AN TOÀN HỆ ĐIỀU HÀNH
(Operating System Security)

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MỤC TIÊU CỦA MÔN HỌC

Kiến thức:

-Giải thích được các yếu tố cần đảm bảo để một hệ điều hành là an toàn

-Phân tích được các nguy cơ và lỗ hổng tiềm tàng đối với an toàn hệ điều hành

-Nắm vững các giải pháp an toàn cho hệ điều hành

Kỹ năng:

-Thực hiện được các tấn công khai thác lỗ hổng hệ điều hành

-Thực hiện được các giải pháp an toàn cho hệ điều hành

KẾ HOẠCH

- Số tín chỉ : 2 (30 tiết)
- Lý thuyết: 20 tiết (5 buổi)
- Thực hành: 10 tiết (3 buổi)
- Kiểm tra đánh giá:
  - Chuyên cần: 10%
  - Thực hành: 40%
  - Lý thuyết (cuối kỳ): tự luận, 50%

Tài liệu tham khảo

[1] Bài giảng (slides)

[2] Trent Jaeger, Operating System Security, The Pennsylvania State University, 2008

[3] Peter Szor, The Art of Computer Virus Research And Defense, Addison Wesley Professional, 2005

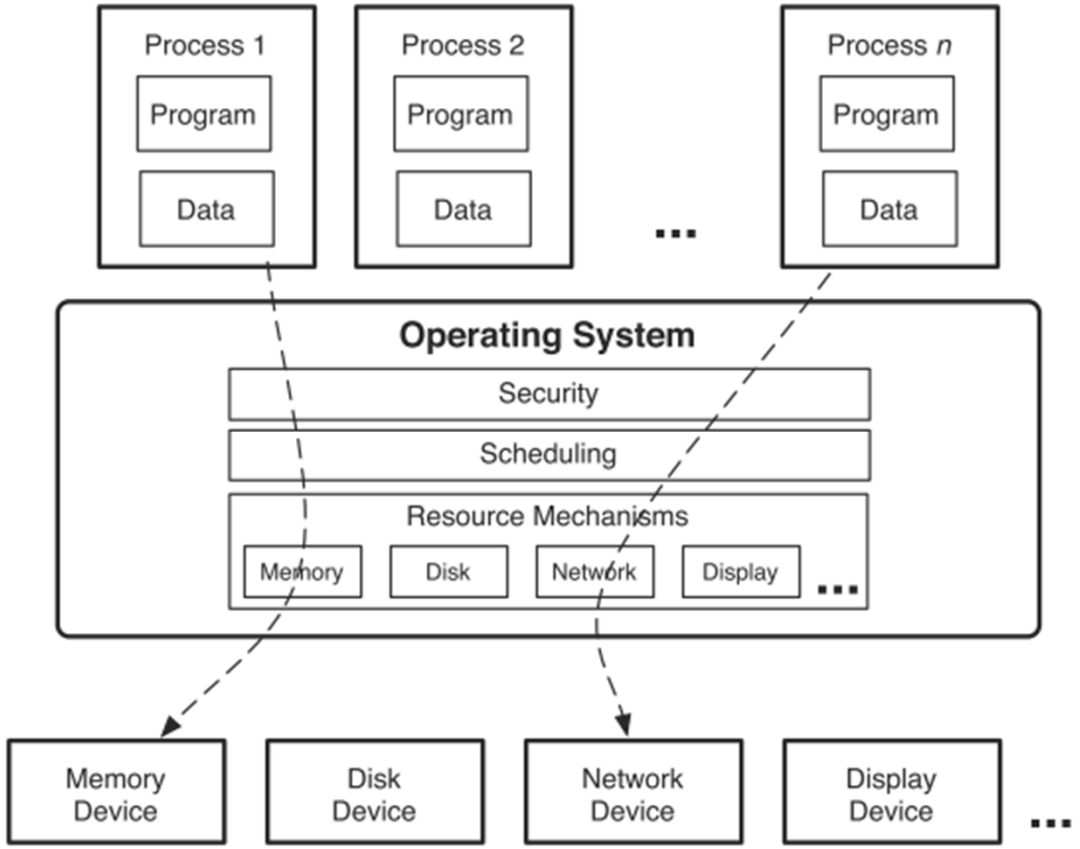
[4]Ric Vieler ,Professional Rootkits,Wrox Press 2007

[5]Chris Anley,John Heasman,Gerardo Richarte, The Shellcoder's Handbook: Discovering and Exploiting Security Holes,Second Edition, Wiley Publishing, 2007

Introduction of Operating System Security

Functions of Operating Systems

- Provides access to the various hardware resources (e.g., CPU,memory, and devices)
- An operating system runs security, scheduling, and resource mechanisms to provide processes with access to the resources



Security

- Ensuring the security of all processes run on the system
- For example, a file system must not allow a process request to access one file to overwrite the disk space allocated to another file.
- Also, file systems must ensure that one write operation is not impacted by the data being read or written in another operation.
- Scheduling mechanisms must ensure availability of resources to processes to prevent denial of service attacks.
- OS Attacks: The misuse of OS's mechanisms to maliciously impact the execution of another process

SECURITY GOALS

- The system implements accesses to system resources that satisfy the following: **secrecy, integrity, and availability**
- A system access is traditionally stated in terms of which subjects (e.g., processes and users) can perform which operations (e.g., read and write) on which objects (e.g., files and sockets).
- Secrecy requirements limit the objects that individual subjects can read because objects may contain secrets that not all subjects are permitted to know.
- Integrity requirements limit the objects that subjects can write because objects may contain information that other subjects depend on for their correct operation. Some subjects may not be trusted to modify those objects.
- Availability requirements limit the system resources (e.g., storage and CPU) that subjects may consume because they may exhaust these resources.

Threats of Security Goals

- Vulnerabilities of OS's mechanisms
- Vulnerabilities of Hardware's mechanisms
- OS security in association with Computer security