**INTRODUCTION**

The objective of this project is to ease the analysis of the log files and to infer as much as information from the log files. A user may input a web server log file to the program and wait for it to run the analysis of the data in the log file. After the analysis it returns visual data representing the data like IP address and the frequency of visit from the IP address. User-Agents used to visit the website and the method of requests made by the clients and frequency of the request methods. The output is not shown as traditional tables, but are visualized using graphs which makes it easier to consume the given information. The interface is a GUI in a windows based application which is a platform-independent because a platform-independent programming language is used to create the application. The application serves to be robust, which means that it could handle huge log files. The final product will have no more features that are specified in this document. This document describes the functional and non-functional requirements of the “Web Server Log Analysis System”. This application “Web Server Log Analysis System” is developed to help Security administrators, developers and Incident responders to remove their burden of looking up the logs manually.

**OVERALL DESCRIPTION**

The user launches the application, then by clicking on the Choose File button he could browse through the file system to find the log file that needs to be analyzed, then he clicks on the Generate Graph button to start the analysis. Then the application starts reading the file line by line and perform analysis on them. After it has done with the analysis, the graphs are generated based on the analysis performed and displayed to the user. From the displayed graphs, the users may easily infer information from the log file. The speed of the program depends on the size of the log file, the speed goes inversely proportional to the size of the log file.

**SPECIFIC REQUIREMENTS**

**3.1 Functional Requirements**

**<NEED TO FILL>**

**3.2 Non-Functional Requirements**

**<NEED TO FILL>**

**3.3 External Interface Requirements**

**3.3.1 User Interfaces**

The application is user-friendly menu based interface. It has 2 simple screens as follows.

1. The Initial Screen

This is the screen where the log file that is to be analyzed is selected. Either we have to select a log file that is locally available or we may provide a URL of the log file hosted on our internal servers.

2. The Output Screen

This screen shows the output of the analysis, this is filled with the graphs from the analysis. We may use the drop-down available in this screen to modify the output and acquire what is needed.

**3.3.2 Hardware Interfaces**

Screen resolution of at least 800×600 required for proper and complete rendering of the graphs. Higher resolutions would be better.

Standalone systems, no network connection required

**3.3.3 Software Interfaces**

Any kind of Operating System(Linux, Unix, Windows, Mac OS)

Python3.8 Installed

**3.4 Performance Requirements**

**<NEED TO FILL>**

**3.5 Design Constraints**

**<NEED TO FILL>**

**3.6 Software System Attributes**

**<NEED TO FILL>**

**UML ANALYSIS MODEL**

**4.1 USE CASE DIAGRAM**

**<YET TO COME>**

**4.2 CLASS DIAGRAM**

**<YET TO COME>**

**4.3 SEQUENCE DIAGRAM**

**<YET TO COME>**

**4.4 STATE-CHART DIAGRAM**

**<YET TO COME>**

**4.5 ACTIVITY DIAGRAM**

**<YET TO COME>**

**PROJECT DESIGN**

The objective of this project is to develop an application that analyzes the log file from Web servers. This application could analyze logs from the Apache Web server.

**The Web Server Log**

The log file generated by default installation of Apache is as follows,

78.172.44.50 - - [19/Jan/2015:12:08:08 +0000] "GET /run HTTP/1.1" 200 83 "-" "Mozilla/5.0 (Macintosh; Intel Mac OS X 10.10; rv:35.0) Gecko/20100101 Firefox/35.0"

Breaking down it into parts,

**“*78.172.44.50*”** – It is the IP address that is used to access the web server.

**“*-*”** - Identity check when authentication is enabled on the server.

**“-”** - The username used to access the authenticated content on the server.

**“*[19/Jan/2015:12:08:08 +0000]*”** – Timestamp, the time which the request made.

**“*GET / HTTP/1.1*”** – The request method used to access the resource.

**“*200*”** – The status cide returned by the server while accessing a resource.

**“*83*”** – The size of the response returned to the user by the server.

**“*-*”** - The Referer, the site which referred the user to our site.

***“Mozilla/5.0 (Macintosh; Intel Mac OS X 10.10; rv:35.0) Gecko/20100101 Firefox/35.0” –*** The User-Agent used by the user to access the server.

Our project reads a log file with lot of lines similar to this. Then save all the data in variables and generate graphs from all the data obtained from the file.

**The File Selection Phase**

First the program is launched, it opens the user-friendly GUI of the application. In the GUI there is a Choose File button to select the log file for analysis. After the button is pressed, the filesystem browser opens allowing us to select the log file to proceed for the analysis. Then the path is stored in a variable and there is a button provisioned to start the analysis of the log file. When the button is pressed, the application proceeds to the analysis phase where it starts analysis of the log file.

**The Analysis Phase**

This phase of the application follows up after selecting the file to analyze and proceeds to the analysis. The file is read line by line to avoid memory overhead. First a line is read and is split by the spaces. Then IP address(String), Timestamp (dictionar -y), Request method(dictionary), Status code(dictionary), the Accessed file (dictionar -y) and User-Agent(list) are obtained and stored in seperate variables after the split. First the IP address is appended to a list and a Data Object is created which stores all the above said variables as class variables. Then this data object is appended to another seperate list. While reading the next line, first the IP address list is checked to see if the IP is present, if it is present, the data according to the object is updated(the main reason why the variables are initialized as dictionaries). If it is not present, then the process of initialization occurs. The reason to initialize the User-Agent as a list is that one user may use the same browser, when he uses a large number of User-Agents within a time, it is an alarm of a DoS attack, also may serve as a work for the development team to tailor pages for that specific UA. This process is repeated until the whole file is read. Then the application moves on to the next phase.

**The Visualization Phase**

The list of data objects is iterated through one-by-one and for a given IP address, the total number of requests made is found out by adding all the values in the Requests dictionary. The variables for which the graphs are requested in the first phase is stored in variables and using those variables the graphs are generated. We

may also generate graphs dynamically using the drop-down box that is present in this screen.

The final thing is left to the user, he may infer the necessary information from the graphs. It may either be used for Incident Response, SEO or for further development of the deployed application depending upon the type of user running the application.

**CODE**

#!/usr/bin/env python3

import matplotlib.pyplot as plt

class Data:

def \_\_init\_\_(self, ip):

self.ip = ip

self.req = {}

self.res = {}

self.UA = []

self.file = {}

self.tms = {}

def \_\_repr\_\_(self):

return self.ip

class LogLyzer:

objArray = []

ipList = []

def \_\_init\_\_(self, filename):

self.filename = filename

def readFile(self):

with open(self.filename) as f:

while True:

line = f.readline().replace("\"","").strip()

if(not line):

break

else:

temp = line.split()

if( temp[0] not in self.ipList ):

self.ipList.append(temp[0])

obj = Data(temp[0])

obj.req[temp[5]] = obj.req.get(temp[5],0) + 1

obj.res[temp[8]] = obj.res.get(temp[8],0) + 1

obj.file[temp[6]] = obj.file.get(temp[6],0) + 1

obj.UA.append(' '.join(temp[11:]))

obj.tms[temp[3].replace("[","")] = obj.tms.get(temp[3].replace("[",""),0) + 1

self.objArray.append(obj)

else:

index = self.ipList.index(temp[0])

self.objArray[index].req[temp[5]] = self.objArray[index].req.get(temp[5], 0) + 1

self.objArray[index].res[temp[8]] = self.objArray[index].res.get(temp[8], 0) + 1

self.objArray[index].file[temp[6]] = self.objArray[index].file.get(temp[6], 0) + 1

if( ' '.join(temp[11:]) not in self.objArray[index].UA ):

self.objArray[index].UA.append(' '.join(temp[11:]))

self.objArray[index].tms[temp[3].replace("[","")] = self.objArray[index].tms.get(temp[3].replace("[",""), 0) + 1

def main():

log = LogLyzer("varysample")

log.readFile()

ipReq = {}

for obj in log.objArray:

print(obj.ip)

print(obj.req)

ipReq[obj.ip] = sum(list(obj.req.values()))

print(obj.res)

print(obj.UA)

print(obj.file)

print(obj.tms)

print("\n")

fig,ax = plt.subplots()

ax.bar(ipReq.keys(),ipReq.values())

fig.show()

main()

**OUTPUT**

**<YET TO COME>**

**CONCLUSION**

Log analysis is an important task for System administrators, Security administrators and even for developers at times. Our project “Web Server Log Analysis System” makes the tasks of these administrators simpler by just getting in the log file as input and visualizing things present in the log file. This application would reduce the burden of those administrators task of manually going through the log files. All these presented using a simple to use and user-friendly GUI.

**REFERENCES**

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4. Nihuo Software Inc, Log File Sample Explained, <https://www.loganalyzer.net/log-analysis-tutorial/log-file-sample-explain.html>, 24 Oct 2020.

Introduction

Overall Description

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Functional Requirements

non-functional requirement

external interface requirements

performance requirements

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software system attributes

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class diagram

sequence diagram

state chart diagram

activity diagram

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output

Conclusion

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