

Configuration Manual

MSc Research Project
Cyber Security

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MSc Project Submission Sheet



School of Computing

Student Name: Arjun Vijaypal Singh

Student ID: 21213330

Program: MSc Cyber Security

Year: 2022-2023

Module: MSc Research Project

Lecturer: Vikas Sahni

Submission Due

Date: 18th September 2023

Project Title: Penetration Testing of Enet Protocol Implementation in Online Games

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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Arjun Vijay pal Singh

Date: 16/09/2023

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Configuration Manual

Arjun Vijaypal Singh
Student 21213330

1 Introduction

Mega proxy is the tool developed for multiple protocol purpose penetration testing such as TCP, UDP, and Enet the tool allows to interact with CLI in order to use. The usage of tool is simple with one command, however, in order to develop a penetration testing approach with the tool. It is required to have a base knowledge of protocols such as UDP, RTP, etc.

It has a structured way of performing the tampering based on Python script with existing knowledge of Protocol and its command. In order to successfully be able to work with mega proxy and the game , the project must be downloaded, installed, and configured properly.

The stages below describe the installation and integration process.

2 Environment Setup

1. Install Python version 3.9.5 or less. If multiple Python versions are installed on your Windows computer, you can still execute a particular version. For instance, to launch Python 3.9, the command should begin with
2. Navigate to the internal GitLab URL of Cyrextech through VPN. Download the Mega proxy by selecting the appropriate branch, such as MP divert for this research. Choose "zip" and download the branch.

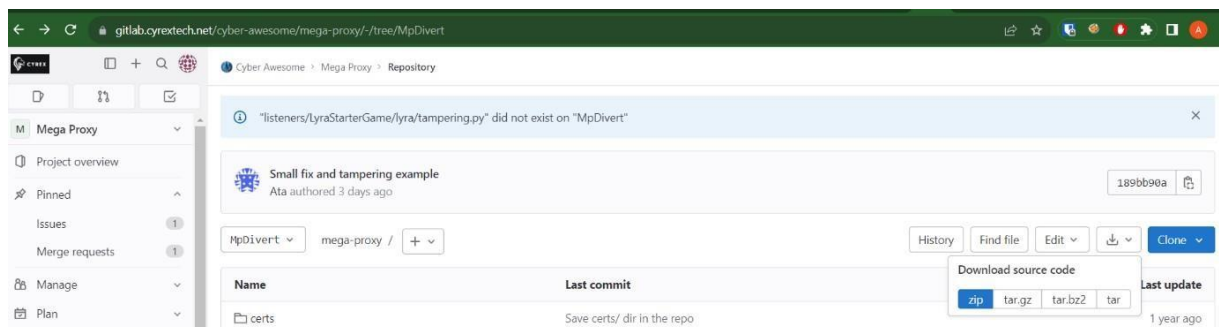


Figure 1 Downloading the Mega proxy.

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3. Unzip and navigate to the megaproxy folder and open folder into the terminal.

1

<https://confluence.magicmedia.studio/display/SEC/1.+Setting+Up+MegaProxy>

- Now navigate to https://gitlab.cyrextech.net/-/profile/personal_access_tokens. Create the personal access token in order to install the requirements for megaproxy
- Now run the command `python -m pip install -r requirements.txt`

```
C:\Users\arjun\Desktop\MpDivert>python -m pip install -r requirements.txt
Looking in indexes: https://pypi.org/simple, https://gitlab.cyrextech.net/api/v4/projects/55/packages/pypi/simple
Processing c:\users\arjun\desktop\mpdivert\blackboxprotobuf-0.1.1-py2.py3-none-any.whl (from -r requirements.txt (line 3
4))
Requirement already satisfied: flask~=1.1.2 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-packages (
from -r requirements.txt (line 2)) (1.1.4)
Requirement already satisfied: pymongo~=3.10.1 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-packag
es (from -r requirements.txt (line 3)) (3.10.1)
Requirement already satisfied: websockets~=10.1 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-packag
es (from -r requirements.txt (line 4)) (10.4)
Requirement already satisfied: simplejson~=3.17.2 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-pack
ages (from -r requirements.txt (line 5)) (3.17.6)
Requirement already satisfied: pycryptodome~=3.9.8 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-pac
kages (from -r requirements.txt (line 6)) (3.9.9)
Requirement already satisfied: h2~=2.6.2 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-packages (fr
om -r requirements.txt (line 7)) (2.6.2)
Requirement already satisfied: pyOpenSSL~=21.0.0 in c:\users\arjun\appdata\local\programs\python\python38\lib\site-packa
ges (from -r requirements.txt (line 8)) (21.0.0)
```

- It will ask for the username and password for the GitLab instance give the userid and personal access token created and it will install all the requirements.
- Download the stumble Guys game by logging into the Steam account in your Windows environment.
- Open the Stumble Guys game and Netlimiter into the system. A game will connect to your Windows system. Analyze the traffic and grab the IP of the game based on the data in and data out packet.

stumble guys.exe	216.120.180.81	5055 (unot)	UNOT	410 B	410 B	12-08-2023 20:47:24	13-08-2023 20:01:18	
stumble guys.exe	54.148.202.77	443 (https)	http protocol over TLS/SSL	30.94 KB	35.86 KB	12-08-2023 20:47:24	12-08-2023 20:50:24	ws-scopelyuswest2.pusher.com
stumble guys.exe	216.120.180.44	5056 (inter)	Intecom Pointspan 1	1.26 MB	708.38 K	12-08-2023 20:47:24	12-08-2023 20:50:24	
stumble guys.exe	255.255.255.255	30000 (ndr)	Secure Network Data Man	0 B	17.62 KB	12-08-2023 20:47:24	13-08-2023 20:04:18	
stumble guys.exe	100.24.215.32	443 (https)	http protocol over TLS/SSL	14.21 KB	3.49 KB	12-08-2023 20:50:24	13-08-2023 20:04:18	raven-spacetime.aprod.scopely.io
stumble guys.exe	54.224.170.68	443 (https)	http protocol over TLS/SSL	12.18 KB	4.72 KB	12-08-2023 20:50:24	13-08-2023 20:04:18	a048f039-8c5d-4b12-8a11-bedead657ed1.event-collector

- Configure the config file with the IP and port.
- Navigate to MP folder `C:\Users\arjun\Desktop\mega-proxy-MpDivert\configs\Scopely2`

2

```
Restricted mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn more
```

```
! stumble_guys.yml X
```

```
C: > Users > arjun > Desktop > mega-proxy-MpDivert > configs > Scopely > ! stumble_guys.yml
```

```
1 project_name: Stumble Guys
2 listen_interfaces:
3   - name: pun
4     address: 10.20.207.14
5     port: 8081
6     remote_ip_addr: 216.120.180.44
7     remote_ip_port: 5056
8     protocol: UDP
9     modules: [divert]
10    target: auto
11    user_modules:
12      - redirector
```

3

11. Run the CMD as admin and navigate to the MP folder.

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12. Type the command and run the MP

```
Administrator: Command Prompt - python main.py --config C:\Users\arjun\Desktop\mega-proxy-MpDivert\configs\Scopely\stumble_guys.yml
```

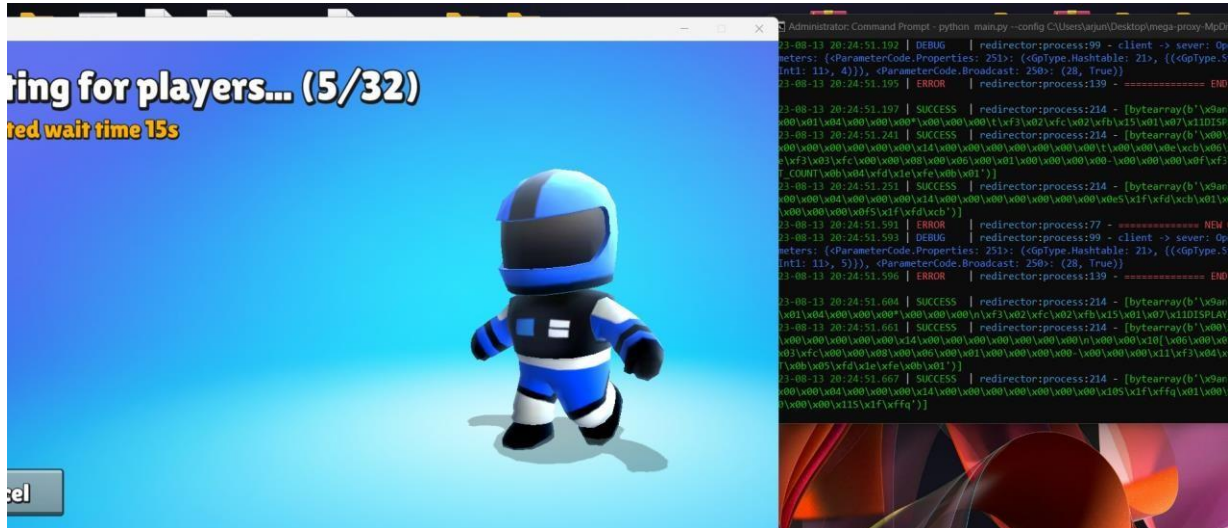
```
Microsoft Windows [Version 10.0.22621.1992]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>cd C:\Users\arjun\Desktop\mega-proxy-MpDivert

C:\Users\arjun\Desktop\mega-proxy-MpDivert>python main.py --config C:\Users\arjun\Desktop\mega-proxy-MpDivert\configs\Scopely\stumble_guys.yml
2023-08-13 20:24:03.067 | DEBUG | protocols.Photon.Realtime.PhotonPeer: __init__:105 - photonpeer initied.
2023-08-13 20:24:03.068 | DEBUG | protocols.Photon.Realtime.PhotonPeer: __init__:105 - photonpeer initied.
2023-08-13 20:24:03.071 | WARNING | modules.divert:on_event:140 - Waiting for the socket hook
```

13. Play the game and analyse the packet.

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14. Develop the Tamper script by navigating to the listener folder C:\Users\arjun\Desktop\mega-proxy-MpDiver\listeners\StumbleGuys\pun\redirector.py\
15. Import the necessary packages from the real time and quantum folder

```

redirector.py x
Q set 9 results
1 from protocols.Photon.Realtime.PeerBase import *
2 from protocols.Photon.Realtime.NCommand import SendOptions
3 from protocols.Photon.Realtime.PhotonPeer import PhotonPeer, ConnectionProtocol, DeliveryMode
4 from protocols.Photon.Realtime.Enums import EgMessageType
5 from protocols.Photon.Quantum.DeterministicNetwork import DeterministicNetwork, NetworkEvent, DeterministicTickInput
6 from protocols.Photon.Quantum.Messages.RttUpdate import RttUpdate
7 from protocols.Photon.Quantum.Messages.SetPlayerData import SetPlayerData
8 from protocols.Photon.Quantum.Serializer import Serializer
9 from protocols.Photon.Quantum.BitStream import BitStream
10 from protocols.Photon.Quantum.RuntimePlayer import RuntimePlayer
11 from protocols.Photon.Quantum.Messages.CustomTickInput import CustomTickInput
12 from loguru import logger
13
14 from src.config import ProxyInstanceConfig
15 from src.events import Events
16 from src.megaproxy import spawnListener
17 from src.utils import catch_all, load_file
18 import copy

```

16. Develop the Tamper script in redirector.py according to the protocol of quantum. \ 17. Create a different if-else block for all component
18. Start tampering and alter the data.

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<https://confluence.magicmedia.studio/display/SEC/1.+Setting+Up+MegaProxy>

4

3 Monthly | Internship Activity Report

Student Name : **Arjun Vijaypal Singh**

Student Number: **x21213330**

Company: **Cyrextech**

Month Commencing: **June 2023**

My research thesis project is "Penetration Testing Approach on Enet Protocol Implementation in Online Games".

The purpose of selecting the topic is provide a comprehensive approach to perform the penetration testing approach in an online gaming environment.

I am going to learn and provide a better understanding of securing the multiplayer online gaming environment. I have written the abstract and introduction for the thesis.

Employer Comments

Arjun started to gain insights into Cyrextech as an organization and the complexities of online game hacking.

Student Signature:

Arjun Singh

Date: **30 June 2023**

Industry

Tim De Wachter

Supervisor: Date: **30 June 2023**

Student Name : **Arjun Vijaypal Singh**

Student Number:

x21213330

Company: **Cyrextech**

Month Commencing:

July 2023

After the completion of the abstract and intro, I started to learn about the Enet Protocol.

- 1: Understanding of the online gaming environment
2. Conducted a comprehensive literature survey to gain knowledge about various game security vulnerabilities.
- 3: Worked on Mega-proxy usage
- 4 Worked on Research Methodology and Design specification.
5. Communicated with the industry mentor to resolve the blockers 6:
Finalize the game for penetration testing.

Employer Comments

With support of our team Arjun setup our proprietary tool (mega proxy) and researched its working.

Student Signature:

Arjun Singh

Date: **31 July 2023**

Industry Supervisor: Date: **31 July**

Tim De Wachter **2023**

Student Name : **Arjun Vijaypal Singh**

Student Number: **x21213330**

Company: **Cyrextech**

Month Commencing: **August 2023**

After the completion of Research Methodology and Design Specification. I worked on Implementing the actual project topic.

- 1: Completed the implementation.
- 2: Started to Intercept the ongoing game packets.
- 3: Resolve the Blocker for tampering data in Python script with industry mentor.
- 4: Completed the Evaluation with live test cases.
- 5: Worked on Completing the research report.

Employer Comments

Arjun successfully intercepted gameplay traffic and extended the existing functionality with tampering scripts specifically for his use case.

Student Signature:

Arjun Singh

Date: **29 August 2023**

Industry Supervisor: Date: **29 August**

Tim De Wachter 2023