

Stevens Institute of Technology Security Systems Engineering

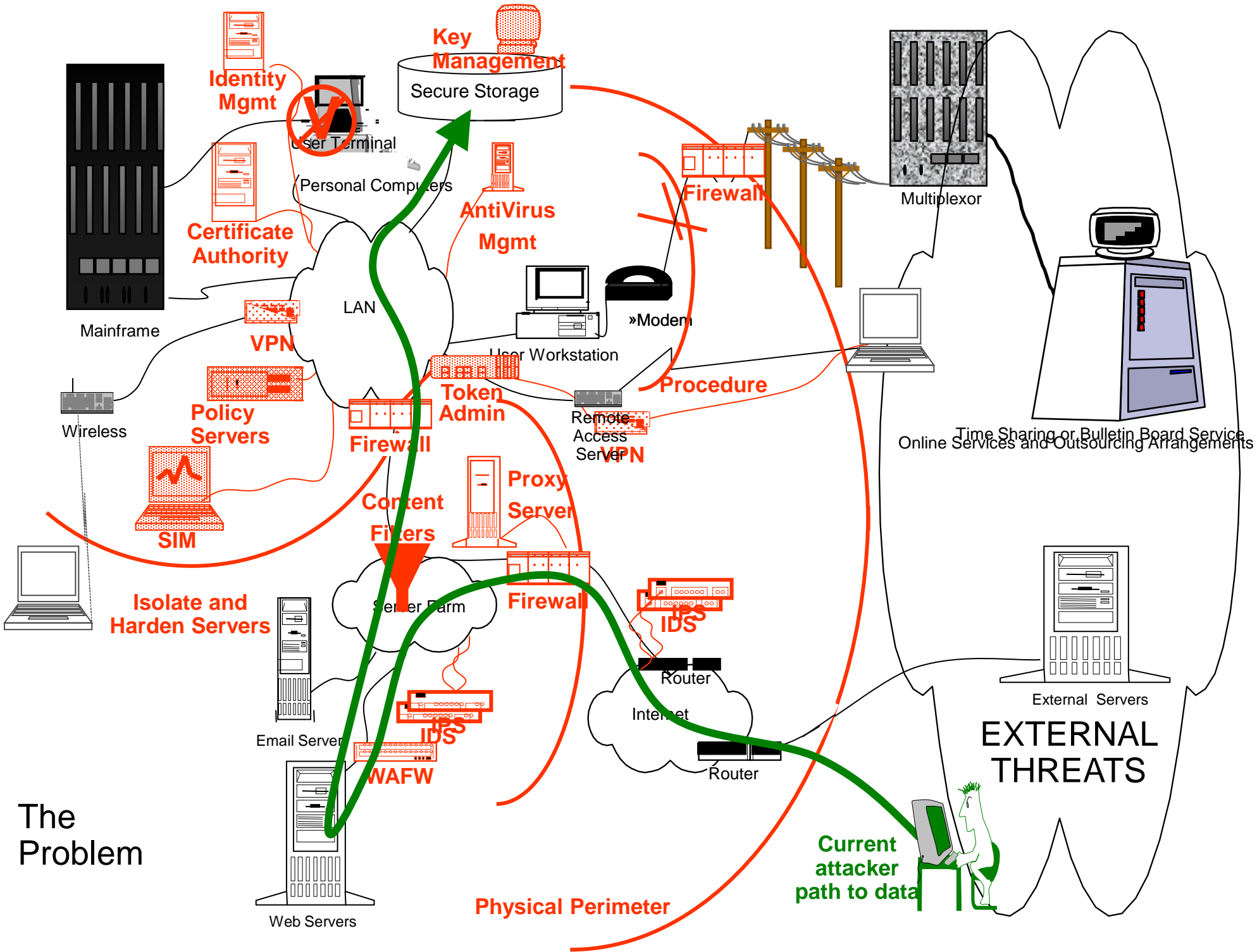
STEVENS
Institute of Technology

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Stevens Institute Security Research

- National Center for Secure and Resilient Maritime Commerce
- Naval Security Infrastructure Technology Laboratory
- Center for the Advancement of Secure Systems and Information Assurance
 - National Cybersecurity Center of Excellence in Information Assurance Education
 - National Cybersecurity Center of Excellence in Information Assurance Research
- Leader of the DoD University Affiliated Research Center for Systems Engineering Systems Security Core Research Topic

Why new focus on Systems Engineering Security?



The Problem

EXTERNAL THREATS

Current attacker path to data

Physical Perimeter

Identity Mgmt

Key Management
Secure Storage

Certificate Authority

AntiVirus Mgmt

Firewall

LAN

VPN

Token Admin

Procedure

Policy Servers

Firewall

Proxy Server

Content Filters

Firewall

Isolate and Harden Servers

Server Farm

IDS

Email Server

IDS

WAF

Web Servers

Internet

Router

Multiplexor

Time Sharing or Bulletin Board Service
Online Services and Outsourcing Arrangements

External Servers



SYSTEMS ENGINEERING
Research Center

SERC Security Engineering Research Roadmap

- 1. Define systems security**
- 2. Measure systems security**
- 3. Devise system security frameworks**
- 4. Improve the proficiency of the security engineering workforce**



SYSTEMS ENGINEERING
Research Center
Security Roadmap

1. Define systems security

- **Reassess periphery models**
- **Focus on whole systems**
- **Examine interfaces and interactions**
- **Understand similarities and differences across domains**



2. Measure systems security

- **Achievable and comparable security attributes**
- **Outcome-based rather than vulnerability-based**
- **Identify systemic value of currently available control standards**
- **Identify and measure trade-offs with respect to security features**



3. Devise systems security frameworks

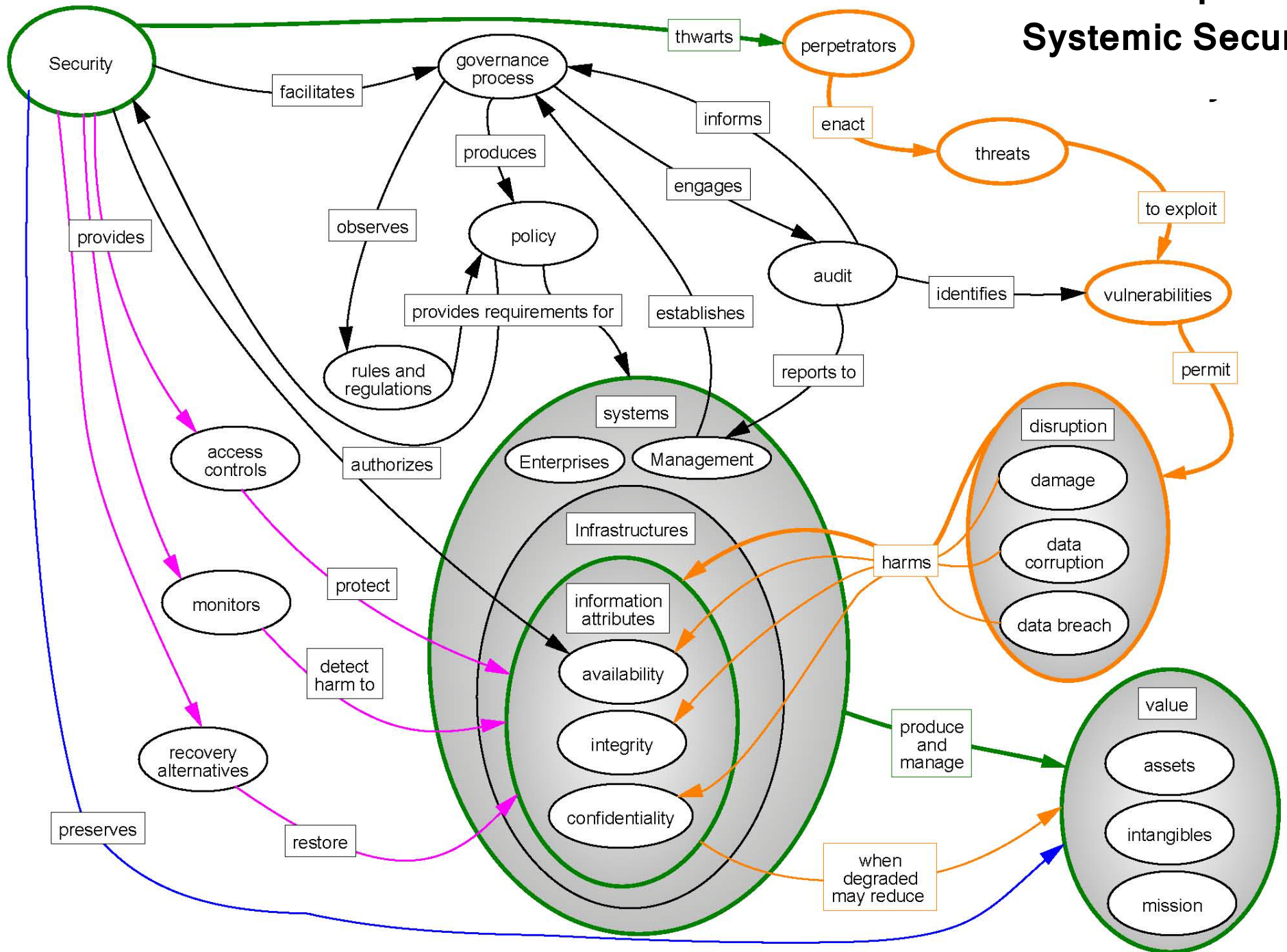
- **Include policy, process and technology**
- **Provide basis for evaluation**
- **New classes of system-level solutions**
- **Security-receptive architectures**



4. Improve the proficiency of the security engineering workforce

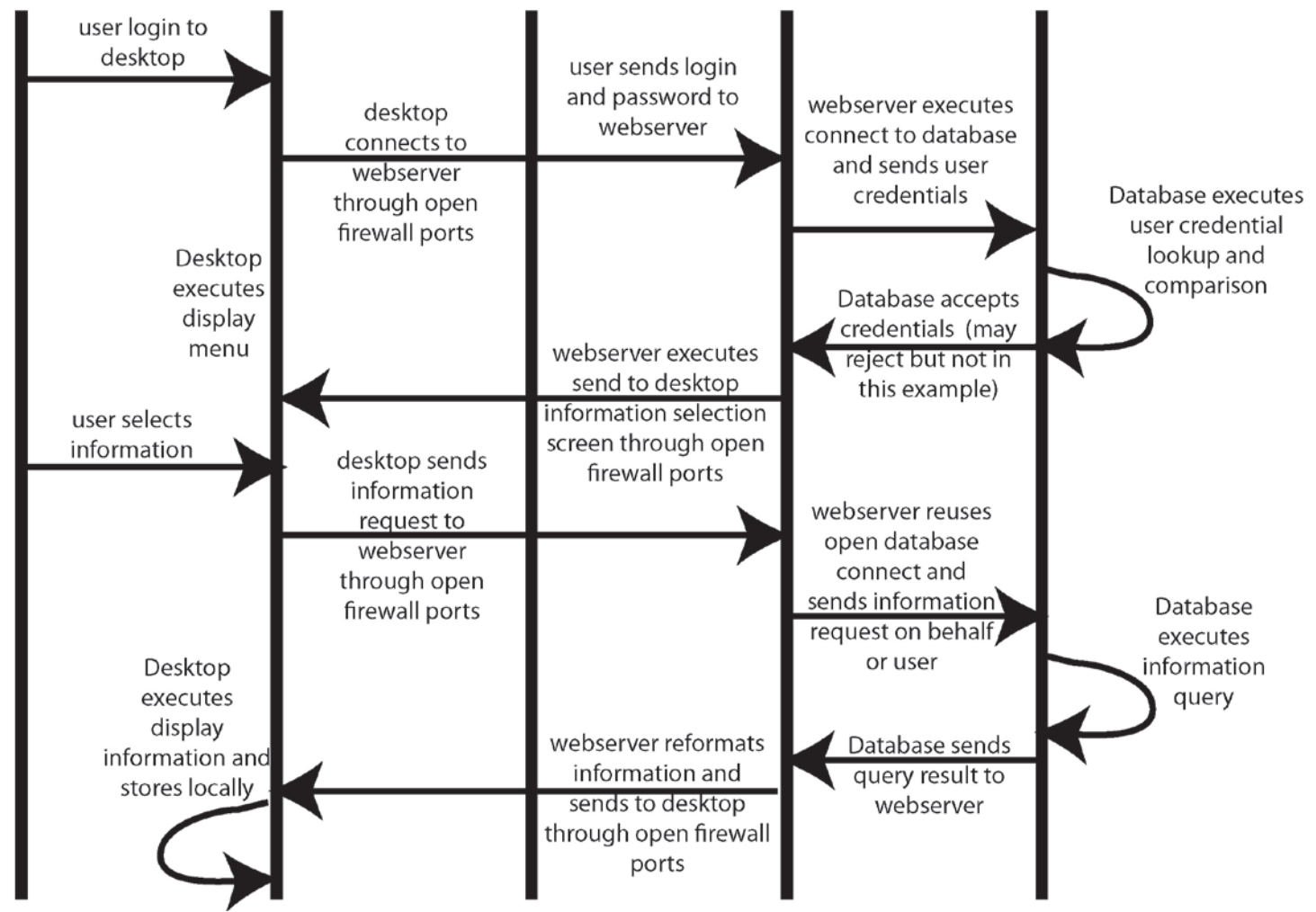
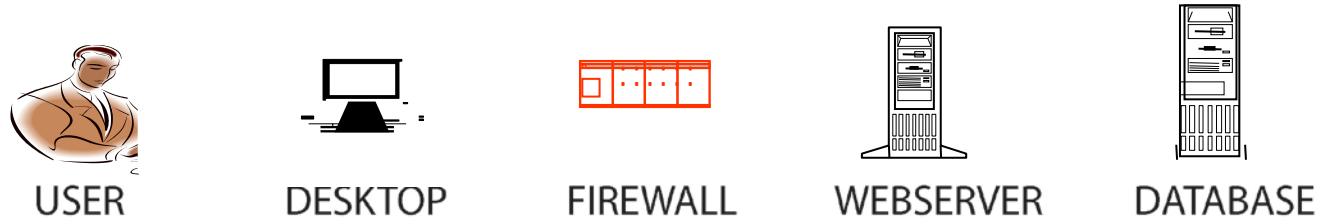
- **Encourage and educate workforce**
- **Operational security requirements**
- **Community force multipliers**
- **Engage stakeholders**

Example: Systemic Security

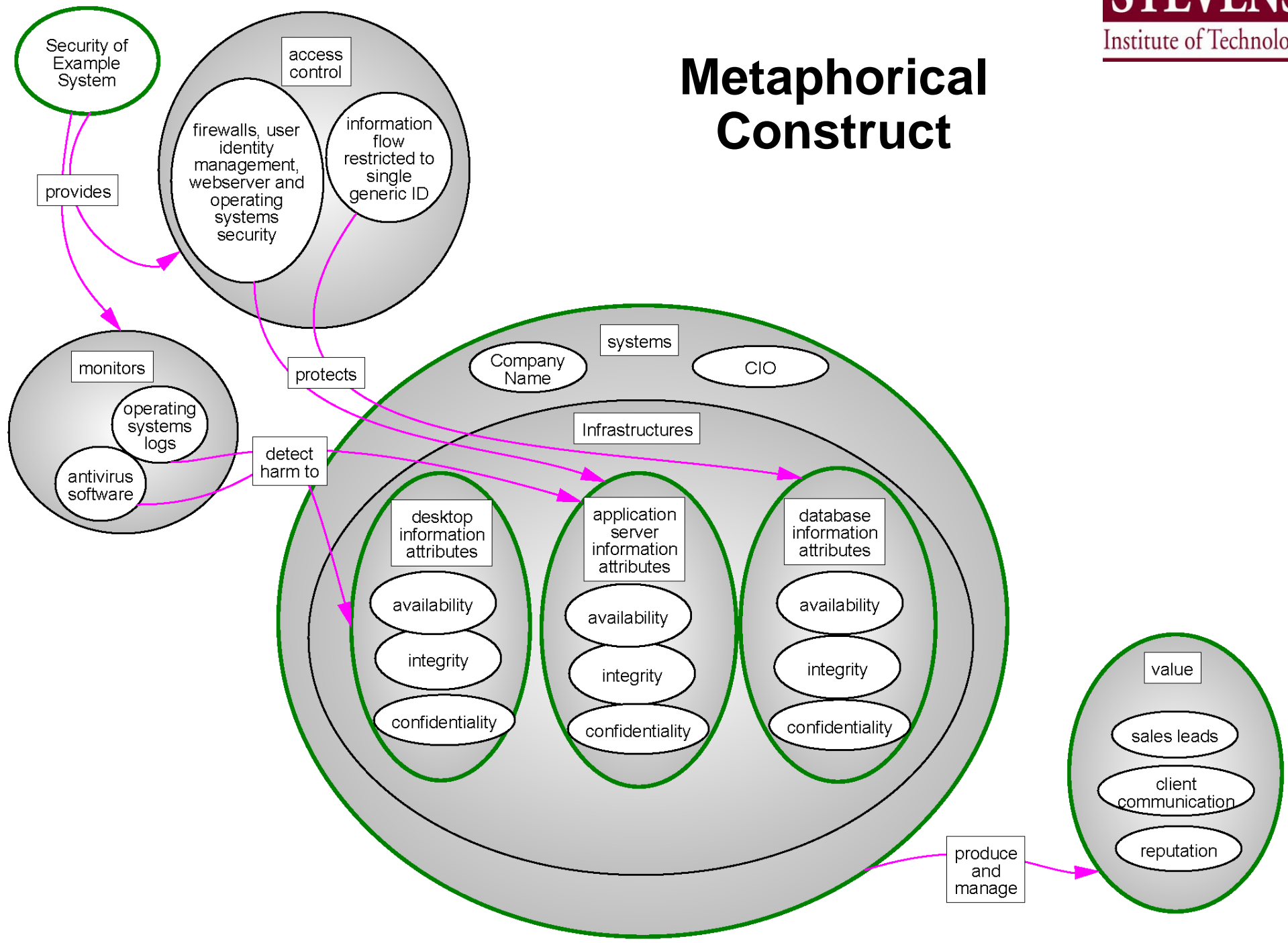


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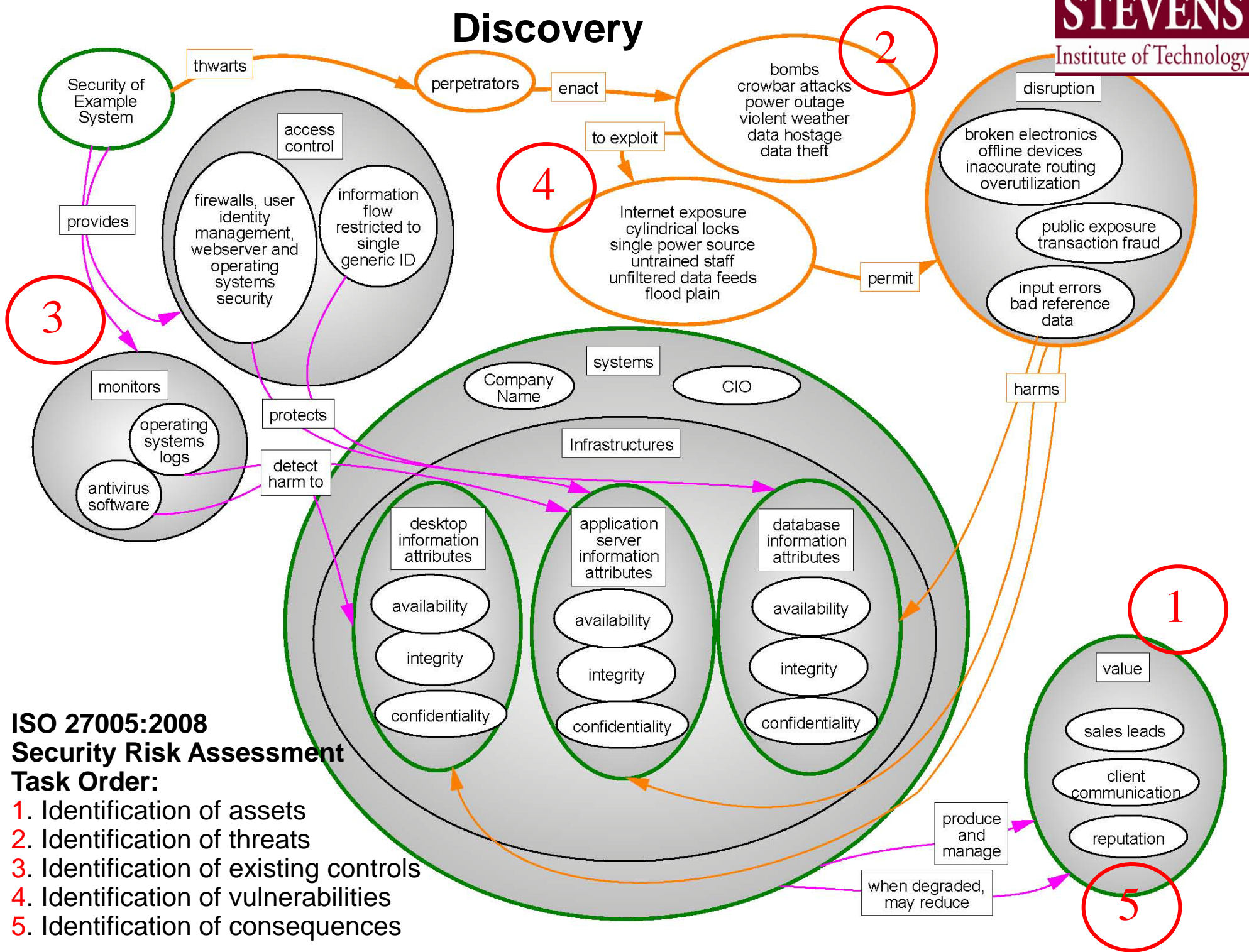
Example System



Metaphorical Construct



Discovery



ISO 27005:2008 Security Risk Assessment Task Order:

1. Identification of assets
2. Identification of threats
3. Identification of existing controls
4. Identification of vulnerabilities
5. Identification of consequences

An aerial photograph of the Stevens Institute of Technology campus in Hoboken, New Jersey. The campus is lush with green trees and features several large, multi-story brick buildings. A prominent tall, grey cylindrical tower stands on the left side of the campus. To the right, there is a large green sports field with a baseball diamond and a soccer field. In the background, the Hudson River flows, and the dense skyscrapers of the New York City skyline are visible across the water under a hazy sky.

Questions? Discussion?

***Follow-up:
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