Ransomware

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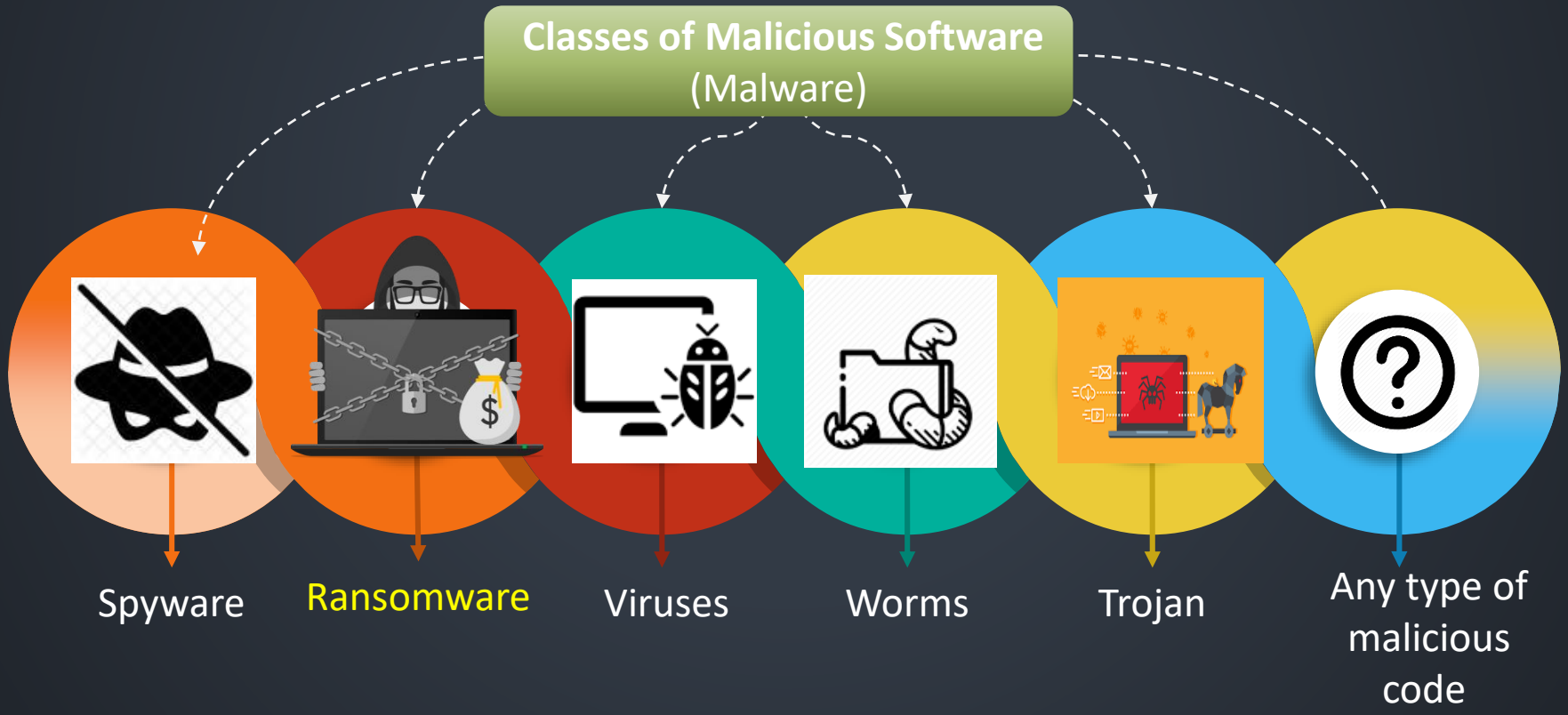
Outline

- What is a ransomware?
- How does it work?
- Prevention mechanisms
- Example: WannaCry
- Summary

What is a malware?

Malware

Malware is a malicious software that aims to access or damage a system without the permission of its user.



Malware Types

- **Virus**: piece of software that infects programs
  - replicates and goes on to infect other content
  - easily spread through network environments

- Worm: Uses a network to **self propagate** to other computers
  - Does not need a user intervention
  - Different from a virus because it does not need to attach to any program

- **Trojan Horses** need to be ran or installed onto a computer
  - They appear to be normal download until installed
  - When installed they steal or delete data

- **Spyware** **spies** on the user to see what information it can collect off the user's computer to display pop-up ads
  - May use memory from programs running in the background of the computer to keep close watch on the user

  => causing the program or computer to slow down

What is a ransomware?

Ransomware ?

Ransomware is a type of malware that encrypts files or locks computers, preventing access to them until a ransom is paid.

Types of Ransomware

1- Crypto ransomware encrypt data files on Computer, preventing access to them until a ransom is paid .

2- Locker ransomware locks the computer completely , so the user will not have access to computing resources until a ransom is paid.

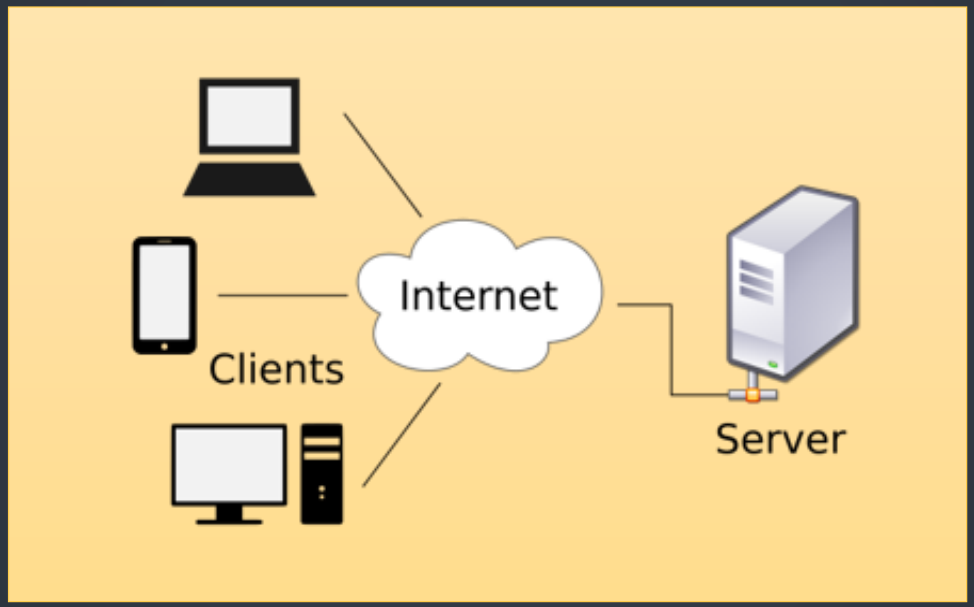
Impact

Loss of access to critical personal or business data / systems

How Does Crypto Ransomware Work

Main Components

1- Malicious software installed on the computer



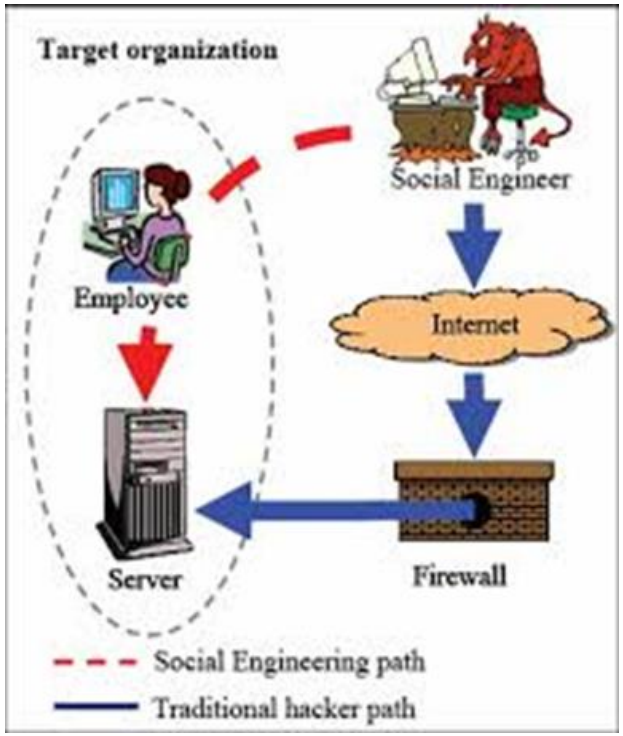
2- Hacker server communicating with the clients and giving orders in a master/slave manner

How Does It Work

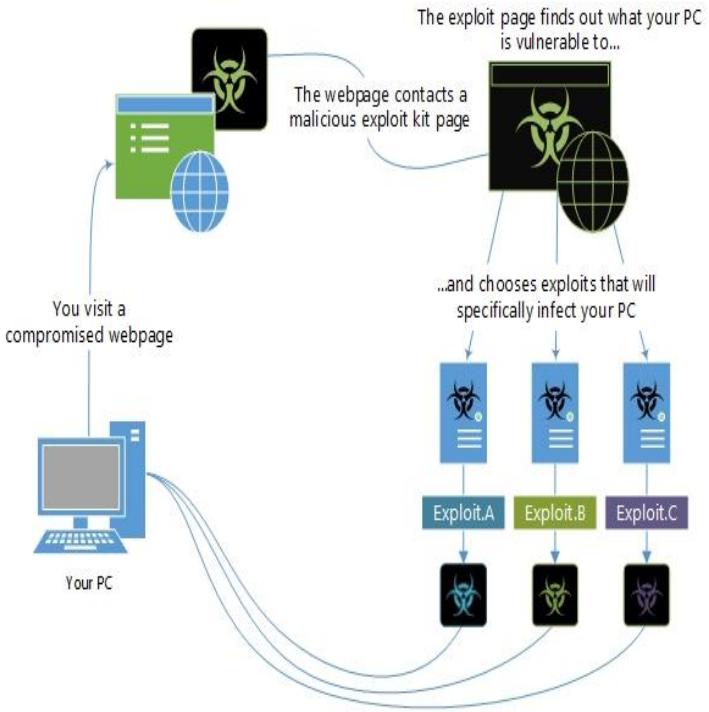
Crypto ransomware goes through 5 stages

Stage-1: Installation

Delivered as files



Delivered by exploit kits

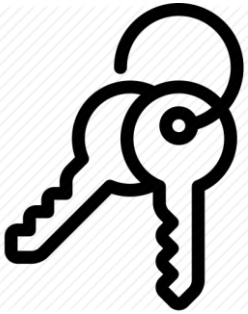


Stage-2: Contact Server & Handshake

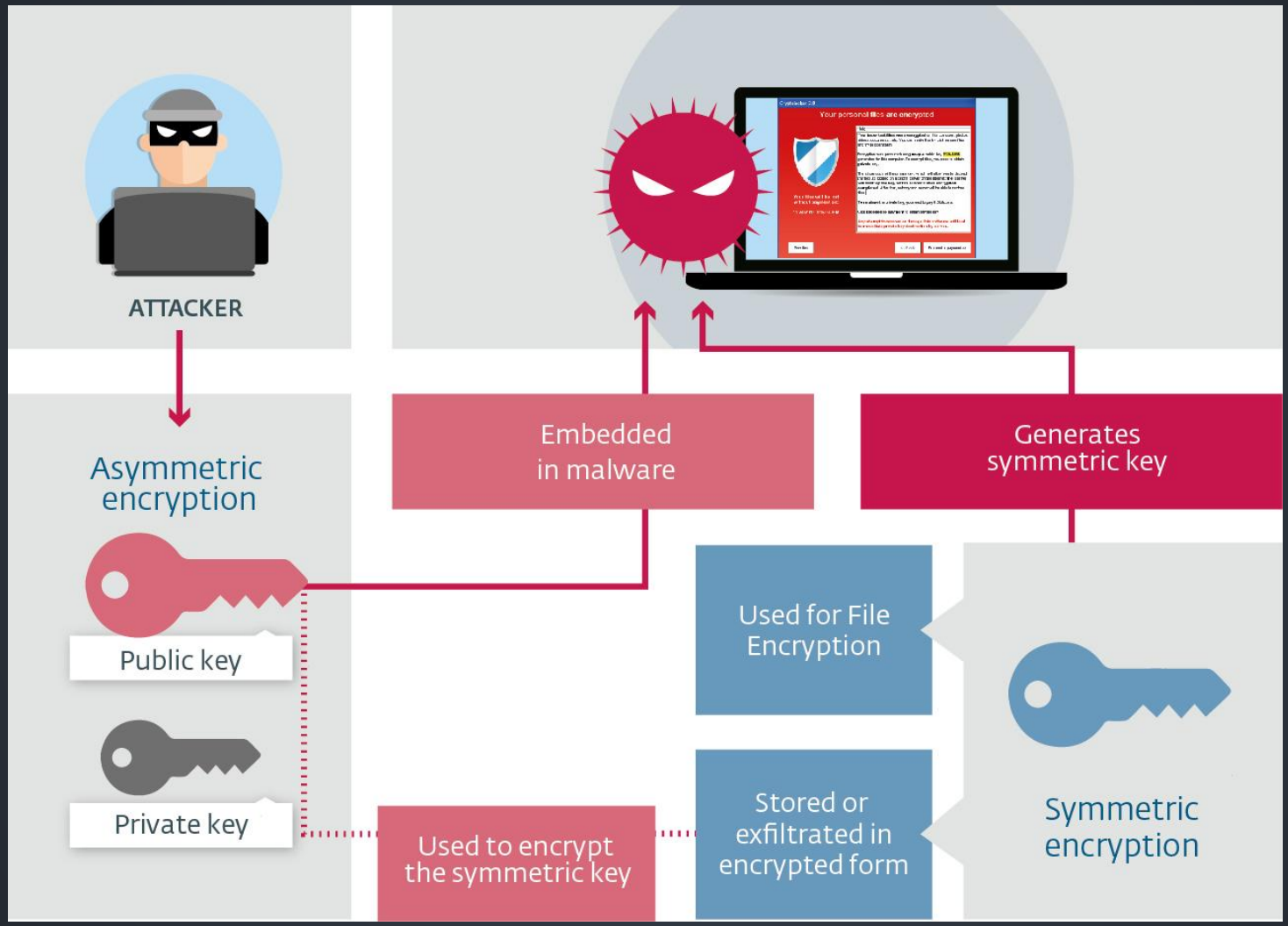
Ransomware server and client identify each other by handshake.

Stage-3: Generate Keys

The server or the client generate the keys that are going to be used for encryption step.



Stage 4: Encryption

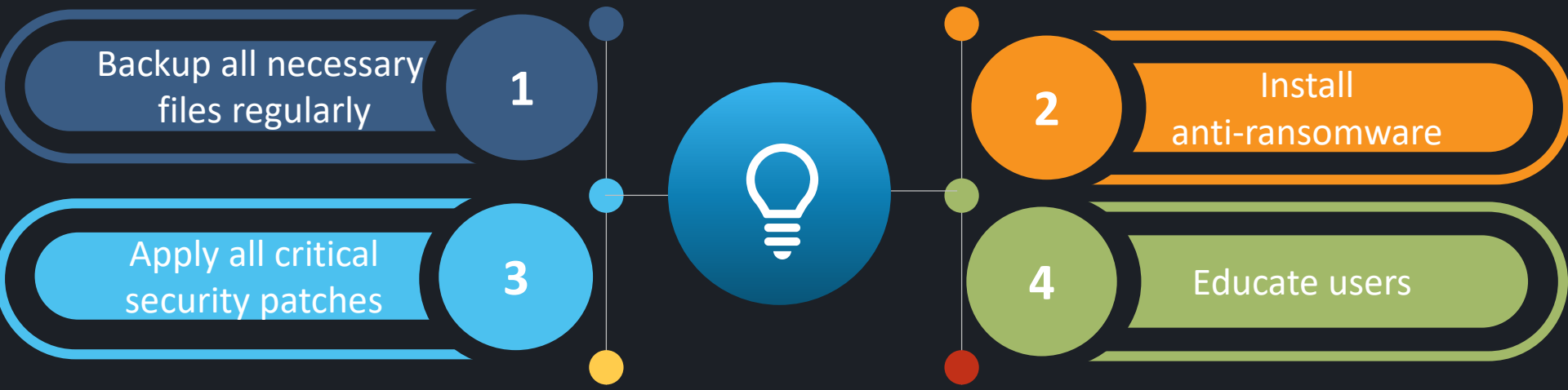


After paying the ransom the **symmetric key gets decrypted by the attacker's private key**. Then it is used to decrypt the files.

Stage-5: Extortion

Finally, a screen is displayed to the users informing them about time limit to pay up before destroying the decryption key by the criminals.

Prevention mechanisms



Example: WannaCry

Self-propagating worm module

Ransom module deals with asking and making sure ransom is paid

Targets computers running Microsoft Windows by encrypting data and demanding ransom payments in the Bitcoin cryptocurrency.

Spreading Method: Worm module scans for open TCP port 445 on IP addresses in same network, or a random IP address. Then, exploits 2 vulnerabilities to spread.

Encryption: Every file encrypted using different AES key, which is itself encrypted using 2048-bit RSA.

Summary

- There are two types of ransomware:
  - Crypto ransomware => locks files
  - Locker ransomware => locks computer
- Crypto ransomware goes through 5 steps: installation, contact server, establish keys, encryption and extortion
- May cause loss of access to critical personal or business data / systems
- One can stay safe by installing some anti ransomware, having a backup for all important files and applying all the critical security patches
- WannaCry is a famous crypto ransomware