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Network Security 1

Module 1 – Overview of Network Security

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Learning Objectives

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–1.1 Introduction to Network Security

–1.2 Introduction to Vulnerabilities, Threats, and Attacks

–1.3 Attack Examples

–1.4 Vulnerability Analysis

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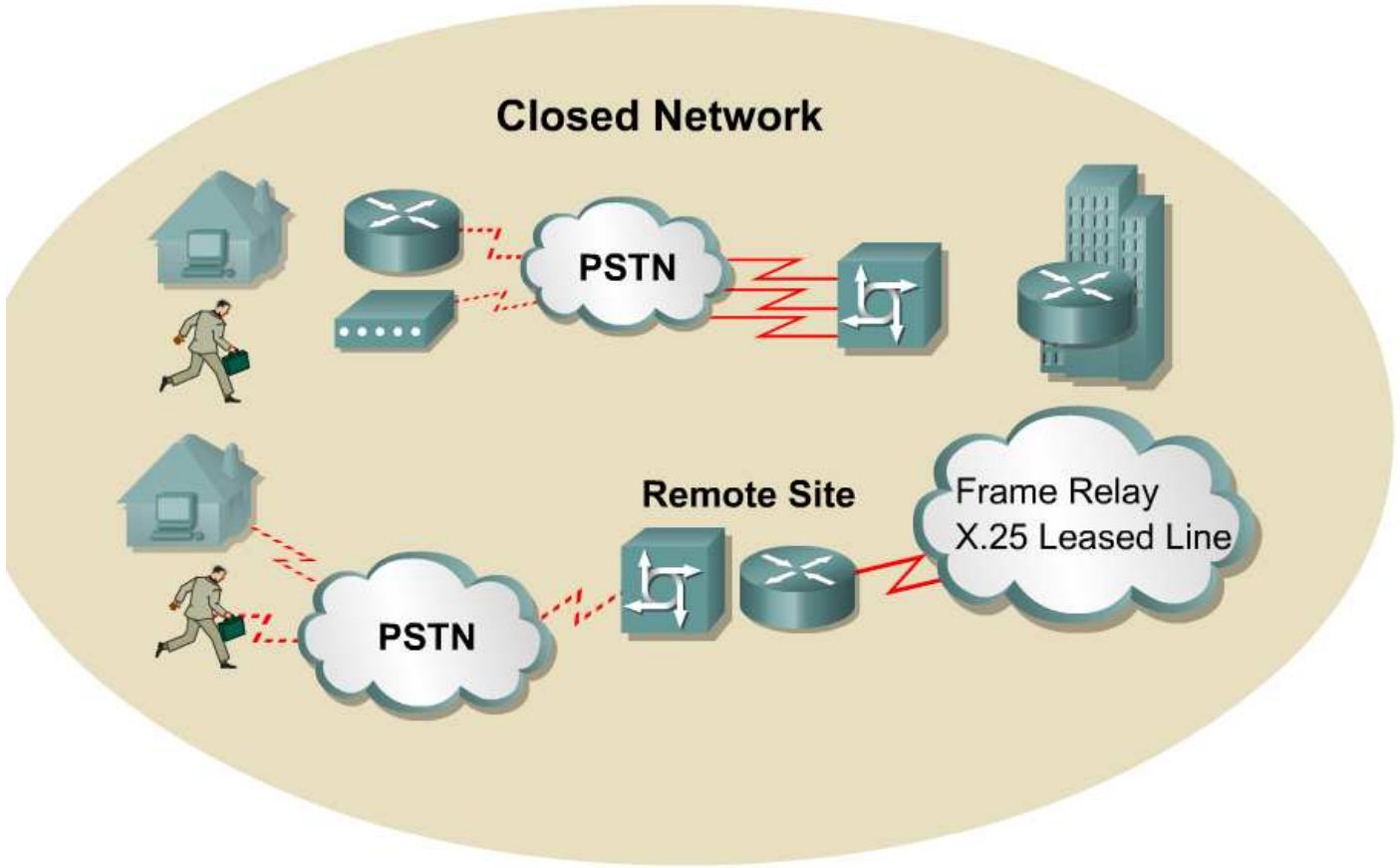
The Closed Network



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The Network Today

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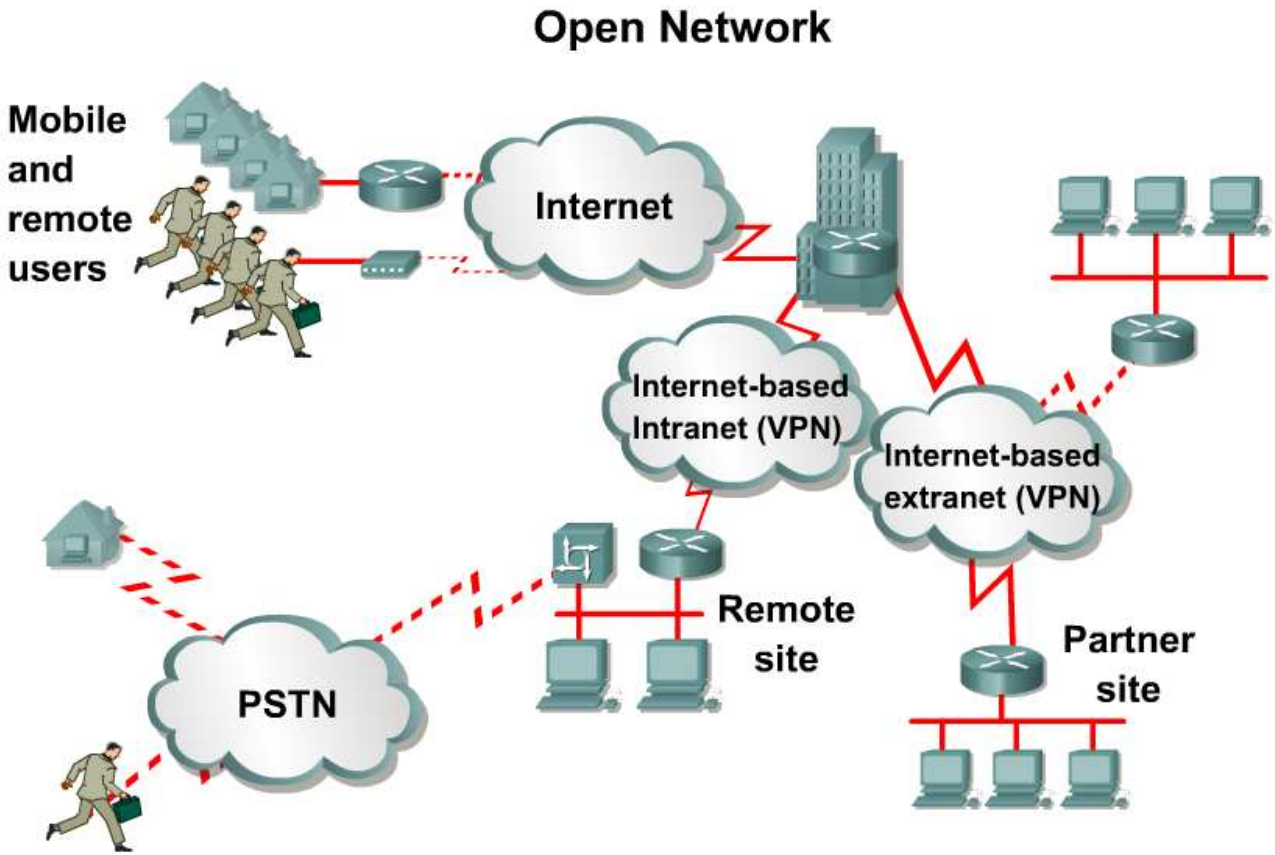

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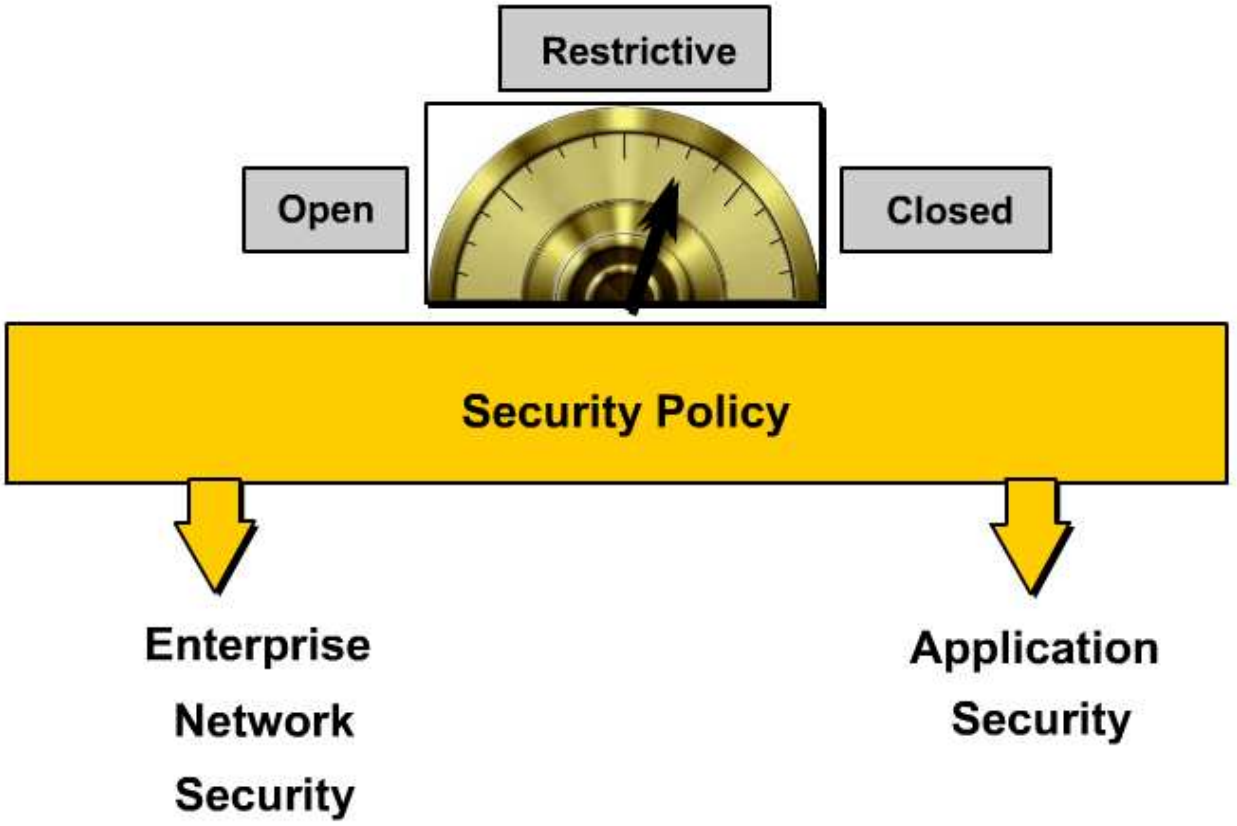
Network Security Models



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Trends that Affect Security

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- Increase of network attacks
- Increased sophistication of attacks
- Increased dependence on the network
- Lack of trained personnel
- Lack of awareness
- Lack of security policies
- Wireless access
- Legislation
- Litigation

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1.2 Introduction to Vulnerabilities, Threats, and Attacks

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Network Vulnerabilities

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- Technology
- Configuration
- Policy

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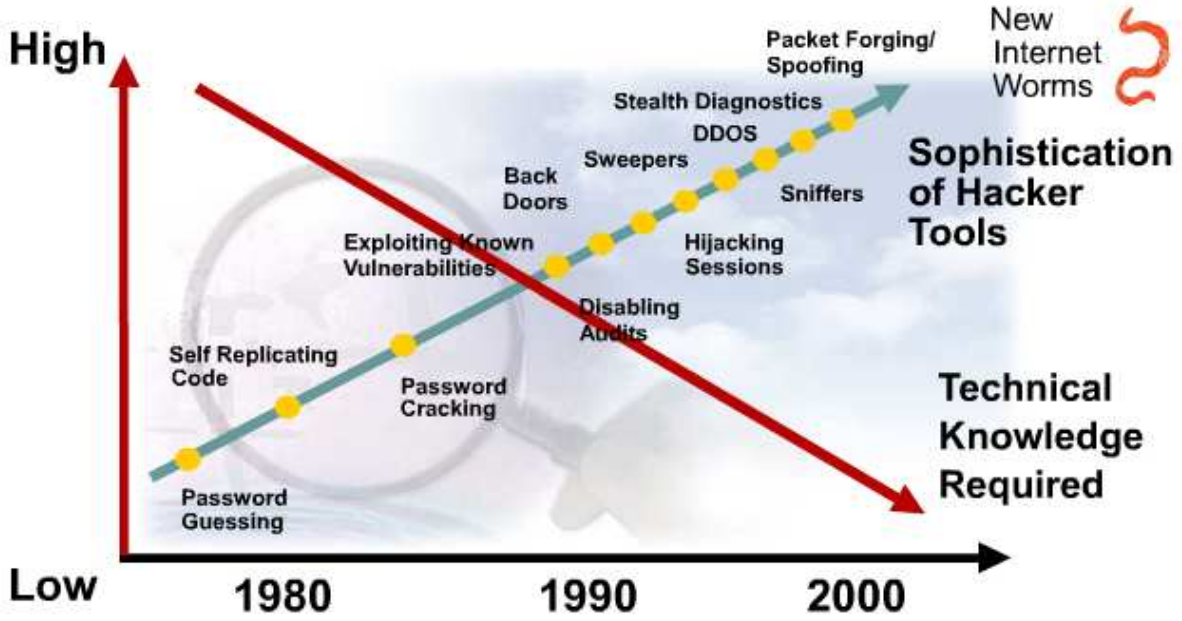
Threat Capabilities—More Dangerous and Easier to Use



Threats continue to become more sophisticated as the technical knowledge required to implement attacks deminishes.

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1.3 Attack Examples

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Network Threats

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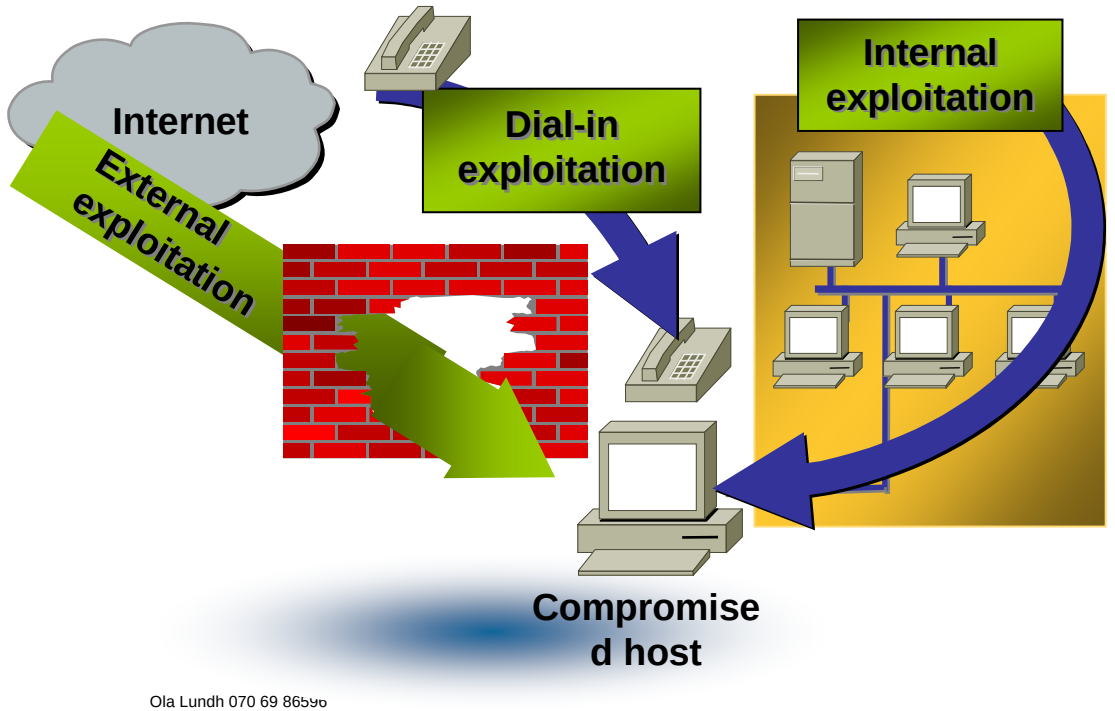
- There are four general categories of security threats to the network:
  - Unstructured threats
  - Structured threats
  - External threats
  - Internal threats



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Four Classes of Network Attacks

- Reconnaissance attacks
- Access attacks
- Denial of service attacks
- Worms, viruses, and Trojan horses

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Specific Attack Types

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- All of the following can be used to compromise your system:
  - Packet sniffers
  - IP weaknesses
  - Password attacks
  - DoS or DDoS
  - Man-in-the-middle attacks
  - Application layer attacks
  - Trust exploitation
  - Port redirection
  - Virus
  - Trojan horse
  - Operator error
  - Worms

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DoS Attacks

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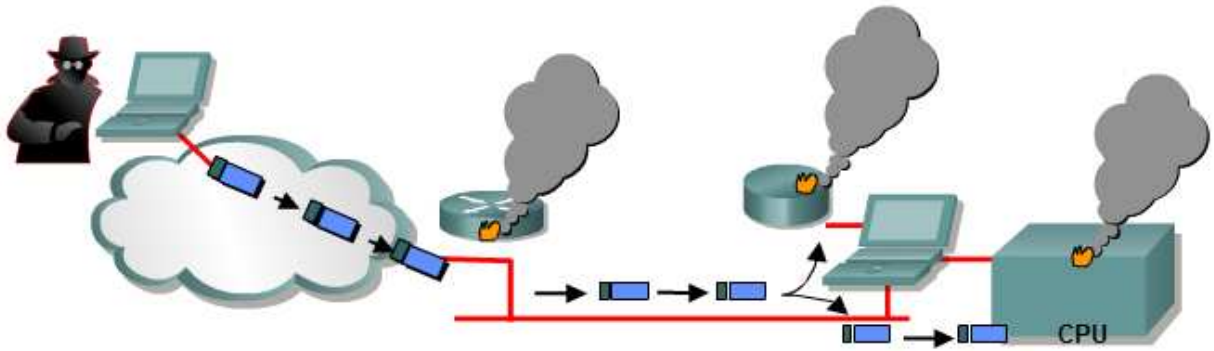
DoS attacks prevent authorized people from using a service by using up system resources.



Resource overloads

- Disk space, bandwidth, buffers, and so on.
- Ping floods: smurf, and so on.
- Packet storms: UDP bombs, fraggle, and so on.

Malformed data

- Oversized packets: ping of death, and so on.
- Overlapping packets: winuke, and so on.
- Un-handled data: teardrop, and so on.

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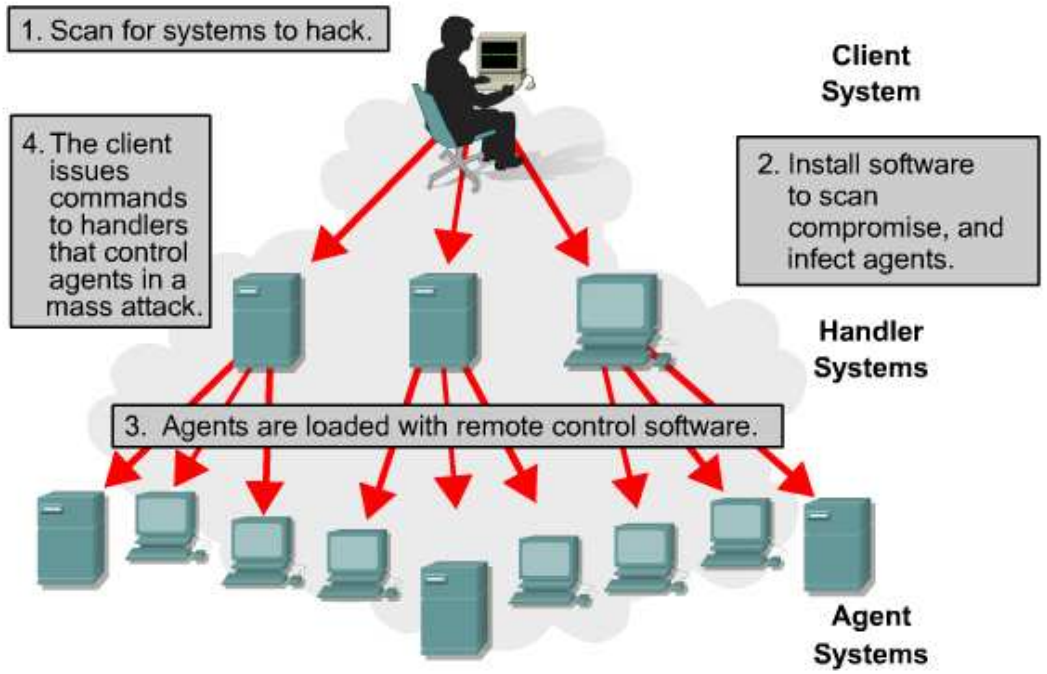
DDoS Attack Example



In a Distributed Denial of Service attack (DDoS) a hacker tricks other machines into flooding the target machine with nuisance traffic that robs system performance.

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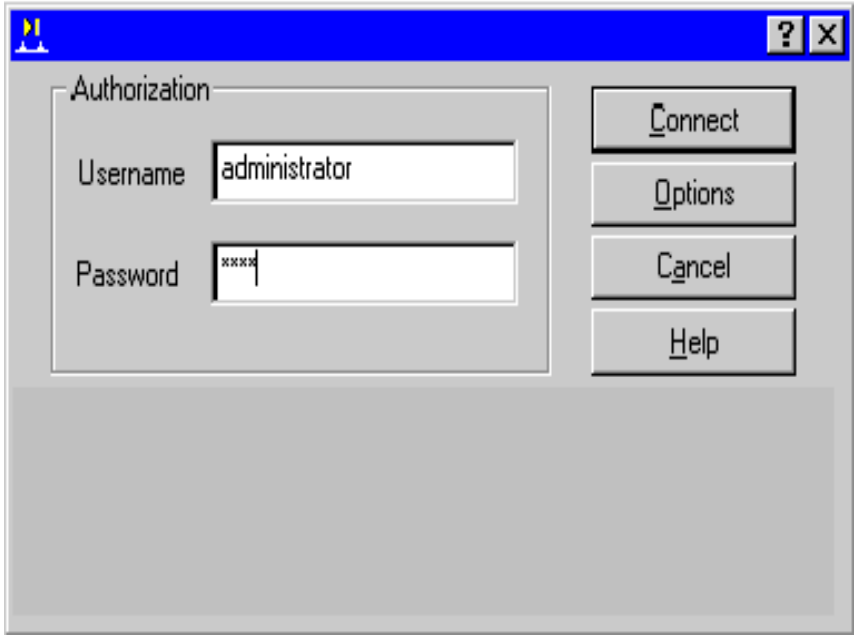
Password Attacks

- Hackers can implement password attacks using several different methods:
  - Brute-force attacks
  - Dictionary Attacks
  - Trojan horse programs
  - IP spoofing
  - Packet sniffers



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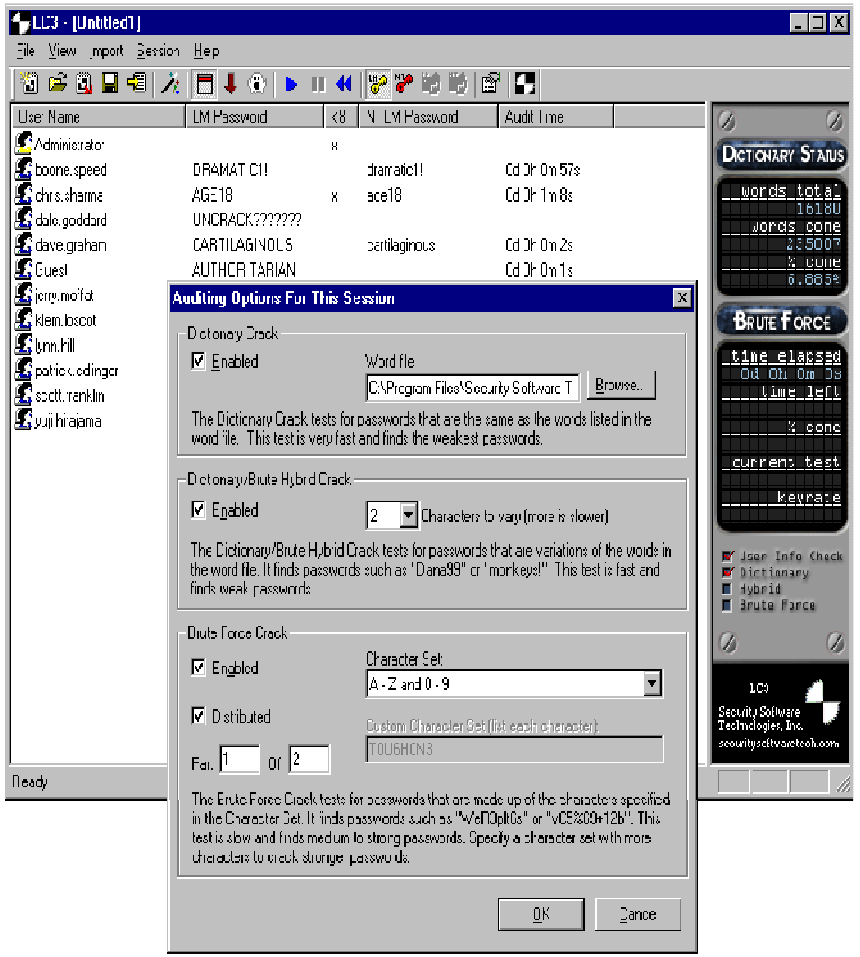
Password Attack Example

- L0phtCrack can take the hashes of passwords and generate the clear text passwords from them. Passwords are computed using two different methods:
  - Dictionary cracking
  - Brute force computation



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Password Attacks Mitigation

- The following are mitigation techniques:
  - Do not allow users to use the same password on multiple systems.
  - Disable accounts after a certain number of unsuccessful login attempts.
  - Do not use plain text passwords. OTP or a cryptographic password is recommended.
  - Use “strong” passwords. Strong passwords are at least eight characters long and contain uppercase letters, lowercase letters, numbers, and special characters.

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Virus and Trojan Horses

- Viruses refer to malicious software that are attached to another program to execute a particular unwanted function on a user's workstation. End-user workstations are the primary targets.
- A Trojan horse is different only in that the entire application was written to look like something else, when in fact it is an attack tool. A Trojan horse is mitigated by antivirus software at the user level and possibly the network level.

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Vulnerabilities Exist at all OSI Layers

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Auto Secure

To secure the management and forwarding planes of the router, use the auto secure command in privileged EXEC mode.

```
auto secure [management | forwarding]
  [no-interact]
```

Syntax Description

- `management` (Optional) Only the management plane will be secured.
- `forwarding` (Optional) Only the forwarding plane will be secured.
- `no-interact` (Optional) The user will not be prompted for any interactive configurations. If this keyword is not enabled, the command will show the user the noninteractive configuration and the interactive configurations thereafter.

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