sobig.D, Mapson. |
| Directory Virus | It inserts a malicious code into a cluster and marks it as allocated in the FAT. | It prevents FAT allocation from being allocated in the future | Spam Laws, DIR II virus |

# V. HISTORIES OF WORST COMPUTER VIRUS ATTACKS

Virus attacks are not shocking news anymore. But here is the list of the worst of those attacks which shocked many at that time in history. The history of computer virus attack is as follow;

**A. Melissa**

Melissa was created by David L. Smith in 1999 and is based on a Microsoft Word macro. He intended to spread the virus through e-mail messages. The virus prompts the recipient to open a document and by doing so the virus gets activated. The activated virus replicates itself and will be transferred to 50 persons whose address is present in the recipient's e-mail address book. The increase in e-mail traffic due to the virus forced some companies to block e-mail programs until the virus attack was controlled.

**B. MyDoom**

The My Doom creates a backdoor in the OS of the victim's computer. The MyDoom virus had two triggers. One of them began a denial of service (DoS) attack on Feb. 1, 2004. In Feb. 12, 2004 the second trigger was initiated which stopped the virus distributing itself. Later that year, MyDoom virus outbreak occurred for a second time, which targeted several search engine companies. The virus would send a search request to a search engine and will use e-mail addresses obtained in the search results. Such a type of
attack slowed down search engine services and caused some website crash.

**C. ILOVEYOUILOVEYOU**

ILOVEYOU was a standalone program which was capable of replicating itself. The virus initially traveled through the e-mail, same way as Melissa virus. The email had a subject which says that the message was a love letter from the secret admirer. Attachment with this e-mail caused all the trouble. The file LOVE-LETTER-FOR-YOU.TXT.vbs contained the worm. As the name suggests Visual Basic Scripting was used for creating this virus. The copied itself several times and made victim's several folders hidden, it added several new files to the victim's computer registry keys and replaced several files with copies of itself.

**D. Nimda**

Nimda was spread through the Internet rapidly and became one of the fastest propagating computer virus. The Nimda worms aimed on the Internet servers and its real purpose was to slow down the Internet traffic. Nimda could travel through the Internet in multiple methods which included the email. The Nimda worm was able to create a backdoor into the victim's OS. If the victim was logged in as the administrator for the machine, then the worm would provide the attacker the full control over the system. The Nimda virus caused several network systems to crash as the system's resources were taken away by the worm. The Nimda worm was one of the dreaded distributed denials of service (DDoS) attack virus.

**E. The Klez Virus**

The Klez virus appeared in late 2001 and infected a victim's computer through an e-mail message. The virus replicated itself and was sent itself to all the contacts in the victim's address book. The virus could disable virus-scanning software and could falsely act as a virus-removal tool. The modified version of this virus could take any name from the contact list of the victim and can place that address in the "From" field. This technique is called spoofing. By spoofing the e-mail appears to come from a source when it's actually coming from somewhere else. Spoofing will prevent the user's chance to block email from a suspected recipient.

**F. SQL Slammer / Sapphire SQL**

Slammer / Sapphire virus caused a damage of affected networks included Bank of America's ATM service, Continental Airlines etc. A few minutes after the infection of the first Internet server, the number of victims of the Slammer virus doubled every few seconds. After Fifteen minutes of the first attack, half of the servers that act as the pillars of the Internet were affected by the virus.

**G. Sasser and Netsky**

The Sasser worm exploited Microsoft Windows vulnerability. The infected system will look for other vulnerable systems and instruct those systems to download the virus. A random scan of the IP addresses was done to find potential victims. The virus made it difficult to shut down the computer without turning OFF the system. The Netsky virus spread through e-mail and Windows networks. The virus causes a denial of service (DoS) attack on the affected system.

**H. Leap-A/Oompa-A**

Oompa-A, was one of the viruses which aimed at Mac systems. The viruses used the iChat instant messaging program for its propagation among vulnerable Mac computers. The Leap-A virus was not able to cause much harm to computers, but showed that even a Mac computer can be affected by malicious softwares.

**I. Code Red and Code Red II**

Code Red and Code Red II exploited operating system vulnerability found in Windows 2000 and Windows NT machines. A buffer overflow problem was the vulnerability. Due to this if the OS receives more information than its buffers handling capacity; the adjacent memory will be overwritten. The original worm initiated a distributed denial of service attack to the White House website. That means all the infected computers with Code Red try to contact the Web servers at the same time, thereby overloading the machines. The infected machine no longer obeys the owner, allowing a remote user to control and access the machine.

**J. Storm Worm**

The Storm Worm got this particular name because of the fact that the e-mail messages which carry the virus carried a subject "230 dead as storm batters Europe." Some versions of this Worm turn computers into bots or Zombies. The infected computers become vulnerable to further attack by the person behind the attack.

## VI. WORKING OF COMPUTER VIRUS

Computer viruses have a life cycle that starts when they're created and ends when they're completely eradicated. The following diagram [Diagram 1: Life Cycle] points are describes in each stage [9].

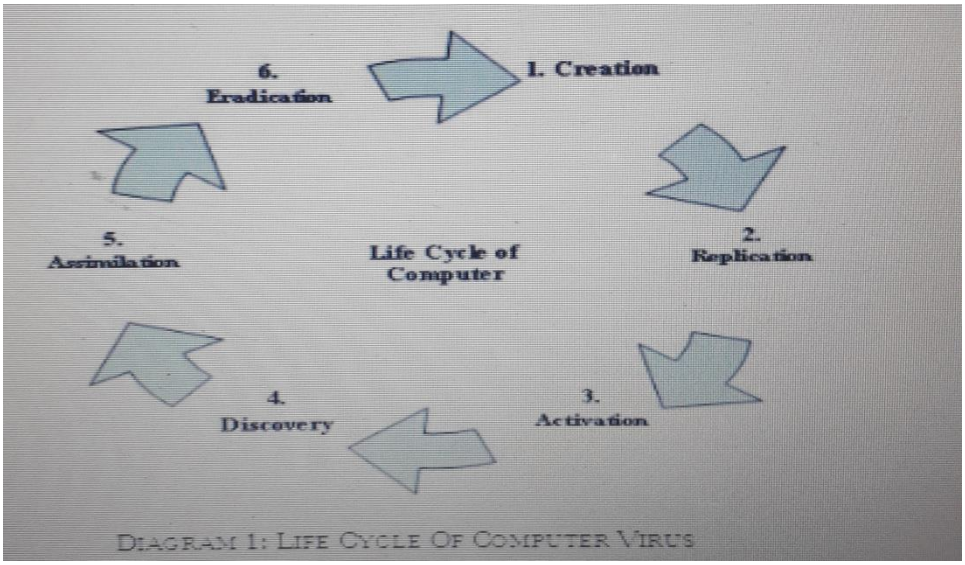


DIAGRAM 1: LIFE CYCLE OF COMPUTER VIRUS

**Stage I - Creation –** The Computer viruses are created by misguided individuals who wish to cause widespread, random damage to computers.

**Stage II -Replication -** Computer Viruses replicate by nature means it copies itself from one PC to anther PC.

**Stage III -Activation -** Viruses that have damage routines will activate when certain conditions are met. Viruses without damage routines don't activate, instead causing damage by stealing storage space.

**Stage IV -Discovery -** This phase doesn't always come after activation, but it usually does. Discovery normally takes place at least a year before the virus might have become a threat to the computing community.

**Stages V -Assimilation -** At this point, antivirus developers modify their software so that it can detect the new virus. This can take anywhere from one day to six months, depending on the developer and the virus type.

**Stage VI -Eradication -** If enough users install up-to-date virus protection software, any virus can be wiped out. So far no viruses have disappeared completely, but some have long ceased to be a major threat.

The same or different developer develops a different strain of a new virus and process begins afresh.

## VII. PROBLEMS OF COMPUTER VIRUS

Many common computer problems are easy to fix but hard to diagnose. Once you figure out what is wrong with the computer, a solution is easy to find. Most of the time, it will either be a problem of: viruses, malware, spyware or a computer running slow. There are some common problems occur due to the virus attacks which are given bellow;

1. Computer speed or performance has slowed
2. Computer system freezes and blue screens of death.
3. The computer keeps on rebooting again and again.
4. An entire disk or drive is erased.
5. Cause erratic screen behavior.
6. Unexplained messages appear on the screen.
7. Your browser home page changed itself.
8. Application software seems to be changed.
9. Operating system software appears to be modified.
10. Unexplained printing problems occur.

## Monitoring System

Malware and Trojans tools create a backdoor in the system and that allows hackers to remotely control and use your computer system. It is always essential to monitor your system resource utilizations and your network connections. If it finds any unwanted or unknown connections in the server or other computer machine over the internet, then it always recommends disconnecting the session immediately. It also blocks unwanted and unnecessary ports as well, as this will minimize the attack scope for any hacker. There are number of tools that are available for this purpose and most easily available tools is net stat which will provide you with all the required information regarding TCP/IP connections.

## VIII. CONCLUSIONS

A computer virus is software intentionally written to copy itself without the computer owner's permission and then perform some other action on any system where it resides. Now a days, viruses are being written for almost every computing platform Anti-virus protection is, or should be, an integral part of any Information Systems operation, be it personal or professional. There are number of computer virus are created and these computer virus are affected in day today life. These viruses erase important data. before finding the solution against the computer virus people must know the basic thing of computer virus like which are the type of computer virus are created now a days, working of computer virus, problem occurs from computer virus.

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