The future belongs to those who believe in the beauty of their **dreams**

Eleanor Roosevelt

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- Senior system engineer at PACI (2012-present)

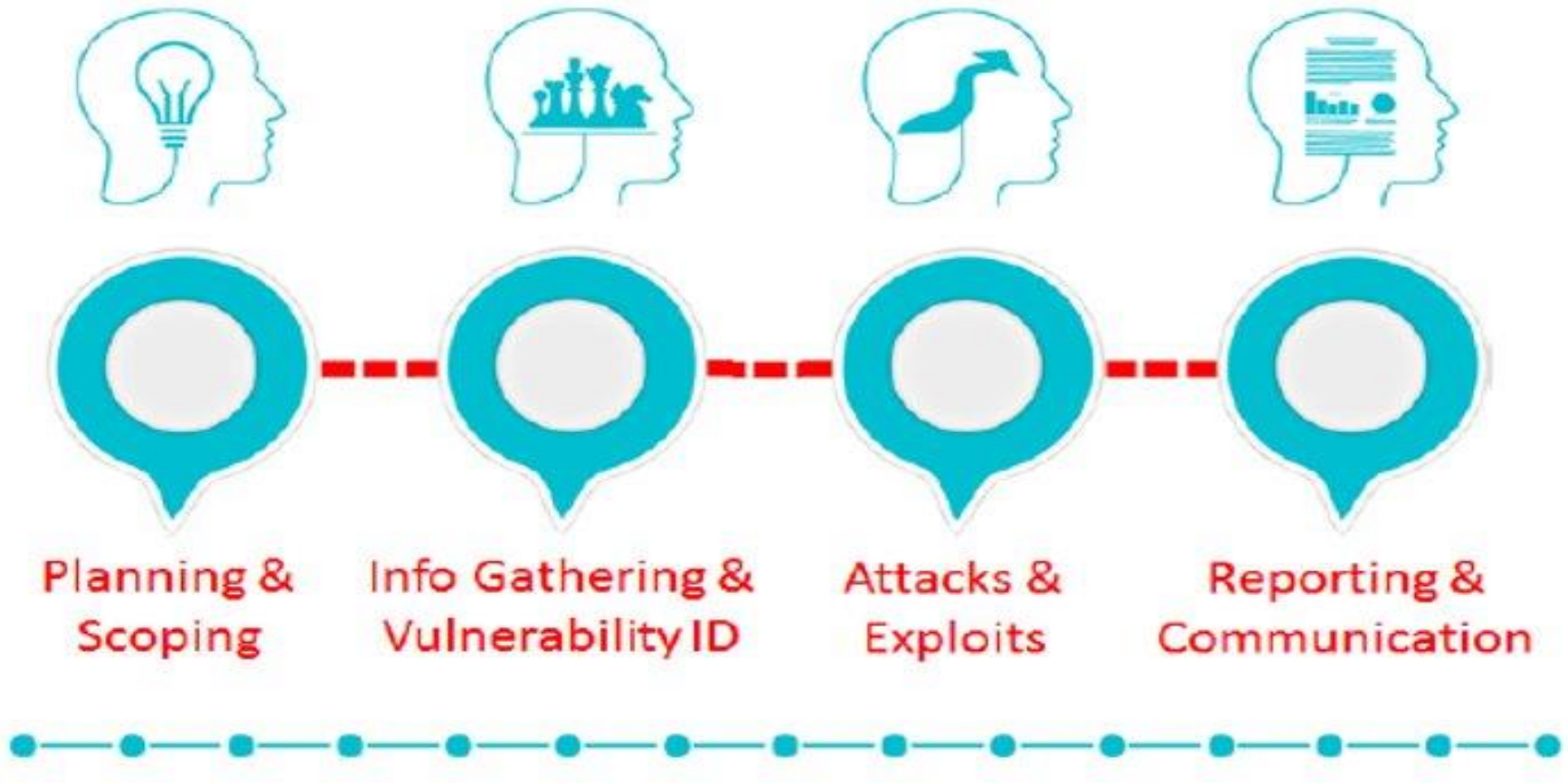
- Cybersecurity (sec+501)

- Linuxing, lifetime lover of animals, dreamer, Workaholic, Helper..#speaker #volunteer

Penetration testing

Penetration testing, also called pen testing or ethical hacking, is the practice of testing a computer system, network or web application to find security vulnerabilities that an attacker could exploit.

Pentest Methodology



Planning a Penetration Test

- **Rules of Engagement**

- Determining scope
- • Who has the authority to authorize testing? •What is the purpose of the test? •What is the proposed timeframe for the testing? Are there any restrictions as to when the testing can be performed? •Does your customer understand the difference between a vulnerability assessment and a penetration test?

Testing Strategies

Target Selection

- Internal or External
- Physical
- Users
- SSIDs
- Applications

Information gathering and Vulnerability

- Conducting information gathering
- Performing vulnerability scanning
- Analyzing results of vulnerability scans

Vulnerability Scans

Scans of a host, system, or network to determine what vulnerabilities exist

- Credentialed scans
  - Scanner uses an authorized user or admin account
  - Closer to the system administrator's perspective
  - Finds more vulnerabilities
- Non-credentialed scans
  - Scanner doesn't have a user or admin account
  - Closer to the hacker's perspective

Analyzing results of vulnerability scans

Asset Categorization	Adjudication	Prioritize the Vulnerabilities
Categorize by Operating System or function. Domain Controllers, Web Servers, Databases, etc. ▪ Categorize by most vulnerabilities ▪ Categorize by the most critical vulnerability	Must consider which vulnerabilities to attack False positives	Consider the most critical vulnerabilities first What target should we focus on first?

Attacks and Exploits

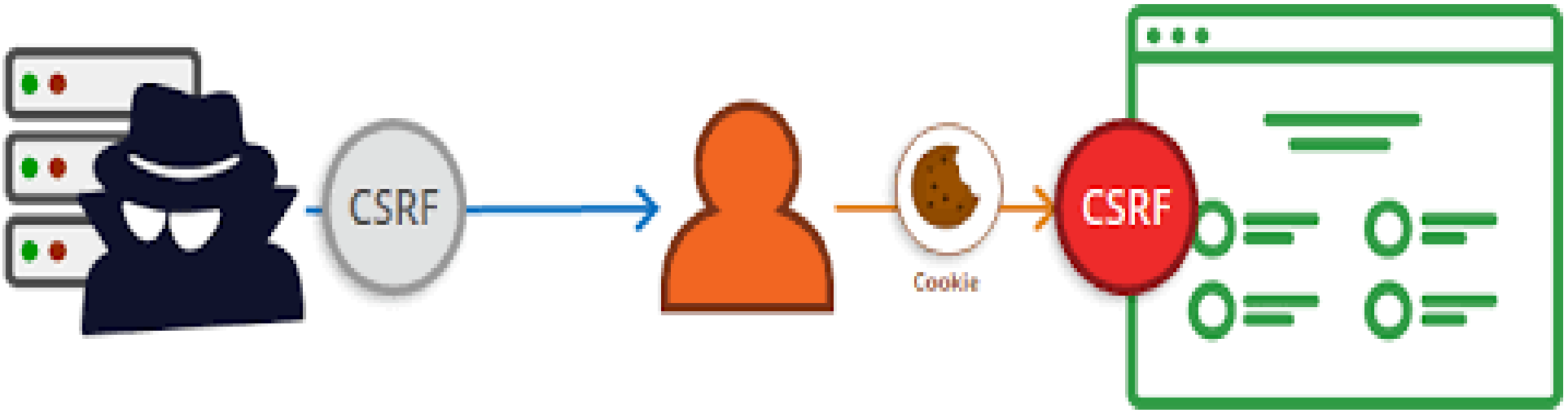
Application-based Vulnerabilities

- Cross-site scripting (XSS)
- Clickjacking
- Security misconfiguration (Directory traversal)

- Unsecure coding practices(Unauthorized use of function/unprotected API)

  Designers should implement function-level access control

Cross-Site Request Forgery



Injection Attacks

- Insertion of additional information or code via a data input from a client to the application
- Most commonly done as SQL inject, but can also be HTML, Command, or Code
- Prevent this through input validation and using least privilege for the databases

Authentication

*Session hijacking

Attacks the web session control mechanism by taking over a session by guessing session token

*Redirect

*Default credentials

Reporting and Communication

Communication Paths

Reasons

- Situational Awareness

  A shared common understanding of the network and its current security state

- De-confliction

  Determining if detected activity is a hacker or an authorized penetration tester

Triggers

- Stages

Communication often occurs as the assessment moves from one phase to another

IOC

- Indicators of Compromise (IOC) are the evidence that a cyber-attack has taken place.
- IOC give valuable information about what has happened but can also be used to prepare for the future and prevent against similar attacks.
- Critical findings

Report writing and handling best practices

- Normalization of Data
- Written Report of Findings
- How Long Do I Keep the Report?

Mitigation Strategies

Report should contain a list of not just findings, but recommendations on how to mitigate a vulnerability

- Technology
  - o Add a multifactor authentication system

- People
  - o Employee cybersecurity training
  - o Hire qualified and certified IT professionals

Post-Report Activities

- Post-Engagement Cleanup → Remove shells, tools, and credentials created
- Client Acceptance → Does the client agree you have fulfilled the scope of work?
- Follow-up Actions or Retests → Will a retest be conducted after 30 or 90 days?

Lessons learned

- If both positive and negative experience occurred.
- How can it go better next time.
- What did you do great on!
- What could have gone better!

Thank you