Pennyworth Write-up

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Introduction

In the cyber security industry, there is a way to identify, define, and catalog publicly disclosed vulnerabilities.

That type of identification is called a CVE, which stands for Common Vulnerabilities and Exposures. Post-analysis, each vulnerability is assigned a severity rating, called a CVSS score, ranging from 0 to 10,where 0 is considered Informational, and 10 is Critical. These scores are dependent on several factors, some of which being the level of CIA Triad compromise (Confidentiality, Integrity, Availability), the level of attack complexity, the size of the attack surface, and others.

One of the most well-known and most feared vulnerability types to find on your system is called an Arbitrary Remote Command Execution vulnerability.

In this example, we will be exploring precisely this typology of attack vectors.

Enumeration

As always, we will be starting with an nmap scan. The -sC and -sV switches will be employed in order to force default script usage (albeit intrusive) and advanced version detection for services identified on any of the open ports. This will help us get a better overview of the target and understand its' purpose on the network.In computer security, arbitrary code execution (ACE) is an attacker's ability to execute arbitrary commands or code on a target machine or in a target process. [..] A program designed to exploit such a vulnerability is called an arbitrary code execution exploit.

The ability to trigger arbitrary code execution over a network (primarily via a wide-area network such as the Internet) is often called remote code execution (RCE).

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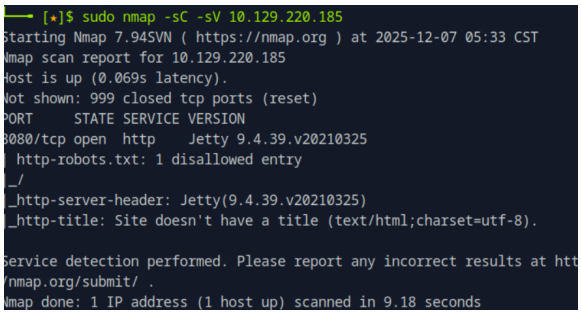
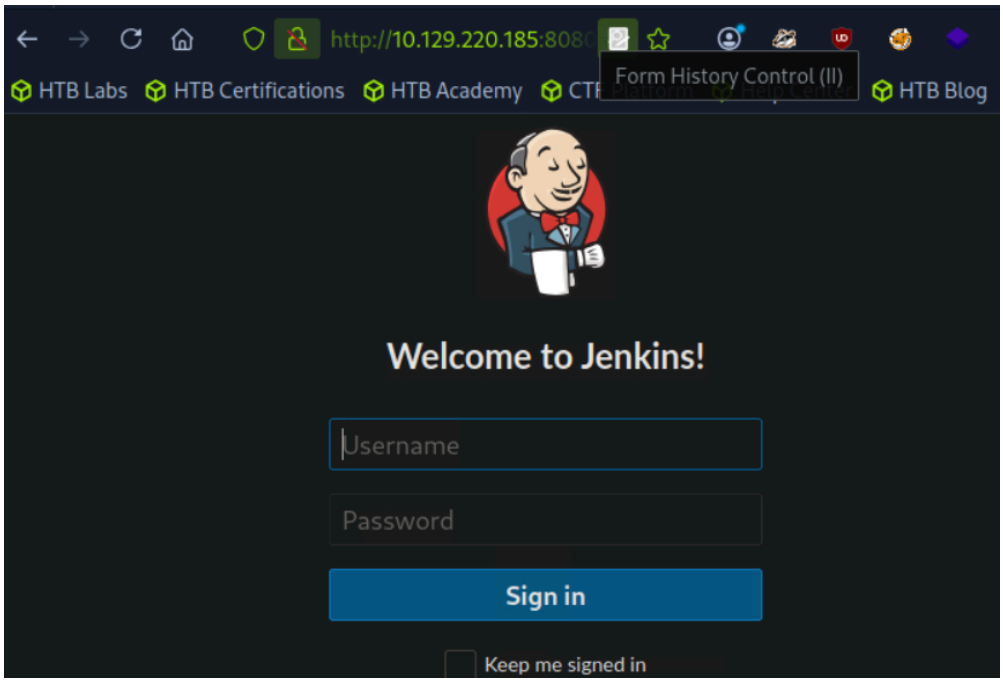


From the output of the scan, we find a singular result of interest. Jetty version 9.4.39.v20210325 is running on an open TCP port 8080. Like any other HTTP server, we will need to use our browser to explore this service easily. Navigating to the IP address of the target through our URL search bar will yield an error, as we will need to specify the port the service is running on. Looking back at the scan,

the service is not running on port 80, which is the one your browser would be expecting if you input the IP address of the target alone. However, if we specify the IP:PORT combination as shown below, we will meet the following result.



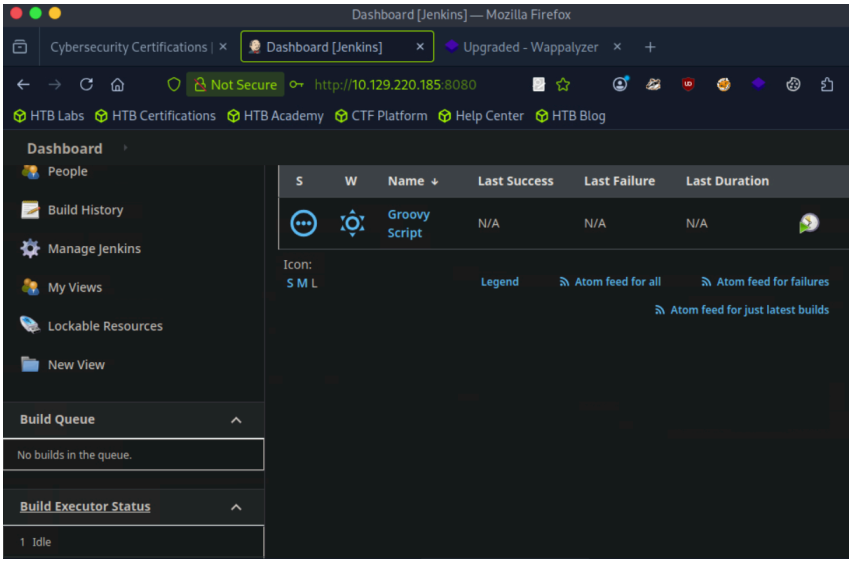
Jenkins is a free and open-source automation server. It helps automate the parts of software development related to building, testing, and deploying, facilitating continuous integration and delivery. It is a server-based system.

The HTTP server seems to be running a Jenkins service. A small summary of this service can be found in the snippet below. It will give us a general idea of the capabilities of such a service and how it might interact with the backend. Any interactions are essential, as they can serve as a gateway to gaining a foothold on the host running everything in the backend. If any of them is misconfigured, they could prove to be an easy path of exploitation for an attacker.
The potential approach we can explore against this login screen is to try logging in using commonly used weak credential pairs. This relies on the possibility that server administrators might have overlooked configuring the Jenkins service securely. Upon searching the web for common weak credential pairs, we get the following result:

admin:password
admin:admin
root:root
root:password
admin:admin1
admin:password1
root:password1

Fortunately, we were right. Attempting multiple combinations from the list above, we can successfully log in using the credential pair root:password and are presented with the administrative panel for the

Jenkins service. Now, it is time to look around.



Foothold

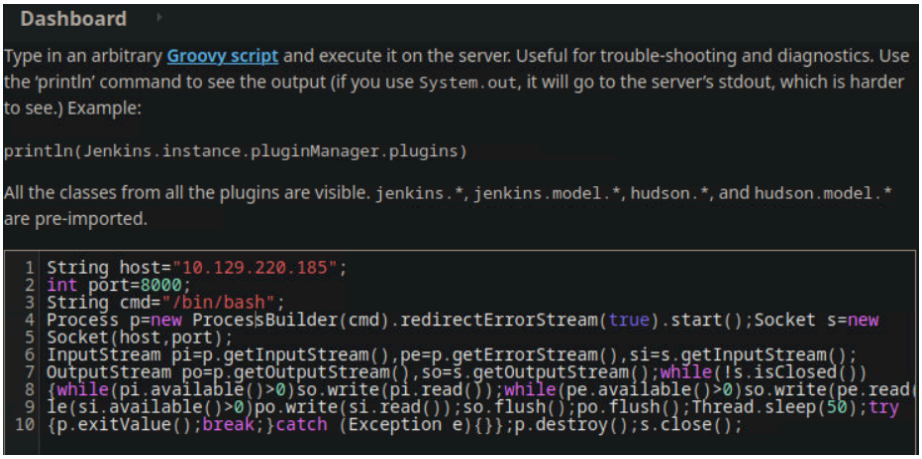
At the bottom right corner of the page, the current version of the Jenkins service is displayed. This is one of the first clues an attacker will check - specifically if the currently installed version has any known CVE's orattack methods published on the Internet. Unfortunately, this is not our case. The current version is reported as secure. As an alternative, we stumble across two vital pieces of information while searching for Jenkins exposures.

A handbook including multiple ways of gaining Jenkins RCE's

A repository similar to the above, including links to scripts and tools

When stumbling across invaluable resources such as the examples above, it is vital that you save them for later in a well-organized bookmark folder for quick access. It is highly encouraged to use well-established research in your professional activities, and this situation does not differ from the case.

The payload we are looking for is as below. This snippet of text has only the {your_IP} part at the very first line which needs to be changed to fit your specific case. In this case, you will need to find out your IP address from the deployed VPN connection. After replacing the {your_IP} bit with your IP address, you can paste this whole snippet into the Script Console in Jenkins.



In order to get your IP address for the currently deployed VPN connection, you need to open a new terminal tab or window and input the ip a | grep tun0 command. The output will look as below, and the IP address you need to replace in the snippet above is marked in green