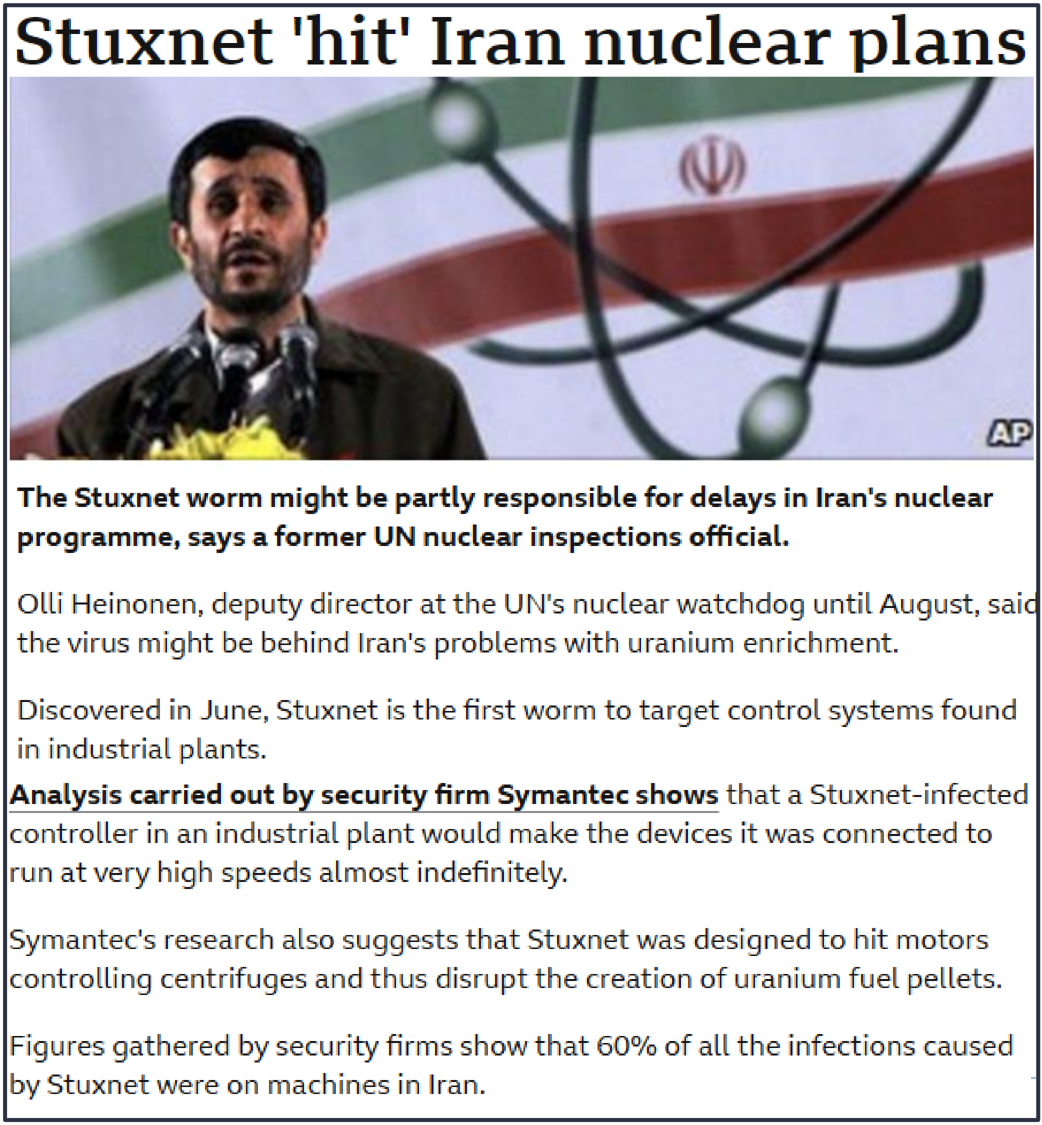
# Significance of Computer Security

## Critical to national security

- Cyber espionage: steal classified information from rival government or military systems, such as diplomatic strategies, defense plans, etc.
- Election interference: spread false information to influence public opinion, hack political campaigns, or manipulate voting systems.
- Cyber warfare: disrupt the military operations, or Distributed Denial of Service attacks against government services or infrastructure
- Supply chain attacks: target software or hardware suppliers to compromise the systems in government or defense agencies
- Cyber terrorism: launch attacks aimed at causing physical destruction or fear, such as targeting dams, chemical plants or hospitals

# Case Study: Stuxnet Malware



## Stuxnet 'hit' Iran nuclear plans

**The Stuxnet worm might be partly responsible for delays in Iran's nuclear programme, says a former UN nuclear inspections official.**

Olli Heinonen, deputy director at the UN's nuclear watchdog until August, said the virus might be behind Iran's problems with uranium enrichment.

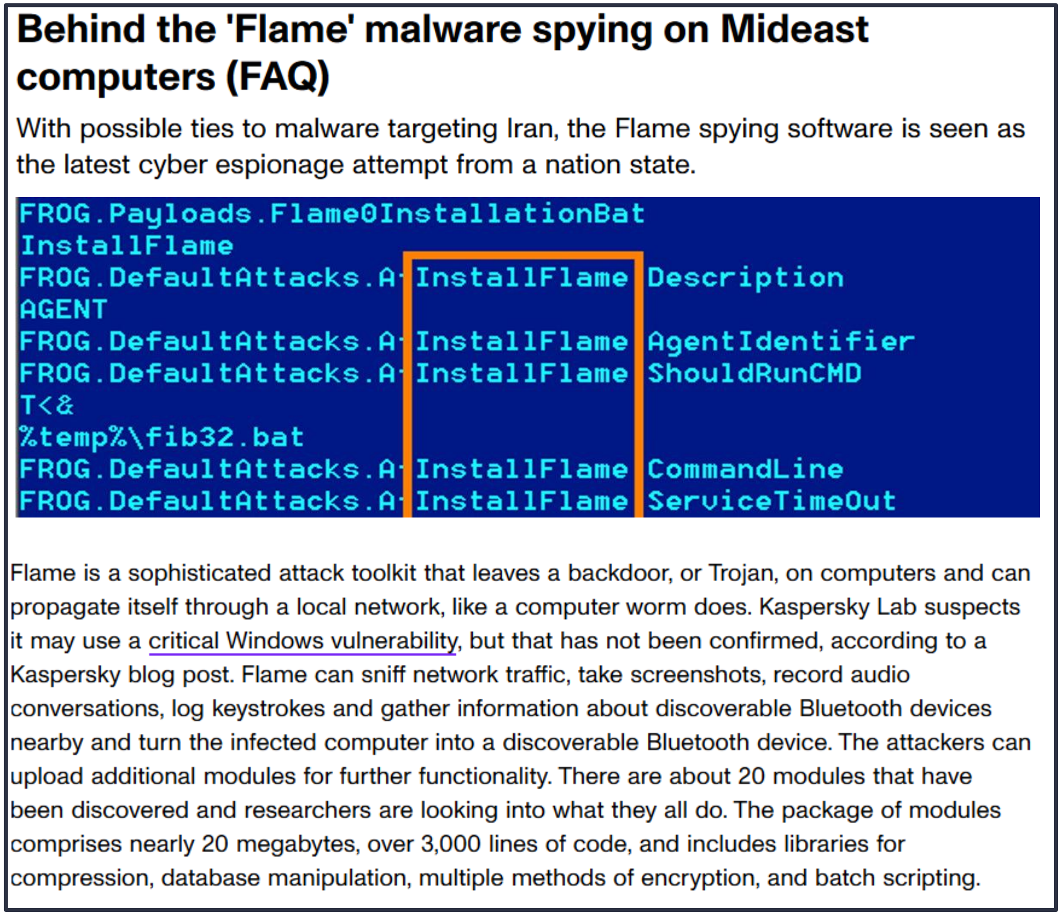
Discovered in June, Stuxnet is the first worm to target control systems found in industrial plants.

**Analysis carried out by security firm Symantec shows** that a Stuxnet-infected controller in an industrial plant would make the devices it was connected to run at very high speeds almost indefinitely.

Symantec's research also suggests that Stuxnet was designed to hit motors controlling centrifuges and thus disrupt the creation of uranium fuel pellets.

Figures gathered by security firms show that 60% of all the infections caused by Stuxnet were on machines in Iran.

# Case Study: Flame Spyware



## Behind the 'Flame' malware spying on Mideast computers (FAQ)

With possible ties to malware targeting Iran, the Flame spying software is seen as the latest cyber espionage attempt from a nation state.

```
FROG.Payloads.Flame0InstallationBat
InstallFlame
FROG.DefaultAttacks.A InstallFlame Description
AGENT
FROG.DefaultAttacks.A InstallFlame AgentIdentifier
FROG.DefaultAttacks.A InstallFlame ShouldRunCMD
T<&
%temp%\fib32.bat
FROG.DefaultAttacks.A InstallFlame CommandLine
FROG.DefaultAttacks.A InstallFlame ServiceTimeOut
```

Flame is a sophisticated attack toolkit that leaves a backdoor, or Trojan, on computers and can propagate itself through a local network, like a computer worm does. Kaspersky Lab suspects it may use a critical Windows vulnerability, but that has not been confirmed, according to a Kaspersky blog post. Flame can sniff network traffic, take screenshots, record audio conversations, log keystrokes and gather information about discoverable Bluetooth devices nearby and turn the infected computer into a discoverable Bluetooth device. The attackers can upload additional modules for further functionality. There are about 20 modules that have been discovered and researchers are looking into what they all do. The package of modules comprises nearly 20 megabytes, over 3,000 lines of code, and includes libraries for compression, database manipulation, multiple methods of encryption, and batch scripting.

# System Complexity Leads to Insecurity

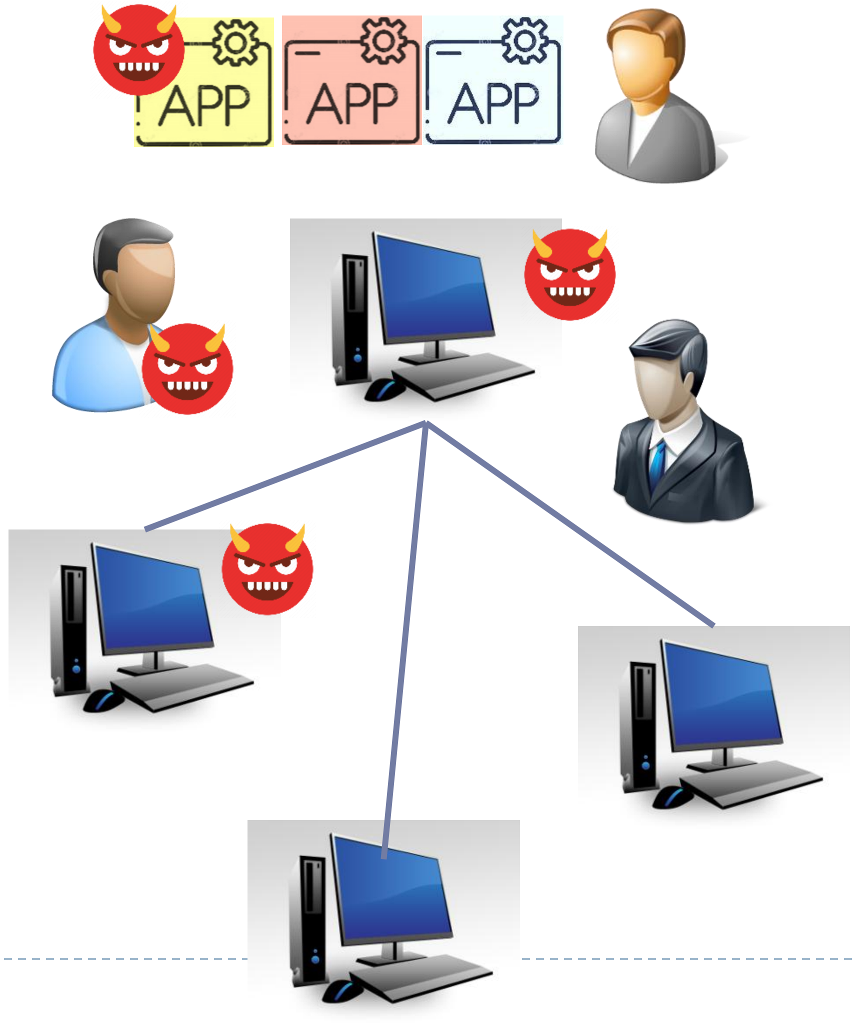
## Provide a protected environment for data and their processing

**Standalone computer single user monoprogram**

- Physical security

**Standalone computer single user multiprogram**

- Physical security
- Process protection



**Standalone computer multiple user**

- Physical security
- Process protection
- Data protection
- User authentication

**Networked computer**

- Physical security
- Process protection
- Data protection
- User authentication
- Communication protection

# Human Factors Lead to Insecurity

## System Users

- Security features are not used correctly, e.g., misconfiguration.
- Users like convenience and may try to disable some security configurations that are not inconvenient

## System Developers

- Security features are not designed correctly; security components are not implemented correctly
- Developers are humans, and humans can make mistakes.

## External Parties

- Individual’s trust can be manipulated for profit, e.g., social engineering