

# Need of Security

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**Course : Cryptography and Network Security**

# Outline

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- ❖ **Need of Security**
- ❖ **What Does Security Mean?**
- ❖ **Network Security is Needed**
- ❖ **Gap to be Filled- Security/Networks**
- ❖ **Need of Network Security Design**
- ❖ **Introduction to Network Security**

# Need of Security



# Motivation

**Security** is critical to the success of any modern organization and **security risk** must be managed to **acceptable levels**.

**Cyber security** spending will grow from **\$86.4 billion in 2018** to **\$93 billion in 2019**.



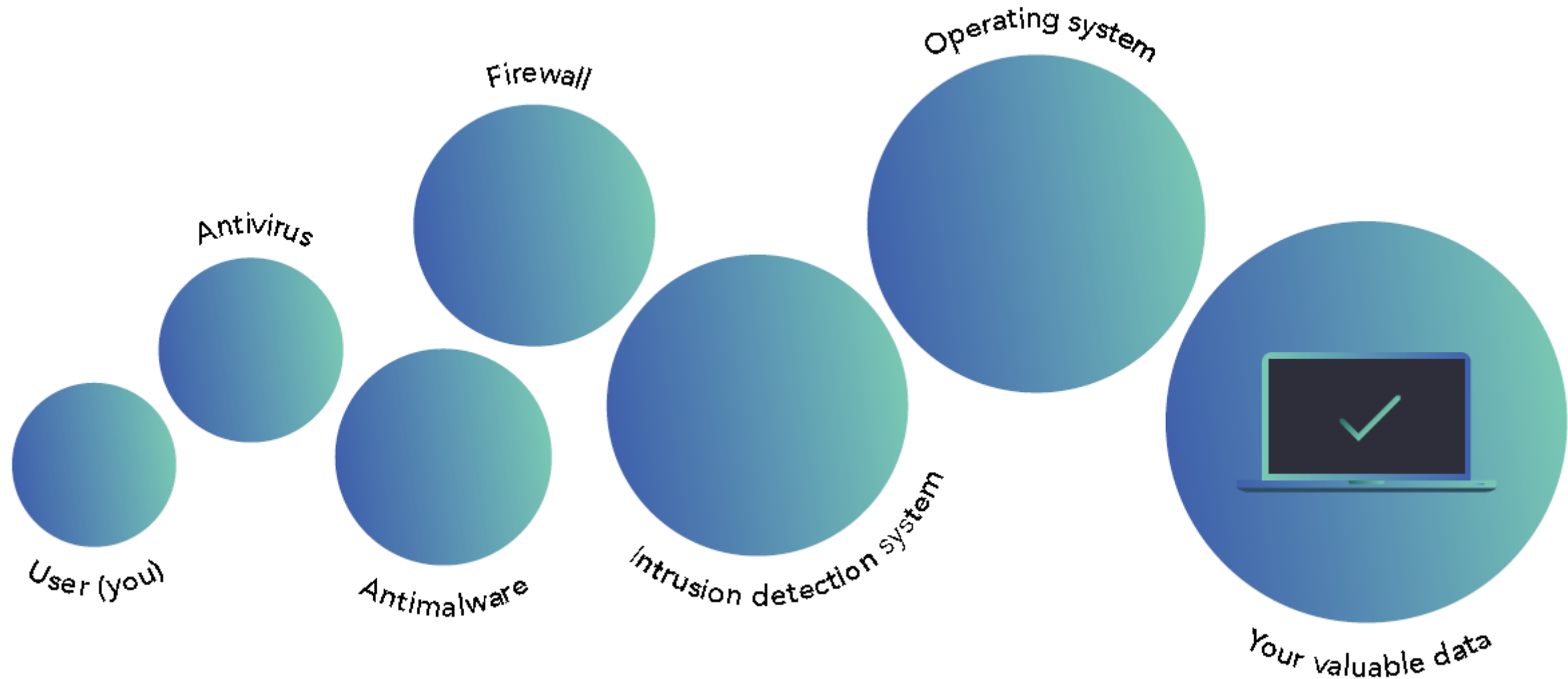
# Role and Responsibility in Protecting the Firm and Client Data

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# The Layered Security model

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# What Does Security Mean?

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# What Does Security Mean?

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❖ “**Security**” is an extremely expansive term.

- ✓ Personal security
- ✓ Physical security
- ✓ Corporate security
- ✓ National (homeland) security
- ✓ Operations security
- ✓ Personnel security

✓ **Communication security**

✓ Computer security

✓ **Network Security**

✓ System security

❖ So what does “**Security**” mean?



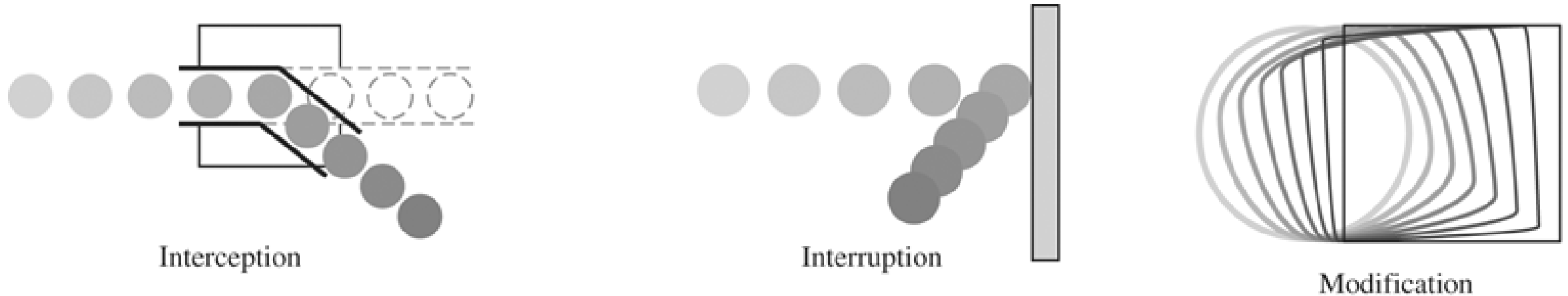
# What Does Security Mean?

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- ❖ **Security** seems to mean something like “protection of assets against attack.”
- ❖ Doesn't the meaning of “protection” vary depending on the nature of the threat?

# Some Examples of Threats

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- ✓ **Interruption:** an asset becomes unusable, unavailable, or lost.
- ✓ **Interception:** an unauthorized party gains access to an asset.
- ✓ **Modification:** an unauthorized party tampers with an asset.

# Security Problem is Severe

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❖ “Security” is an increasingly prevalent problem in computer science.

Why?

- ✓ **Increased connectivity;**
- ✓ **Large number of valuable assets online;**
- ✓ **Low threshold to access;**
- ✓ **Sophisticated attack tools and strategies available;**
- ✓ **Others?**

# Network Security is Needed

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# Motivation

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- The world is becoming more **interconnected** with the advent of the **Internet** and **new networking technology**.
  - ✓ **Wireless Networks, Internet of Things, Cloud Networks,**
- **Security** on the Internet or Networks is now at the forefront of **computer related issues**.

# Why Network Security is Needed

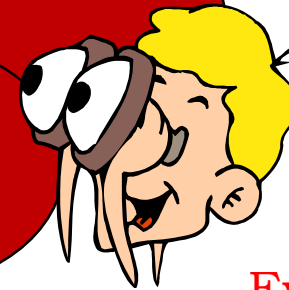
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Alice

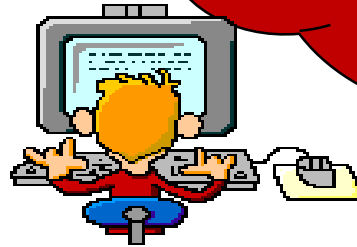


Network:  
Internet  
Intranet  
LAN  
WAN

...



Eve



Bob

# Properties of Network Security

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➤ Network Security is only Successful in preventing loss of information, when three fundamental precepts are followed

1. A Secure Network must have INTEGRITY
2. To secure a network there must be CONFIDENTIALITY,
3. Network Security requires AVAILABILITY

# Goals of Network Security

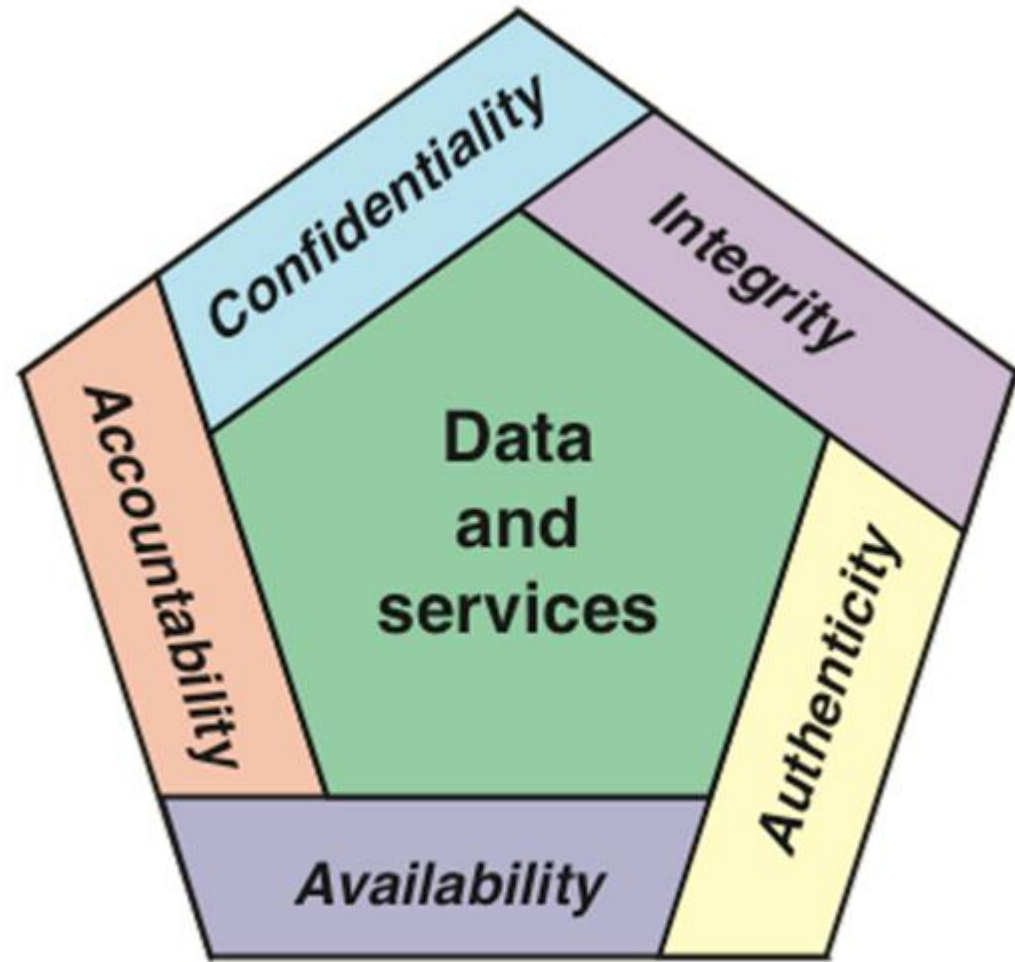
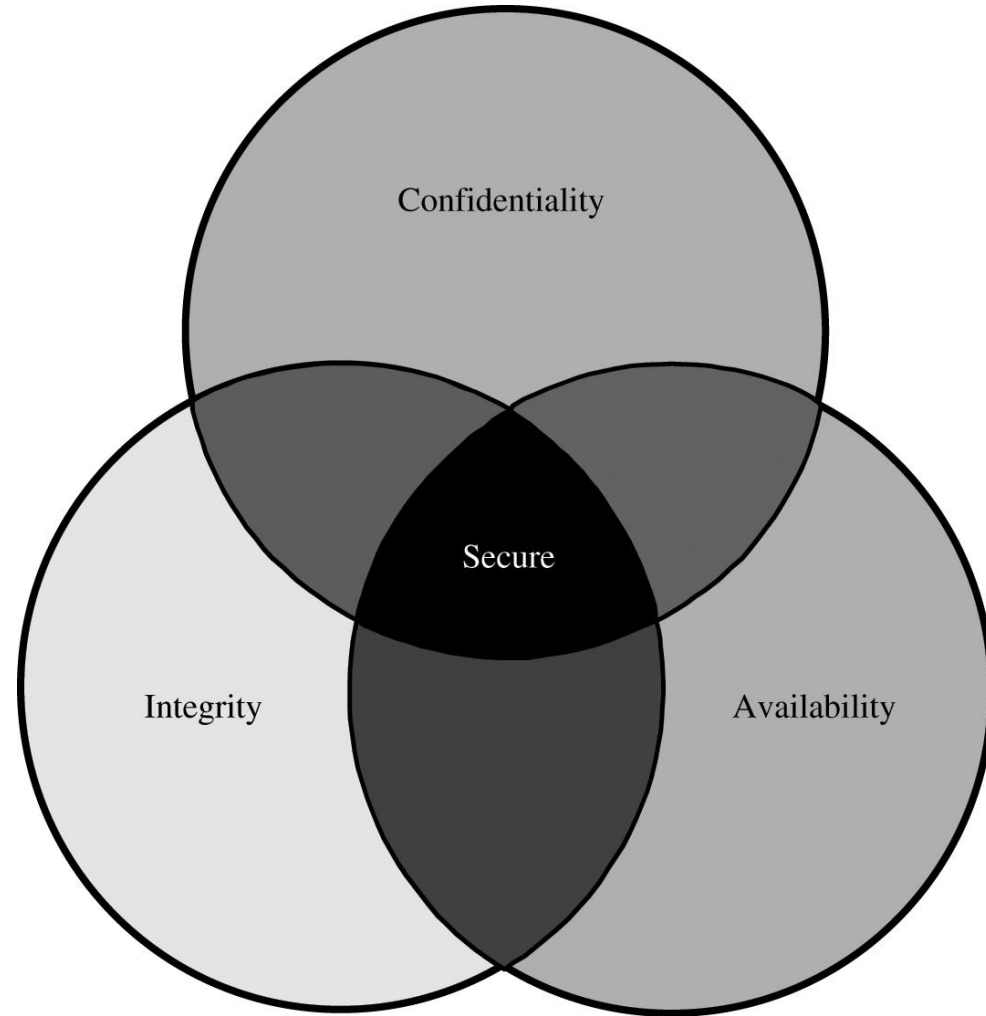


Figure 1.1 Essential Network Security Requirements





# Gap to be Filled

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# Gap to be Filled

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- Although, Network Security is a critical requirement in emerging networks.
  - ❖ There is a significant lack of security methods that need to be implemented.
  - ❖ There exists a “Communication Gap” between the developers of security technology and developers of networks.

# Network Design

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- ❖ Network design is a well-developed process that is based on the Open Systems Interface (OSI) model.
- ❖ Network design supports
  - ✓ **Modularity,**
  - ✓ **Flexibility,**
  - ✓ **Ease of Use, and Standardization of protocols.**

# Secure Network Design

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- In contrast to Network Design, Secure Network Design is not a well-developed process.
- There isn't a methodology to manage the complexity of security requirements.
  - Secure Network Design does not contain the same advantages as network design.

# Need of Network Security Design

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# Need of Network Security Design

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➤ When **Developing A Secure Network**, the following need to be considered

1. Access
2. Confidentiality
3. Authentication
4. Integrity
5. Non-Repudiation

# Access

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- ❖ Authorized users are provided to Access or communicate to and from a particular network



# Confidentiality

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- ❖ Information in the network remains private





# Authentication

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- ❖ Ensure the **users of the network** are who they say they are



# Integrity

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- ❖ Ensure the message has not been **modified in transit**



# Non Repudiation

- ❖ Ensure the user does not refute that he used the network



# Introduction to Network Security

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# Introduction to Network Security

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❖ Network/Internet Security which consists of measures to **Deter**, **Prevent**, **Detect**, and **Correct** security violations that involve the transmission & storage of information.

# Key Definition

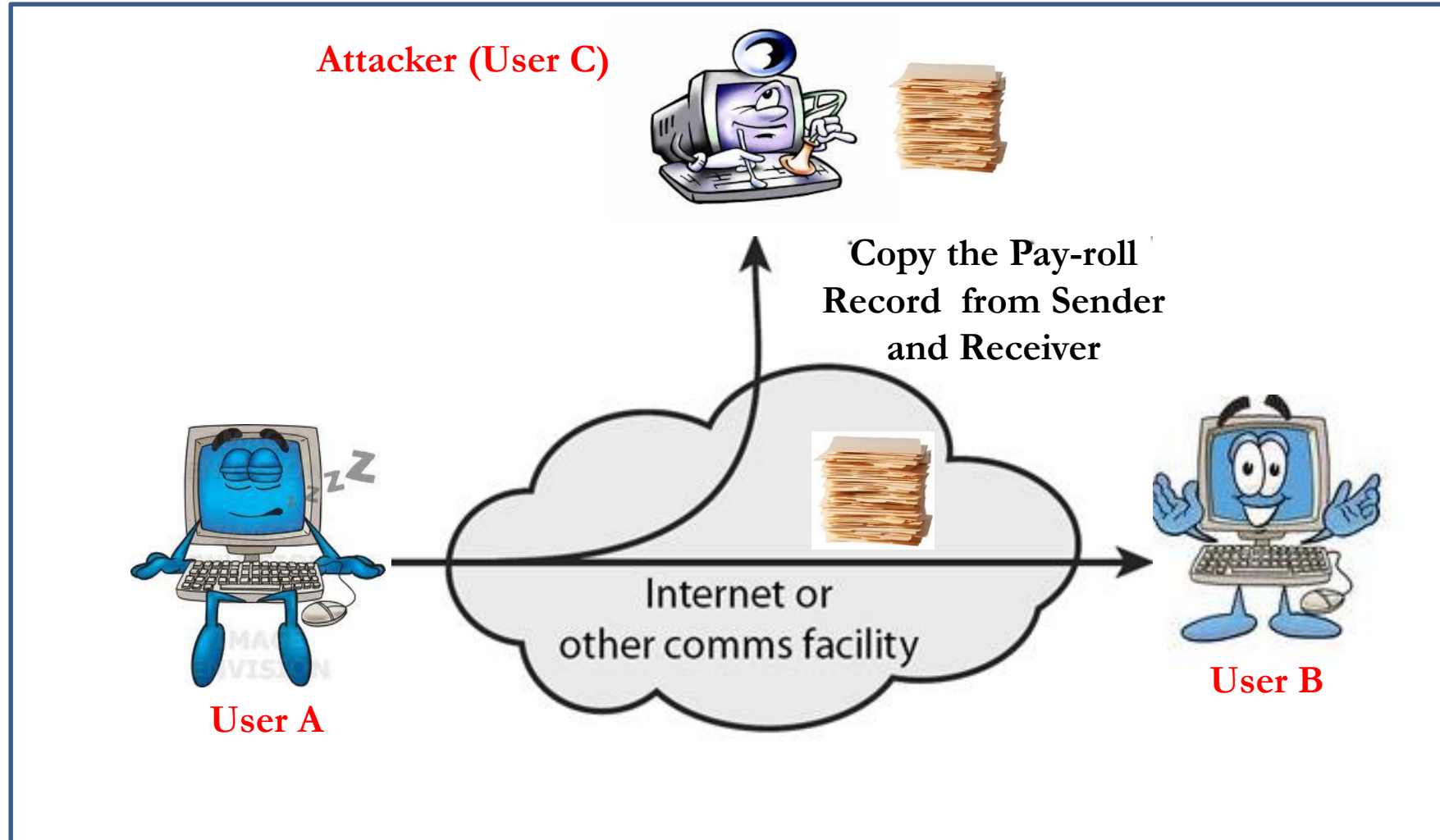
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**Computer Security:** Computer Security is the generic name for the collection of tools designed to protect data and to thwart hackers

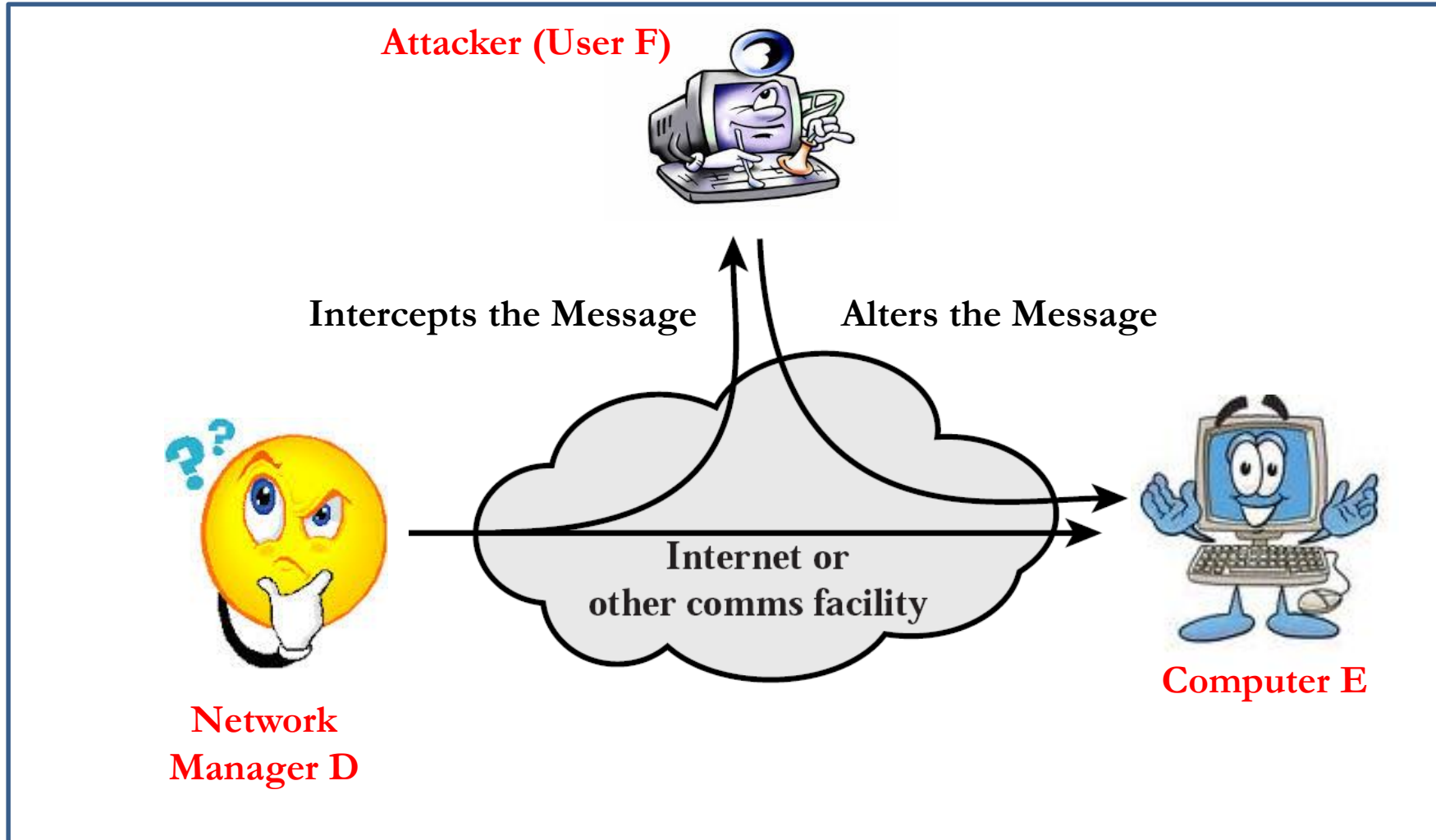
**Network Security** - Network Security measures to protect data during their transmission

**Internet Security** - Internet Security measures to protect data during their transmission over a collection of interconnected networks

# Some of the Security Violations

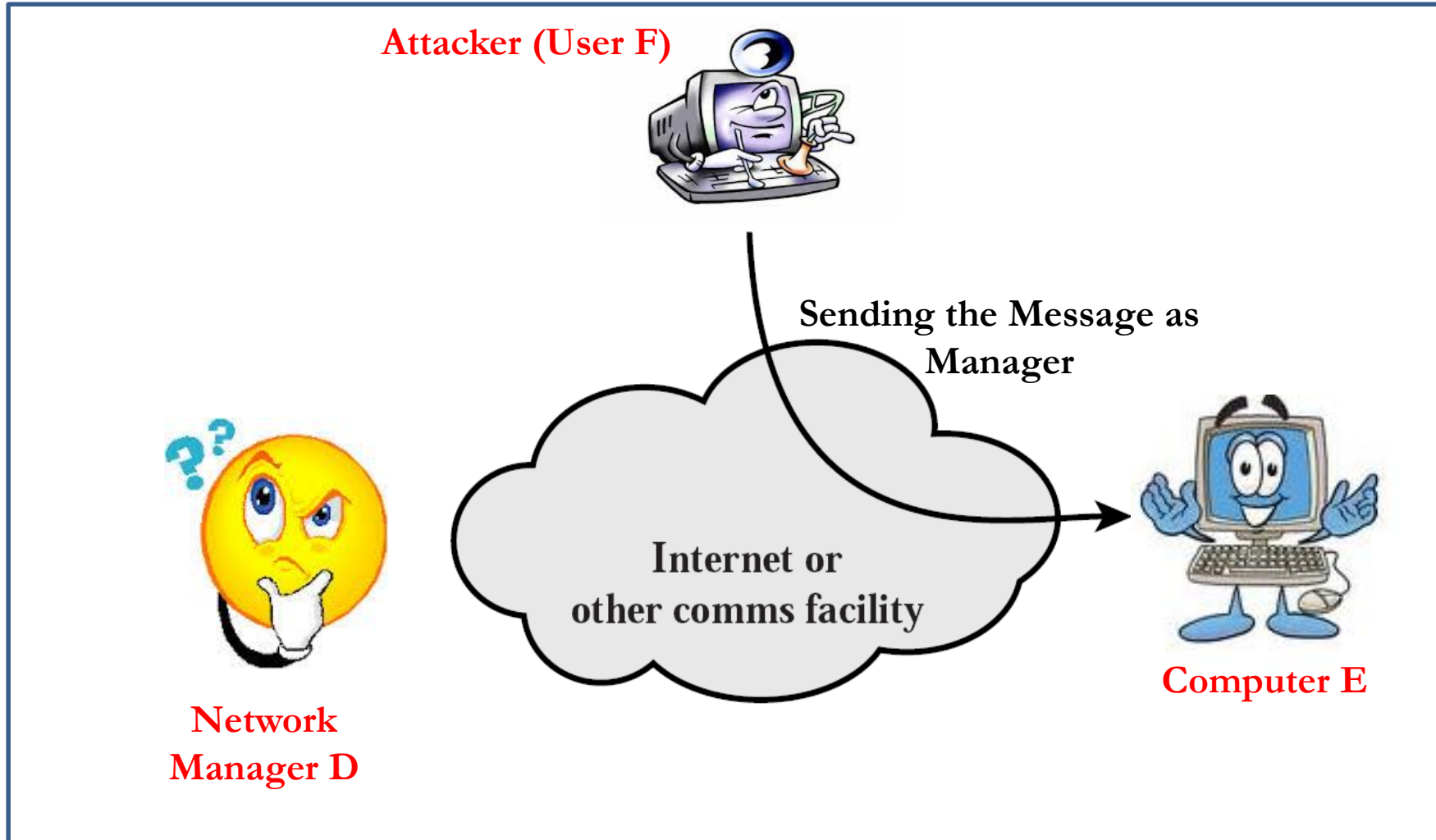


# Scenario-2



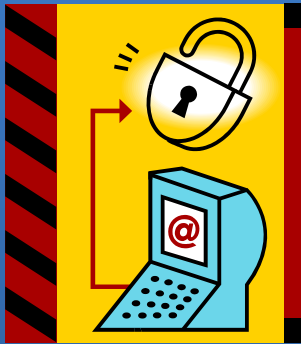


# Scenario-3



# The Field of Network and Internet security consists of:

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Measures to Deter, Prevent,  
Detect, And Correct Security  
**Violations** that involve the  
transmission of information

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**Thank U**

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