DEVILSWAY

By

Malik Muhammad Saad Saeed

Muhammad Awais Raza

Muhammad Mohsin Ali Raza

Asghar Ali

Supervisor

AP Bilal Rauf

Submitted to the faculty of Department of Software Engineering,

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Engineering

CERTIFICATE OF CORRECTIONS & APPROVAL

Certified that work contained in this thesis titled"DEVILSWAY*"*, carried out by Muhammad Mohsin Ali, Malik Muhammad Saad, Awais Raza and Asghar Ali under the supervision of AP Bilal Rauf for partial fulfillment of Degree of Bachelor of Software Engineering, in Military College of Signals, National University of Sciences and Technology, Islamabad during the academic year 2021 is correct and approved. The material that has been used from other sources it has been properly acknowledged / referred.

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Malik Muhammad Saad Saeed

Regn No: 00000240988

Signature:

Muhammad Awais Raza

Regn No: 00000240956

Signature:

Muhammad Mohsin Ali Raza

Regn No: 00000240939

Signature:

Asghar Ali

Regn No: 00000240942

Signature:

Signature of Supervisor

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Dedicated to my exceptional parents and adored siblings whose tremendous support and cooperation led me to this wonderful accomplishment.

Abstract

Proxy chains,TOR,VPNs, IP spoofing, MAC spoofing have been used by us to get to a certain level of privacy or the feeling of not being tracked. All these mentioned and many other tools are employed by both a daily normal internet surfer and an ethical hacker looking for bug bounties. solutions like creating an untracked layer of network over the internet, I2P, to communicate are some of the best ways to reach a certain freedom these tools have been able to get you a certain cover,100% privacy/security is not possible, for your browsing but none of the tools available is capable of doing all of it at once . Devilsway tends to be the solution of covering you from clearing of cache trace to any request made over internet. Smart present day solutions are sending your traffic under a TOR tunnel or over I2p protocols or sometimes employing proxy chains. But all of it at once is just too much load for your connection and therefore the performance is greatly compromised and we refrain from such cumbersome tasks. SoDevilsway is going to give its user "one-tap" solution.

Key Words: *DEVILSWAY*

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CHAPTER 1: INTRODUCTION

1.1 Overview

The idea of the project is to develop an indigenous network security solution that will provide the user with a cost-efficient simple yet effective solution to the violations of one's privacy. IT environments are growing ever more distributed, complex, and difficult to manage whereas cyber-traceability and tracking are becoming more and more common. Cookies, digital fingerprints, TOR network, VPNs, Harmful applications, network rules and many other system vulnerabilities have been compromising a user's privacy and security. With the rapid increase in ways advertisement industries, websites, government agencies, ISPs and cyber-attackers track our device's traffic has made the situation alarming. This accentuates the need to come up with an elaborate script to provide a simple user with a way to escape most of the privacy breaches and tracking.

1.2 Scope

The scope of DEVILSWAY is to provide a cost-effective yet comprehensive solution that will benefit organizations and individuals in protecting their data against digital tracking, eavesdropping and violations of privacy. DEVILSWAY will be relaying all of the user's traffic under a secure communication channel over an anonymous network while optimizing your device to be anonymous under a DEVILSWAY session.

1.3 Product Functions

The main functions of DEVILSWAY are highlighted below:

- It is a one-tap solution for professionals and beginners alike to browse the internet anonymously.
- This will include all the traffic going through any sort of application running.

- Clear existing browser cookies and make new cookies while the session is underway which would be cleared when the session ends.

- Clearing cache to break any ongoing network sessions.

- Setting firewall and browser rules to block harmful traffic

1.4 Deliverables

Sr.	Tasks	Deliverables
1	Literature Review	Literature Survey
2	Requirements Gathering	SRS Document
3	Application Design	Design Document (SDS)
4	Implementation	Implementation on computer with a live test to show the accuracy and ability of the project
5	Testing	Evaluation plan and test document
6	Training	Deployment Plan
7	Deployment	Complete application along with necessary documentation

1.5 Overview of the Document

This document shows the complete working process of our project DEVILSWAY. It starts with the literature review which shows past work done in a similar field, requirement analysis of the system, system architecture which highlights the modules of the software and

represents the system in the form of a component diagram, Use Case Diagram, Sequence Diagram, and general design of the system. Then it will move on to discuss the detailed Description of all the components involved. Further, the dependencies of the system and its relationship with other products and the capacity of it to be reused will be discussed.

1.5.1 Document Conventions

This section describes the standards followed while writing the document.

1.5.2 Headings

Headings are prioritized in a numbered fashion, the highest priority heading having a single digit and subsequent headings having more numbers, per their level. All the main headings are titled as follows: single-digit number followed by a dot and the name of the section (All bold Times New Roman, size 18, Centered).

All second-level subheadings for every subsection have the same number as their respective main heading, followed by one dot and subsequent subheading number followed by name of the subsection (All bold Times New Roman, size 16). Further subheadings, i.e., level three and below, follow the same rules as above for numbering and naming, but different for the font (All bold Times New Roman, size 14).

1.5.3 Figures

All figures in this document have captions and are numbered. Context and flow diagrams are based on UML standards.

1.5.4 References

All references in this document are provided where necessary, however, were not present, the meaning is self-explanatory. All ambiguous terms have been clarified in the glossary at the end of this document.

1.5.5 Basic Text

All other basic text appears in regular, size 12 Times New Roman. Every paragraph explains one type of idea.

CHAPTER 2: LITERATURE REVIEW

Many proprietary and open source tools are available to cover different aspects we are hoping to cover in Devilsway.

- Technitium MAC Address Changer
- MAC Address Changer
- Spoof-me-now - a simple lightweight script spoofing MAC
- Anonsurf - a ParrotSec/ one tap solution (but doesn't spoof from your ISP !
- TOR browser

Technitium MAC Address Changer can spoof the MAC Address of your Network Interface Card (NIC) providing a very simple user interface and enough information regarding each NIC of the machine. Each NIC has a MAC address assigned to it by its manufacturer which is used by drivers to access LAN. Technitium MAC Address Changer can set a new MAC for your NIC, bypassing the original.

TMAC works by writing a value into registry. After enabling the NAD, registry search for 'Network Address' in the key. If a value is present, it uses it as MAC otherwise uses the original MAC Address. Some NAD have this feature built-in while some don't. TMAC does not randomize MAC while DEVILSWAY on the other hand, randomizes your MAC.

Portable Spoof-me-now can be used to change your MAC Address. Its interface is user-friendly which provides direct access to all options. You can select a NAD and change your MAC Address into the one you want.

Anonsurf is a tool that can be used to spoof your IP Address. It uses Tor IPTables for the configuration of IP packet filter rules. Anonsurf anonymizes the framework to very good extent but does not give you a total incognito state. As Anonsurf follow the TOR protocols, so it makes browsing a little slower.

Again, Anonsurf does not randomizes the MAC while DEVILSWAY does.

TOR is a open source software that lets you have anonymous communication. It directs traffic through the free, volunteer overlay network and a lot of relays to conceal the user's location and user's activity.

We use TOR IPTables to route the DEVILSWAY traffic through TOR Network.

CHAPTER 3: SOFTWARE REQUIREMENT SPECIFICATION

3.1 Introduction

The introduction of the Software Requirements Specification (SRS) provides an overview of the entire SRS with purpose, scope, definitions, acronyms, abbreviations, references, and overview of the SRS. This document aims to present a detailed description of the project DEVILSWAY which uses an anonymous network to relay a user's traffic with a combination of features to provide the user with a one-tap privacy solution with the aim of minimum traceability

3.1.1 Purpose

This document covers the software requirement specifications for project "DEVILSWAY". The idea of the project is to develop an indigenous network security solution that will provide the user with a cost-efficient simple yet effective solution to the violations of one's privacy. IT environments are growing ever more distributed, complex, and difficult to manage whereas cyber-traceability and tracking are becoming more and more common. Cookies, digital fingerprints, TOR network, VPNs, Harmful applications, network rules and many other system vulnerabilities have been compromising a user's privacy and security. With the rapid increase in ways advertisement industries, websites, government agencies, ISPs and cyber-attackers track our device's traffic has made the situation alarming. This accentuates the need to come up with an elaborate script to provide a simple user with a way to escape most of the privacy breaches and tracking.

This document is meant to outline the features and requirements of DEVILSWAY, to serve as a guide to the developer on one hand and a software validation document for the prospective client on the other.

3.2 System Overview

3.2.1 Product Perspective

Today a normal user cannot comprehend the level of information being gathered about him through various data points. Which are then used to create the user's profile. These user

profiles can tell a lot about a user's personality, needs, desires, locations visited, sites visited and important credentials which can be used as leverage anytime. Many solutions like TOR network and VPNs have been in use to avoid tracking and remaining anonymous while browsing the internet. However, the effect on connectivity speed and the fact that a user is still being tracked by various other methods is a dangerous thing. No doubt a certain combination of well-developed tools and deep knowledge of system security would allow an IT professional to cover most of the venues for being anonymous and avoiding certain basic breaches. In contrast, there is no one-tap solution available for a layman to avoid all this.

The perspective to be carried forward by our team was to provide a one-tap solution for professionals and beginners alike to browse the internet anonymously. This will include all the traffic going through any sort of application running. Additional features are added to provide security and protection against any privacy violations of which some users are unaware.

3.2.2 User Classes and Characteristics

The following section describes the types of users of DEVILSWAY. There are explanations of the user followed by the interactions the user(s) shall be able to make with the software.

3.2.2.1 Network Administrator

In this given scenario the primary actor is the DEVILSWAY script running on any user's system. The script is easy-to-use and executable on one tap therefore no special training and knowledge is required from the user. This tool would be launching all further actions to achieve anonymity and maintain the ongoing session.

3.2.3 Operating Environment

The essential physical components for the proper operation of DEVILSWAY in the evaluated configuration are:

3.2.3.1 Software

- IDE: Python IDE (python 3)

- OS: Windows/linux
- Python networking libraries and modules: WMI module, Scrappy-rotating-proxy.
- IP tables

3.2.3.2 **Hardware**

- Workstation (fortraining)

- Standard DesktopClient

3.2.4 Design and Implementation Constraints

Language requirements: Software must be in English language

3.2.5 User Documentation

Following are the guides for the user of DEVILSWAY:

- UserManual

- Online Documentation forusers

  Documentation for developers and technicians working on the projects include:

- ProjectSynopsis

- SRSDocument

- UMLDiagrams/Documents

3.2.6 Assumptions and Dependencies

- DEVILSWAY would be working at the application layer.
- It would be dealing with routing from the data link layer to the application layer.
- There is one layman user with no technical knowledge to run the script.
- It is assumed that the network DEVILSWAY selects to route the traffic over would be enough to hide the user's identity.
- There is the possibility of tracking you through your posts or comments made while logged onto a specific service.
- It is assumed that the IT environment will provide a communication channel to achieve

connectivity.

3.3 External Interface Requirements

3.3.1 Hardware Interfaces

- Computers/Laptops with InternetConnections

3.3.2 Software Interfaces

- Operating System: Windows /Linux

- Frontend Dashboard:Python

3.3.3 Communications Interfaces

Wi-Fi/Ethernet will be used by the client to connect to the server on which the trained model is present.
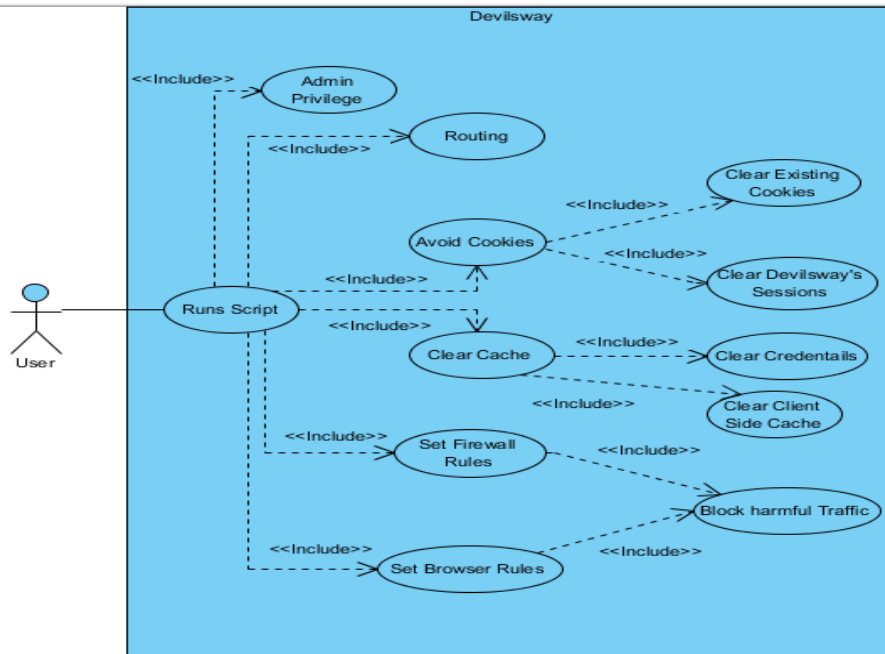
3.4 System Features

This section illustrates organizing the functional requirements and component diagram for the DEVILSWAY:

- Security
- Routing
- Spoofing
- Avoid cookies
- Clear cache
- Set firewall and browser rules

3.5 Overall Use Case Diagram

3.5.1 Authentication

3.5.1.1 Stimulus/ResponseSequence

Normal Path: User runs the script successfully.
Preconditions • The user should have Python installed and DEVILSWAY script. • The user shall provide administrator privileges for DEVILSWAY.
Interactions • On running the script DEVILSWAY's functions will be triggered.
Postconditions • User has successfully run the script.
Categorization • **Criticality:** High • **Probability of Defects:** Low • **Risk:** High

Exceptional Path: User unable to run the script.
Preconditions   • User has previous versions of Python installed.
Interactions   • On running the script DEVILSWAY's functions will be triggered.
Postconditions   • An error notification is generated that the script failed to run.
Categorization   • **Criticality:** High   • **Probability of Defects:** Low   • **Risk:** High

3.5.1.2 Functional Requirements

1. The system shall be able to run DEVILSWAY script.
2. The system shall be able to trigger all the functions.
3. In case the script is unable to run, then it shall generate an error notification.

3.5.2 Routing

This feature enables the network traffic under a secure communication channel over an anonymous network while optimizing your device to be anonymous under a DEVILSWAY session.

3.5.2.1 Stimulus/ResponseSequences

Normal Path: Successful Routing
Preconditions   • The User has run the DEVILSWAY script.
Interactions   • Network traffic goes through a secure communication channel over an anonymous network.
Postconditions   • Successful routing.
Categorization   • **Criticality:** High   • **Probability of Defects:** Low   • **Risk:** High

Exceptional Path: Routing Failed
Preconditions   • The User has run the DEVILSWAY script.
Interactions   • Network traffic will not go through a secure communication channel over an anonymous network.
Postconditions   • Generates an error Routing failed.
Categorization   • **Criticality:** Very High   • **Probability of Defects:** Low   • **Risk:** High

3.5.2.2 Functional Requirement

1. The system shall be able to move the network traffic under a secure communication channel over an anonymous network.
2. If unsuccessful, generate an error.

3.5.3 Avoid Cookies

3.5.3.1 Description

This feature will clear existing browser cookies and make new cookies while the session is underway which would be cleared when the session ends.

3.5.3.2 Stimulus/ResponseSequence

Normal Path: Browser Cookies cleared before and after a DevilsWay session.
Preconditions   • The user runs the script successfully.
Interactions   • New cookies will be made while the session is underway and at the end, they will be cleared using DEVILSWAY script.
Postconditions   • Cookies are cleared when the DEVILSWAY session ends.
Categorization   • **Criticality:** High   • **Probability of Defects:** Medium   • **Risk:** High

3.5.3.3 FunctionalRequirements

1. Existing Cookies should be cleared.
2. Cookies creating during the DEVILSWAY session should be cleared at the end of the session.

3.5.4 Clear System Cache

3.5.4.1 Description

Clearing cache to break any ongoing network sessions to achieve anonymity.

3.5.4.2 Sequence/ResponseSequences

4.5.2.1 Normal Path: Clear Cache
Preconditions
• . The user runs the script successfully.
Interaction
• DEVILSWAY will trigger cleaning up of cache and any other dangerous process.
Postconditions
• The cache is cleared during the DEVILSWAY session.
Categorization
• **Criticality:** High • **Probability of Defects:** Medium • **Risk:** High

3.5.4.3 Functional Requirements

1. The System cache shall be cleared on running the script.
2. If clearing cache fails to generate the error.

3.5.5 Set Firewall Rules

3.5.5.1 Description

Setting firewall rules to block harmful traffic.

3.5.5.2   Stimulus/ResponseSequence

Normal Path: Setting Firewall Rules.
Preconditions   • The user runs the script successfully
Interactions   • DEVILSWAY will trigger firewall rules to block harmful traffic.
Postconditions   • Rules are set successfully.
Categorization   • **Criticality:** High   • **Probability of Defects:** Medium   • **Risk:** High

Exceptional Path: Setting Firewall Rules Fail
Preconditions   • The user runs the script successfully
Interactions   • Setting Firewall rules fail.
Postconditions   • Generate error
Categorization   • **Criticality:** High   • **Probability of Defects:** Medium   • **Risk:** High

3.5.5.3   FunctionalRequirements

1. The script shall set firewall rules to block harmful traffic.
2. If the script fails, generate an error.

3.5.6   Browser Rules

3.5.6.1   Description

Setting browser rules to block harmful traffic.

3.5.6.2 Stimulus/ResponseSequence

Normal Path: Setting Browser rules.
Preconditions   • The user runs the script successfully.
Interactions   • DEVILSWAY will trigger browser rules to block harmful traffic.
Postconditions   • Rules are set successfully.
Categorization   • **Criticality:** High   • **Probability of Defects:** Medium   • **Risk:** High

Exceptional Path: Setting browser rules fail
Preconditions   • The user runs the script successfully
Interactions   • Setting Browser rules fail.
Postconditions   • Generate Error.
Categorization   • **Criticality:** High   • **Probability of Defects:** Medium   • **Risk:** High

3.5.6.3 FunctionalRequirements

1. The script shall set firewall rules to block harmful traffic.
2. If the script fails, generate an error.

3.6 Other Non-Functional Requirements

3.6.1 Safety Requirements

● Minimum privileged activity:

○ The script shall only use administrator privileges where necessary.

3.6.2 Performance Requirements

As performance is the critical component in anonymity solutions like TOR but as for DEVILSWAY, it provides better performance than the other solutions.

3.6.3 Security Requirements

- No Split Tunneling

    - All Traffic shall be routed by DevilsWay during a session.

- Up-to-date Firewall.

3.6.4 Software Quality Attributes

3.6.4.1 Availability

The endpoints should be up and running 24/7.

3.6.4.2 Correctness:

The spoofing method would be consistent.

3.6.4.3 Accuracy:

DEVILSWAY will provide a greater level of anonymity than any other solutions present.

3.6.4.4 Adaptability:

Currently, the server runs on Windows OS, but it must adapt to Linux/Unix.

3.6.5 Business Rules

- The system is available for Linux/Windows.
- DEVILSWAY will only be able to route traffic over an anonymous network which would determine the level of privacy.
- DEVILSWAY solution is suitable for both a layman and an IT professional.

CHAPTER 4 : DESIGN AND DEVELOPMENT
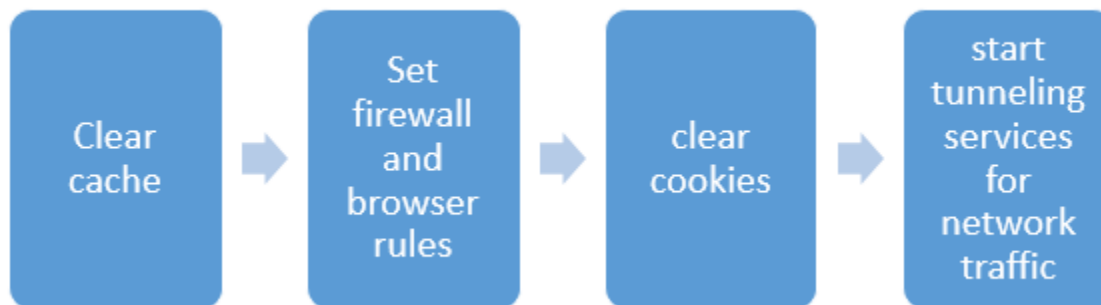
4.1 Introduction

4.1.1 Purpose

This software design section contains the complete design description of the project *"DevilsWay"*. The purpose of this document is to understand each component and module of the project. It will provide information about the relationship between each module and how they are interconnected. The document is intended to inform stakeholders the details of the design and the design process. It is meant to outline the features, structure, and architecture of a "*DevilsWay*", to serve as a guide to developers and the intended audience. The intended audiences for the DevilsWay include project supervisor, group members, project evaluation team and other concerned persons. It also shows how the use cases detailed in the SRS will be implemented in the system using this design.
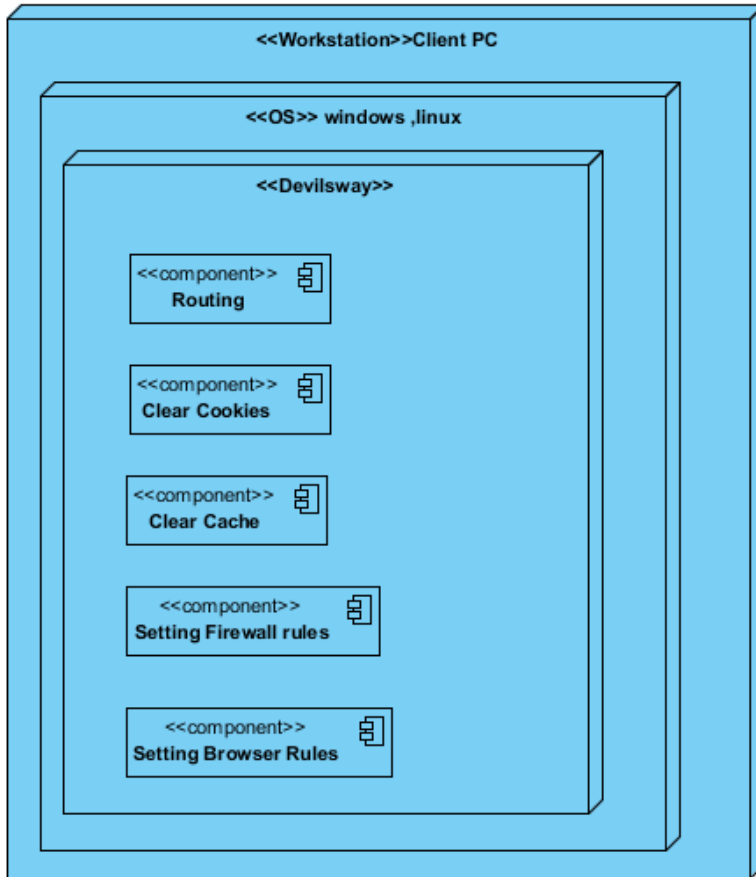
4.2 System architecture

4.2.1 Architectural Design

As the script would run it would carry out a series of tasks. Firstly, it would set some browser and firewall rules to protect system from harmful traffic. Then moving on to clearing the cache and existent cookies so that any previously started network sessions be stopped and cleansed. Finally, it would route all the network over the user selected network channel.

4.2.2 Decomposition Description

4.2.2.1 DeploymentDiagram

<<Workstation>>Client PC

<<OS>> windows ,linux

<<Devilsway>>

<<component>>
Routing

<<component>>
Clear Cookies

<<component>>
Clear Cache

<<component>>
Setting Firewall rules

<<component>>
Setting Browser Rules

4.2.2.2 FlowDiagram

Run Script → Admin Priviledge → Clear Cache

Setting Firewall and Browser Rule → Avoid Cookies → Start tunneling Service
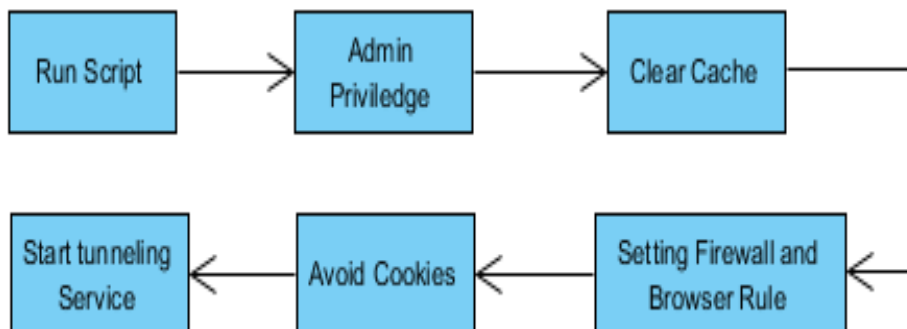
4.2.2.3 ClassDiagram
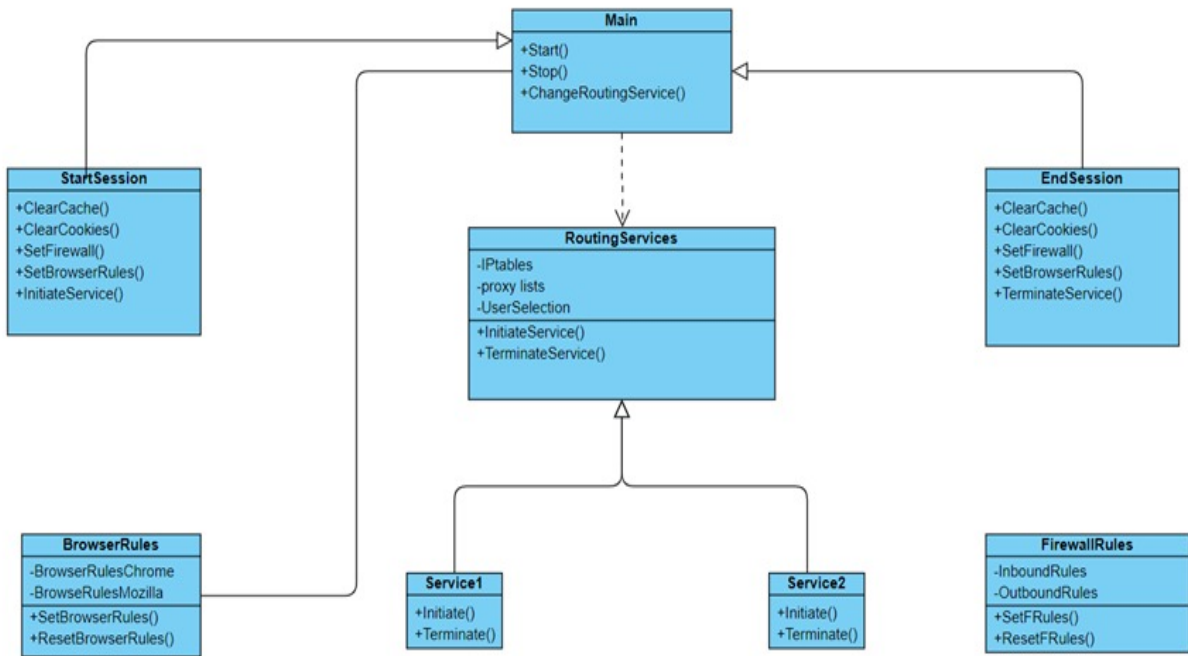
4.2.2.4 ActivityDiagram

- Analyze Network logs using firewall and browser rules

- Avoid Cookies

- Routing Network Traffic

- Clear Cache

4.2.2.5 ComponentDiagram
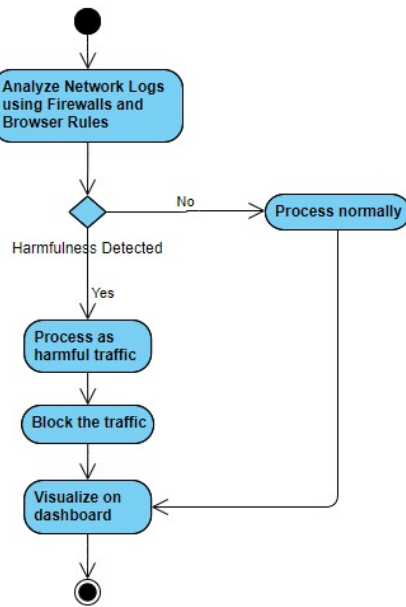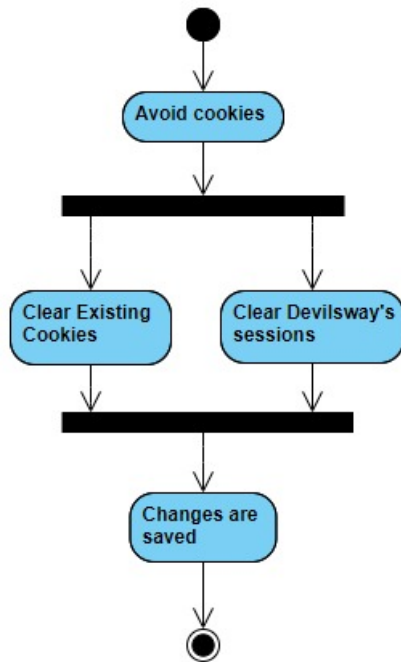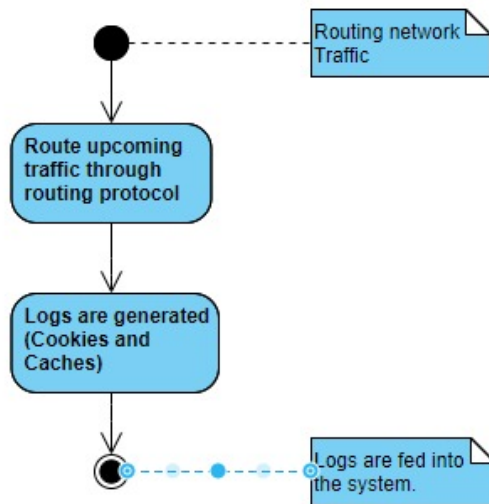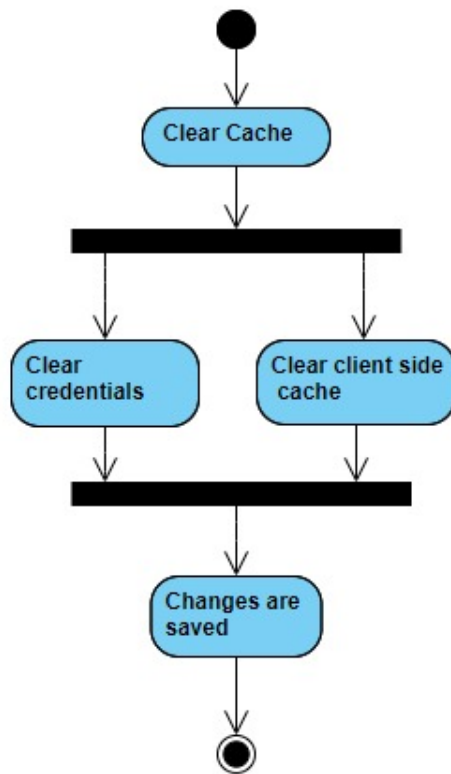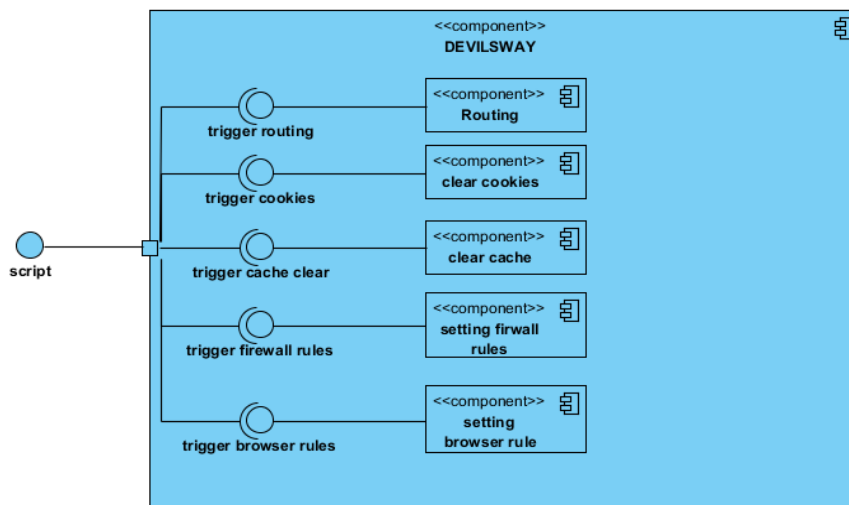
4.2.3 Design Rationale

We have selected Pipe and Filter architecture to proceed with. Such architecture designs perform transformations on data and process the input they receive, and pipes, which serve as connectors for the stream of data being transformed, each connected to the next component in the pipeline. Some of the reasons this is selected as the architecture

1. Ensures loose and flexible coupling of components, filters.
2. Loose coupling allows filters to be changed without modifications to other filters.
3. Conductive to parallel processing.
4. Filters can be treated as black boxes. Users of the system don't need to know the logic behind the working of each filter.
5. Re-usability. Each filter can be called and used over and over again

4.3 Data Design

4.3.1 Data Description

As the system is quite simple and retains no large amounts of data except the routing tables and rules for the routing. These will be saved in subsequent files for different features. No database would be required. Files will be stored locally but protected.

CHAPTER 5 : TESTING

5.1 TEST CASE # 1

Test Case ID	BU_001	Test Case Description	Runs Successful		
Created By	Mohsin	Reviewed By	Mohsin	Version	2.1
Tester's Name	Awais	Date Tested	10-may-2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:				
1	Access to Linux and script				
Test Scenario	On running the script GUI should pop out with the on off switch for Devilsway				

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Run Script	GUI pop out	As Expected	Pass

OUTPUT:

5.2 TEST CASE # 2

Test Case ID	BU_002	Test Case Description	IP and MAC change on running the script		
Created By	Mohsin	Reviewed By	Mohsin	Version	2.1
Tester's Name	Awais	Date Tested	10-may-2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:			
1	Access to Linux and script			
Test Scenario	On running the script GUI should pop out with the on off switch for Devilsway and after switching on IP and MAC change on running the script			

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Run Script	GUI pop out	As Expected	Pass
2	Switch on	IP and MAC change	As Expected	Pass

OUTPUT:

Before Running

```
wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.158  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::cfda:61dc:7f55:dd75  prefixlen 64  scopeid 0x20<link>
        ether d8:fc:93:e5:db:bb  txqueuelen 1000  (Ethernet)
        RX packets 1631  bytes 774707 (756.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 1578  bytes 256524 (250.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

After Running

```
 [+] Anonymizer status [ON]
 [*] Getting public IP, please wait...
 [?] Still waiting for IP address...
Current mac is : d8:fc:93:e5:db:bb
MAC Randomized to 00:23:92:08:ED:B9
 [+] Your IP is 92.246.84.133
```

5.3 TEST CASE # 3

Test Case ID	BU_003	Test Case	IP and MAC change on switch off the script

		Description			
Created By	Mohsin	**Reviewed By**	Mohsin	**Version**	2.1
Tester's Name	Awais	**Date Tested**	10-may-2021	**Test Case (Pass/Fail/Not Executed)**	Pass

S #	Prerequisites:		
1	Access to Linux and script		
Test Scenario	On running the script GUI should pop out with the on off switch for Devilsway and after switching on IP and MAC randomizes while after switching of the script IP and MAC will come to original state		

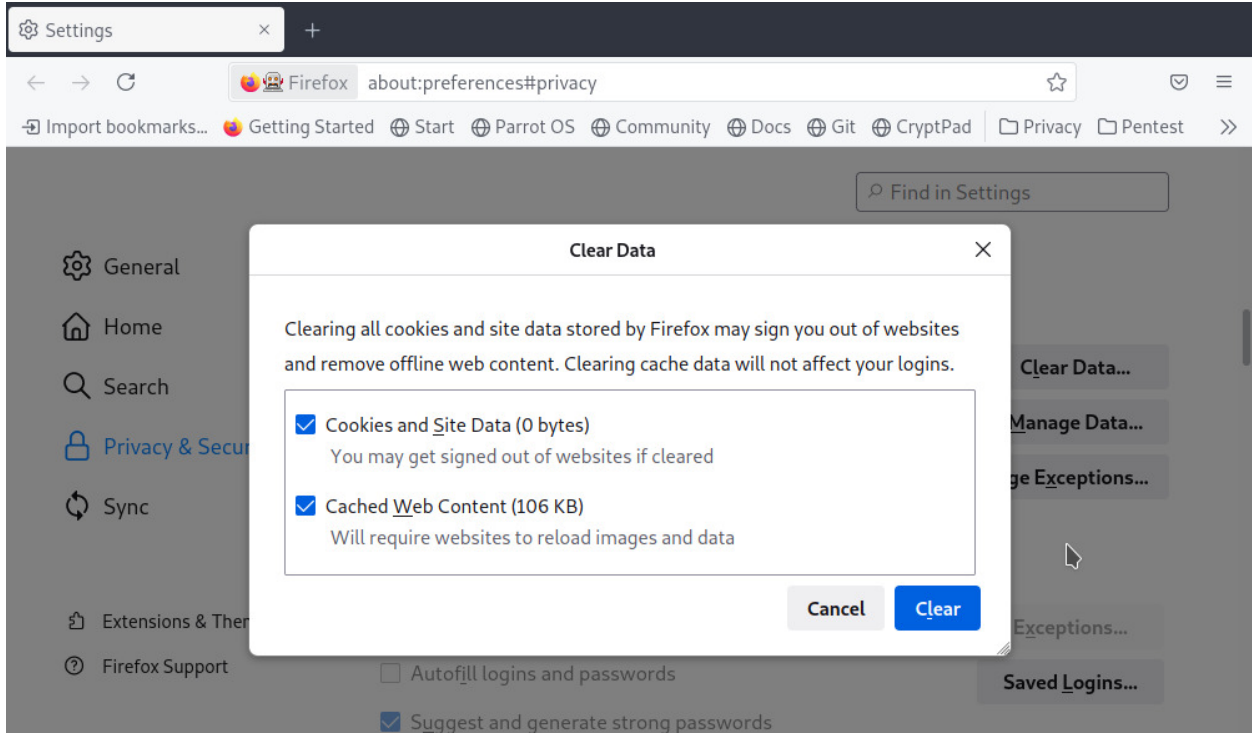| Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Run Script	GUI pop out	As Expected	Pass
2	Switch on	IP and MAC change	As Expected	Pass
3	Switch off	MAC original state	As Expected	Pass

OUTPUT:


```
MAC changed back to d8:fc:93:e5:db:bb
 [!] Anonymizer status [OFF]
```

5.4 TEST CASE # 4

Test Case ID	BU_004	Test Case Description	Clearing Cache		
Created By	Mohsin	**Reviewed**	Mohsin	**Version**	2.1

Tester's Name	Awais	By Date Tested	10-may-2021	Test Case (Pass/Fail/Not Executed)	Pass
S #	Prerequisites:				
1	Access to Linux and script				

Test Scenario	On running the script GUI should pop out with the on off switch for Devilsway and after switching on IP and MAC change on running the script and when the session will switch off it will clear browser cache

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Run Script	GUI pop out	As Expected	Pass
2	Switch on	IP and MAC change	As Expected	Pass
3	Switch off	Clear Browser Cache	As Expected	Pass

OUTPUT:

5.5 TEST CASE # 5

Test Case ID	BU_004	Test Case Description	Clearing Cache		
Created By	Mohsin	Reviewed By	Mohsin	Version	2.1
Tester's Name	Awais	Date Tested	10-may-2021	Test Case (Pass/Fail/Not Executed)	Pass

S #	Prerequisites:			
1	Access to Linux and script			
Test Scenario	On running the script GUI should pop out with the on off switch for Devilsway and after switching on IP and MAC change on running the script and when the session will switch off it will clear browser cache			

Step #	Step Details	Expected Results	Actual Results	Pass / Fail / Not executed / Suspended
1	Run Script	GUI pop out	As Expected	Pass
2	Switch on	IP and MAC change	As Expected	Pass
3	Switch off	Clear Browser Cookies	As Expected	Pass

REFERENCES:

1] https://linuxhint.com/anonsurf/
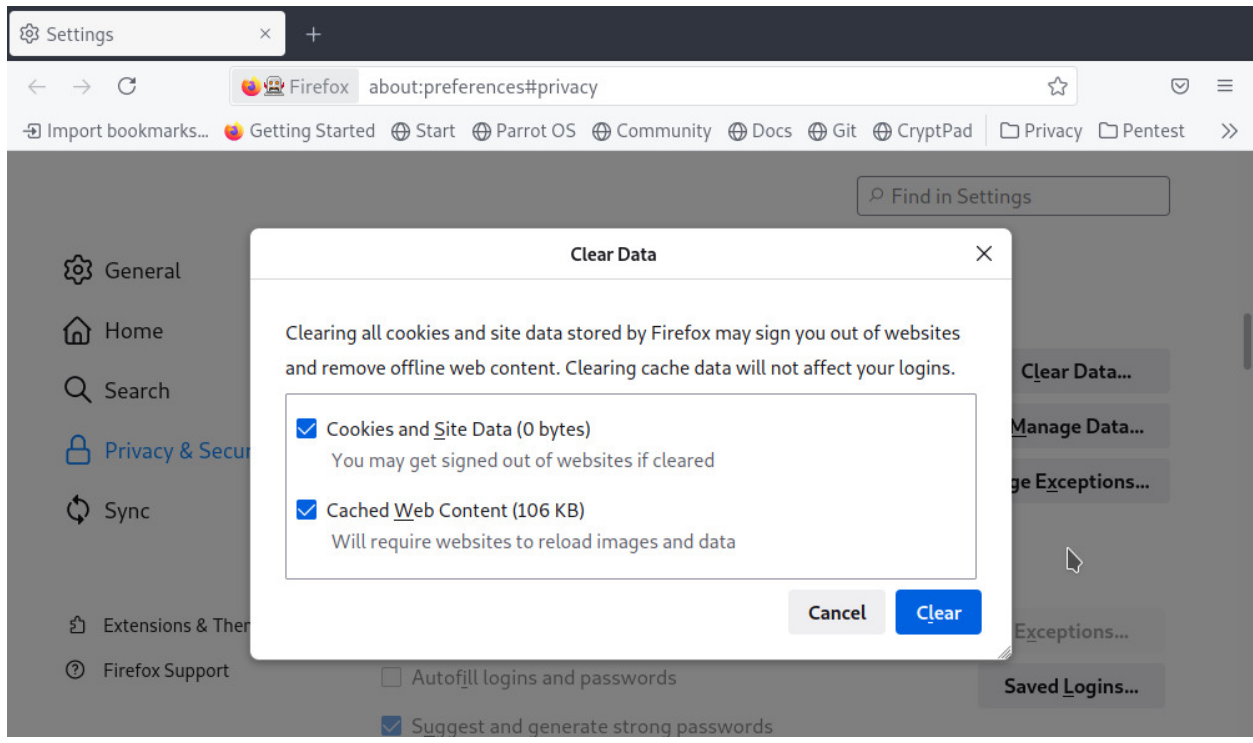
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Devilsway *By Muhammad Mohsin Ali Raza*

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