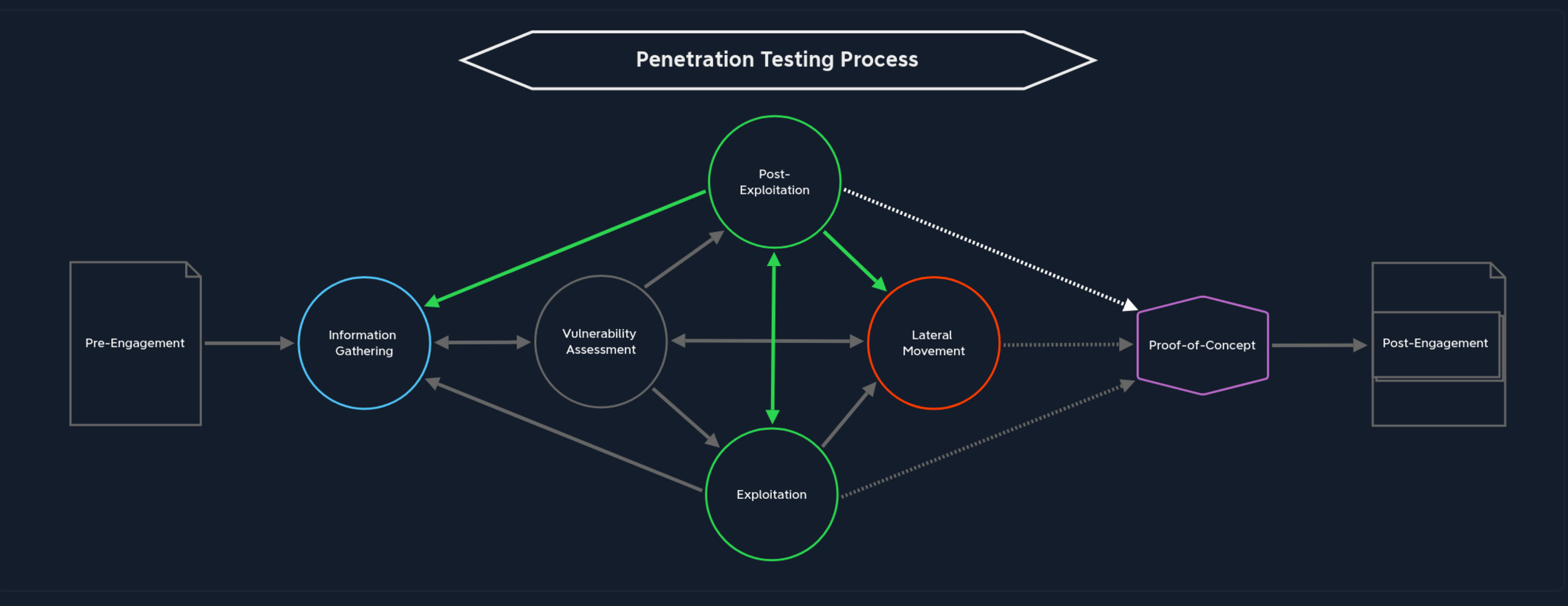
Post-Exploitation

Let's assume we successfully exploited the target system during the `Exploitation` stage. As with the Exploitation stage, we must again consider whether or not to utilize `Evasive Testing` in the `Post-Exploitation` stage. We are already on the system in the post-exploitation phase, making it much more difficult to avoid an alert. The `Post-Exploitation` stage aims to obtain sensitive and security-relevant information from a local perspective and business-relevant information that, in most cases, requires higher privileges than a standard user. This stage includes the following components:

Evasive Testing	Information Gathering
Pillaging	Vulnerability Assessment
Privilege Escalation	Persistence
Data Exfiltration	



Evasive Testing

If a skilled administrator monitors the systems, any change or even a single command could trigger an alarm that will give us away. In many cases, we get kicked out of the network, and then threat hunting begins where we are the focus. We may also lose access to a host (that gets quarantined) or a user account (that gets temporarily disabled or the password changed). This penetration test would have failed but succeeded in some ways because the client could detect some actions. We can provide value to the client in this situation by still writing up an entire attack chain and helping them identify gaps in their monitoring and processes where they did not notice our actions. For us, we can study how and why the client detected us and work on improving our evasion skills. Perhaps we did not thoroughly test a payload, or we got careless and ran a command such as `net user` or `whoami` that is often monitored by EDR systems and flagged as anomalous activity.

> ⓘ It can often help our clients if we run commands or tools that their defenses stop or detect. It shows them that their defenses are working on some attacks. Keep in mind that we are emulating an attacker, so it's not always entirely bad for some of the attacks to get noticed. Though when performing evasive testing, our goal should be to go mostly undetected so we can identify any "blind spots" our clients have in their network environments.

Evasive testing is divided into three different categories:

`Evasive`	`Hybrid Evasive`	`Non-Evasive`

This does not mean that we cannot use all three methods. Suppose our client wants to perform an intrusive penetration test to get as much information as possible and the most in-depth testing results. In that case, we will perform `Non-Evasive` Testing, as the security measures around the network may limit and even stop us. However, this can also be combined with `Evasive` testing, using the same commands and methods for non-evasive testing. We can then see if the security measures can identify and respond to the actions performed. In `Hybrid-Evasive` testing, we can test specific components and security measures that have been defined in advance. This is common when the customer only wants to test specific departments or servers to see if they can withstand the attacks.

Information Gathering

Since we have gained a new perspective on the system and the network of our target system in the Exploitation stage, we are basically in a new environment. This means we first have to reacquaint ourselves with what we are working with and what options are available. Therefore, in the `Post-Exploitation` stage, we go through the `Information Gathering` and `Vulnerability Assessment` stages again, which we can consider as parts of the current stage. This is because the information we had up to this point was gathered from an external perspective, not an internal one.

From the inside (local) perspective, we have many more possibilities and alternatives to access certain information that is relevant to us. Therefore, the information gathering stage starts all over again from the local perspective. We search and gather as much information as we can. The difference here is that we also enumerate the local network and local services such as printers, database servers, virtualization services, etc. Often we will find shares intended for employees to use to exchange and share data and files. The investigation of these services and network components is called `Pillaging`.

Pillaging

Pillaging is the stage where we examine the role of the host in the corporate network. We analyze the network configurations, including but not limited to:

Interfaces	Routing	DNS
ARP	Services	VPN
IP Subnets	Shares	Network Traffic

`Understanding the role of the system` we are on also gives us an excellent understanding of how it communicates with other network devices and its purpose. From this, we can find out, for example, what alternative subdomains exist, whether it has multiple network interfaces, whether there are other hosts with which this system communicates, if admins are connecting to other hosts from it, and if we can potentially reuse credentials or steal an SSH key to further our access or establish persistence, etc. This helps, above all, to get an overview of the network's structure.

For example, we can use the policies installed on this system to determine what other hosts are using on the network. Because administrators often use particular schemas to secure their network and prevent users from changing anything on it. For example, suppose we discover that the password policy requires only eight characters but no special characters. In that case, we can conclude that we have a relatively high probability of guessing other users' passwords on this and other systems.

During the pillaging stage, we will also hunt for sensitive data such as passwords on shares, local machines, in scripts, configuration files, password vaults, documents (Excel, Word, .txt files, etc.), and even email.

Our main goals with pillaging are to show the impact of successful exploitation and, if we have not yet reached the goal of the assessment, to find additional data such as passwords that can be inputs to other stages such as lateral movement.

Persistence

Once we have an overview of the system, our immediate next step is maintaining access to the exploited host. This way, if the connection is interrupted, we can still access it. This step is essential and often used as the first step before the `Information Gathering` and `Pillaging` stages.

We should follow non-standardized sequences because each system is individually configured by a unique administrator who brings their own preferences and knowledge. It is recommended that we `work flexibly` during this phase `and adapt` to the circumstances. For example, suppose we have used a buffer overflow attack on a service that is likely to crash it. In that case, we should establish persistence to the system as soon as possible to avoid having to attack the service multiple times and potentially causing a disruption. Often if we lose the connection, we will not be able to access the system in the same way.

Vulnerability Assessment

If we can maintain access and have a good overview of the system, we can use the information about the system and its services and any other data stored on it to repeat the `Vulnerability Assessment` stage, but this time from inside the system. We analyze the information and prioritize it accordingly. The goal we pursue next is the escalation of privileges (if not already in place).

Again, it is essential to distinguish between exploits that can harm the system and attacks against the services that do not cause any disruption. In doing so, we weigh the components we have already gone through in the first Vulnerability Assessment stage.

Privilege Escalation

Privilege escalation is significant, and in most cases, it represents a critical moment that can open many more new doors for us. Getting the highest possible privileges on the system or domain is often crucial. Therefore we want to get the privileges of the `root` (on `Linux-based` systems) or the domain `administrator`/`local administrator`/`SYSTEM` (on `Windows-based` systems) because this will often allow us to move through the entire network without any restrictions.

However, it is essential to remember that the escalation of privileges does not always have to occur locally on the system. We can also obtain stored credentials during the information gathering stage from other users who are members of a higher privileged group. Exploiting these privileges to log in as another user is also part of privilege escalation because we have escalated our privileges (quickly) using the new set of credentials.

Data Exfiltration

During the `Information Gathering` and `Pillaging` stage, we will often be able to find, among other things, considerable personal information and customer data. Some clients will want to check whether it is possible to exfiltrate these types of data. This means we try to transfer this information from the target system to our own. Security systems such as `Data Loss Prevention` (`DLP`) and `Endpoint Detection and Response` (`EDR`) help detect and prevent data exfiltration. In addition to `Network Monitoring`, many companies use encryption on hard drives to prevent external parties from viewing such information. Before exfiltrating any actual data, we should check with the customer and our manager. It can often be enough to create some bogus data (such as fake credit card numbers or social security numbers) and exfiltrate it to our system. That way, the protection mechanisms that look for patterns in data leaving the network will be tested, but we will not be responsible for any live sensitive data on our testing machine.

Companies must adhere to data security regulations depending on the type of data involved. These include, but are not limited to:

Type of Information	Security Regulation
Credit Card Account Information	`Payment Card Industry` (`PCI`)
Electronic Patient Health Information	`Health Insurance Portability and Accountability Act` (`HIPAA`)
Consumers Private Banking Information	`Gramm-Leach-Bliley` (`GLBA`)
Government Information	`Federal Information Security Management Act of 2002` (`FISMA`)

Some frameworks companies may follow include:

(`NIST`) - National Institute of Standards and Technology	(`CIS Controls`) - Center for Internet Security Controls
(`ISO`) - International Organization for Standardization	(`PCI-DSS`) - The Payment Card Industry Data Security Standard
(`GDPR`) - General Data Protection Regulation	(`COBIT`) - Control Objectives for Information and Related Technologies
(`FedRAMP`) - The Federal Risk and Authorization Management Program	(`ITAR`) - International Traffic in Arms Regulations
(`AICPA`) - American Institute of Certified Public Accountants	(`NERC CIP Standards`) - NERC Critical Infrastructure Protection Standards

It is worth familiarizing ourselves with each of these frameworks but what is crucial for us, however, is how we handle this information. For us, the type of data does not have much significance, but the required controls around it do, and as stated previously, we can simulate exfiltrating data from the network as a proof of concept that it is possible. We should check with the client to ensure that their systems are intended to catch the fake data type that we attempt to exfiltrate if we are successful, so we do not misrepresent anything in our report.

It's a good habit to run a screen recording (along with taking screenshots) as additional evidence for such vital steps. If we only have terminal access, we can display the hostname, IP address, user name, and the corresponding path to the customer file and take a screenshot or screen capture. This helps us prove where the data originated from and that we could remove it from the environment successfully.

If sensitive data like this is found, our client should, of course, be informed immediately. Based on the fact that we could escalate the privileges and exfiltrate personal data, they may want to pause, end, or shift the focus of the penetration test, especially if data exfiltration was the primary goal. However, this is at our client's discretion, and many will prefer that we keep testing to identify all possible weaknesses in their environment.

Next, we'll discuss lateral movement, a key stage in the penetration testing process that may use data from our post-exploitation as an input.

Questions

Answer the question(s) below to complete this Section and earn cubes!

+ 2 How many types of evasive testing are mentioned in this section?

Submit your answer here...

Submit

+ 2 What is the name of the security standard for credit card payments that a company must adhere to? (Answer Format: acronym)

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