

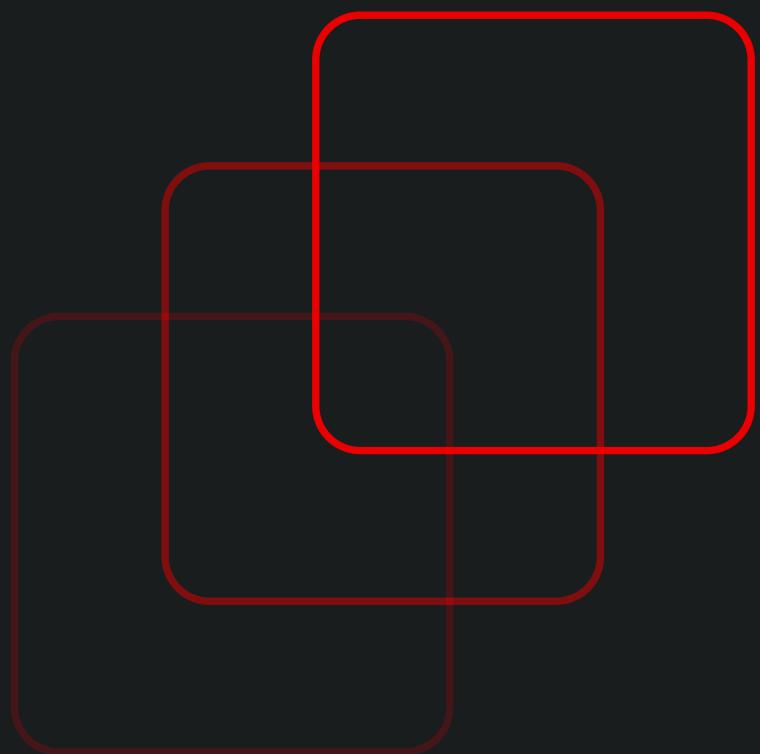
DE DANSKE  
ØYEBRÆMESTERSKABER

# Pentesting

An Introduction

Shreyas Srinivasa, Ph.D.

PostDoc Researcher, AAU Copenhagen



March 02.24

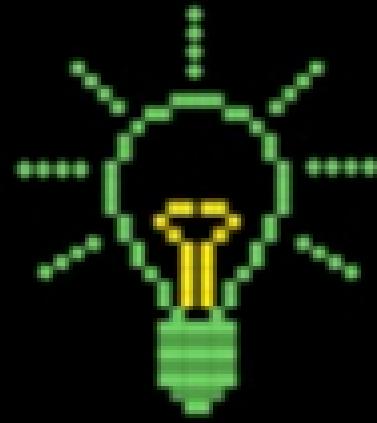




DE DANSKE  
CYCLISTERSKABER

# DDC 2024

ONLINE  
TRÆNINGSDAGE



FEBRUAR-MARTS

ONLINE  
KVALIFIKATION



24. FEB. - 17. MARTS

REGIONALE  
MESTERSKABER



13. APRIL

DE DANSKE  
CYBERMESTERSKABER

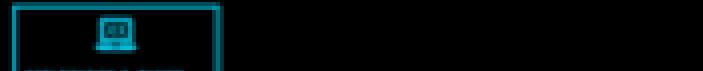
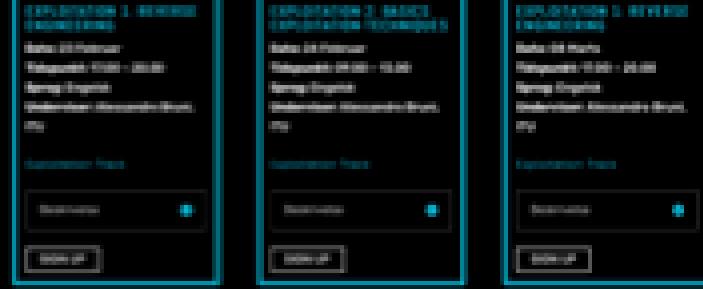


4. MAJ

# Online træninger (februar – marts)

Online træninger er for ALLE.

## Beginner Track



## Exploitation Track



## Crypto Track



## Pentest Track



# Online kvalifikation ( 24. feb. – 17. marts)

Alle kan være med til online kvalifikation, men kun 15-25 årige kan gå videre efterfølgende.

## JUNIOR (15-20 ÅR)

*(din alder per 31.12.2024)*

### ONLINE KVALIFIKATION

\*KVAL SLUTTER D. 17. MARTS

ÅBNER D. 24. FEBRUAR

## SENIOR (21-25 ÅR)

*(din alder per 31.12.2024)*

### ONLINE KVALIFIKATION

\*KVAL SLUTTER D. 17. MARTS

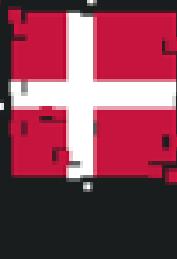
ÅBNER D. 24. FEBRUAR

## OPEN

*Åben for alle, der ikke hører til  
aldersgruppen 15-25 - Du deltager IKKE i  
konkurrencen i denne kategori*

\*KVAL SLUTTER D. 17. MARTS

ÅBNER D. 24. FEBRUAR



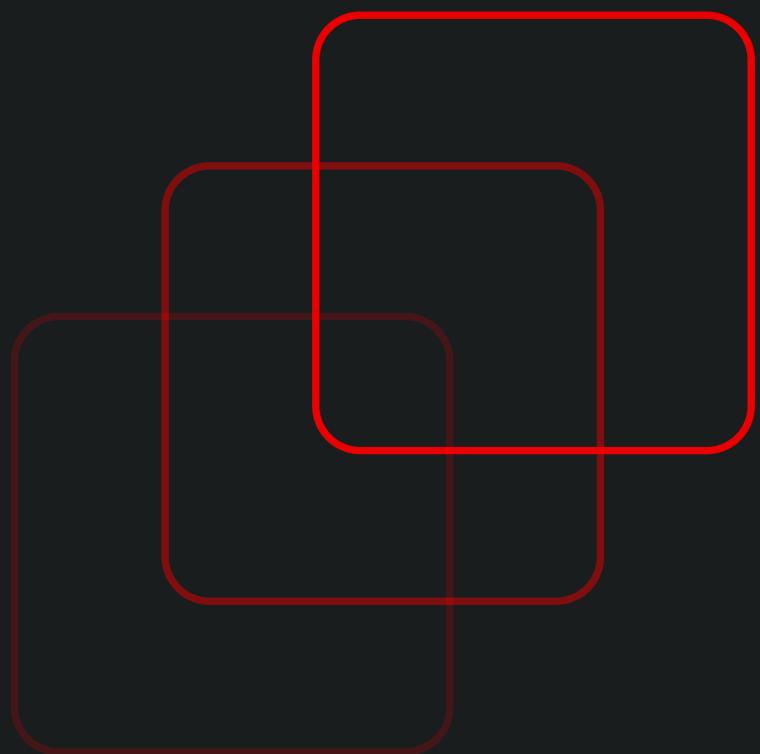
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March 02.24



# Agenda this evening ...

## 01 Introduction

- Pentesting, vs. Hacking, vs. Red Teaming
- Types
- Workflow

## 02 Tools & Techniques

- Recon & Enumeration (with NMap, Wappalyzer, Nikto)
- Exploitation (ExploitDB, Metasploit, BurpSuite)
- Reporting

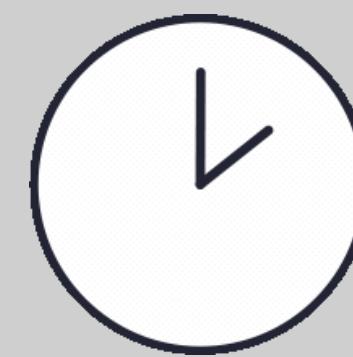
# Shreyas Srinivasa, Ph. D.



- 34 yrs, from **Bengaluru, India** 
- **Ph.D.** from **Aalborg University**
- Bachelors @ **VTU, India** and Masters @ **TU Darmstadt, Germany**
- Work: 2 yrs in NOC, 6 yrs in SOC
- Research interests: Cyber Threat Intelligence, Cyber Deception, Cyber crime , Internet Security Measurements, OSINT (GOSI)
- Visiting scholar @ **University of Cambridge**, Cambridge Cybercrime Center
- Community service: community worker @**TraceLabs** (finding leads on missing children using OSINT), **Cyberpeace** Institute (NGO)
- Mentor @ **Google Summer of Code** from 2020
- A humble **coffee farmer**



# Timeline



- **Introduction**  
Pentesting
- **Break - 20 minutes**  
Elaborate on what you want to discuss.
- **Techniques and Tools + Activity**  
Overview of tools and techniques
- **Haaukins Challenges**  
Playground

# Disclaimer

- This training is an introduction to pentesting and not **redteaming**
- **The training is based on the principle of “Ethical Hacking”**
- The aim is to understand preliminary concepts, techniques and tools
- **Please take consent before testing a real target (from the direct owner)**
- Have a legal binding before you perform PenTests
- **It is illegal to do Pentests without consent, and can be a punishable offense**

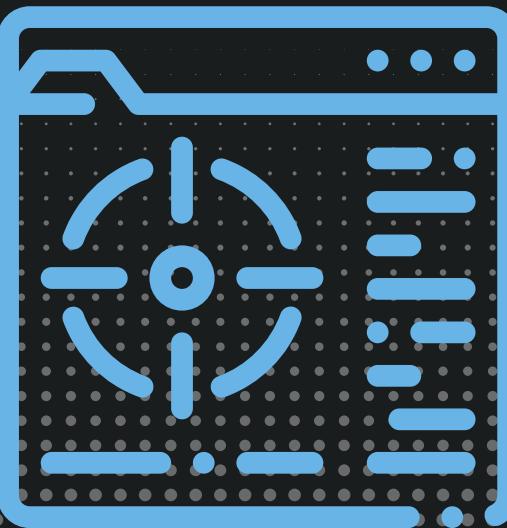


# Material for today

<https://github.com/sastry17/DDC-Pentest/blob/main/training.zip>



# PenTesting



# Pentesting

What is it?

“An **ethically agreed**, planned and **consented process**, to **test the security of a target system/service** from an **attacker perspective**”

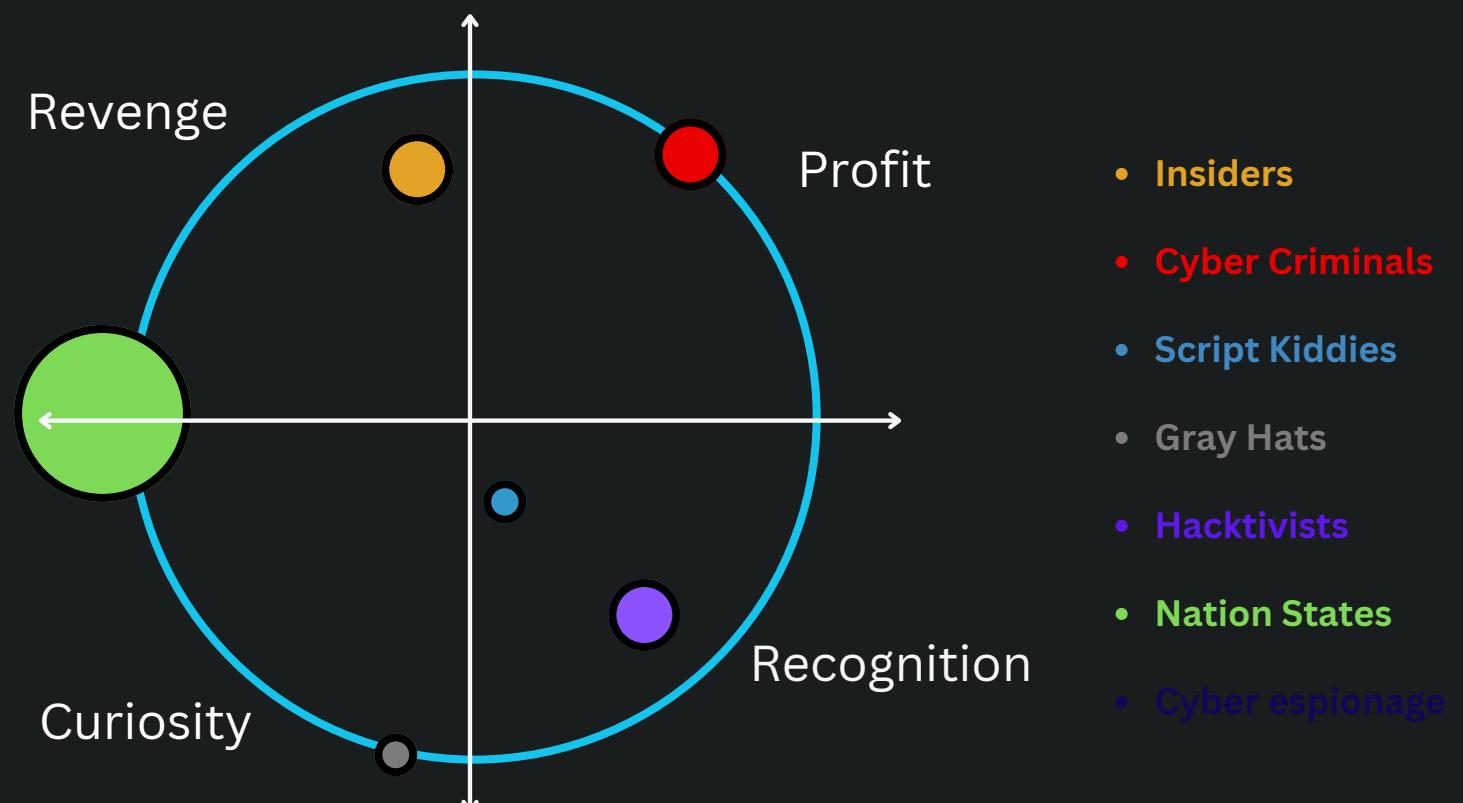
- Goals:
  - Identify the attack surface
  - Improve the security posture
  - Determine and reduce risk
  - Compliance

# Pentesting vs Hacking



## What it is not?

- Hacking in general perspective is an “**Unethical process**”
- Hacking does not take consent, and hence **there is always a “victim”**
- Hacking leads to “**Irresponsible Disclosure**”, “**Loss**” or “**Harm**”
- Hacking is motivated by **revenge, monetary profit, hactivism**



# PenTesting vs Red-Teaming



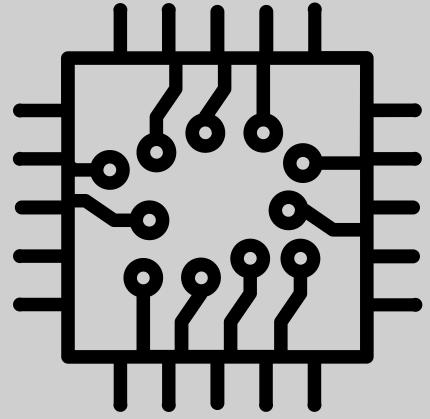
## A line of distinction

Aspect	PenTesting	Red-Teaming
Objective	Identify and exploit vulnerabilities with an agreed scope	Simulation of real-world attacks to test detection and response capabilities
Scope	Predefined targets and vulnerabilities within a limited timeframe.	Broader scope with multi-stage attacks and several attack vectors
Methodology	Systematic approach and structured process and techniques	Holistic approach that may involve technical attacks, social engineering and physical security assessments
Engagement	Conducted with consent with the target owner, organization/team is fully aware of system under test	Conducted as a secretive process, with the defensive team unaware of the process and timeline

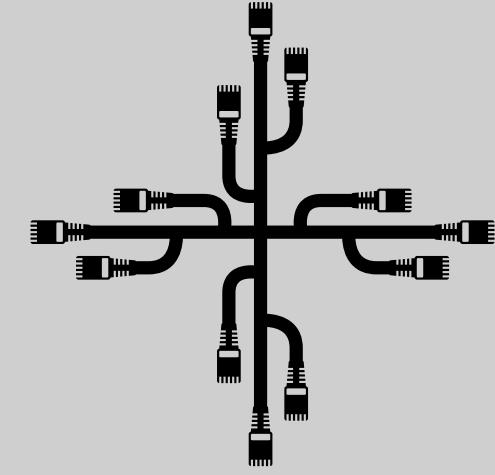
# PenTest - Types



Physical  
access test



Hardware



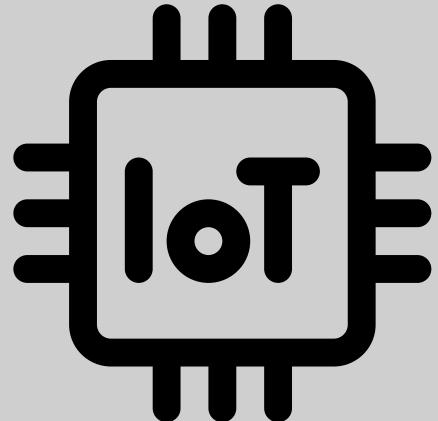
Network



Web



App



IoT

# PenTesting Workflow



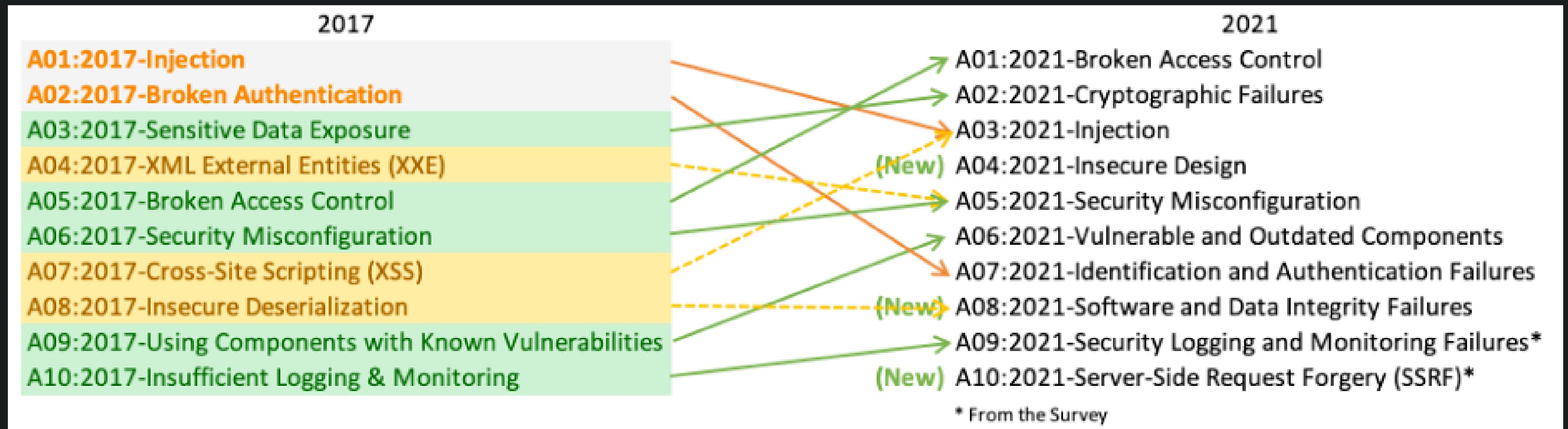
# PenTesting Workflow

src: <https://docs.rapid7.com/metasploit/>



# OWASP top 10 checks

- The OWASP Top 10 is a standard awareness document for developers and web application security.
- It represents a broad consensus about the most critical security risks to web applications



src: <https://owasp.org/www-project-top-ten/>

# OWASP Resources for Web Testing

## OWASP Web Penetration Testing Checklist (**19 Pages**)

[https://owasp.org/www-project-web-security-testing-guide/assets/archive/OWASP\\_Web\\_Application\\_Penetration\\_Checklist\\_v1\\_1.pdf](https://owasp.org/www-project-web-security-testing-guide/assets/archive/OWASP_Web_Application_Penetration_Checklist_v1_1.pdf)

## OWASP Web Security Testing Guide (**465 Pages**)

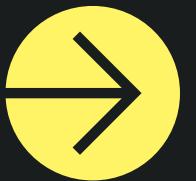
<https://github.com/OWASP/wstg/releases/download/v4.2/wstg-v4.2.pdf>

# Break? - (15min)



# Tools & Techniques

# Recon & Enumeration



- **Recon** - It is the “Information Gathering process”
  - Organizational Intelligence (OPSEC)
  - Metadata collection (DNS records, MX records, Social Engineering, Employee Listing, traceroutes, patents)
- **Enumeration** - Gather information about the target
  - network topology, service discovery, port-scanning
  - web-application enumeration - server software and versions, virtual hosts, folders and paths



# Recon & Enumeration - Tools



- Shodan and Censys - OPSec and Information gathering - open ports, services, “history”
- **ExploitDB/searchsploit, NVD** - Database of reported vulnerabilities(NVD) and exploits(ExploitDB)
- **whois, RIPEdb, mxtools** - domain and IP information gathering
- **NMap** - IP Enumeration, Port-scanning, Service Discovery, OS Fingerprinting
- **Wappalyzer** - website technologies JS, CSS, HTML. Works as a browser extension
- **Wfuzz, Recon-ng** - DNS enumeration
- **wafw00f** - WAF detection
- **dirbuster** - web paths and directories





# Hands On - Recon

1

- **Shodan & Censys**

- Open web browser, Go to shodan.io
- Search for “Telnet”
- Open another tab on the browser
- Go to <https://search.censys.io>
- Search for “cybermesterskaberne.dk” :)

2

- **ExploitDB**

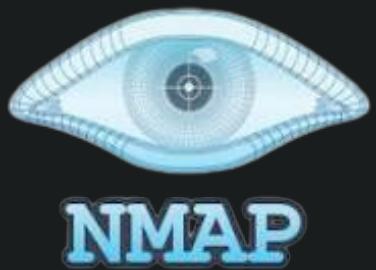
- Open web browser, Go to exploit-db.com
- Search for “samba 3.0.20” :)



# HandsOn - NMap

## NMap Activity:

- Launch NMap tool from your machines (Terminal -> nmap)
- type> **nmap scanme.nmap.org**
- Next, type> **nmap -sV scanme.nmap.org**
- Next, type> **nmap -v -O scanme.nmap.org**



```
(sastry17@hs24)-[~]
$ nmap scanme.nmap.org
Starting Nmap 7.94SVM ( https://nmap.org ) at 2024-02-29 06:43 EST
Nmap scan report for scanme.nmap.org (45.33.32.156)
Host is up (0.18s latency).
Other addresses for scanme.nmap.org (not scanned): 2600:3c01::f03c:91ff:fe18:bb2f
Not shown: 991 closed tcp ports (conn-refused)
PORT      STATE     SERVICE
19/tcp    filtered chargen
22/tcp    open      ssh
53/tcp    open      domain
80/tcp    open      http
135/tcp   filtered msrpc
139/tcp   filtered netbios-ssn
445/tcp   filtered microsoft-ds
9929/tcp  open      nping-echo
31337/tcp open      Elite

Nmap done: 1 IP address (1 host up) scanned in 14.15 seconds
```

# Activity.1 - 20 mins

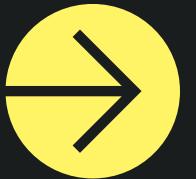
Open file “Activity1.pdf” from the zip file.



# Exploitation



# Exploitation



- **Exploitation** - Using the knowledge of vulnerabilities and systems to exploit them for gaining access
- The exploit is determined based on the vulnerabilities identified in the information gathering phase
- However, the exploit needs to be developed or customized (if already developed) and tested
- After exploitation: Gaining control of the system, Privilege Escalation, Pivoting and Gathering evidence
- Techniques - reverse shells, injection attacks
- Tools - **Metasploit Framework(MSF)**, Burp Suite, Zed Applocation Proxy



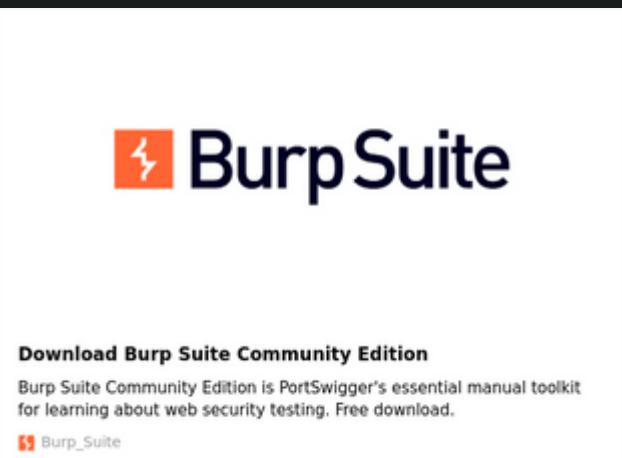
# Exploitation - Metasploit Framework

- MSF Framework : one of the most widely used tools for Pentesting
- Modules - Exploits, Payloads, Auxilliaries, Encoders
- Contains a collection of searchable exploits on diverse types of vulnerabilities
- Components - msfconsole, msfdb, msfvenom, meterpreter



# Exploitation - Burp Suite

- comprehensive web application security testing tool that includes a range of features for vulnerability scanning, manual testing, and exploitation
- offers a built-in web proxy, scanner, intruder, repeater, sequencer
- widely used by security professionals and penetration testers for assessing the security posture of web applications.



# Activity.2 - 30 mins

Open file “Activity2.pdf” from the zip file.

+ 15 mins break!



# Reporting



# Reporting

- Generating a report on the findings of the pentest
- Intended for both Management and Technical teams. However, a brief “Management Summary” is included on the overall assessment
- The report includes - how the issue was found, how it was exploited and the remedies

# Sample Reporting Structure

Based on: <https://owasp.org/www-project-web-security-testing-guide/v42/5-Reporting/README>

## 1. Introduction

### 1.1 Version Control

### 1.2 Contents

### 1.3 The Team

### 1.4 Scope

### 1.5 Limitations

### 1.6 Timeline

### 1.7 Disclaimer

## 2. Executive Summary

## 3. Introduction

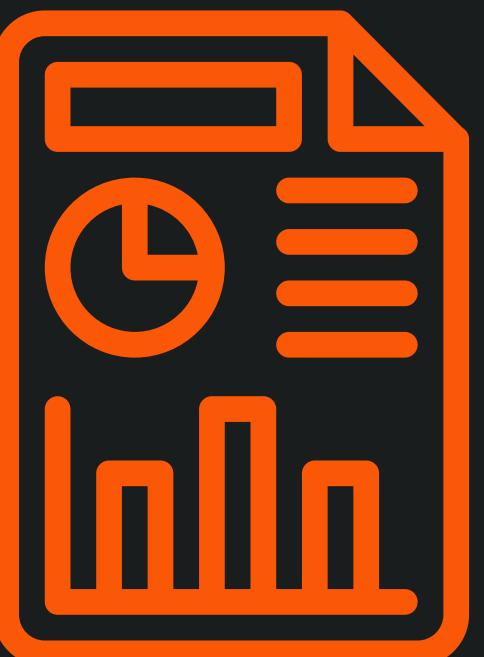
### 3.1 Findings Summary

### 3.2 Findings Details

### 3.3 Remediation

## 4. Appendices

Ref. ID	Title	Risk Level
1	User Authentication Bypass	High



# Questions?



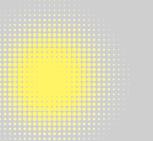
# Resources

 OWASP

 The HackTricks Book

 PayloadsAllTheThings

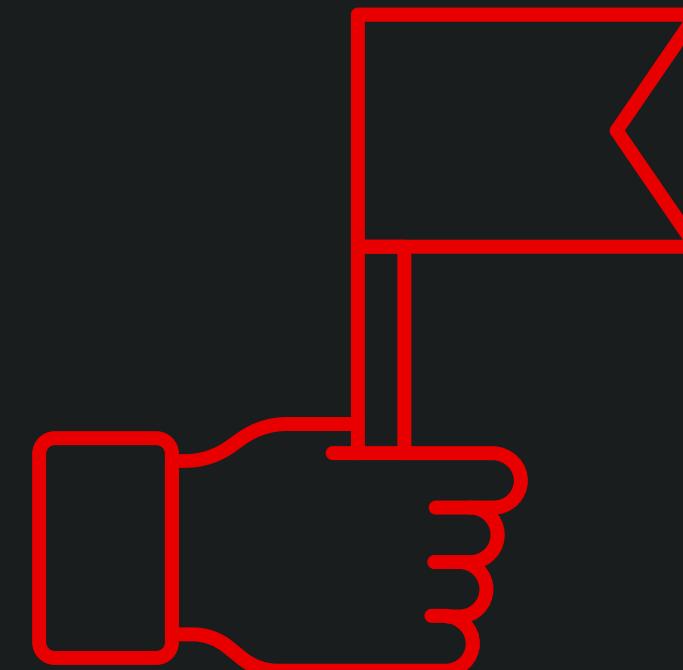
 Portswigger Academy ❤️

 HackTheBox Academy



For the rest of  
the evening . . .

Solve the other challenges at:  
<https://ddcpentest.cbs.haaukins.com/>





# DE DANSKE CYBERMESTERSKAER

WE WANT YOUR  
**FEEDBACK**



PENETRATION TESTING  
EVALUATION QR CODE

2. marts 2024

# Contact

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Thats all Folks