Answers **(5)**	Coding Efficiency **(5)**	Viva **(5)**	Timely Completion **(5)**	Total **(20)**	Dated Sign of Subject Teacher

Expected Date of Completion:----------

Actual Date of Completion:----------

Experiment No: Group A-1

Problem Definition:

Write a program for Tracking Emails and Investigating Email Crimes. i.e. Write a program to analyze e–mail header

1.1 Prerequisite:

Application Layer Protocols

1.2 Learning Objective:

1. To understand how Mails are transferred from Sender to Receiver.
2. To Understand Email related Parameter.

1.3 Theory:

1.3.1 Introduction

Analysis of email is especially important not just because email may be used to communicate about things that we might be interested in for an investigation, but because it is a comparatively permanent and public record of those communications. In the case of a phone call, there is only the record that a call took place; in a spoken conversation, there may be no record at all. Conventional mail can be virtually untraceable, and paper documents are easily destroyed. Email, however, is unique; when a message is sent, the entire message is stored for both the sender and the receiver, and records of the mail being sent are stored on dozens of servers that the message passes through before arriving at its destination. There are a number of ways to analyze email, including: data mining techniques, which may be applied to large or small data sets; straightforward searching of a user's email for certain content; and in-depth analysis of an individual email's lineage.

E-mail system comprises of various hardware and software components that include sender’s client and server computers and receiver’s client and server computers with required software and services installed on each. Besides these, it uses various systems and

services of the Internet. The sending and receiving servers are always connected to the Internet but the sender's and receiver's client connects to the Internet as and when required.

An e-mail communication between a sender '*Alice'* having e-mail address '*alice@a.com*' and recipient '*Bob'* having e-mail address '*bob@b.com*' is shown in figure 1.'*Alice'* composes an e-mail message on her computer called client for '*Bob'* and sends it to her sending server 'smtp.a.org' using *SMTP* protocol. Sending server performs a lookup for the mail exchange record of receiving server '*b.org*' through Domain Name System (*DNS)* protocol on *DNS* server '*dns.b.org*'. The *DNS* server responds with the highest priority mail exchange server '*mx.b.org'* for the domain 'b.org'. Sending server establishes *SMTP* connection with the receiving server and delivers the e-mail message to the mailbox of '*Bob'* on the receiving server. '*Bob'* downloads the message from his mailbox on receiving server to local mailbox on his client computer using *POP3* or *IMAP* protocols. Optionally, '*Bob'* can also read the message stored in his server mailbox without downloading it to the local mailbox by using a Webmail program.

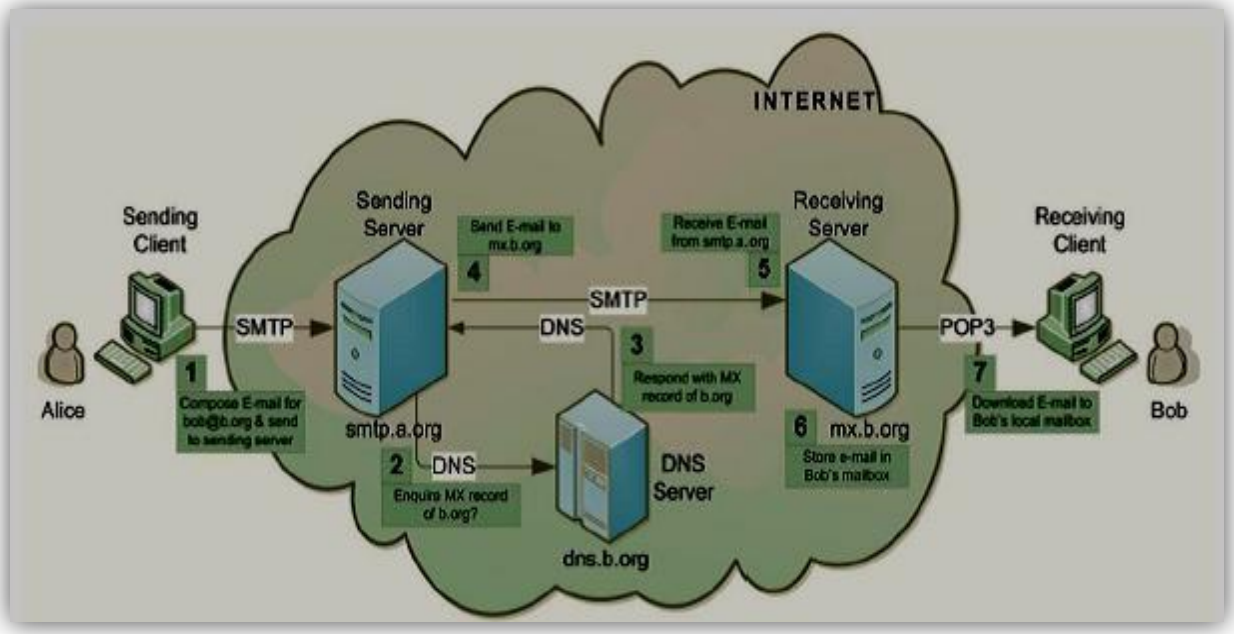


Figure 1*: E-mail communication between a sender 'Alice' and recipient 'Bob'*

1.3.2 E-MAIL ACTORS, ROLES AND RESPONSIBILITIES

E-mail is a highly distributed service involving several actors that play different roles to accomplish end-to-end mail exchange. These actors fall under "User Actors", "Message Handling Service (*MHS*) Actors" and "Administrative Management Domain (*ADMD*) Actors" groups.

User Actors are people, organizations or processes that serve as sources or sinks of messages. They can generate, modify or look at the whole message. User Actors can be of following four types (Table 1):

User Actor Type	Roles and Responsibilities
Author	▪ Responsible for creating the message, its contents, and its list of Recipient addresses. ▪ The MHS transfers the message from the Author and delivers it to the Recipients. ▪ The MHS has an Originator role that correlates with the Author role.
Recipient	▪ The Recipient is a consumer of the delivered message. ▪ The MHS has a Receiver role that correlates with the Recipient role. ▪ A Recipient can close the user-communication loop by creating and submitting a new message that replies to the Author e.g. an automated form of reply is the Message Disposition Notification (MDN)
Return Handler	▪ It is a special form of Recipient that provides notifications (failures or completions) generated by the MHS as it transfers or delivers the message. ▪ It is also called Bounce Handler.
Mediator	▪ It receives, aggregates, reformulates, and redistributes messages among Authors and Recipients. ▪ It forwards a message through a re-posting process. ▪ It shares some functionality with basic MTA relaying, but has greater flexibility in both addressing and content than is available to MTAs. It preserves the integrity and tone of the original message, including the essential aspects of its origination information. It might also add commentary. ▪ It does not create new message that forwards an existing message, Reply or annotation. ▪ Some examples of mediators are: Alias, ReSender, Mailing Lists, Gateways and Boundary Filter.

All types of Mediator user actors set HELO/EHLO, ENVID, RcptTo and Received fields. Alias actors also typically change To/CC/BCC and MailFrom fields. Identities relevant to ReSender are: From, Reply-To, Sender, To/CC/BCC, Resent-From, Resent-Sender, Resent-To/CC/BCC and MailFrom fields. Identities relevant to Mailing List processor are: List-Id, List-*, From, Reply-To, Sender, To/CC and MailFrom fields. Identities relevant to Gateways are: From, Reply-To, Sender, To/CC/BCC and MailFrom fileds.

Message Handling Service (MHS) Actors are responsible for end-to-end transfer of messages. These Actors can generate, modify or look at only transfer data in the message. *MHS* Actors can be of following four types (Table 2):

MHS Actor Type	Roles and Responsibilities
Originator	▪ It ensures that a message is valid for posting and then submits it to a Relay ▪ It is responsible for the functions of the Mail Submission Agent. ▪ It also performs any post-submission that pertain to sending error and delivery notice. ▪ The Author creates the message, but the Originator handles any transmission issues with it
Relay	▪ It performs MHS-level transfer-service routing and store-and-forward function by transmitting or retransmitting the message to its Recipients. ▪ It adds trace information but does not modify the envelope information or the semantics of message content. ▪ It can modify message content representation, such as changing the form of transfer encoding from binary to text, but only (as required) to meet the capabilities of the next hop in the MHS. ▪ When a Relay stops attempting to transfer a message, it becomes an Author because it sends an error message to the Return Address.
Gateway	▪ It connects heterogeneous mail services despite differences in their syntax and semantics. ▪ It can send a useful message to a Recipient on the other side, without requiring changes to any components in the Author's or Recipient's mail services.
Receiver	▪ It performs final delivery or sends the message to an alternate address. ▪ It can also perform filtering and other policy enforcement immediately before or after delivery.

For networks, a port means an endpoint to a logical connection. The port number identifies what type (application/service offered) of port it is. The commonly used default port numbers used in e-mail are shown in Table 3. A complete list of default port numbering assignment is given in

Port No	Protocols/Services	Description
25	SMTP SMTP e-mail server	Simple Mail Transfer Protocol - core Internet protocol used to transfer from client to server (MUA to MTA) and server to server (MTA to MTA)
110	POP3 POP e-mail server	Post Office Protocol allows clients (MUA's) to retrieve stored e-mail
143	IMAP IMAP(4) e-mail server	Internet Message Access Protocol provides a means of managing e-mail messages on a remote server and retrieve stored e-mail
465	SMTPS WSMTP (SSMTP) protocol over TLS|SSL	SMTP via SSL encrypted connection (Unofficial)
993	IMAPS SSL encrypted IMAP	IMAP via SSL encrypted connection
995	POP3S SPOP SSL encrypted POP	POP via SSL encrypted connection
587	MSA	Outgoing Mail (Submission)
80	HTTP	Webmail
443	HTTPS	Secure Webmail

1.3.3 Analyzing an Individual Email

Although webmail will feature prominently in this section, the analysis of a particular email's lineage is much broader and can be applied to any email. A simple view of the path of an email from a sender to a client is presented in Figure 2. The email originates from the sender, whether from a local email client or a webmail application. When the email is sent, it is first sent to a Simple Mail Transfer Protocol (SMTP) server. That server forwards it to other SMTP servers until it finally reaches the destination server. On reaching its destination, the email is sent to a Post Office Protocol (POP) server, or any number of similar mail-delivery servers (IMAP is another, and webmail services may use their own servers for this purpose). The receiving client then connects to that server, retrieves the message, and allows the recipient to read it.

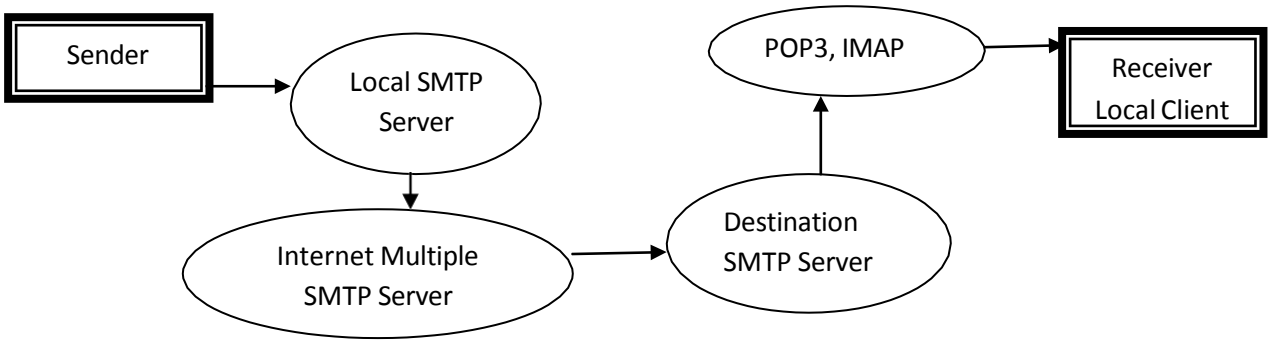


Figure 2: *Path of an email from a sender to a client*

When the email is sent and when it is received, those respective servers add their own information to the email's header, and most likely log the action. Access to those logs may be required for much analysis, but specifics are outside of the scope of this paper. Considerable information can be gleaned from the header alone.

Suppose Moses, with the address moses@nmt.edu, sends an email from his office on the New Mexico Tech campus to his similarly named friend, with the email address thenewmoses@gmail.com. The subject of this email is "Snakes," and the content "Fish."

Below is the entire theoretical email, including all headers.

From:
moses@nmt.edu
Subject: Snakes
Date: September 25, 2021 9:35:29 PM
MDT To: thenewmoses@gmail.com
X-Gmail-Received:
ca493ed685a8e9ae77165ab2ce345127e5b310b4 Delivered-
To: thenewmoses@gmail.com
Received: by 10.90.33.15 with SMTP id g15cs279684agg; Mon, 25 Sep
2021 20:35:32 0700 (PDT)
Received: by 10.35.113.12 with SMTP id q12mr526602pym; Mon, 25 Sep 2021
20:35:32 -0700 (PDT)
Received: from mailhost.nmt.edu (mailhost.NMT.EDU
[129.138.4.52]) by mx.gmail.com with ESMTP id 36si2059018nza.
2021.09.25.20.35.32; Mon, 25 Sep 2021 20:35:32 -0700 (PDT)
Received: from localhost (localhost.localdomain [127.0.0.1]) by
localhost.localdomain (Postfix) with ESMTP id 09FF4436164 for
<thenewmoses@gmail.com>; Mon, 25 Sep 2021 21:35:32 -0600
(MDT) Received: from mailhost.nmt.edu ([127.0.0.1]) by localhost
(mailhost.nmt.edu [127.0.0.1]) (amavisd-new, port 10024) with
ESMTP id 11225-05 for <thenewmoses@gmail.com>; Mon, 25 Sep 2021
21:35:30 -0600 (MDT)
Received: from [192.168.1.2] (cs-fitch017.nmt.edu [129.138.21.110])
by mailhost.nmt.edu (Postfix) with ESMTP id 6FD4B436030 for
<thenewmoses@gmail.com>; Mon, 25 Sep 2021 21:35:30 -0600
(MDT) Return-Path: <moses@nmt.edu>
Received-Spf: pass (gmail.com: best guess record for
domain of moses@nmt.edu designates 129.138.4.52 as
permitted sender) Mime-Version: 1.0 (Apple Message
framework v752.2)
Content-Transfer-Encoding: 7bit
Message-Id: <77E313EF-271F-4AD0-A8D3-81263BF7B083@nmt.edu>

Content-Type: text/plain; charset=US-ASCII;
format=flowed X-Mailer: Apple Mail (2.752.2)
X-Virus-Scanned: by amavisd-new-2.3.1 (20050509) (RHEL AS) at
nmt.edu Fish

E-MAIL IDENTITIES:

Field Name	Set By	Field Description
Layer: ***Message Header Fields (Identification Fields)***		
Message- ID:	Originator	Globally unique message identification string generated when it is sent.
In-Reply-To:	Originator	Contains the Message-ID of the original message in response to which the reply message is sent.
References:	Originator	Identifies other documents related to this message, such as other e-mail message.
Layer: ***Message Header Fields (Originator Fields)***		
From:	Author	Name and e-mail address of the author of the message
Sender:	Originator	Contains the address responsible for sending the message on behalf of Author, if not omitted or same as that specified in From field.
Reply- To:	Author	E-mail address, the author would like recipients to use for replies. If present it overrides the From field.
Layer: ***Message Header Fields (Originator Date Fields)***		
Date:	Originator	It holds date and time when the message was made available for delivery.
Layer: ***Message Header Fields (Informational Fields)***		
Subject:	Author	It describes the subject or topic of the message.
Comments:	Author	It contains summarized comments regarding the message.
Keyword:	Author	It contains list of comma separated keywords that may be useful to the recipients e.g. when searching mail.
Layer: ***Message Header Fields (Destination Address Fields)***		
TO:	Author	Specifies a list of addresses of the recipients of the message. These addresses might be different from address in RcptTo SMTP commands
CC:	Author	Generally same as To Field. Generally a To field specifies primary recipient who is expected to take some action and CC addresses

1.4 Execution Steps

- Open the Email which you want to analyze header
- Click on the right side three vertical dot(more) and select show original.
- New tab will be open then copy header information which you want to analyze.
- Open **https://www.whatismyip.com/email-header-analyzer** website.
- Copy the header information and click on analyze button.
- Then You will see the header analysis on screen.

1.5 Assignment Question:

1. Why to Analyze Email Header?
2. What Fields are analyzed during Email Analysis Header?
3. Which Readymade Tools are Available for Analyzing E-Mail Header?
4. Explain Email Architecture in Detail?
5. What is POP3, IMAP, SMTP, and MIME?

1.6 Conclusion:

E-mail is a widely used and highly distributed application involving several actors that play Different roles. These actors include hardware and software components, services and protocols which provide interoperability between its users and among the components along the path of transfer. Cybercriminals forge e-mail headers or send it anonymously for illegitimate purposes which lead to several crimes and thus make e-mail forensic investigation crucial.

Answers **(5)**	Coding Efficiency **(5)**	Viva **(5)**	Timely Completion **(5)**	Total **(20)**	Dated Sign of Subject Teacher

Expected Date of Completion:----------

Actual Date of Completion:----------

Assignment Group A-2

Problem Definition:
Implement a program to generate and verify CAPTCHA image.

2.1 Prerequisite:

Basics of PYTHON

2.2 Learning Objectives:

1. Understand the use of CAPTCHA Image.
2. Generation and Verification of it.

2.3New Concepts:

1. CAPTCHA generation
2. Functions used like RANDOM

2.4 Theory

2.4.1 Introduction

A **CAPTCHA** (an acronym for "**C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part") is a type of challenge-response test used in computing to determine whether or not the user is human. The most common type of CAPTCHA was first invented by Mark D. Lillibridge, Martin Abadi, Krishna Bharat and Andrei Z. Broder. This form of CAPTCHA requires that the user type the letters of a distorted image, sometimes with the addition of an obscured sequence of letters or digits that appears on the screen. Because the test is administered by a computer, in contrast to the standard Turing test that is

administered by a human, a CAPTCHA is sometimes described as a reverse Turing test. Actually CAPTCHA is used as a simple puzzle hurdle, which restricts various automated programs to sign-up E-mail accounts, cracking passwords, spam sending, privacy violation

etc. This CAPTCHA actually challenges a particular automated program, which is trying to access some private zone. So, CAPTCHA helps in preventing access of personal mail accounts by some un-authorized automated spamming programs

2.4.2 Characteristics:-

CAPTCHAs are by definition fully automated, requiring little human maintenance or intervention to administer. This has obvious benefits in cost and reliability.

By definition, the algorithm used to create the CAPTCHA must be made public, though it may be covered by a patent. This is done to demonstrate that breaking it requires the solution to a difficult problem in the field of artificial intelligence (AI) rather than just the discovery of the (secret) algorithm, which could be obtained through reverse engineering or other means.

Modern text-based CAPTCHAS are designed such that they require the simultaneous use of three separate abilities—invariant recognition, segmentation, and parsing—to correctly complete the task with any consistency.

1. Invariant recognition refers to the ability to recognize the large amount of variation in the shapes of letters. There are nearly an infinite number of versions for each character that a human brain can successfully identify. The same is not true for a computer, and teaching it to recognize all those differing formations is an extremely challenging task.
2. Segmentation, or the ability to separate one letter from another, is also made difficult in CAPTCHAs, as characters are crowded together with no white space in between.
3. Context is also critical. The CAPTCHA must be understood holistically to correctly identify each character. For example, in one segment of a CAPTCHA, a letter might

look like an “m.” Only when the whole word is taken into context does it become clear that it is a “u” and an “n.”

Each of these problems pose a significant challenge for a computer, even in isolation. The presence of all three at the same time is what makes CAPTCHAs difficult to solve.

2.4.3 Why we Prefer Captcha rather other security measures?

1. To Protect Website’s Registration Forms –

Many Websites like Hotmail, Gmail, Yahoo, Facebook etc. offers free free registration. It is necessary to protect these website’s registrations so that it ensures the registered user is a human not a program or bot. Captcha Code is used to protect the Registration Form Submission Programmatically.

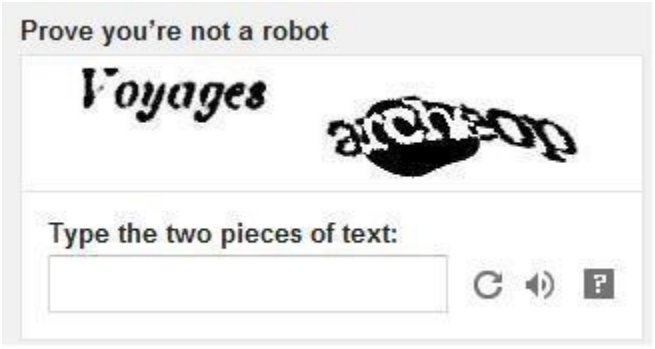


Figure 1:- *Gmail Registration Form Captcha Code Image Screen Capture*

2. To Prevent Comment Spams in Blogs –

Captcha Code is used in the comment form so that only human can comment on a post otherwise spammers can flood hundreds of comments to a single post.

3. To Protect Email Address Scrapping –

Spammers crawl the web in the search of Email address posted in the clear text (e.g. **email@website.com**). You can protect your email address either by using Captcha to hide the email address, one can solve the Captcha before showing the Email address or by using alternative trick to post Email Address in the format of email at website dot com.

4. To Protect from Search Engine Bots –

Many Html tags are available to specifying indexing condition to Search engine bots. To

prevent a website or specific webpage from search engine crawling, it is desirable to use **html meta tag** but sometimes it is not completely sure that the webpage is fully protected from search engine crawlers and large companies who needs a high security uses Captcha rather than to use only meta tags to protect their highly public protected and confidential Web Pages.

2.4.4 Application of CAPTCHA:-

Applications of CAPTCHAs

CAPTCHAs have several applications for practical security:

- **Preventing Comment Spam in Blogs.** Most bloggers are familiar with programs that submit bogus comments, usually for the purpose of raising search engine ranks of some website (e.g., "buy penny stocks here"). This is called comment spam. By using a CAPTCHA, only humans can enter comments on a blog. There is no need to make users sign up before they enter a comment, and no legitimate comments are ever lost!
- **Protecting Website Registration.** Several companies (Yahoo!, Microsoft, etc.) offer free email services. Up until a few years ago, most of these services suffered from a specific type of attack: "bots" that would sign up for thousands of email accounts every minute. The solution to this problem was to use CAPTCHAs to ensure that only humans obtain free accounts. In general, free services should be protected with a CAPTCHA in order to prevent abuse by automated scripts.
- **Protecting Email Addresses From Scrapers.** Spammers crawl the Web in search of email addresses posted in clear text. CAPTCHAs provide an effective mechanism to hide your email address from Web scrapers. The idea is to require users to solve a CAPTCHA before showing your email address.
- **Online Polls.** In November 1999, *http://www.slashdot.org* released an online poll asking which was the best graduate school in computer science (a dangerous question to ask over the web!). As is the case with most online polls, IP addresses of voters were recorded in order to prevent single users from voting more than once.

However, students at Carnegie Mellon found a way to stuff the ballots using programs that voted for CMU thousands of times. CMU's score started growing rapidly. The next day, students at MIT wrote their own program and the poll became a contest between voting "bots." MIT finished with 21,156 votes, Carnegie Mellon with 21,032 and every other school with less than 1,000. Can the result of any online poll be trusted? Not unless the poll ensures that only humans can vote.

- **Preventing Dictionary Attacks.** CAPTCHAs can also be used to prevent dictionary attacks in password systems. The idea is simple: prevent a computer from being able to iterate through the entire space of passwords by requiring it to solve a CAPTCHA after a certain number of unsuccessful logins. This is better than the classic approach of locking an account after a sequence of unsuccessful logins, since doing so allows an attacker to lock accounts at will.
- **Search Engine Bots.** It is sometimes desirable to keep WebPages unindexed to prevent others from finding them easily. There is an html tag to prevent search engine bots from reading web pages. The tag, however, doesn't guarantee that bots won't read a web page; it only serves to say "no bots, please." Search engine bots, since they usually belong to large companies, respect web pages that don't want to allow them in. However, in order to truly guarantee that bots won't enter a web site, CAPTCHAs are needed.
- **Worms and Spam.** CAPTCHAs also offer a plausible solution against email worms and spam: "I will only accept an email if I know there is a human behind the other computer." A few companies are already marketing this idea.

2.4.5 Advantages:

1. Distinguishes between a human and a machine
2. Makes online polls more legitimate
3. Reduces spam and viruses
4. Makes online shopping safer
5. Diminishes abuse of free email account services

2.4.6 Disadvantages:

1. Sometimes very difficult to read
2. Are not compatible with users with disabilities
3. Time-consuming to decipher
4. Technical difficulties with certain internet browsers
5. May greatly enhance Artificial Intelligence

2.5 Algorithm:

1. Start
2. Install captcha in python by this command : **pip install captcha**
3. Import **image.captcha** from ImageCaptcha
4. Generate captcha by **generate(captcha_text)** function
5. For randomly captcha generation use function **random.randint()**
6. Create an image to write a captcha text
7. End

5.7 Assignment Questions:

1. What is Full Form of CAPTCHA?
2. Write down different forms of CAPTCHA?
3. Why CAPTCHA is needed?
4. Explain the uses of different captcha as per Requirement?

Conclusion:

Hence we conclude that CAPTCHA is used to distinguished Human and Machine and Provide Security to Programs.

Answers **(5)**	Coding Efficiency **(5)**	Viva **(5)**	Timely Completion **(5)**	Total **(20)**	Dated Sign of Subject Teacher

Expected Date of Completion:----------

Actual Date of Completion:----------

Assignment Group A-3

Problem Definition: Write a Computer Forensics Application Program in Java/Python/C++ for recovering Deleted Files and Deleted Partitions.

3.1 Prerequisite:
a) Knowledge about Partitions in Ubuntu. b) Path of Trash folder.

3.2 Learning Objectives:

- Understand the concept of Recovery of deleted files.
- Implementation of recovery of deleted Partitions.

3.3New Concepts:
a. Recovery of files in LINUX OS.

3.4 Theory
3.4.1 Introduction

Have you accidentally deleted an important file because you are in a habit of using "Shift+Del" rather than delete only?? Well don't panic.There are many utilities in Ubuntu and other Linux distributions which helps you in recovering the so called "permanently deleted" files. Actually when you delete a file permanently (accidentally or intentionally), It doesn't get removed from your hard disk.It get stored in certain blocks of the storage device and they continue to exist in the blocks unless you overwrite them with newer files. There are many Tools available to recover permanently deleted files Scalpel.

Scalpel is a platform independent command based tool which is small yet very powerful.

But, if the file is deleted i.e. by just pressing Delete button the file is stored in Trash folder in Ubuntu OS. So it is easy to recover the deleted files from Trash Folder. Just we need to know the path of trash folder.

Path is: ="/home/gurukul/.local/share/Trash/files"

There are sub-Folders in Trash Folder namely :

1. files- contains files which are deleted
2. info- contains information of files deleted
3. expunged

3.4.2 Introduction to file systems:

File systems are one of the things any newcomer to linux must become acquainted with. In the world of Microsoft you never really have to worry about it, the default being NTFS. Linux however, being built on a world of open source and differing opinions, is not limited in this way and so the user should have an understanding of what a file system is, and how it affects the computer.

At the core of a computer, it's all 1s and 0s, but the organization of that data is not quite as simple. A *bit* is a 1 or a 0, a *byte* is composed of 8 bits, a kilobyte is 1024 (i.e. 2) bytes, a megabyte is 1024 kilobytes and so on and so forth. All these *bits* and *bytes* are permanently stored on a Hard Drive. A hard drive stores all your data, any time you save a file, you're writing thousands of 1s and 0s to a metallic disc, changing the magnetic properties that can later be read as 1 or 0. There is so much data on a hard drive that there has to be some way to organize it, like a library of books and the old card drawers that indexed all of them, without that index, we'd be lost. Libraries, for the most part, use the Dewey Decimal System to organize their books, but

there exist other systems to do so, none of which have attained the same fame as Mr. Dewey's invention. File systems are the same way. The ones most users are aware of are the ones Windows uses, the vFat or the NTFS systems, these are the Windows default file systems.

Ubuntu (like all UNIX-like systems) organizes files in a hierarchical tree, where

relationships are thought of in teams of children and parent. *Directories* can contain other directories as well as *regular files*, which are the "leaves" of the tree. Any element of the tree can be references by a *path name*; an *absolute path name* starts with the character / (identifying the *root directory*, which contains all other directories and files), then every child directory that must be traversed to reach the element is listed, each separated by a / sign.

3.4.3 Main directories

The standard Ubuntu directory structure mostly follows the File system Hierarchy Standard, which can be referred to for more detailed information.

Here, only the most important directories in the system will be presented.
/bin is a place for most commonly used terminal commands, like ls, mount, rm, etc.

/boot contains files needed to start up the system, including the Linux kernel, a RAM disk image and bootloader configuration files.

/dev contains all *device files*, which are not regular files but instead refer to various hardware devices on the system, including hard drives.

/etc contains system-global configuration files, which affect the system's behavior for all users. **/home** home sweet home, this is the place for users' home directories.

/lib contains very important dynamic libraries and kernel modules

/media is intended as a mount point for external devices, such as hard drives or removable media (floppies, CDs, DVDs).

/mnt is also a place for mount points, but dedicated specifically to "temporarily mounted" devices, such as network filesystems.

/opt can be used to store addition software for your system, which is not handled by the package manager.

/proc is a virtual filesystem that provides a mechanism for kernel to send information to processes.

/root is the superuser's home directory, not in /home/ to allow for booting the system even if /home/ is not available.

/sbin contains important administrative commands that should generally only be

employed by the superuser.

/srv can contain data directories of services such as HTTP (/srv/www/) or FTP.

/sys is a virtual filesystem that can be accessed to set or obtain information about the kernel's view of the system.

/tmp is a place for temporary files used by applications.

/usr contains the majority of user utilities and applications, and partly replicates the root directory structure, containing for instance, among others, /usr/bin/ and /usr/lib.

/var is dedicated variable data that potentially changes rapidly; a notable directory it contains is /var/log where system log files are kept. **Steps to Partition HardDisk Drive in Ubuntu:-**

Step 1. If you are trying to format or partition your hard drive it is assumed that bios is able to detect the device. To determine the path and other specific information about your drive open a terminal window and enter this command:

sudo lshw -C disk

Step 2. After entering this command Ubuntu should return something similar to this. Take note of the “logical name” because this will be used throughout the partitioning process if done via terminal window**.**

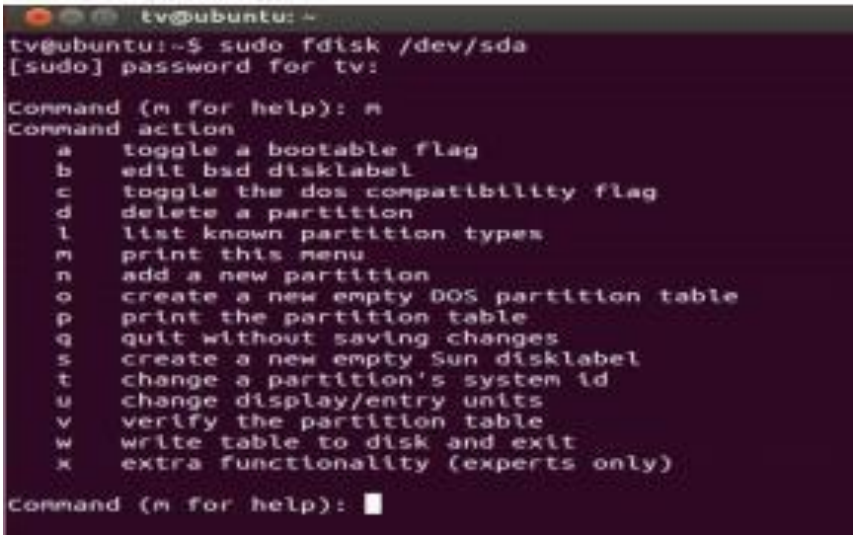
Step 3. The part we will be most concerned with will be the hard drive information that is displayed in the terminal window.

If you plan on using the hard drive only for Ubuntu then the recommended file system to use is either ext3/ext4 depending on whether or not you need backwards compatibility with previous versions of Linux. If you will need to share files between Ubuntu and Windows machines fat 32 is the recommended file system to use, but NTFS will also work well also.

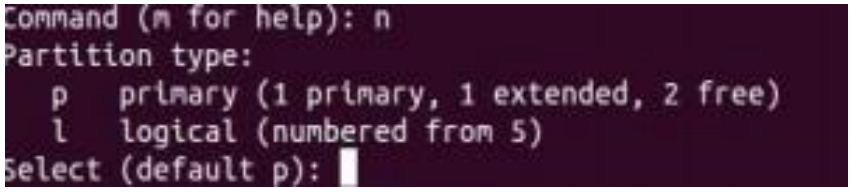
3.4.4 Partition using command line in Terminal: Step

1. Start fdisk with this command

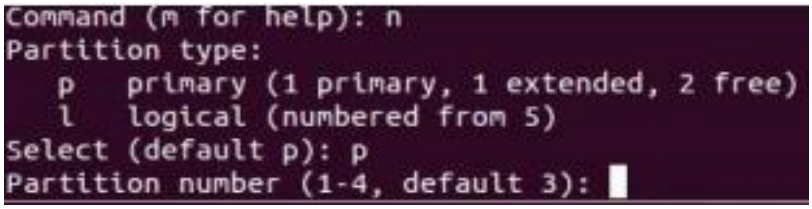
Step 2. Press **"m"** then hit **enter**. This will return a menu like the one below showing all of the available commands for the fdisk program.



Step 3. Since we want to add a new partition press **"n"** and then **enter**.



Step 4. To create a primary partition (what we want) press **"p"** and then hit **enter**.



Step 5.

If you only want 1 partition press **"1"** and hit **enter**. You may be provided with a default response, you may choose this as the Partition number if you would like. Next you will be prompted for the locations of where you would like the first and last sectors of the partition to be. You may again be provided with default responses choose these if you want.

Step 6.

Now choose w to write the partition to the disk. Type "w" then press enter.Your drive is now partitioned. Now we need to format it. By default Linux will recognize this partition as dev/sdb1.

Step 7. To format the partition with an ext3 filesystem.

sudo mkfs -t ext3 /dev/sdb1

3.5 Algorithm:

1. Start
2. Initialize variables as path="/home/gurukul/.local/share/Trash/files" infopath="/home/gurukul/.local/share/Trash/info"
3. Check the list of files present in files folder.
4. Find the path of file to restore it using info folder.
5. Copy the contents of file which is deleted and is in Trash folder into new file at original location.
6. Delete the file from Trash folder.
7. End

3.6 Mathematical Model:

I= P (path of trash folder) **Functions:**
re.findall(r'/.*',line)
destipath.lstrip('[') destipath.rstrip(']')
destipath[:-1]
destipath[1:] **Output:**
R- Recovered file

3.7 Assignment Questions:

1. What is Path of Trash folder in Ubuntu and what are the different folders?
2. How to see hidden files and filesystem of ubuntu?
3. What are different file systems in Ubuntu also state main directories of it??
4. How to list different files and what are the various options of ls used for file related function?

Conclusion:

Hence we conclude that using **Forensics Application Program in Python we can recover Deleted Files.**

Answers **(5)**	Coding Efficiency **(5)**	Viva **(5)**	Timely Completion **(5)**	Total **(20)**	Dated Sign of Subject Teacher

Expected Date of Completion:----------

Actual Date of Completion:----------

Assignment Group A-4

Write a program for Log Capturing and Event Correlation

Prerequisite:

- Latest version of Squid should be used.(version 2.5 or greater)
- A web server for testing purpose which can be used instead of Internet.
- Squid Version greater than 2.6 is required for Transparent squid proxy configuration in this lab.
-

Learning Objectives:

- To understand how Log Records are generated for Further Analysis.

New Concepts:

- Squid and Sarg

Theory

4.1. Introduction:

- During the period of development of internet, users are allowed for unlimited access to the resources due to less number of users. So there were less issues related to accessing speed over internet.
- With the increase in internet usage, many issues raised related to accessing speed, effective bandwidth utilization etc. One method of overcoming these issues is, maintaining a copy of webpage visited by a user in the cache so that the other user who visits the same webpage will access the same website within a short period of time. This method not only increases the accessing speed but also helps in utilizing the bandwidth effectively.
- The above said functionality can be achieved by maintaining a proxy server through which all the users in the organization or a group access the internet. The most widely used proxy server in Linux is Squid Proxy, which is free software released General Public License.

- Squid provides proxy and cache services for **H**yper **T**ext **T**ransfer **P**rotocol (HTTP),

  File **T**ransfer **P**rotocol (FTP), and various other protocols.

To configure a system as a proxy server, one should have a sufficient amount of memory for maintaining the cache which in turn increases the performance.

- In case if the internet connection is not available, setup one host as a web server in place of internet and assign the IP address to the proxy server network interface in the network, used by web server instead of public IP address assigned to that interface.

4.2. Steps to Configure Squid Proxy:

4.2.1. Installation of Squid Package

A Squid proxy server is generally installed on a separate server than the Web server with the original files. Squid works by tracking object use over the network. Squid will initially act as an intermediary, simply passing the client's request on to the server and saving a copy of the requested object. If the same client or multiple clients request the same object before it expires from Squid's cache, Squid can then immediately serve it, accelerating the download and saving bandwidth.

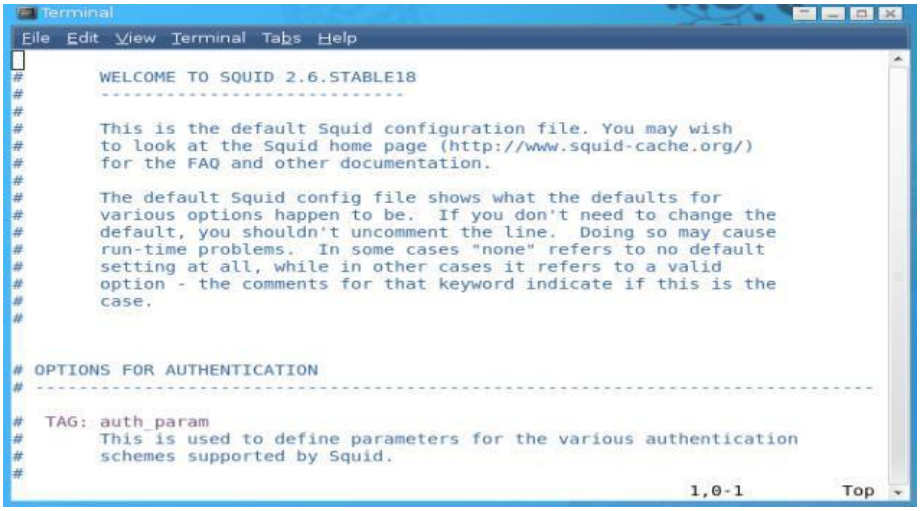
```
sudo apt update
sudo apt -y install squid
```

4.2.2. Accessing the Proxy Server configuration file

To configure squid proxy server we need to edit the *sudo gedit /etc/squid/squid.conf* file and the default location of squid.conf file varies from distribution to distribution and from version to version. We can edit the configuration file using vi editor through command prompt.

```
sudo gedit /etc/squid/squid.conf
```

Then the content of the configuration file can be viewed as shown below in the figure.



Editing the squid configuration file

```
sudo gedit /etc/squid/squid.conf
```

Search the TAG: auth_param and paste the following acl

```
auth_param basic program /usr/lib/squid/basic_ncsa_auth /etc/squid/passwd
auth_param basic children 5
auth_param basic realm Squid Basic Authentication
auth_param basic credentialsttl 2 hours
acl auth_users proxy_auth REQUIRED
http_access allow auth_users

 #search localnet and paste line in last

acl localnet src 192.168.60.70
```

>sudo service squid3 restart

Specifying the interface and port number on which the proxy server should listen.

By default, the proxy server will listen on all the available network interfaces on the system for requests. For Example, if one interface card is assigned a public ip from which it is connected to internet and the other interface card is assigned an ip address which belongs to your local area network. Then in order to make you proxy server to listen for requests from your Local Area Network through a particular port, then change the variable http_port 3128 in the squid configuration file to desired ip address and port number in the format shown below.

http_port <ip address belonging to LAN>:<port number>

Example: For example, if your proxy server has an ip address 192.168.60.70 which belongs to the local area network 192.168.60.0/24 and you want the server to listen for requests from your LAN through a particular port say 3456, then you can change the variable http_port as shown.

http_port 192.168.60.70:3456

Assigning Access Controls

By default, no user machine is allowed to connect to the proxy server except the localhost. To allow the local machines access your proxy server, locate the acl section in the squid configuration file starting with acl and at the end of the last acl line specify your access

control. For example to allow local area network 192.168.60.0/24 machines to access your proxy server, specify the acl as

acl mylan src 192.168.60.0/255.255.255.0

In the above example, mylan specifies the name of my access control. We can specify any name other than my lan for access control. src specifies the source network.

Allow or Deny based on Access Control.

After specifying the access control for your local LAN, we need to provide allow permission for the specified LAN using http_access variable in the squid configuration file as shown in the example below.

Example: To allow the above specified access control (i.e acl mylan src 192.168.60.0/255.255.255.0), we need to specify the http_access variable as

Hyderabad http_access allow mylan

Here mylan specifies the access control used. Suppose if we want to allow all the networks except the 192.168.60.0/24 network to access the proxy then we can specify the http_access variable as

http_access deny !mylan

In the above line, !mylan specifies except mylan network.

Note:

The above specified http_access variable should be specified before the line

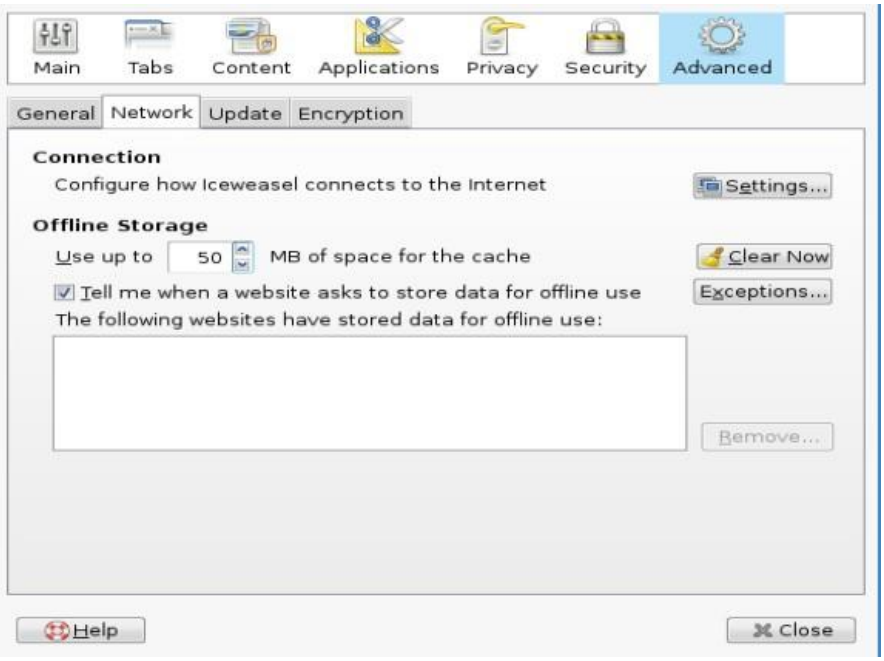
http_access deny all in the configuration file.

Saving the changes and exit the gedit Editor

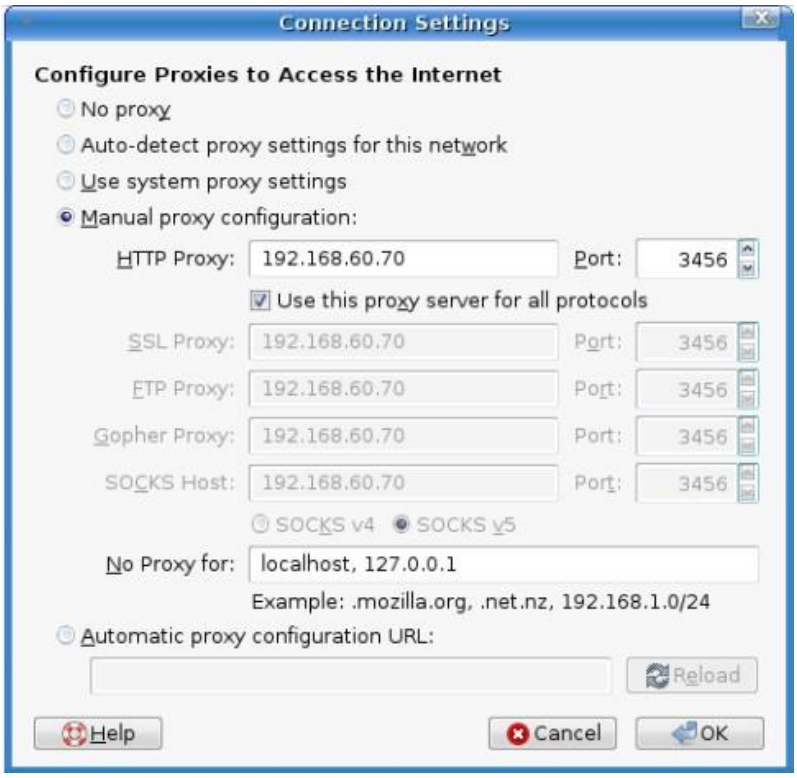
After making appropriate changes to your configuration file exit the vi editor window by pressing Esc followed by :wq!. Here wq specifies save changes and exit the configuration file.

4.3 Testing the Squid configuration

To test the squid configuration, open a browser in any one of the pc in local area network or on the proxy server and specify the proxy settings as the ipaddress of the proxy server and port on which it is listening for requests. For example, in firefox web browser if we want to set the proxy settings in the browser window goto **Edit** -->**Preferences** and window similar to shown below will be displayed.



Now select Advanced tab, and under advanced tab click on Network tab and click on Settings option under Connection field. Then a window similar to the shown below will be displayed.



4.4 SARG – Squid Analysis Report Generator and Internet Bandwidth Monitoring Tool

SARG is an open source tool that allows you to analyze the squid log files and generates
beautiful reports in HTML format with information's about users, IP addresses, top accessed sites, total bandwidth usage, elapsed time, downloads, access denied websites, daily reports, weekly reports and monthly reports.

The SARG is very handy tool to view how much internet bandwidth is utilized by individual machines on the network and can watch on which websites the network's users are accessing.

Installing Sarg from Source

The '**sarg**'package by default not included in **RedHat** based distributions, so we need to manually compile and install it from source tar ball. For this, we need some additional pre- requisites packages to be installed on the system before compiling it from source.

$ sudo apt-get install sarg

Configuring Sarg

Now it's time to edit some parameters in SARG main configuration file. The file contains lots of options to edit, but we will only edit required parameters like:

Access logs

path

Output

directory

Date

Format

Overwrite report for the same date.

Open sarg.conf file with your choice of editor and make changes as shown below.

vi /usr/local/etc/sarg.conf [On RedHat based systems]

Now Uncomment and add the original path to your squid access
log file. # sarg.conf

TAG: access_log file
Where is the access.log file
sarg
-l file
access_log /var/log/squid/access.log

Next, add the correct Output directory path to save the generate squid reports in that directory. Please note, under Debian based distributions the Apache web root directory is '/var/www'. So, please be careful while adding correct web root paths under your Linux distributions.

TAG: output_dir
The reports will be saved in that
directory # sarg -o dir

output_dir /var/www/html/squid-reports

Set the correct date format for reports. For example, 'date_format e' will

display reports in 'dd/mm/yy' format.

TAG: date_format

Date format in reports: e (European=dd/mm/yy), u (American=mm/dd/yy), w (Weekly=yy.ww)

#

date_format e

Next, uncomment and set Overwrite report to 'Yes'. # TAG: overwrite_report yes|no

yes - if report date already exist then will be overwritten.

no - if report date already exist then will be renamed to filename.n, filename.n+1

overwrite_report yes

That's it! Save and close the file.

Step 3: Generating Sarg Report

Once, you've done with the configuration part, it's time to generate the squid log report using the following command.

sarg -x [On RedHat based systems]

Assessing Sarg Report

The generated reports placed under '/var/www/html/squid-reports/' or '/var/www/squid-reports/' which can be accessed from the web browser using the address.

http://localhost/squid-reports OR

http://ip-address/squid-reports

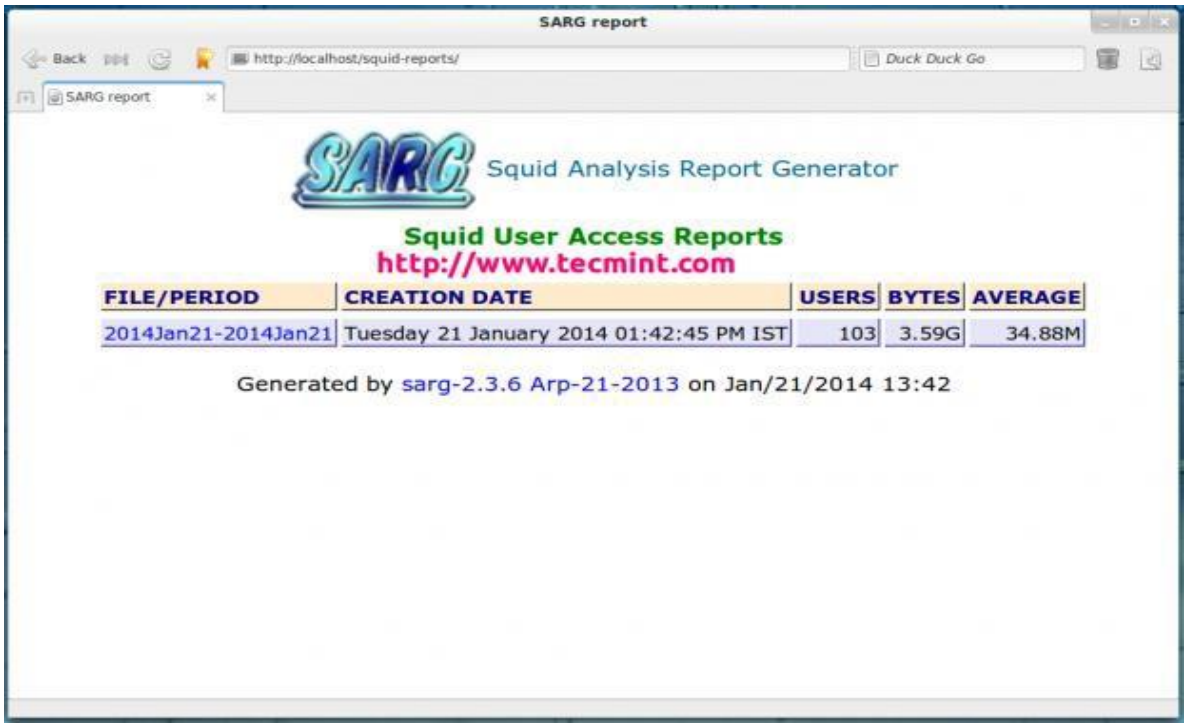


Fig.1 Sarg Main Window

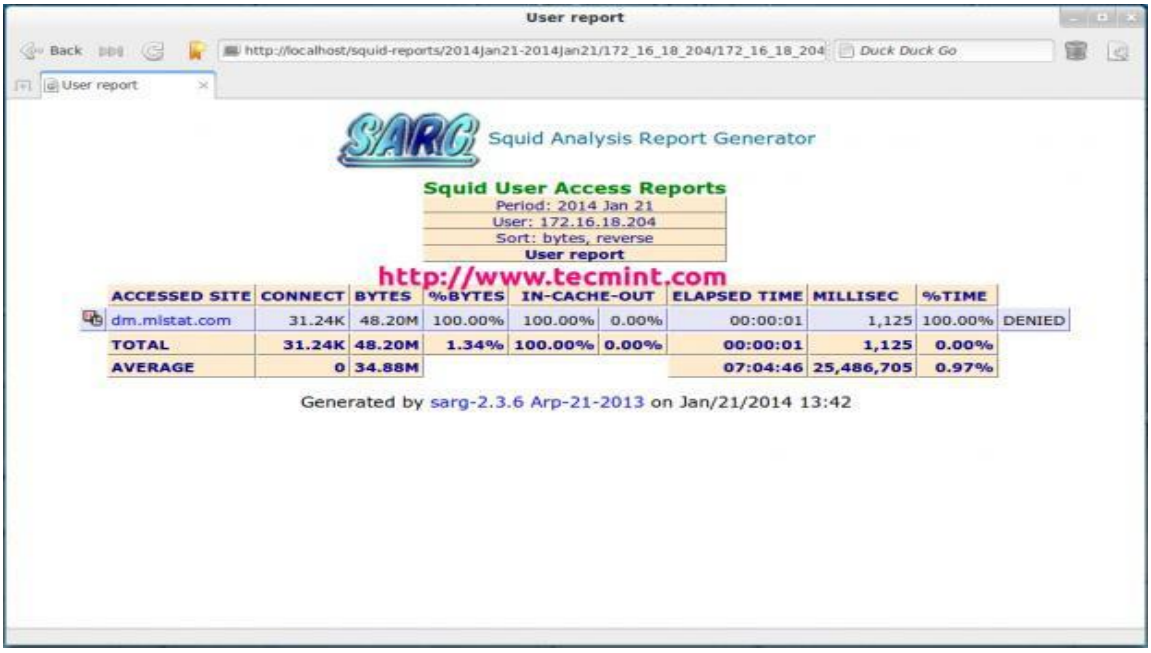
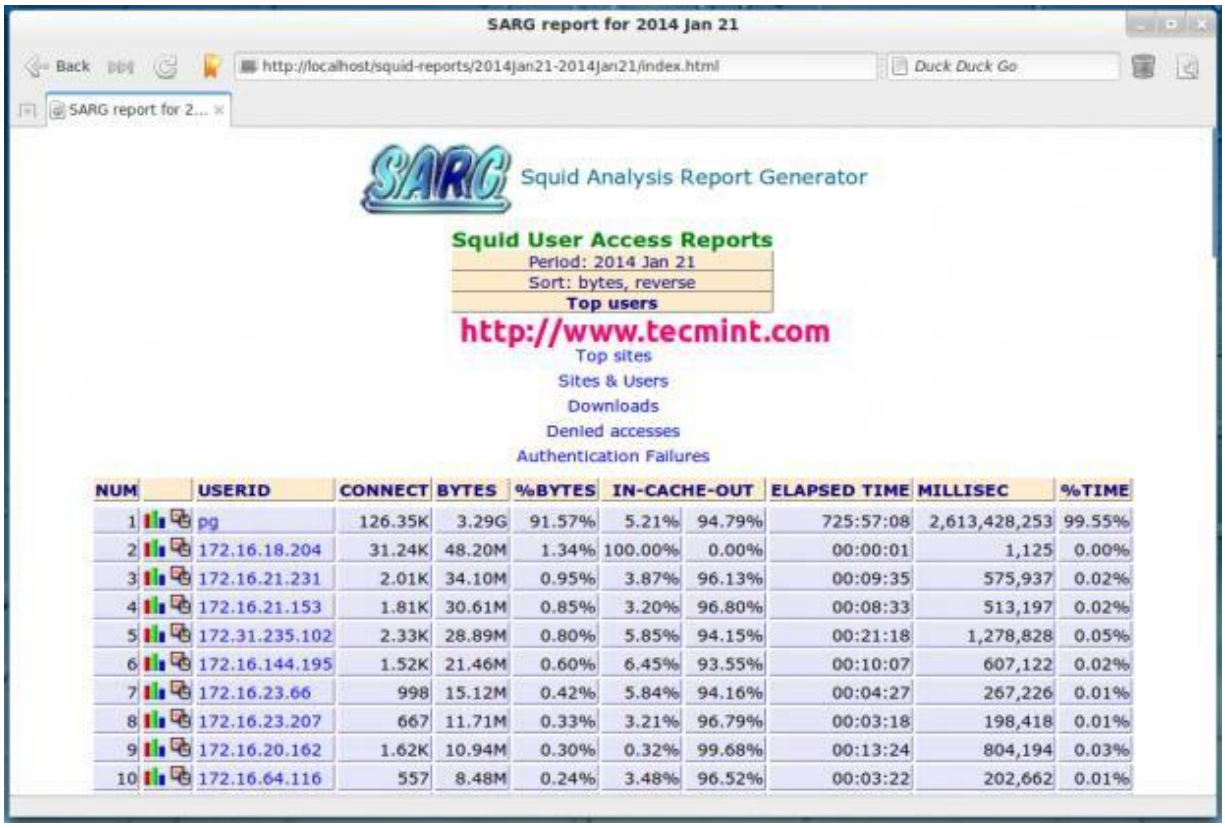
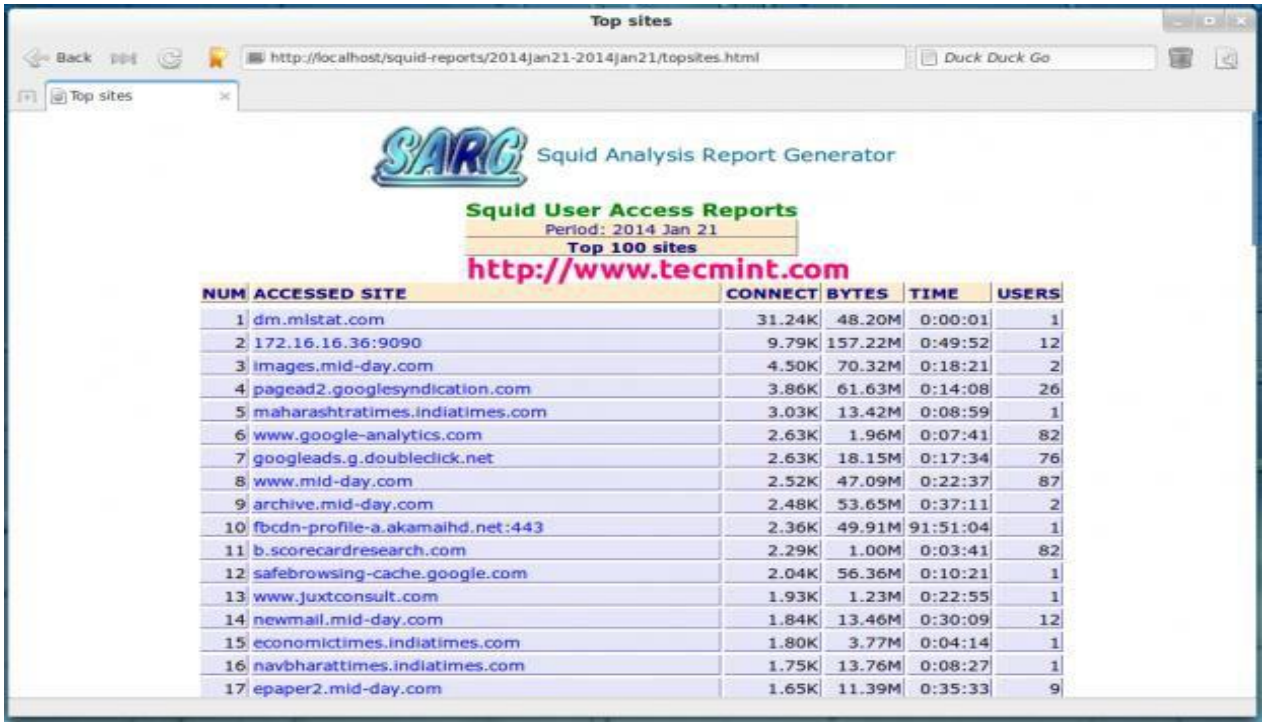


Fig2.User Report



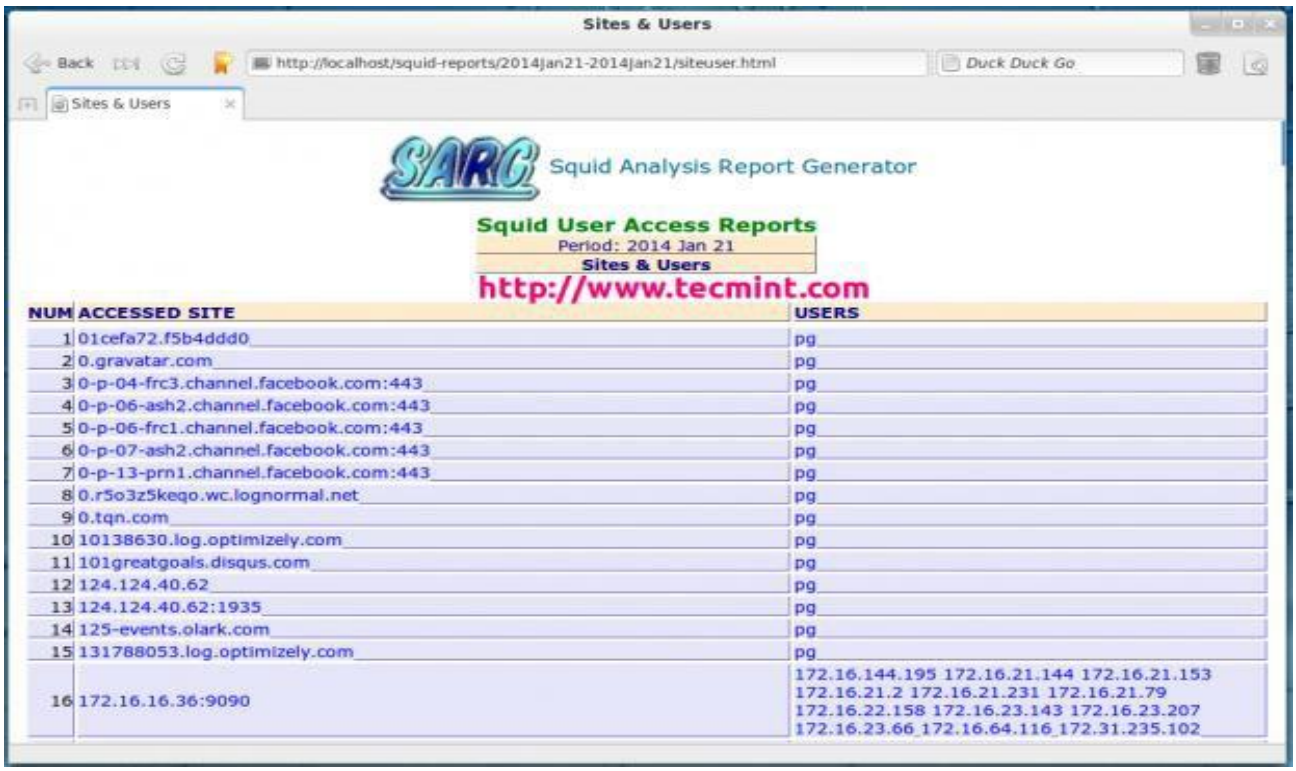
NUM		USERID	CONNECT	BYTES	%BYTES	IN-CACHE-OUT		ELAPSED TIME	MILLISEC	%TIME
1		pg	126.35K	3.29G	91.57%	5.21%	94.79%	725:57:08	2,613,428,253	99.55%
2		172.16.18.204	31.24K	48.20M	1.34%	100.00%	0.00%	00:00:01	1,125	0.00%
3		172.16.21.231	2.01K	34.10M	0.95%	3.87%	96.13%	00:09:35	575,937	0.02%
4		172.16.21.153	1.81K	30.61M	0.85%	3.20%	96.80%	00:08:33	513,197	0.02%
5		172.31.235.102	2.33K	28.89M	0.80%	5.85%	94.15%	00:21:18	1,278,828	0.05%
6		172.16.144.195	1.52K	21.46M	0.60%	6.45%	93.55%	00:10:07	607,122	0.02%
7		172.16.23.66	998	15.12M	0.42%	5.84%	94.16%	00:04:27	267,226	0.01%
8		172.16.23.207	667	11.71M	0.33%	3.21%	96.79%	00:03:18	198,418	0.01%
9		172.16.20.162	1.62K	10.94M	0.30%	0.32%	99.68%	00:13:24	804,194	0.03%
10		172.16.64.116	557	8.48M	0.24%	3.48%	96.52%	00:03:22	202,662	0.01%

Fig 3. Specific Date



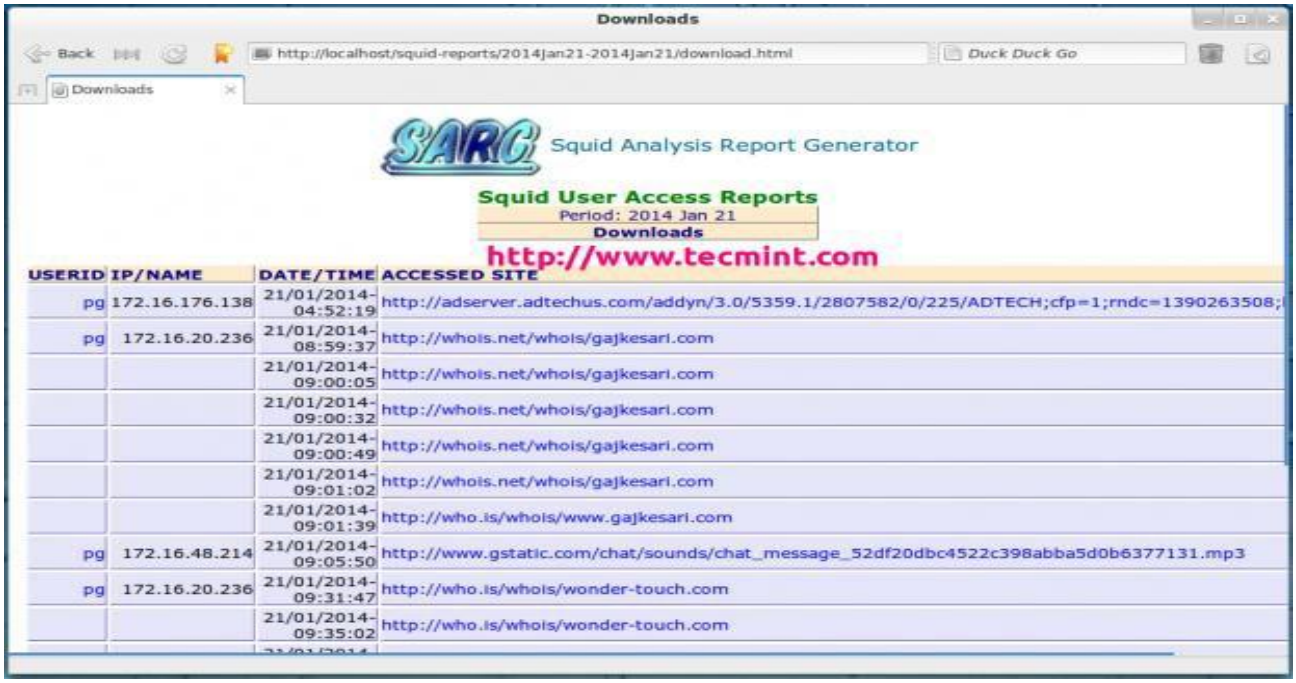
NUM	ACCESSED SITE	CONNECT	BYTES	TIME	USERS
1	dm.mistat.com	31.24K	48.20M	0:00:01	1
2	172.16.16.36:9090	9.79K	157.22M	0:49:52	12
3	images.mid-day.com	4.50K	70.32M	0:18:21	2
4	pagead2.googlesyndication.com	3.86K	61.63M	0:14:08	26
5	maharashtratimes.indiatimes.com	3.03K	13.42M	0:08:59	1
6	www.google-analytics.com	2.63K	1.96M	0:07:41	82
7	googleads.g.doubleclick.net	2.63K	18.15M	0:17:34	76
8	www.mid-day.com	2.52K	47.09M	0:22:37	87
9	archive.mid-day.com	2.48K	53.65M	0:37:11	2
10	fbcdn-profile-a.akamaihd.net:443	2.36K	49.91M	91:51:04	1
11	b.scorecardresearch.com	2.29K	1.00M	0:03:41	82
12	safebrowsing-cache.google.com	2.04K	56.36M	0:10:21	1
13	www.juxtconsult.com	1.93K	1.23M	0:22:55	1
14	newmail.mid-day.com	1.84K	13.46M	0:30:09	12
15	economictimes.indiatimes.com	1.80K	3.77M	0:04:14	1
16	navbharattimes.indiatimes.com	1.75K	13.76M	0:08:27	1
17	epaper2.mid-day.com	1.65K	11.39M	0:35:33	9

Fig 4. Top Accessed Sites



NUM	ACCESSED SITE	USERS
1	01cefa72.f5b4ddd0	pg
2	0.gravatar.com	pg
3	0-p-04-frc3.channel.facebook.com:443	pg
4	0-p-06-ash2.channel.facebook.com:443	pg
5	0-p-06-frc1.channel.facebook.com:443	pg
6	0-p-07-ash2.channel.facebook.com:443	pg
7	0-p-13-prn1.channel.facebook.com:443	pg
8	0.r5o3z5keqo.wc.lognormal.net	pg
9	0.tqn.com	pg
10	10138630.log.optimizely.com	pg
11	101greatgoals.disqus.com	pg
12	124.124.40.62	pg
13	124.124.40.62:1935	pg
14	125-events.olark.com	pg
15	131788053.log.optimizely.com	pg
16	172.16.16.36:9090	172.16.144.195 172.16.21.144 172.16.21.153 172.16.21.2 172.16.21.231 172.16.21.79 172.16.22.158 172.16.23.143 172.16.23.207 172.16.23.66 172.16.64.116 172.31.235.102

Fig 5. Top Sites and Users



USERID	IP/NAME	DATE/TIME	ACCESSED SITE
pg	172.16.176.138	21/01/2014-04:52:19	http://adserver.adtechus.com/addyn/3.0/5359.1/2807582/0/225/ADTECH;cfp=1;rndc=1390263508;
pg	172.16.20.236	21/01/2014-08:59:37	http://whois.net/whois/gajkesari.com
		21/01/2014-09:00:05	http://whois.net/whois/gajkesari.com
		21/01/2014-09:00:32	http://whois.net/whois/gajkesari.com
		21/01/2014-09:00:49	http://whois.net/whois/gajkesari.com
		21/01/2014-09:01:02	http://whois.net/whois/gajkesari.com
		21/01/2014-09:01:39	http://who.is/whois/www.gajkesari.com
pg	172.16.48.214	21/01/2014-09:05:50	http://www.gstatic.com/chat/sounds/chat_message_52df20dbc4522c398abba5d0b6377131.mp3
pg	172.16.20.236	21/01/2014-09:31:47	http://who.is/whois/wonder-touch.com
		21/01/2014-09:35:02	http://who.is/whois/wonder-touch.com

Fig 6. Top Downloads

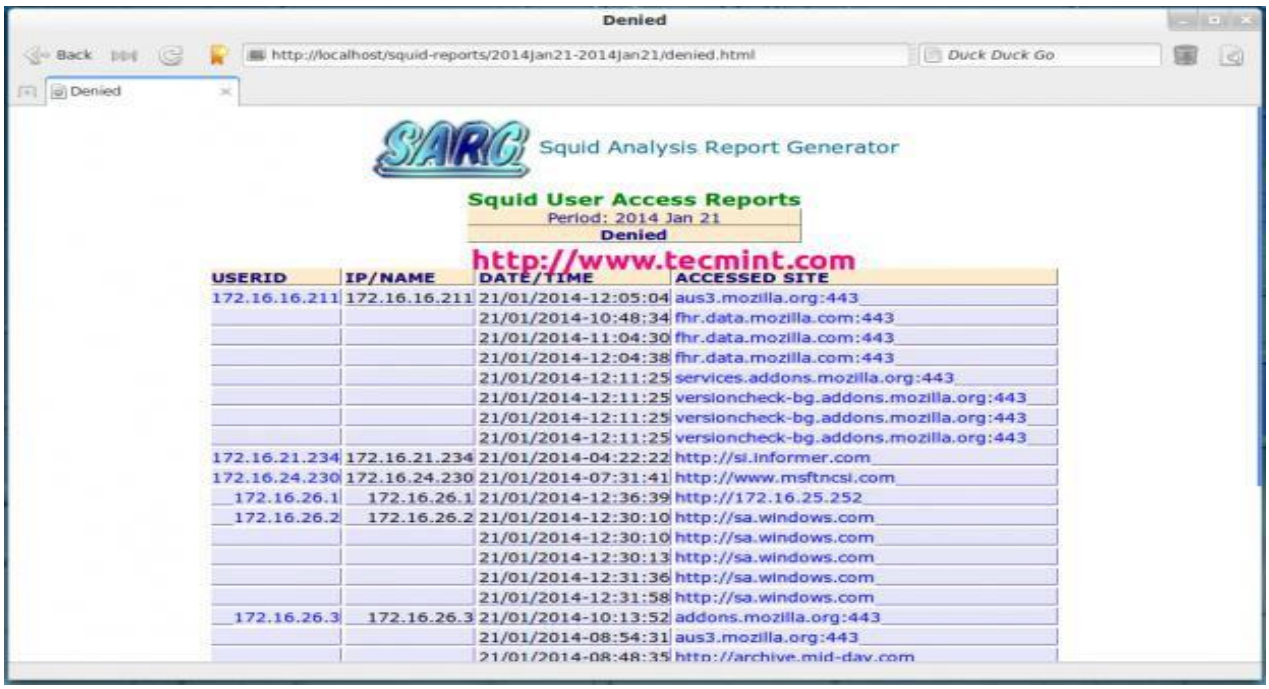


Fig 7. Denied Access

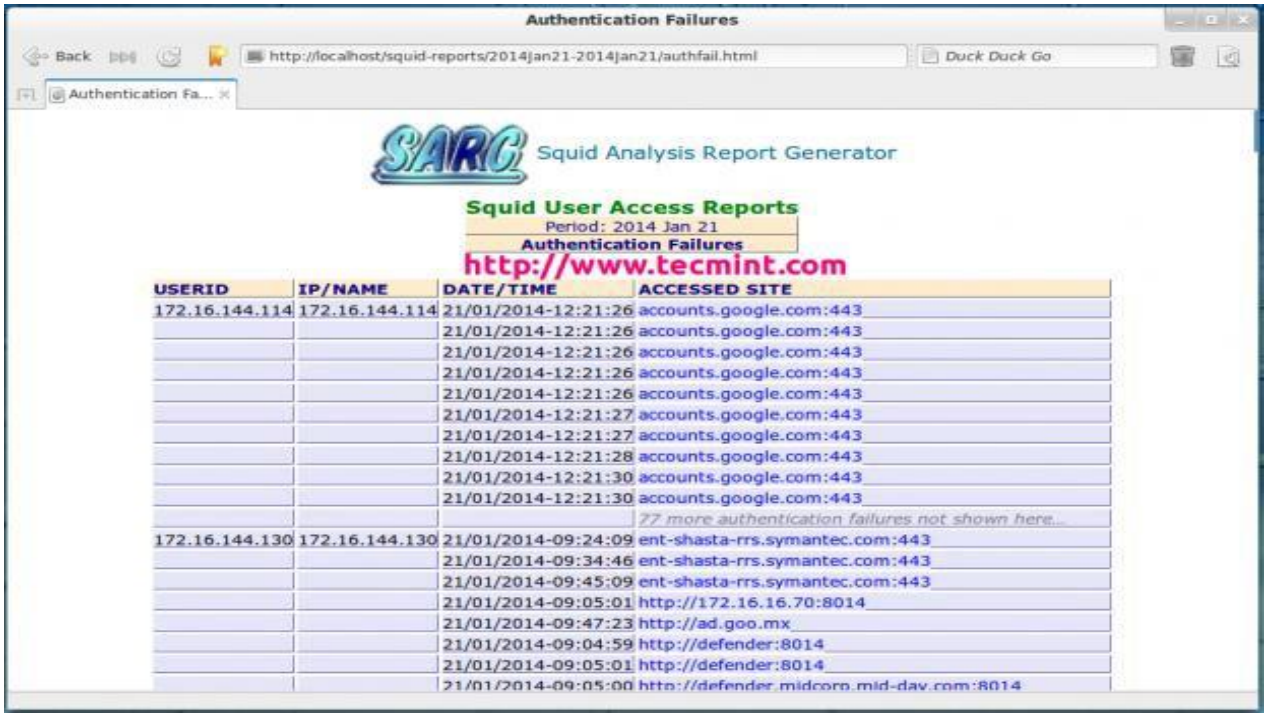


Fig 8. Authentication Failures

4.5 Assignment Questions:

1. Why to Configure Proxy Server?
2. What is SARG?
3. Which Parameter is there in SARG Report?
4. What do you mean by Log and Event Co-relation?

Conclusion:

By configuring this Network Administrator can easily analyze the Network Traffic and Bandwidth Utilization.

Answers **(5)**	Coding Efficiency **(5)**	Viva **(5)**	Timely Completion **(5)**	Total **(20)**	Dated Sign of Subject Teacher

Expected Date of Completion:----------

Actual Date of Completion:----------

Assignment Group A-5

Problem Definition:

Study and Implementation of Honeypot.

5.1 Learning Objectives:

1. To learn the concept of Honeypot
2. To study the representation, implementation of Honeypot

5.2 Learning outcome:

Use honeybot tool to capture packets and configure tools and systems to enter unknown unauthenticated IP.

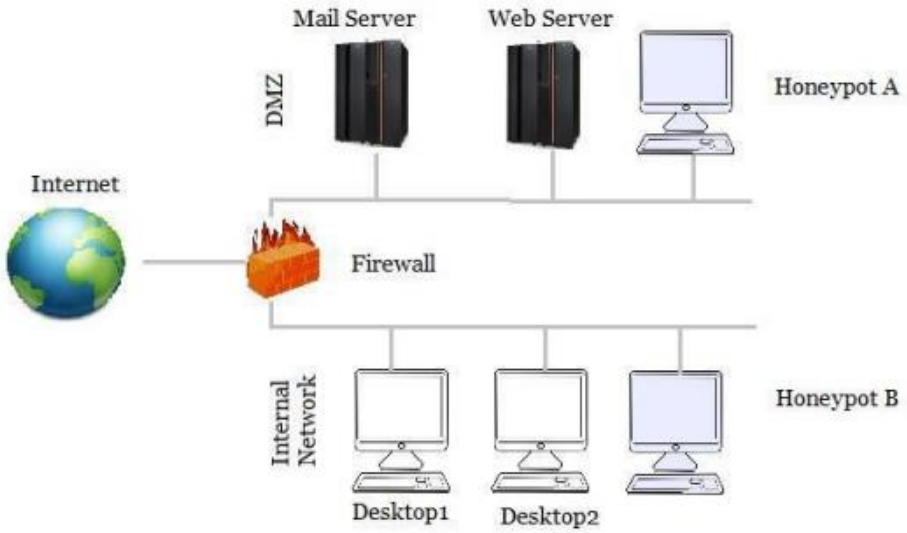
5.3 Theory

5.3.1 Honeypot

It is a computer system. There are files, directories in it just like a real computer. However, the aim of the computer is to attract hackers to fall into it to watch and follow their behavior. So we can define it as a fake system which looks like a real system. They are different than other security systems since they are not only finding one solution to a particular problem, but also they are eligible to apply variety of security problems and finding several approaches for them. For example, they can be used to log Malicious activities in a compromised system; they can be also used to learn new threats for users and creating ideas how to get rid of those problems.

Honeypots are security resources that have no production value; no person or resource should be communicating with them. Any activity sent their way is suspect. Any traffic

initiated by the honeypot means the system has most likely been compromised. Any traffic sent to the honeypot is most likely a probe, scan, or attack. With a honeypot, nothing is expected. To better understand the concepts of honeypots, let's take a look at the following example of honeypot deployments refer the figure.



The purpose here is to demonstrate to you that honeypots can come in many different flavors, and they can achieve different things. However, they are both honeypots because they share the same definition and concepts. With the intent using systems as a honeypots, to determine if there is any unauthorized activity happening within your DMZ. Honeypots passively capture any traffic or activity that interacts with them .

5.1.1Types of Honeypots:

There are two general types of honeypots:

5.1.1.1 Production honeypots are easy to use, capture only limited information, and are used primarily by companies or corporations. They are capturing a limited amount of information; mostly low interaction honeypots are used. security administrator watches the hacker's movements carefully and tries to lower the risks that may come from it towards the company.

5.1.1.2 Research honeypots are complex to deploy and maintain, capture extensive information, and are used primarily by research, military, or government organizations. The objective is to learn how to Protect a system better, they do not bring any direct value to the

security of an organization Honeypots are increasingly used to provide early warning of potential intruders, identify flaws in security strategies, and improve an organization's overall security awareness. “Honeypots can simulate a variety of internal and external devices, including Web servers, mail servers, database servers, application servers, and even firewalls. As a software development manager, we can regularly use honeypots to gain insight into vulnerabilities in both the software my team writes and the OS upon which we depend.” A honeypot is a security resource whose value lies in being probed, attacked, or compromised. This means that whatever we designate as a honeypot, it is our expectation and goal to have the system probed, attacked, and potentially exploited.

5.2 Legal issues with honeypots:

While deploying and start using a honeypot, there are some legal issues that a person should know about. Every country has different laws regarding to honeypot usage and information capturing. These regulations are related to data security, collection of data and finally how to use honeypots. All these different laws are based on the quality of the data that a honeypot can capture and a person who is deploying it. Privacy and data leads us to confidentiality term in network security. Our example is being a network administrator in a company.

5.3 Practical implementation:

We are starting with low interaction honeypot and then continue on a middle level of interaction to finally conclude with a high level of interaction.

- **Starting to honeypot:**

  We started with Honeyd as low level interaction honeypot and then we will move on medium level interaction honeypots. Every honeypot has specific and different attitudes. We will explain them one by one.

- **HoneyBOT is a medium interaction honeypot for windows.**

  A honeypot creates a safe environment to capture and interact with unsolicited and often malicious traffic on a network. HoneyBOT is an easy to use solution ideal for network security research or as part of an early warning IDS. The logging capability of a honeypot is far greater than any other network security tool and captures raw packet level data even including the keystrokes and mistakes made by hackers. The captured information is highly valuable as it contains only malicious traffic with little to no false positives. Honeypots are becoming one of the leading security tools used to

monitor the latest tricks and exploits of hackers by recording their every move so that the security community can more quickly respond to new exploits.

- **How does it work?**

HoneyBOT works by opening a range of listening sockets on your computer which are designed to mimic vulnerable services. When an attacker connects to these services they are fooled into thinking they are attacking a real server. The honeypot safely captures all communications with the attacker and logs these results for future analysis. Should an attacker attempt an exploit or upload a rootkit or trojan to the server the honeypot environment can safely store these files on your computer for malware collection and analysis purposes. Following figure shows implementation of honeypot.

- **Installing and Securing Your Honeypot:**

A honeypot is intentionally put in harms way so it is critical to carry out some security precautions on your honeypot computer before deployment on any network. Install HoneyBOT on a dedicated computer or virtual machine. Update the operating system with security updates and use an antivirus product. You want your honeypot to be as free as possible from legitimate traffic so in broad terms we can consider any traffic to the honeypot to be malicious in nature. Remember that we are attracting attackers to intrude into this system so precautions are important.

- **Network Placement:**

If you place HoneyBOT inside the internal network where it is secured by perimeter defences it should never to be attacked. Any malicious traffic captured in this situation would indicate that another computer inside the network is already compromised or that the perimeter defences have been breached. In this configuration HoneyBOT is acting as an intrusion detection system. If you place

HoneyBOT on an external network or internet you will attract higher volumes of unsolicited network traffic. Direct internet placement is the most common setup with HoneyBOT being on the network DMZ.

- **Windows Services, SMB and NetBIOS**

You should disable any Windows services that are not required for the machine to

operate as they offer an attacker a possible avenue of attack. HoneyBOT cannot listen on a port that is already in use by a Windows service. Some of the services that you may choose to disable include Messenger, ClipBook, COM+, FTP Publishing, SMTP, SNMP, TCP/IP NetBIOS Helper, Telnet, WWW Publishing. SMB (CIFS) provides name resolution, network browsing and printing services over TCP/IP. To disable SMB open the Network Connections window, right click the adapter and select Properties and uninstall Client For Microsoft Networks and File And Printer Sharing. SMB services may also be provided over NetBIOS (NBT). To disable NetBIOS open the Device Manager window, select Show Hidden Devices, expand Non-Plug And Play Drivers and disable NetBios Over Tcpip. If you are monitoring your honeypot via a remote desktop tool then you should change the default listening port to a random high numbered port.

Finally, before starting HoneyBOT take a baseline of the current listening services by opening a command shell and launching netstat with the -ano option. Any listening services that you are unable to disable need to be blocked at the firewall.

- **Firewall:**

A firewall will prevent unsolicited connections from reaching your computer. In order for HoneyBOT to communicate you need to customise your firewall rules to allow incoming connections. If you are using a software firewall you should create an exception for HoneyBOT.

- **HoneyBOT Options:**

Select Options from the View menu to configure HoneyBOT. Automatically Start Engine: The server engine will start automatically when the application is started. Enable Sound Alert: Plays a short sound each time an event occurs. Capture Binaries: If this option is enabled HoneyBOT will attempt to capture malware and other files and save them to the \HoneyBOT\Captures\ folder. If this option is enabled you should add an exception in your antivirus software to exclude this folder from its scan. Automatically Rotate Log: Each day at midnight HoneyBOT will save the current log file and start a new log file. Server Name: The alias name of the HoneyBOT server given to the remote machine.

- **Email Alerts** :

Enter your email address and SMTP server information to receive daily email updates from HoneyBOT.

- **Exports:**

  Select the Export Logs to CSV option to create a daily extract of your log file as a CSV file. Exported logs are saved in the \HoneyBOT\Logs\ folder. You can also choose to participate in the centralised log program and have your log files uploaded to the HoneyBOT website.

- **Syslog :**

  Select to send connection events to a Syslog server. Enter the Syslog server IP address and port.

- **Bindings:**

  Only applicable to multihomed machines. Provides support for multiple networks so HoneyBOT can bind to one or all detected networks. Enter the IP address that you want HoneyBOT to bind to. If the IP address is not valid and more than one IP address is available you will be prompted to select an address when the server engine starts.

- **Updates:**

  Select to have HoneyBOT check for updates on startup. There are two update types that may occur. A service update is a minor update to the server listening services, if a service update is available you will be prompted to install the update. An application update notification will occur if a new version of HoneyBOT is available.

- **Services and Profiles :**

  Select to edit the TCP and UDP services started by the HoneyBOT engine. You can add a new port, edit and disable an existing port, or delete the port configuration entirely. By default HoneyBOT will open more listening ports than a typical computer and this may alert an attacker to its presence. You can choose to limit your honeypot exposure to just a handful of ports that more closely resembles a real operating system. By loading a profile you can quickly emulate common operation system setups like an SQL Server, IIS Server, Exchange Server, etc.

- **Whitelist :**

  You may find HoneyBOT is interacting with services on your network that are

legitimate and not a cause for alarm. You can whitelist the source machine by adding the IP and port to the whitelist settings. When a machine is whitelisted HoneyBOT will no longer accept connections from that machine.

- **Debug :**

  The debug window will display application messages and socket events that occur during typical application operation.

- **Event Navigation:**

The event tree on the left shows the ports that have been probed and remote addresses that have connected to HoneyBOT. The event list at the top right will display all connection attempts including the attributes of the connection. The packet list at the bottom displays each packet transmitted and received between the remote machine and the HoneyBOT server. You can expand the event tree and filter the events displayed by selecting an item in the list.

5.4 Advantages of honeypots:

There are many security solutions available in the market. Anyone can browse the variety of choices through internet and find the most suitable solution for their needs. Honeypots can capture attacks and give information about the attack type and if needed, thanks to the logs, it is possible to see additional information about the attack. New attacks can be seen and new security solutions can be created by looking at them. More examinations can be obtained by looking at the type of the malicious behaviors. It helps to understand more attacks that may happen. Honeypots are not bulky in terms of capturing data. They are only dealing with the incoming malicious traffic. Therefore, the

information that has been caught is not as much as the whole traffic. Focusing only on the malicious traffic makes the investigation far easier.

5.5 Disadvantages of honey pots:

We can only capture data when the hacker is attacking the system actively. If he does not attack the system, it is not possible to catch information. If there is an attack occuring in another system, our honeypot will not be able to identify it. So, attacks not towards our

honeypot system may damage other systems and cause big problems. There is fingerprinting disadvantage of honeypots. It is easy for an experienced hacker to understand if he is attacking a honeypot system or a real system. Fingerprinting allows us to distinguish between these two. It is a not a wanted result of our experiment. The honeypot may be used as a zombie to reach other systems and compromise them. This can be very dangerous.

5.6 Assignment Questions:

Q1.What is Honey Pot?

Q2.What are different types of Honey Pot?

Q3.What is Malware Honey Pot?

Q4. What is Database honey pot?

Q5.What is Honey nets?

Q6. Which are two popular reasons or goals behind setting up a Honey Pot?

Conclusion: Hence, we have successfully studied concept of Honeypot in which we have set different network setting and set different drivers to identify unauthenticated access in our system