

IBM Project Report On Security Information and Event Management

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CERTIFICATE

This is to certify that the **IBM** Project work entitled "**Security Information and Event Management**" by Priyansh Gupta (18162171005), Jinal Kumari (18162171007) and Aradhya Chaurishiya(19162172001) of Ganpat University, towards the partial fulfillment of requirements of the degree of Bachelor of Technology – Computer Science and Engineering, carried out by them in the CSE(CS) Department. The results/findings contained in this Project have not been submitted in part or full to any other University / Institute for award of any other Degree/Diploma.

Name & Signature of Internal Guide

Name & Signature of Head

Place: ICT - GUNI

Date:

ACKNOWLEDGEMENT

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ABSTRACT

Security Information and Event Management (SIEM) systems have been generally sent as a useful asset to identify, and respond against digital assaults. SIEM arrangements have advanced to become complete frameworks that give a wide perceive ability to recognize areas of high dangers and proactively center around moderation systems targeting lessening expenses and time for occurrence reaction. At present, SIEM frameworks and related arrangements are gradually merging with enormous information examination devices. We overview the most generally utilized SIEMs with respect to their basic usefulness and give an investigation of outer variables influencing the SIEM scene in mid and long haul. A rundown of likely upgrades for the up and coming age of SIEMs is given as a feature of the audit of existing arrangements as well as an examination on their advantages and use in basic frameworks.

To accomplish an elevated degree of network protection mindfulness generally mid to enormous estimated organizations use Security Information and Event Management (SIEM) installed into a Security Tasks Center. These frameworks empower the concentrated assortment and examination of safety applicable data produced by a wide range of frameworks, to distinguish progressed dangers and to further develop response time if there should be an occurrence of an episode.

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CHAPTER: 1 INTRODUCTION

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Security Information & Event Management

SIEM is advanced security data framework that examines security alarms and information created from gadgets on an organization progressively. Associations use SIEM instruments to distinguish security occurrences, log security information, oversee episode reaction, and create reports for consistence. The term SIEM was first utilized in 2005 by Imprint Nicolett and Amrit Williams. SIEM as an idea was proposed by them by consolidating the idea of safety data the board (SIM) and security occasion the executives (SEM).

Splunk:-

Splunk is an undeniable, flexible, and effective level that records and searches log logos set aside in the building. Research machine-generated data to provide useful information. The legal advantage of using Splunk is that it does not have to worry about any data source to store its data, as it usually uses its own records to store data.

Splunk is a device often used to view, monitor, and evaluate large-scale machine information by using web-based interaction. Splunk enables the acquisition, solicitation, and comparison of consistent data in an available manager where it can create drafts, reports, alerts, dashboards, and exposures. It hopes to make digitized data available through the organization and can detect data systems, generate estimates, investigate. With the help of Splunk programs, searching for specific data on more complex data is fundamental. As you may know, in log reports, finding out which configuration is right now works. To make this clearer, there is a breach of the Splunk process that helps the client by separating archive issues and identifying ongoing applications.

CHAPTER: 2 PROJECT SCOPE

CHAPTER 2 PROJECT SCOPE

SIEM is a product framework that gathers and totals information and occasions from different systems administration gadgets and assets across IT foundation. As of now, the SIEM market esteem is around \$4.2 billion and is supposed to develop to \$5.5 billion by 2025.

Decide your business-basic information sources

When you have a handle of the ideal task scope, you can then recognize log sources inside the extension to decide how to acquire the pertinent information required. For instance, firewalls, interruption identification frameworks, and antivirus programming act as prime information hotspots for SIEM security use cases. However, there are some more, including switches, web channels, area regulators, application servers, information bases, and other carefully associated resources. It is pivotal that you focus on the sources included to guarantee the SIEM gives the ideal information to help the chose use cases.

Distinguish the high need occasions and cautions

With regards to safeguarding an association against insider and outer dangers, security groups face a steadily developing rundown of safety occasions that should be dissected and followed up on. To get through the clamour, SIEM programming can be utilized to make occasions and information more sagacious. In any case, organizations should initially decide their high need occasions and how to get them from applications and gadgets inside the framework. Along these lines, security groups can utilize the SIEM to invest more energy on episodes and cautions that might be more basic to the business and its information.

Pinpoint your key achievement measurements

An effective SIEM execution lines up with your business objectives. Key achievement measurements not entirely settled before arrangement to guarantee greatest return for capital invested. For instance, decreasing information robbery or further developing how organizations identify expected breaks or insider dangers might be measurements to lay out. Organizations should figure out how achievement affects them and how SIEM security use cases can be utilized to accomplish it.

TOP 3 SIEM TOOLS IN INDUSTRY

1. Solar Winds

- Gives unified log assortment and standardization, mechanized danger recognition and reaction.
- It can perform progressed search and criminological examination.
- With occasion time recognition of dubious action, there will be quicker ID of dangers. Reaction is amazingly quick
- It has administrative consistence preparation. For this, it upholds HIPAA, PCI, DSS, SOX, DISA, STIG, and so on.
- Simple Establishment
- Maverick USB Information Misfortune and Robbery Insurance

Cons

- Needs support for observing public cloud administrations' IaaS or SaaS. Doesn't uphold custom report composing and customization of out-of-the-case consistence report formats. Coming up short on UEBA and security stage.

Decision:

- Solar winds upholds Windows, Linux, Macintosh, and Solaris. According to the surveys, Sun powered Breezes doesn't have a total security suite however it gives great elements and capacities to danger identification. It very well may be a decent answer for SMEs.

2. Splunk

- It can work with any machine information, regardless of whether it is from the cloud or on-premises.
- Robotized activities and work processes for fast and exact reaction.
- Utilizes progressed security examination, which incorporate both solo AI and client conduct abilities.
- It has the capacity of occasion sequencing.
- Fast identification of noxious dangers.
- Cautions the executives and hazard scores.

Cons

- Utilizes fundamental predefined connection rules for observing and revealing necessities. Response capacities are restricted to email warnings. Requires coordination with outsider applications for assignment and work process robotization.

Decision:

- All together, to give you noteworthy and prescient bits of knowledge, Splunk utilizes artificial intelligence and AI. Dashboards and perceptions are adjustable. According to the client audits, it is a costly instrument and subsequently it is best for the undertakings.

3. IBM QRadar

- Progressed rule connection motor and social profiling innovation.
- Adaptable and profoundly versatile stage with huge out-of-the-crate usefulness and presets for various use cases.
- QRadar permits you to focus on security cautions utilizing danger insight.
- Can pass judgment on the effect on an organization, in light of reproduced assaults
- Has a basic yet viable point of interaction

Cons:

- Needs incorporations into other Take off and SIEM stages
- Upgrades could be quicker

Decision:

- IBM Qradar offers various highlights for information assortment, log movement, network action, and resources. It offers help to IE, Firefox, and Chrome programs. According to the client surveys, it centers around basic episodes.

CHAPTER: 3 SOFTWARE AND HARDWARE REQUIREMENTS

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Minimum Hardware Requirements for IBM

Splunk Components	Indexer	Search Head	Master Node	Deployment Server
RAM	4 GB	4 GB	4 GB	4 GB
CPU Core	16	16	8	8
Hard Disk	2000 GB	2000 GB	200 GB	200 GB

Table 3.1 Minimum Hardware Requirements

Minimum Software Requirements for IBM

Operating System	Linux/Window 64 bits
Programming language	Python
Other tools & tech	Splunk

Table 3.2 Minimum Software Requirements

CHAPTER: 4 PROCESS MODEL

CHAPTER 4 PROCESS MODEL

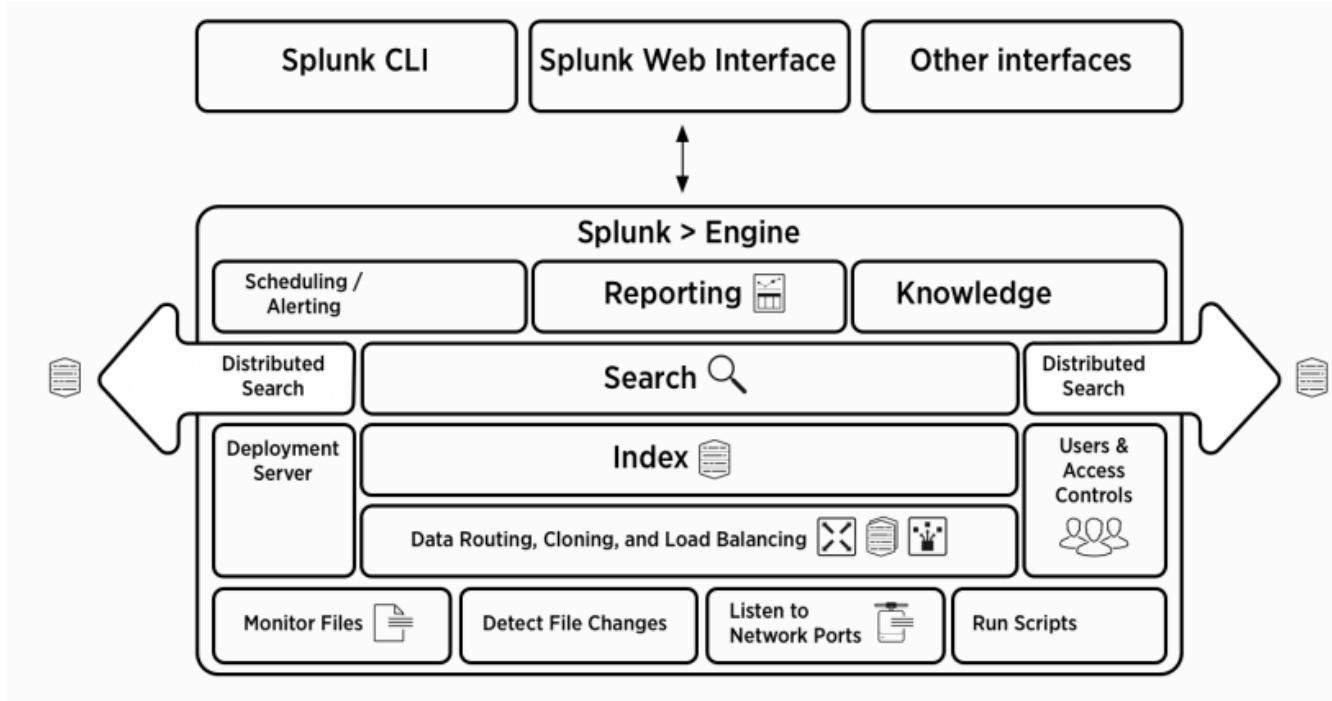


Figure 4.1 Process Model of Project

Splunk Components:-

By accepting that you are looking at the bottom of the image, you will capture the different data pipe sections where the Splunk parts fall under them.

There are **3 sections** of rules in Splunk:

- **Splunk Forwarder**, used to send data
- **Splunk Indexer**, used to sort and order data
- **Head Search**, is a GUI used for viewing, testing and disclosure

1. Splunk Forwarder

- Splunk Forwarder is the part you need to get social media logs. Accept, you want to assemble the logs on a remote machine, then, you can achieve that by using Splunk remote transmitters released from the Splunk special event.
- In all honesty, you can introduce a number of such transmitters to various machines, which will transfer log data to Splunk Indexer for you to take care of and collect. Imagine a situation where you want to make a continuous analysis of data. Splunk forwarders can be used with it as well. You can configure transmitters to send data consistently to Splunk indexes. You can present them in different formats and integrate the current data into different machines logically.
- To understand how similar data transfers happen, you can check out my blog on how Domino uses Splunk to get the best performance.
- Out of some common test devices, Splunk Forwarder consumes less than 1-2% CPU. You can successfully extend it to countless remote structures, and consolidate terabytes of data that has a significant impact on performance.
- From now on, let's list the different types of Splunk transmitters.
- All inclusive Forwarder - You can select a general forwarder if you have any desire to advance the crude information gathered at the source. It is a straightforward part which performs insignificant handling on the approaching information streams prior to sending them to an indexer.
- Information move is a significant issue with pretty much every device on the lookout. Since there is negligible handling on the information before it is sent, parcel of pointless information is likewise sent to the indexer bringing about execution overheads.
- Why go through the difficulty of moving every one of the information to the Indexers and afterward sift through just the pertinent information? Couldn't it be smarter to send the applicable information to the Indexer and save money on data transmission, time and cash as it were? This can be settled by utilizing Weighty forwarders which I have made sense of beneath.

Weighty Forwarder - You can utilize a Weighty forwarder and dispose of a portion of your concerns, since one degree of information handling occurs at the actual source prior to sending information to the indexer. Weighty Forwarder regularly does parsing and ordering at the source and furthermore cleverly courses the information to the Indexer saving money on data transfer capacity and extra room. So when a weighty forwarder parses the information, the indexer just has to deal with the ordering section

Universal Forwarder – You can choose a widespread forwarder if you have any desire to advance the crude information gathered at the source. It is a basic part which performs insignificant handling on the approaching information streams prior to sending them to an indexer.

Information move is a significant issue with pretty much every apparatus on the lookout. Since there is insignificant handling on the information before it is sent, parcel of superfluous information is additionally sent to the indexer bringing about execution overheads.

Why go through the difficulty of moving every one of the information to the Indexers and afterward sift through just the applicable information? Couldn't it be smarter to send the significant information to the

Indexer and save money on data transmission, time and cash as it were? This can be tackled by utilizing Weighty forwarders which I have made sense of beneath.

Heavy Forwarder – You can utilize a Weighty forwarder and kill a portion of your concerns, since one degree of information handling occurs at the actual source prior to sending information to the indexer. Weighty Forwarder commonly does parsing and ordering at the source and furthermore shrewdly courses the information to the Indexer saving money on data transfer capacity and extra room. So when a weighty forwarder parses the information, the indexer just has to deal with the ordering fragment

2. Splunk Indexer:-

Indexer is part of the Splunk that you should use to request and maintain data from the transmitter. The splunk case converts incoming data into events and saves it in documents so that search operations can be performed efficiently. When you receive data from the General Transfer, the index will first separate the data and then record it. Data analysis was performed to kill unfortunate data. However, if you get data from Weighty forwarder, the index will automatically list the data. As the Splunk model records your data, create separate archives. These records contain one of the following:

- Crude information in packed structure
- Lists that highlight crude information (record documents, likewise alluded to as tsidx records), in addition to some metadata records. These records dwell in sets of catalogs called containers. Allow me now to let you know how Ordering functions.

Splunk is processing future data to include faster applications and testing. Works on data in a variety of ways such as:

- Divide the distribution of data into individual, open events
- Making or seeing time stamps
- Extract fields such as host, source, and source type
- Performing client-defined tests on future data, for example, custom field recognition, encryption of sensitive data, creating new or modified keys, applying complex multi-line event rules, filtering disturbing events, and managing events on displayed documents or servers.

Another advantage of Splunk Indexer is data duplication. You do not have to worry about losing data when you consider how Splunk keeps various copies of recorded data. This integration is called file duplication or Indexer integration. This is achieved with the help of the Indexer package, which is a social networking event that is designed to speed up each other's data.

1. Search Head

The pursuit head is the part that permits you to work with Splunk. It provides clients with a graphical user interface for accomplishing various tasks. You can search and inquire about the information stored in the Indexer by entering search words, and you will get the expected result. The inquiry head can be used on its own or in conjunction with other Splunk components on a single server. There is no separate installation record for the search head; all you need to do is enable Splunk web administration on the Splunk server. A Splunk event can be used as both a pursuit head and a hunt peer. A devoted inquiry head is indeed a pursuit head who does nothing but look and does not order. During this time, an inquiry peer is in charge of ordering and distributing information

.Putting it All Together: Splunk Architecture

- Splunk accumulates logs by observing records, identifying document changes, tuning in on ports or running contents to gather log information - these are done by the Splunk forwarder.
- The ordering component, made out of at least one indexers, processes the information, or may get the information pre-handled by the forwarders
- The arrangement server oversees indexers and search heads, setup and strategies across the whole Splunk organization.
- Client access and controls are applied at the indexer level - every indexer can be utilized for an alternate information store, which might have different client authorizations.
- The hunt head is utilized to give on-request search usefulness, and furthermore drives planned look through started via programmed reports.
- The client can characterize Planning, Announcing and Information objects to plan look and make cautions.
- Information can be gotten to from the UI, the Splunk CLI, or APIs incorporating with various outer frameworks.

CHAPTER: 5 PROJECT PLAN

CHAPTER 5 PROJECT PLAN

5.1 List out the tasks

Task1: Setup and install Splunk Enterprise.

Task2: Configure Splunk Enterprise to work on correct configured ports.

Task 3: Start the Splunk GUI and explore the interface.

Task 4: Setup and install Splunk forwarder on Kali client machine.

Task 5: Setup and install Splunk forwarder on Ubuntu client machine.

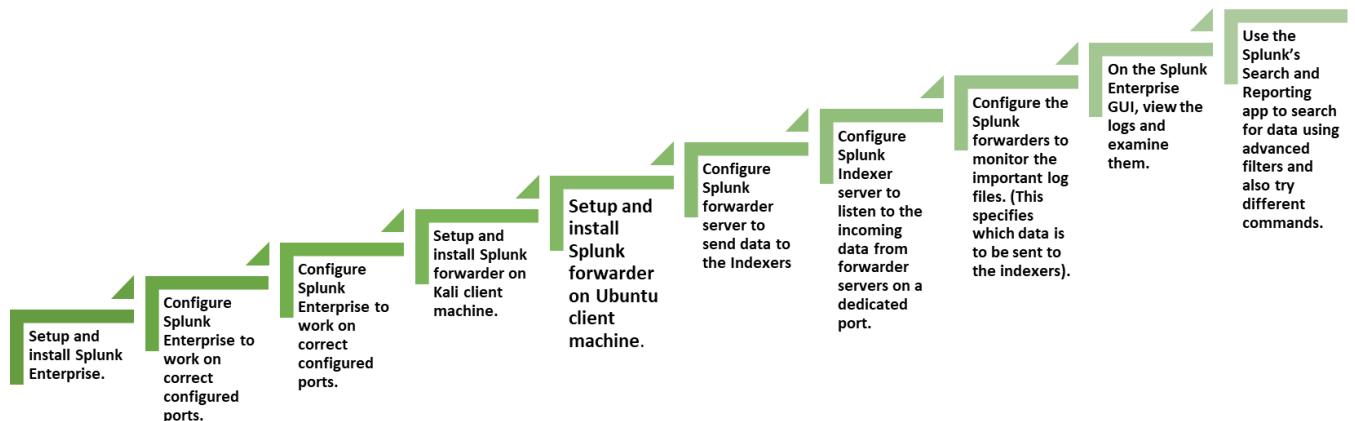
Task 6: Configure Splunk forwarder server to send data to the Indexers

Task 7: Configure Splunk Indexer server to listen to the incoming data from forwarder servers on a dedicated port.

Task 8: Configure the Splunk forwarders to monitor the important log files. (This specifies which data is to be sent to the indexers).

Task 9: On the Splunk Enterprise GUI, view the logs and examine them.

Task 10: Use the Splunk's Search and Reporting app to search for data using advanced filters and also try different commands.



5.2 List of Major Activities

Task1: Configure Splunk Indexer server to listen to the incoming data from forwarder servers on a dedicated port.

Task2: Configure the Splunk forwarders to monitor the important log files. (This specifies which data is to be sent to the indexers).

Task 3: Hosting a webserver with bWAPP on kali machine

Task 4: Performing SQL Injection using SQLMAP from ubuntu machine on kali machine

Task 5: Capturing SQL data in splunk

Task 6: Analyzing the SQL logs

Task 7: Advanced search queries

Task 8: Creating visualizations

Task 9: Creating dashboards

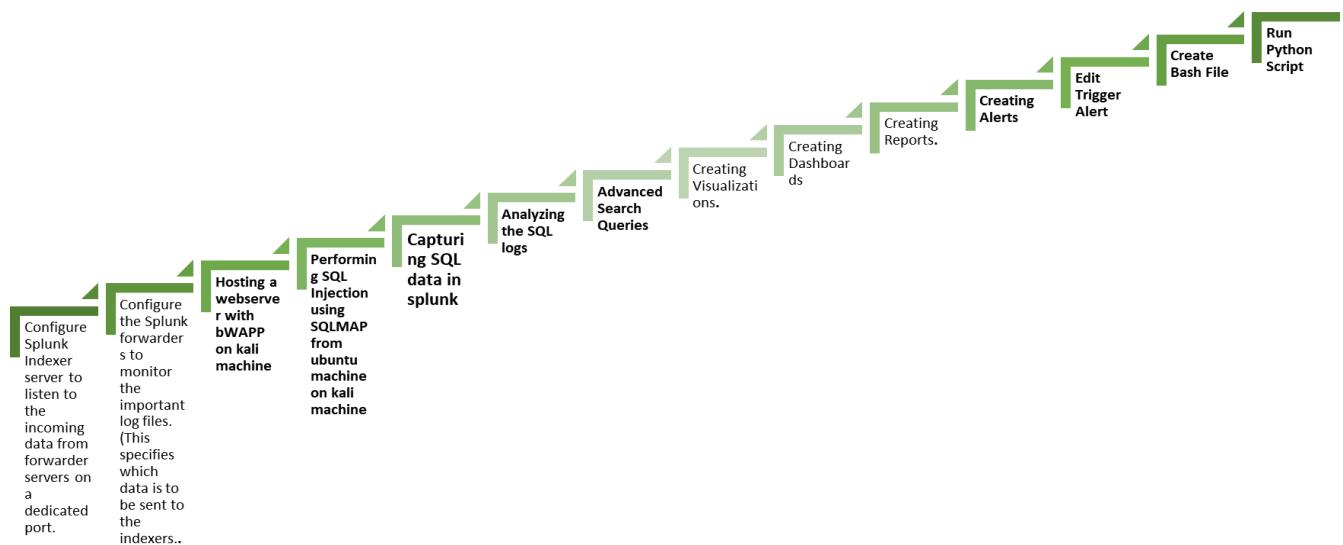
Task 10: Creating reports

Task 11: Creating alert

Task 12: Edit Trigger Alert

Task 13: Create Bash File

Task 14: Run Python Script



CHAPTER: 6 IMPLEMENTATION DETAILS

CHAPTER 6 IMPLEMENTATION DETAIL

6.1.1 Data Collection

What Splunk Can Index

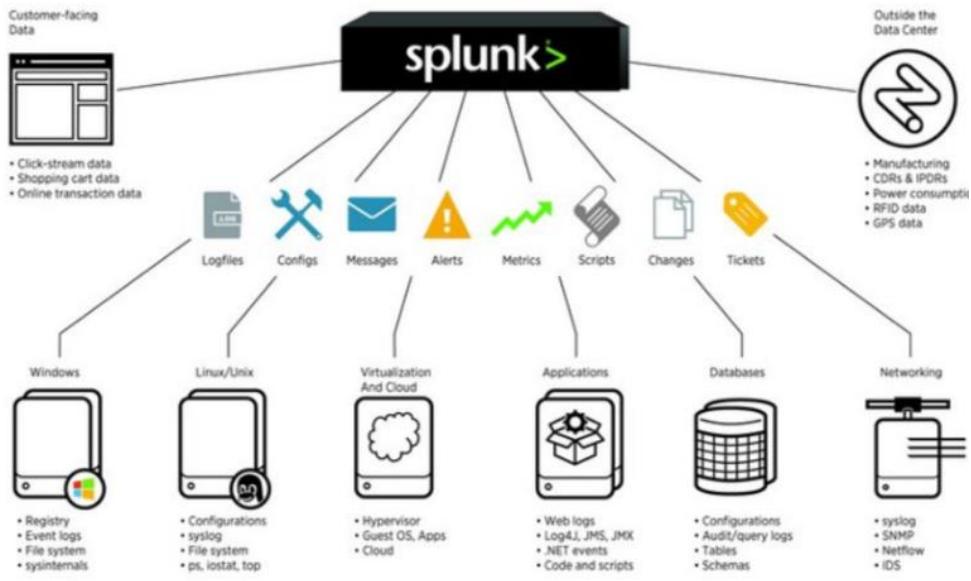
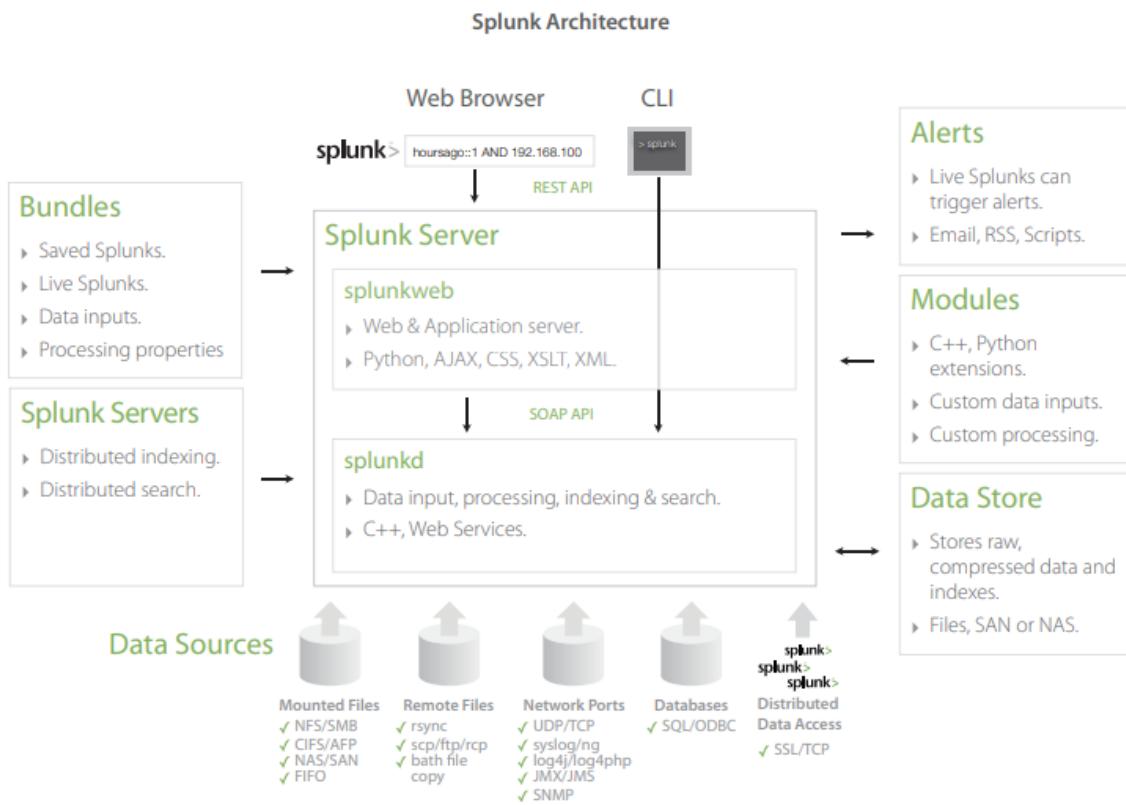


Figure 6.2 Method of Data Collection



Step 1: Start the Splunk server using Splunk CLI

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19044.1466]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>E:
E:>cd Splunk Enterprise
E:\Splunk Enterprise>cd bin
E:\Splunk Enterprise\bin>splunk start

Splunk> Needle, Haystack. Found.

Checking prerequisites...
  Checking http port [5000]: open
  Checking mgmt port [5009]: open
  Checking appserver port [127.0.0.1:5065]: open
  Checking kvstore port [5191]: open
  Checking configuration... Done.
  Checking critical directories... Done
  Checking indexes...
    (skipping validation of index paths because not running as LocalSystem)
      Validated: _audit _internal _introspection _metrics _metrics_rollup _telemetry _thefishbucket history main summary
  Done
  Checking filesystem compatibility... Done
  Checking conf files for problems...
  Done
  Checking default conf files for edits...
  Validating installed files against hashes from 'E:\Splunk Enterprise\splunk-8.0.4-767223ac207f-windows-64-manifest'
File 'E:\Splunk Enterprise\etc\system/default/limits.conf' changed.
File 'E:\Splunk Enterprise\etc\system/default/web.conf' changed.
  Problems were found, please review your files and move customizations to local
All preliminary checks passed.

Starting splunk server daemon (splunkd)....

Splunkd: Starting (pid 8396)
Done

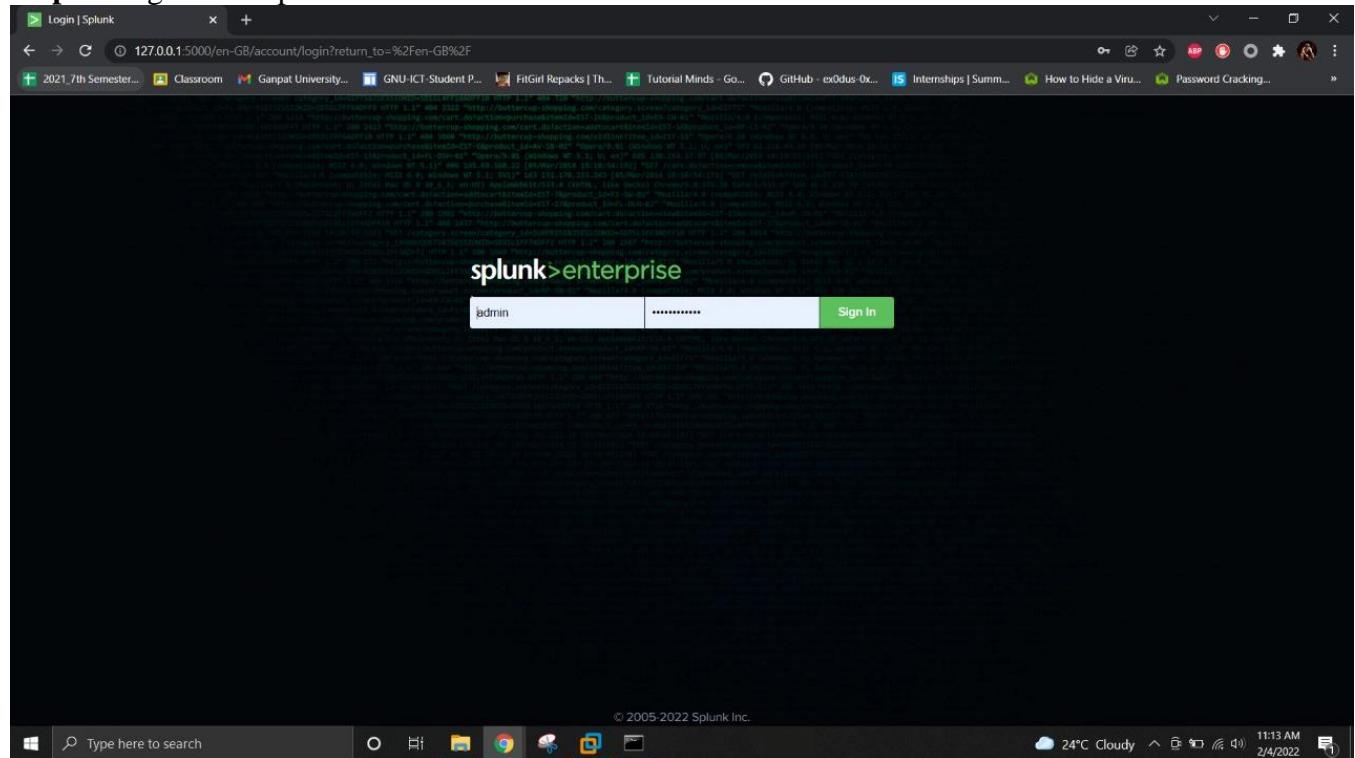
Waiting for web server at http://127.0.0.1:5000 to be available. Done

If you get stuck, we're here to help.
Look for answers here: http://docs.splunk.com

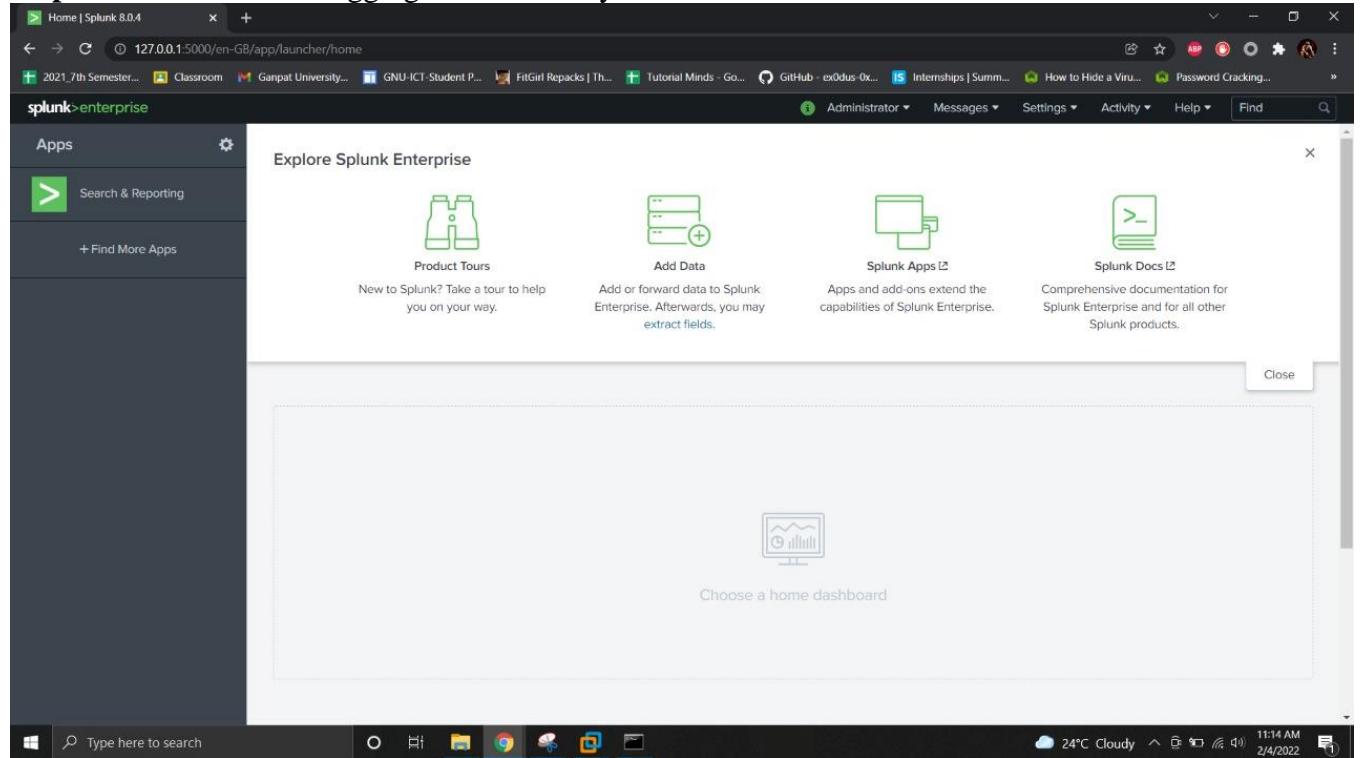
The Splunk web interface is at http://DESKTOP-AQ9RVJ1:5000

E:\Splunk Enterprise\bin>
```

Step 2: Login with Splunk credentials



Step 3: Dashboard after logging in successfully



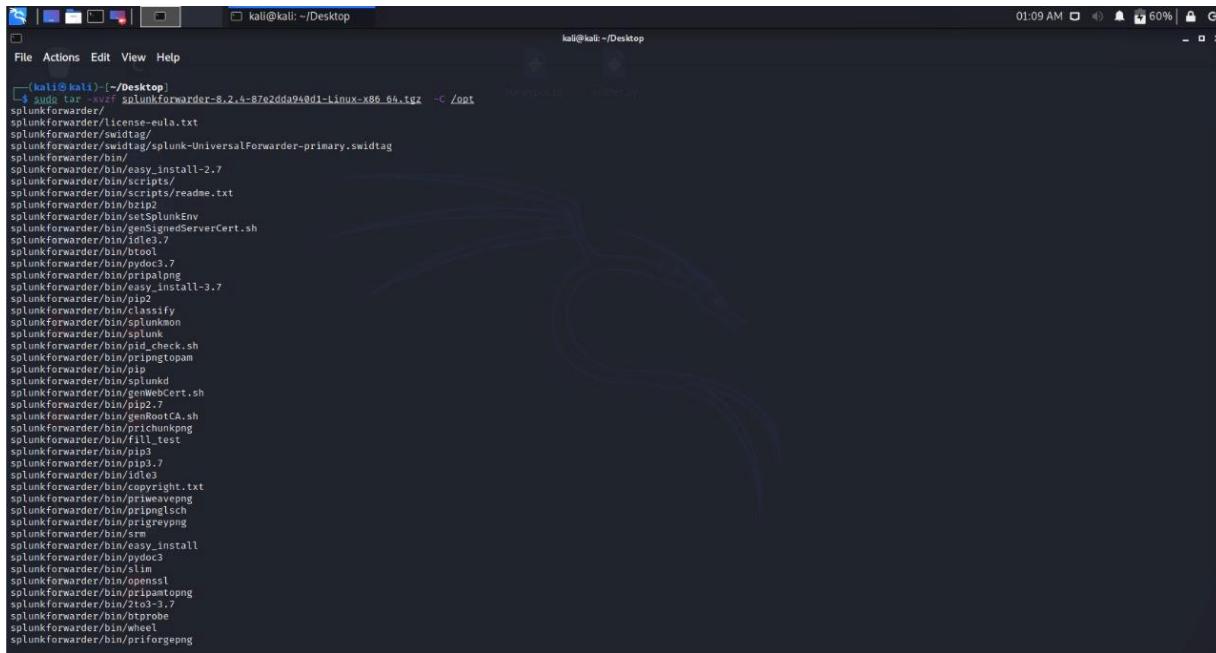
Now, we want to collect data from remote sources in the network. Hence, we will have to setup a listener on a dedicated port to be able to collect different logs from different data sources.

Step 4: Setup a listener to splunk by entering following command:

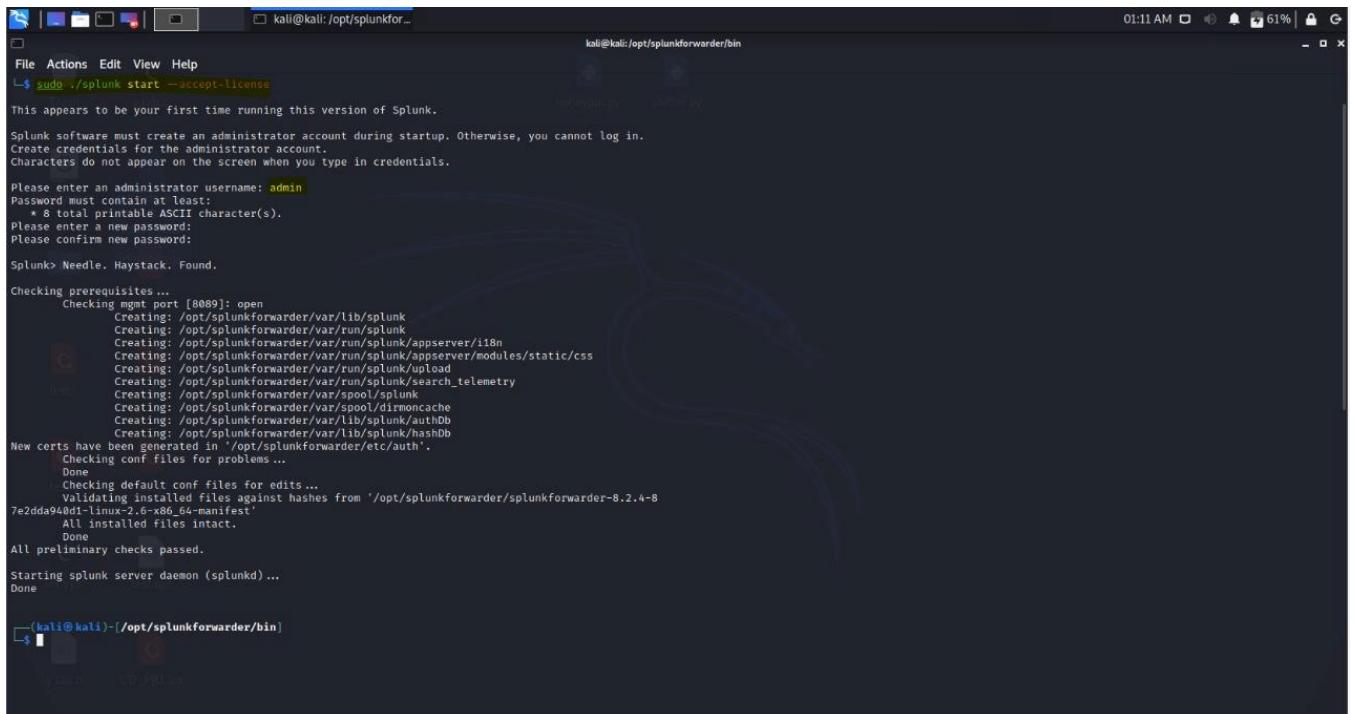
A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The command entered is 'E:\Splunk Enterprise\bin>splunk enable listen 9997 -auth admin:password'. The output shows 'Listening for Splunk data on TCP port 9997.' The prompt then changes to 'E:\Splunk Enterprise\bin>'. The background of the window is black.

Now, to collect data from remote sources, we need to configure SPLUNK forwarder modules on either the machine themselves or within a forwarder server in the network.

Step 5: Setting up SPLUNK forwarders:



```
(kali㉿kali)-[~/Desktop]
└─$ sudo tar -xvf splunkforwarder-8.2.4-8e2dd94dd1-Linux-x86_64.tgz -C /opt
splunkForwarder/
splunkForwarder/license-eula.txt
splunkForwarder/swidtag/
splunkForwarder/swidtag/splunk-UniversalForwarder-primary.swidtag
splunkForwarder/bin/
splunkForwarder/bin/easy_install-2.7
splunkForwarder/bin/scripts/
splunkForwarder/bin/scripts/readme.txt
splunkForwarder/bin/bzip
splunkForwarder/bin/setSplunkEnv
splunkForwarder/bin/genSignedServerCert.sh
splunkForwarder/bin/python3.7
splunkForwarder/bin/btool
splunkForwarder/bin/pydc1.7
splunkForwarder/bin/primalong
splunkForwarder/bin/easy_install-3.7
splunkForwarder/bin/pip2
splunkForwarder/bin/certsify
splunkForwarder/bin/splunkmon
splunkForwarder/bin/splunk
splunkForwarder/bin/pid_check.sh
splunkForwarder/bin/primpoptopam
splunkForwarder/bin/pip
splunkForwarder/bin/splunkd
splunkForwarder/bin/splunkCert.sh
splunkForwarder/bin/pip2.7
splunkForwarder/bin/genRootCA.sh
splunkForwarder/bin/prichunkong
splunkForwarder/bin/fill_test
splunkForwarder/bin/pip3
splunkForwarder/bin/pip3.7
splunkForwarder/bin/pip2.7
splunkForwarder/bin/pip
splunkForwarder/bin/idle
splunkForwarder/bin/copyright.txt
splunkForwarder/bin/priweaveng
splunkForwarder/bin/pripngsch
splunkForwarder/bin/pripngtryng
splunkForwarder/bin/srm
splunkForwarder/bin/easy_install
splunkForwarder/bin/pydc3
splunkForwarder/bin/slim
splunkForwarder/bin/openssl
splunkForwarder/bin/pripamitung
splunkForwarder/bin/python3.7
splunkForwarder/bin/btprobe
splunkForwarder/bin/wheel
splunkForwarder/bin/priforgepng
```



```
kali㉿kali:/opt/splunkfor...
File Actions Edit View Help
└─$ sudo ./splunk start --accept-license
This appears to be your first time running this version of Splunk.

Splunk software must create an administrator account during startup. Otherwise, you cannot log in.
Create credentials for the administrator account.
Characters do not appear on the screen when you type in credentials.

Please enter an administrator username: admin
Password must contain at least:
 * 8 total printable ASCII character(s).
Please enter a new password:
Please confirm new password:

Splunk> Needle, Haystack. Found.

Checking prerequisites ...
    Checking mgmt port [8089]: open
        Creating: /opt/splunkforwarder/var/lib/splunk
        Creating: /opt/splunkforwarder/var/run/splunk
        Creating: /opt/splunkforwarder/var/run/splunk/appserver/i18n
        Creating: /opt/splunkforwarder/var/run/splunk/appserver/modules/static/css
        Creating: /opt/splunkforwarder/var/run/splunk/upload
        Creating: /opt/splunkforwarder/var/run/splunk/search_telemetry
        Creating: /opt/splunkforwarder/var/spool/splunk
        Creating: /opt/splunkforwarder/var/spool/dirmoncache
        Creating: /opt/splunkforwarder/var/lib/splunk/authdb
        Creating: /opt/splunkforwarder/var/lib/splunk/hashdb
New certs have been generated in '/opt/splunkforwarder/etc/auth'.
    Checking conf files for problems ...
        None
        Checking default conf files for edits ...
        Validating installed files against hashes from '/opt/splunkforwarder/splunkforwarder-8.2.4-8e2dd94dd1-Linux-x86_64.manifest'
        All installed files intact.
        Done
All preliminary checks passed.

Starting splunk server daemon (splunkd)...
Done

(kali㉿kali)-[/opt/splunkforwarder/bin]
```

```

kali@kali: /opt/splunkforwar... 01:15 AM
File Actions Edit View Help
Creating: /opt/splunkforwarder/var/run/splunk/upload
Creating: /opt/splunkforwarder/var/run/splunk/search_telemetry
Creating: /opt/splunkforwarder/var/spool/splunk
Creating: /opt/splunkforwarder/var/spool/dirmoncache
Creating: /opt/splunkforwarder/var/lib/splunk/authDb
Creating: /opt/splunkforwarder/var/lib/splunk/hashDb
New certs have been generated in /opt/splunkforwarder/etc/auth .
Checking conf files for problems ...
Done
Checking default conf files for edits...
Validating installed files against hashes from '/opt/splunkforwarder/splunkforwarder-8.2.4-8
7e2dda940d1-linux-2.6-x86_64-manifest'
All installed files intact.
Done
All preliminary checks passed.

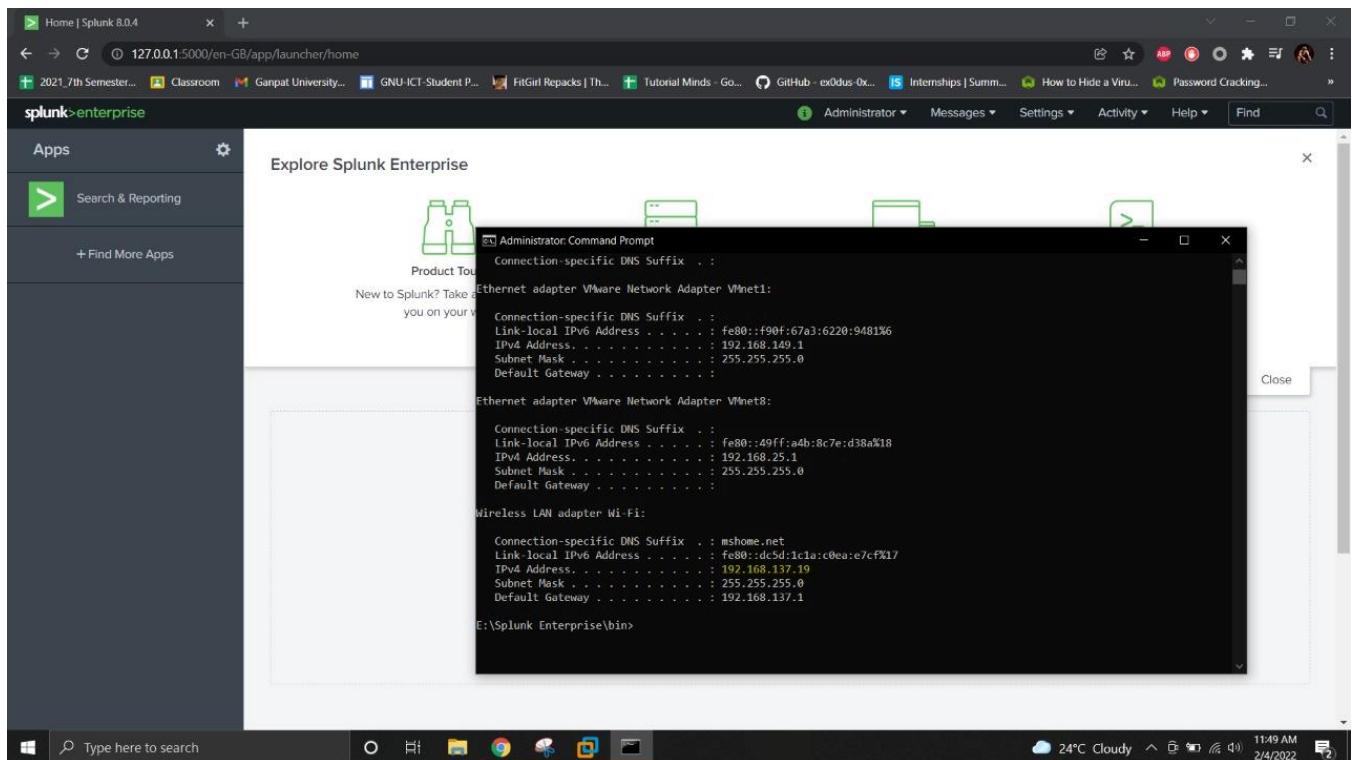
Starting splunk server daemon (splunkd) ...
Done

(kali㉿kali)-[/opt/splunkforwarder/bin]
$ sudo ./splunk add forward-server 192.168.137.19:9997
Your session is invalid. Please login.
Splunk username: admin
Password:
Added forwarding to: 192.168.137.19:9997.

(kali㉿kali)-[/opt/splunkforwarder/bin]

```

Note: The IP provided here to add forwarder server is the IP of our SPLUNK enterprise machine, where the SPLUNK indexer resides.



Once the forwarder server is configured, we will now specify the data source, I.e., which data to be sent to SPLUNK in order to monitor and analyze.

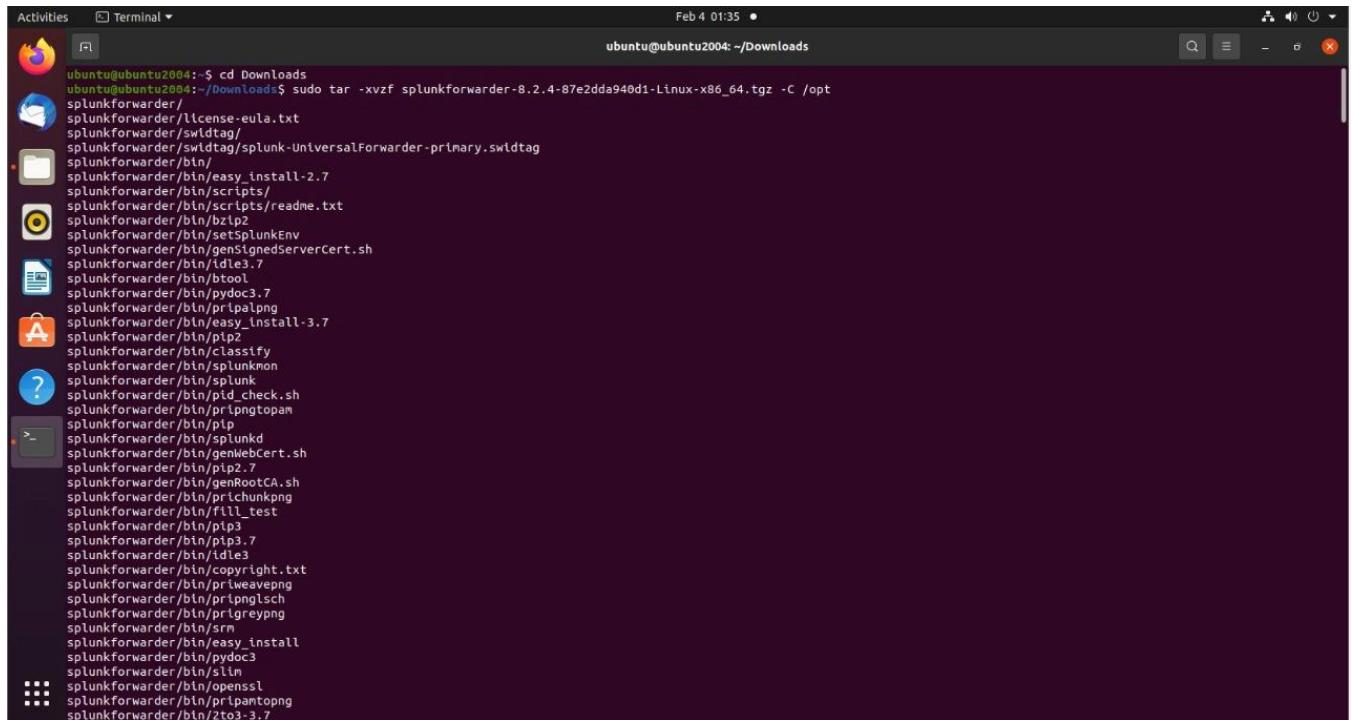
A screenshot of a terminal window titled "kali@kali:/opt/splunkforwarder/bin". The terminal shows the following command sequence:

```
(kali㉿kali)-[~/opt/splunkforwarder/bin]
$ ls /var/log
alternatives.log      boot.log      daemon.log      dpkg.log      inetsim      macchanger.log.1.gz  mysql      syslog      user.log      vmware-network.6.log      wtmp
alternatives.log.1    boot.log.1    daemon.log.1    dpkg.log.1    installer    macchanger.log.2.gz  nginx      syslog.1    user.log.1    vmware-network.7.log      Xorg.0.log
alternatives.log.2.gz boot.log.2    daemon.log.2    dpkg.log.2    journal     macchanger.log.3.gz  ntpstats   syslog.2.gz  user.log.2.gz  vmware-network.8.log      Xorg.0.log.old
apache2.log          boot.log.3    daemon.log.3    dpkg.log.3    kern.log     macchanger.log.4.gz  openvpn    syslog.3.gz  user.log.3.gz  vmware-network.9.log      Xorg.1.log
apt.log              boot.log.4    daemon.log.4    dpkg.log.4    messages    osquery     syslog.4.gz  user.log.4.gz  vmware-network.log      Xorg.1.log.old
auth.log             boot.log.5    debug          dpkg.log.5    kern.log.1  messages.1  postgresql  syslog.5.gz  vmware-network.1.log    vmware-vmsvc-root.1.log
auth.log.1           boot.log.6    debug.1        dpkg.log.6    kern.log.2  messages.2  private    syslog.6.gz  vmware-network.2.log    vmware-vmsvc-root.2.log
auth.log.2.gz         boot.log.7    debug.2        dpkg.log.7    kern.log.3  messages.3  runit     syslog.7.gz  vmware-network.3.log    vmware-vmsvc-root.3.log
auth.log.3.gz         btmp        debug.3       faillog      lastlog    messages.4    samba     syslogat  vmware-network.4.log    vmware-vmsvc-root.log
auth.log.4.gz         btmp.1      debug.4       faillog      lastlog.1  messages.4.gz  stunnel4  unattended-upgrades  vmware-network.5.log    vmware-vmtoolsd-root.log

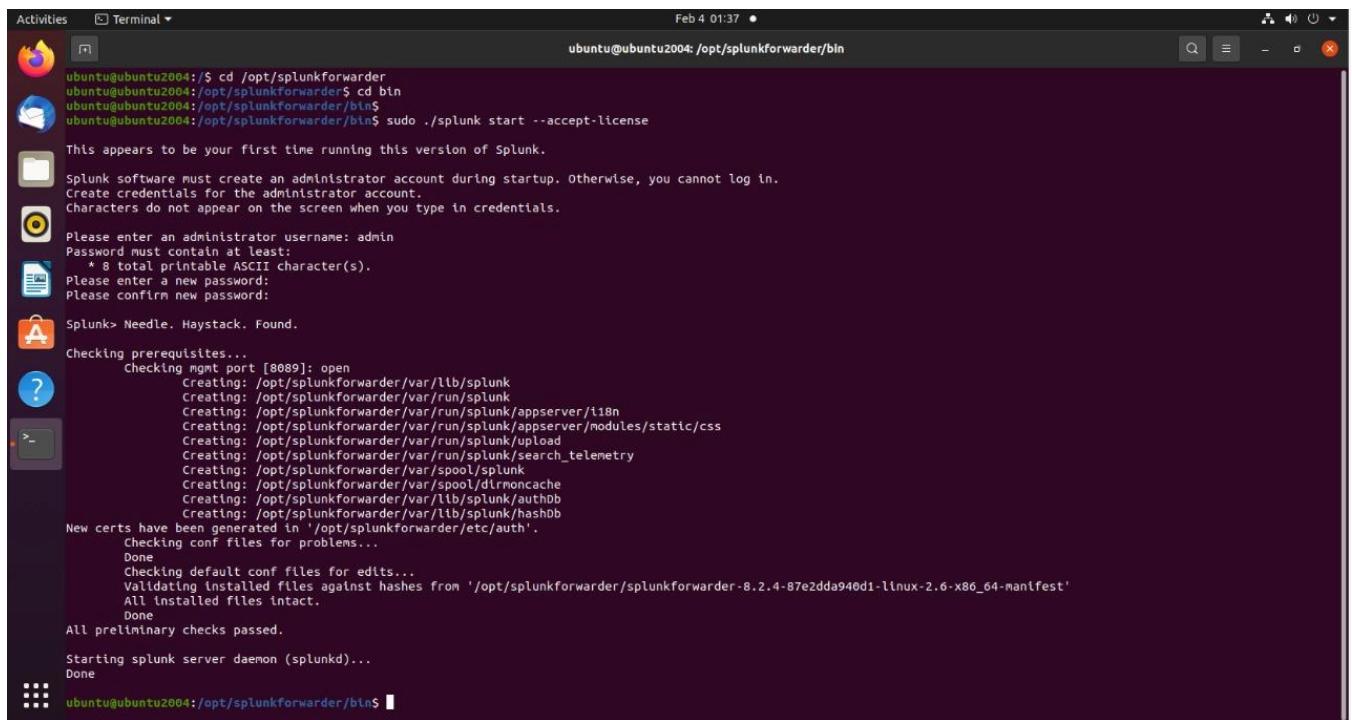
(kali㉿kali)-[~/opt/splunkforwarder/bin]
$ sudo ./splunk add monitor /var/log/syslog -index main -sourcetype kali_syslogs
Added monitor of '/var/log/syslog'.
```

The remote forwarder is currently arranged. It will send the predetermined information source to the SPLUNK indexer continuously.

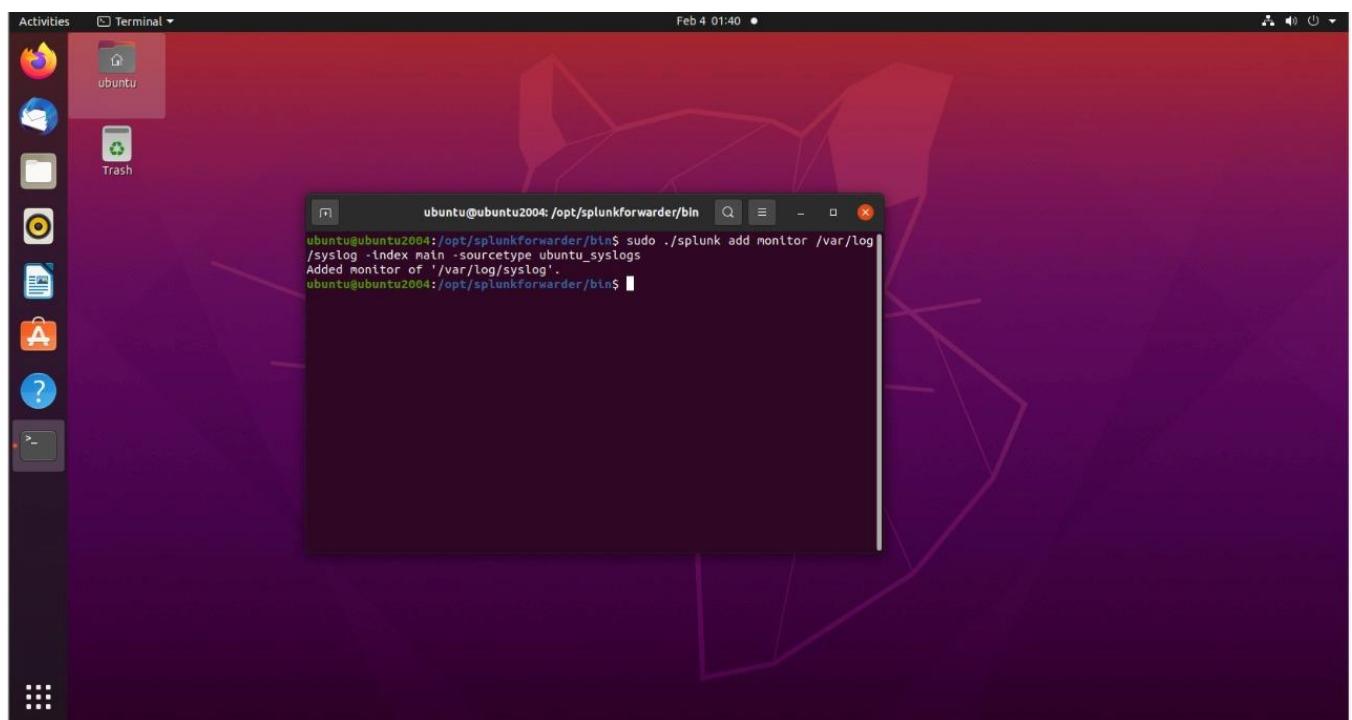
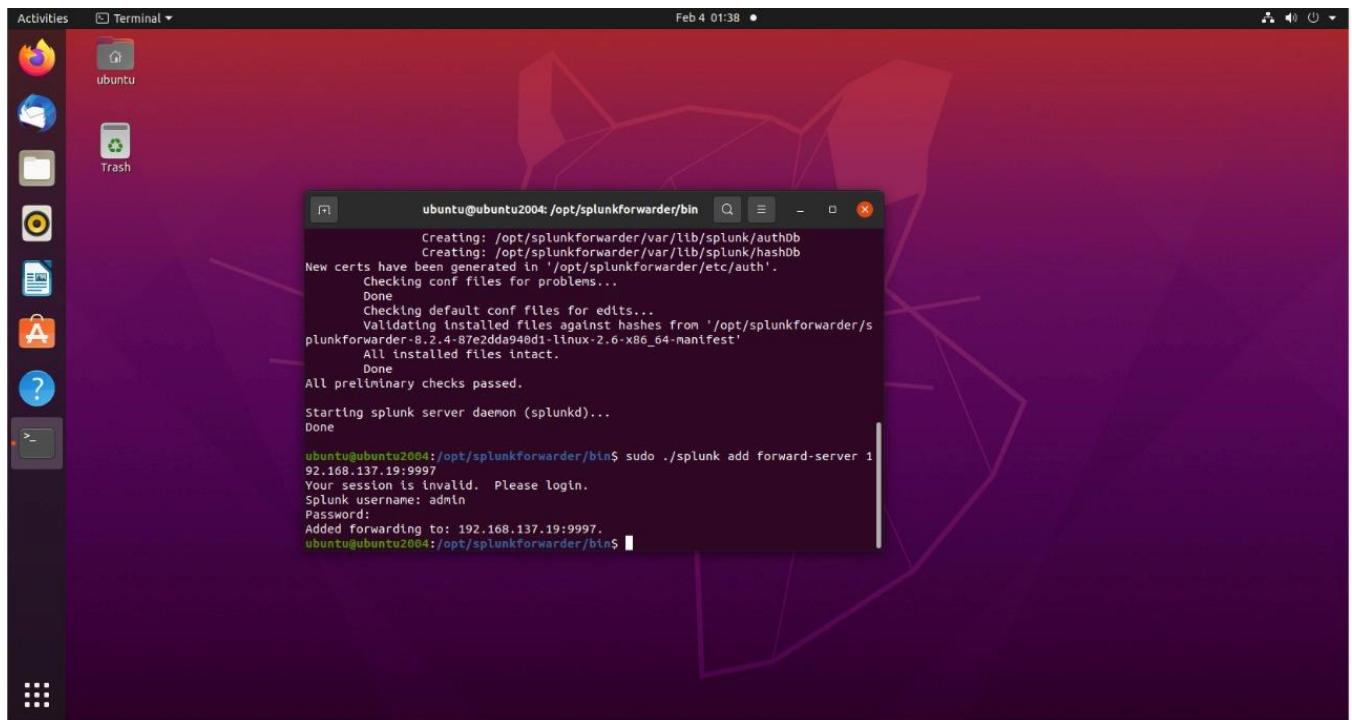
Similarly, doing the same for Ubuntu machine:



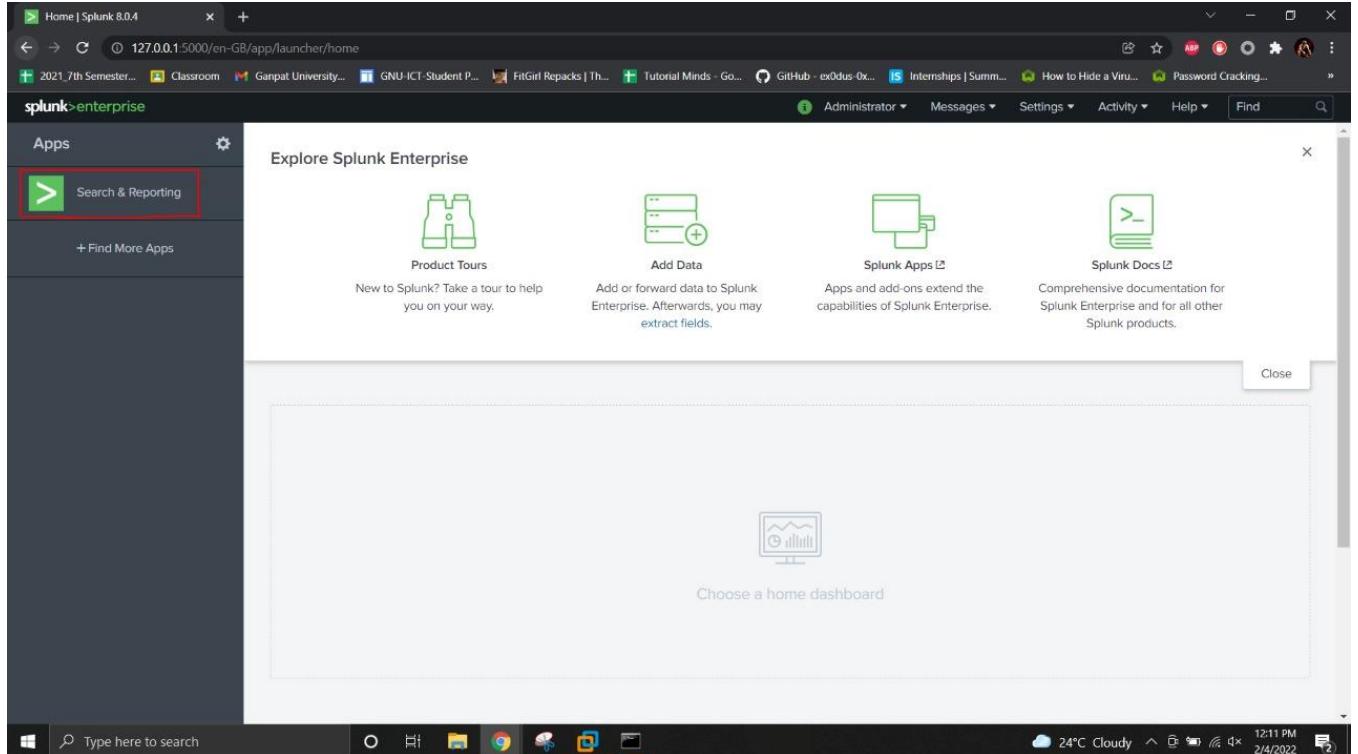
A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal shows the command `cd Downloads` followed by `sudo tar -xvzf splunkforwarder-8.2.4-87e2dda940d1-Linux-x86_64.tgz -C /opt`. The output lists numerous files and directories extracted from the archive, including `splunkforwarder/`, `splunkforwarder/bin/`, `splunkforwarder/bin/easy_install-2.7`, `splunkforwarder/bin/scripts/`, `splunkforwarder/bin/bzlp2`, `splunkforwarder/bin/setSplunkEnv`, `splunkforwarder/bin/gensignedServerCert.sh`, `splunkforwarder/bin/idle3.7`, `splunkforwarder/bin/bttool`, `splunkforwarder/bin/pydoc3.7`, `splunkforwarder/bin/principals`, `splunkforwarder/bin/easy_install-3.7`, `splunkforwarder/bin/pip2`, `splunkforwarder/bin/classify`, `splunkforwarder/bin/splunkmon`, `splunkforwarder/bin/splunk`, `splunkforwarder/bin/pid_check.sh`, `splunkforwarder/bin/pripingtopam`, `splunkforwarder/bin/pip`, `splunkforwarder/bin/splunkd`, `splunkforwarder/bin/genwebCert.sh`, `splunkforwarder/bin/pip2.7`, `splunkforwarder/bin/genRootCA.sh`, `splunkforwarder/bin/prichunkpng`, `splunkforwarder/bin/fill_test`, `splunkforwarder/bin/pip3`, `splunkforwarder/bin/pip3.7`, `splunkforwarder/bin/idle3`, `splunkforwarder/bin/copyright.txt`, `splunkforwarder/bin/priweaveng`, `splunkforwarder/bin/pringlensch`, `splunkforwarder/bin/srm`, `splunkforwarder/bin/easy_install`, `splunkforwarder/bin/pydoc3`, `splunkforwarder/bin/slim`, `splunkforwarder/bin/openssl`, `splunkforwarder/bin/primaptopm`, `splunkforwarder/bin/2to3-3.7`.



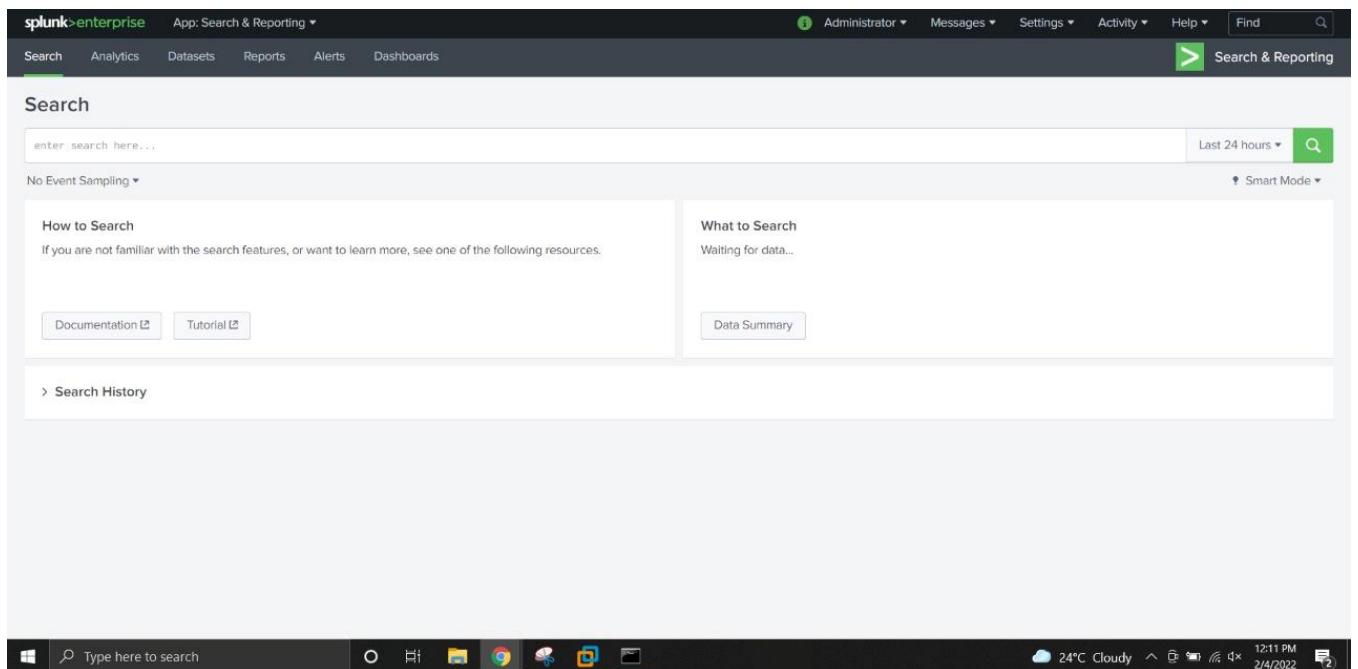
A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal shows the command `cd /opt/splunkforwarder` followed by `cd bin` and `sudo ./splunk start --accept-license`. The output shows the initial configuration steps for Splunk, including creating an administrator account, setting a password, and generating certificates. It also shows the creation of various configuration and log files in the `/opt/splunkforwarder/bin` directory. The process concludes with the message "All installed files intact." and "All preliminary checks passed.", followed by the start of the Splunk server daemon.



Step 6: Now, go to SPLUNK indexer server that is the web GUI for SPLUNK Enterprise and go to the app “Search and Reporting”:



Step 7: Wait for the SPLUNK indexer to receiver to receive data from the remote forwarders:



The screenshot shows the Splunk 8.0.4 search interface. At the top, there's a navigation bar with links like '2021_7th Semester...', 'Classroom', 'GNU-ICT-Student P...', 'FitGirl Repacks | Th...', 'Tutorial Minds - Go...', 'GitHub - ex0dus-0x...', 'Internships | Summ...', 'How to Hide a Viru...', and 'Password Cracking...'. Below the navigation bar is a dark header with the 'splunk>enterprise' logo and 'App: Search & Reporting'. On the right side of the header are links for 'Administrator', 'Messages', 'Settings', 'Activity', 'Help', and a 'Find' button.

The main area is titled 'Search' and contains a search bar with placeholder text 'enter search here...'. To the right of the search bar are buttons for 'Last 24 hours' and a magnifying glass icon. Below the search bar is a dropdown menu 'No Event Sampling ▾' and a 'Smart Mode' dropdown.

On the left, there's a 'How to Search' section with a link to 'Documentation' and a 'Tutorial' button. On the right, there's a 'What to Search' section showing '12,350 Events INDEXED' and time ranges from '7 days ago' to '3 minutes ago' (EARLIEST EVENT to LATEST EVENT). Below these sections is a 'Data Summary' button.

At the bottom of the interface, there's a 'Search History' section with a link to 'Search History'.

The taskbar at the bottom of the screen shows various pinned icons and the system clock indicating 12:18 PM on 2/4/2022.

Step 8: Click on Data summary and view different stats.

This screenshot is similar to the previous one but with the 'Data Summary' modal open in the center. The modal has a title 'Data Summary' and tabs for 'Hosts (2)', 'Sources (1)', and 'Sourcetypes (3)'. The 'Hosts (2)' tab is selected, showing a table with two rows:

Host	Count	Last Update
kali	5,974	04/02/2022 12:29:46.000
ubuntu2004	6,465	04/02/2022 12:25:45.000

Below the table are 'filter' and search buttons. To the right of the table, there's a status message '2 minutes ago LATEST EVENT'. The background of the interface remains the same as in the first screenshot.

The taskbar at the bottom of the screen shows various pinned icons and the system clock indicating 12:31 PM on 2/4/2022.

Search | Splunk 8.0.4

127.0.0.1:5000/en-GB/app/search/search

splunk>enterprise App: Search & Reporting

Administrator Messages Settings Activity Help Find

Search Analytics Datasets Reports All

Data Summary

Hosts (2) Sources (1) Sourcetypes (3)

Filter

Source	Count	Last Update
/var/log/syslog	12,439	04/02/2022 12:29:46.000

INDEXED EARLIEST EVENT LATEST EVENT

3 minutes ago

Documentation Tutorial Data Summary

> Search History

Search | Splunk 8.0.4

127.0.0.1:5000/en-GB/app/search/search

splunk>enterprise App: Search & Reporting

Administrator Messages Settings Activity Help Find

Search Analytics Datasets Reports All

Data Summary

Hosts (2) Sources (1) Sourcetypes (3)

Filter

Sourcetype	Count	Last Update
kali_syslogs	5,291	04/02/2022 12:29:46.000
syslog	2,147	04/02/2022 12:09:11.000
ubuntu_syslogs	5,001	04/02/2022 12:25:45.000

4 minutes ago

Documentation Tutorial Data Summary

> Search History

Type here to search

24°C Cloudy 12:33 PM 2/4/2022

Step 9: Using SPLUNK search module to search and view the received data:

Index="main"

The screenshot shows the Splunk 8.0.4 search interface. The search bar at the top contains the query "index='main'". Below the search bar, it says "2,379 events (03/02/2022 12:30:00.000 to 04/02/2022 12:36:26.000) No Event Sampling". The main area displays a table of event logs. The first few log entries are:

	i	Time	Event
>	04/02/2022 12:35:10.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:35:01.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:45.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:34.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:34.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:34.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:34.000	host = kali	source = /var/log/syslog sourcetype = kali_syslogs

The screenshot shows the Splunk Enterprise 8.0.4 search interface. The search bar at the top contains the query "index='main'". Below the search bar, it says "2,379 events (03/02/2022 12:30:00.000 to 04/02/2022 12:36:26.000) No Event Sampling". The main area displays a table of event logs. The first few log entries are:

	i	Time	Event
>	04/02/2022 12:24:18.000	host = ubuntu2004	source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:24:18.000	host = ubuntu2004	source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:24:18.000	host = ubuntu2004	source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:24:17.000	host = ubuntu2004	source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:24:17.000	host = ubuntu2004	source = /var/log/syslog sourcetype = ubuntu_syslogs

According to different hosts:

The screenshot shows the Splunk 8.0.4 interface with a search bar containing "host='kali'". The results show 845 events from February 4, 2022, between 02:07:10 and 02:35:10. The results table includes columns for Time and Event. The event details show various system logs from the kali host, such as cron jobs and NetworkManager dispatcher service starts.

Time	Event
Feb 4 02:07:10	kali upowerd[985]: energy 14.370000 bigger than full 14.290000
Feb 4 02:05:10	host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 02:05:10	kali upowerd[985]: energy 14.290000 bigger than full 14.230000
Feb 4 02:05:01	host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 02:35:01	host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 01:59:45	host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 01:59:45	host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 01:59:34	host = kali source = /var/log/syslog sourcetype = kali_syslogs

The screenshot shows the Splunk 8.0.4 interface with a search bar containing "host='ubuntu2004'". The results show 1,567 events from February 4, 2022, between 02:07:10 and 02:37:10. The results table includes columns for Time and Event. The event details show various system logs from the ubuntu2004 host, including NetworkManager dispatcher service starts and dbus-daemon activity.

Time	Event
Feb 4 02:07:20	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:18	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:10	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:10	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:10	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:10	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
Feb 4 02:07:10	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs

According to Data source

source="/var/log/syslog"

✓ 2,417 events (03/02/2022 12:30:00.000 to 04/02/2022 12:40:14.000) No Event Sampling ▾

Events (2,417) Patterns Statistics Visualization

Format Timeline ▾ — Zoom Out + Zoom to Selection × Deselect 1 hour per column

Time	Event
Feb 4 12:39:10.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:01.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs

< Hide Fields All Fields i

SELECTED FIELDS
a host 2
a source 1
a sourcetype 3

INTERESTING FIELDS
date_hour 3
date_mday 1
date_minute 40
date_month 1
date_second 58
date_wday 1
date_year 1
a date_zone 1

Windows Type here to search 24°C Cloudy 12:40 PM 2/4/2022

According to source type

sourcetype="kali_syslogs"

✓ 167 events (03/02/2022 12:30:00.000 to 04/02/2022 12:41:07.000) No Event Sampling ▾

Events (167) Patterns Statistics Visualization

Format Timeline ▾ — Zoom Out + Zoom to Selection × Deselect 1 hour per column

Time	Event
Feb 4 12:39:10.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:09.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs
Feb 4 12:39:01.000	04/02/2022 host = kali source = /var/log/syslog sourcetype = kali_syslogs

< Hide Fields All Fields i

SELECTED FIELDS
a host 1
a source 1
a sourcetype 1

INTERESTING FIELDS
date_hour 2
date_mday 1
date_minute 12
date_month 1
date_second 14
date_wday 1
date_year 1
a date_zone 1

Windows Type here to search 24°C Cloudy 12:41 PM 2/4/2022

New Search

sourcetype="ubuntu_syslogs"

✓ 104 events (03/02/2022 12:30:00.000 to 04/02/2022 12:41:42.000) No Event Sampling ▾

Events (104) Patterns Statistics Visualization

Format Timeline ▾ - Zoom Out + Zoom to Selection × Deselect 1 hour per column

Time	Event
04/02/2022 12:40:40.000	Feb 4 02:10:40 ubuntu2004 systemd-resolved[679]: Server returned error NXDOMAIN, mitigating potential DNS violation DVE-2018-0001, retrying transaction with reduced feature level UDP. host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
04/02/2022 12:37:20.000	Feb 4 02:07:28 ubuntu2004 systemd[1]: NetworkManager-dispatcher.service: Succeeded. host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
04/02/2022 12:37:10.000	Feb 4 02:07:10 ubuntu2004 systemd[1]: Started Network Manager Script Dispatcher Service. host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
04/02/2022 12:37:10.000	Feb 4 02:07:10 ubuntu2004 dbus-daemon[724]: [system] Successfully activated service 'org.freedesktop.nm_dispatcher' host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
04/02/2022 12:37:10.000	Feb 4 02:07:10 ubuntu2004 systemd[1]: Starting Network Manager Script Dispatcher Service... host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs

< Hide Fields All Fields i Time Event

SELECTED FIELDS a host 1 a source 1 a sourcetype 1

INTERESTING FIELDS # date_hour 2 # date_mday 1 # date_minute 12 # date_month 1 # date_second 15 # date_wday 1 # date_year 1 a date_zone 1

Type here to search 24°C Cloudy 12:41 PM 2/4/2022

According to event type

New Search

eventtype="splunkd-log" host="kali"

✓ 622 events (03/02/2022 12:30:00.000 to 04/02/2022 12:46:05.000) No Event Sampling ▾

Events (622) Patterns Statistics Visualization

Format Timeline ▾ - Zoom Out + Zoom to Selection × Deselect 1 hour per column

Time	Event
04/02/2022 02:45:59.117	02-04-2022 02:15:59.117 -0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.19:9997, reuse=1. host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
04/02/2022 02:45:42.314	02-04-2022 02:15:42.314 -0500 INFO TailReader [1910 tailreader@0] - Batch input finished reading file='/opt/splunkforwarder/var/spool/splunk/tracker.log' host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
04/02/2022 02:45:29.255	02-04-2022 02:15:29.255 -0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.19:9997, reuse=1. host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
04/02/2022 02:45:12.314	02-04-2022 02:15:12.314 -0500 INFO TailReader [1910 tailreader@0] - Batch input finished reading file='/opt/splunkforwarder/var/spool/splunk/tracker.log' host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
04/02/2022 02:14:59.359	02-04-2022 02:14:59.359 -0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.19:9997, reuse=1. host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd

< Hide Fields All Fields i Time Event

SELECTED FIELDS a host 1 a source 1 a sourcetype 1

INTERESTING FIELDS # date_hour 2 # date_mday 1 # date_minute 60 # date_month 1 # date_second 39 # date_wday 1 # date_year 1 a date_zone 1

Type here to search 24°C Cloudy 12:46 PM 2/4/2022

SPLUNK supports more such advanced search commands.

Project Approach: Splunk Enterprise

Splunk Enterprise is item thing that engages you to look, separate, and picture the data gathered from the pieces of your IT structure or business. Splunk Endeavor learns from locales, applications, sensors, contraptions, and so on. After you describe the data source, Splunk Endeavor records the data stream and parses it into a movement of individual events that you can view and look. Most clients partner with Splunk Undertaking with a web program and use Splunk Web to control their association, administer and make data objects, run look, make turns and reports, and so on. We can moreover use the request line association highlight deal with your Splunk Venture association. You can loosen up the Splunk Venture environment to fit the specific necessities of your relationship by using applications. An application is a combination of arrangements, data articles, points of view, and dashboards that unexpected spikes sought after for the Splunk stage. A single Splunk Venture foundation can run different application.

1. Hosting a webserver with bWAPP on kali machine:-

bWAPP is vulnerable web application for testing purpose , so we download and host the site on apache server.

Download the bwapp and navigate to the location

-Cd downloads

Now we unzip the zip file directly in apache web folder using following command

-sudo unzip -d /var/www/html bwapp.zip

Navigate to apache web folder

-cd /var/www/html

Then check the required bwapp files in the folder

-ls

Start the required services of apache and mysql server

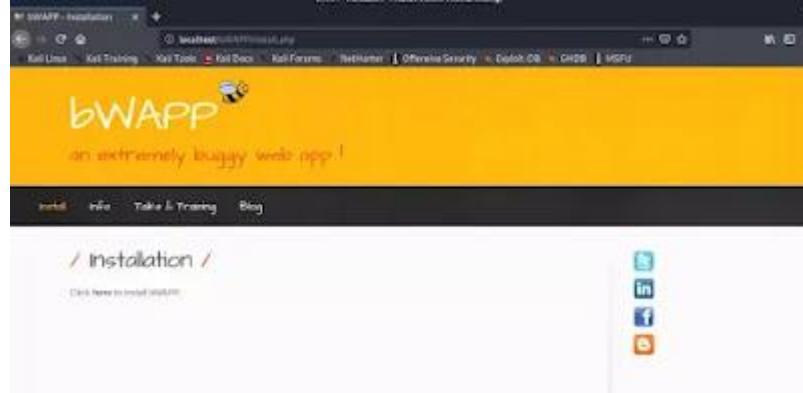
-sudo service apache2 start

-sudo service mysql start

Configure the required mysql settings

-cd /bwapp/admin

Then, at that point, we open our program and explore to localhost/bWAPP/install.php



Here we click for introduce it. On the off chance that the setup is awesome, it ought to effectively introduce.

The screenshot shows the bWAPP homepage with a yellow header containing the logo and the text "an extremely buggy web app!". Below the header is a black navigation bar with links: Login, New User, Info, Tutorials & Training, and Blog. The main content area has a title "/ Installation /". A message "bWAPP has been installed successfully!" is displayed.

Then, at that point, we go to login page tapping on the menu bar.

The screenshot shows the bWAPP login page. It features a yellow header with the bWAPP logo and the text "an extremely buggy web app!". Below the header is a black navigation bar with links: Login, New User, Info, Tutorials & Training, and Blog. The main content area has a title "/ Login /" and a form for entering a username and password. To the right of the form is a "Missing & Exploited Children" logo and a link to "Scan your website for XSS and SQL injection vulnerabilities".

The default username is honey bee and the default secret phrase is bug. Utilizing those we click on login with low security level.

The screenshot shows the bWAPP portal page. It features a yellow header with the bWAPP logo and the text "an extremely buggy web app!". Below the header is a black navigation bar with links: Bug, Change Password, Create User, Set Security Level, Reset, Credits, Blog, Logout, and Welcome Bee. A "Set your security level" dropdown is set to "low". The main content area has a title "/ Portal /" and a sidebar with a "bWAPP v2.2" section listing various injection types: A1 - Injection / HTML Injection - Reflected (GET), HTML Injection - Reflected (POST), HTML Injection - Reflected (Current URL), HTML Injection - Stored (Blog), Form Injection, LDAP Injection (Search), Mail Header Injector (SMTP). A "Hack" button is located at the bottom of this sidebar. To the right of the sidebar is a "MISSING & EXPLOITED CHILDREN" logo and social media links for Twitter, LinkedIn, Facebook, and YouTube.

2. Performing SQL Injection using SQLMAP from ubuntu machine on kali machine:-

- sqlmap is an open source login device that enables the process involved in detecting and implementing SQL installation imperfections and managing data set servers.
- Incorporates a powerful local engine, various expert features for direct introduction analysis, and a wide range of switches that include a set of fingerprint data, data acquisition data sets, approval of a basic record framework, and outsourcing orders through external organizations.

3. Capturing and Analyzing the SQL logs in splunk:-

One of the numerous capacities of Splunk is constant observing of IT framework.

- In particular, Splunk can be utilized to screen SQL Server examples
- Splunk information authorities assemble the information from your information sources (logs, takes care of, measurements, documents, etc) across a scope of various stages, organizations, servers, applications, data sets and administrations. Anything information you want to gather, you'll probably find an application or extra that is preconfigured to gather it, or can arrange it physically.
- This capacity to file your information to such an extent that it very well may be rapidly and effectively looked is one of Splunk's assets; it is now and again alluded to as a web crawler for machine information and it can assist you with grasping the reason for issues, track accessibility, limit and execution, oversee setup and security of your server components, etc.
- Thus, for instance, you could utilize Splunk to do your framework observing, gathering measurements and log information for Windows servers (in addition to Linux, MacOS), as well as bunches, Docker compartments and the sky is the limit from there.
- You can then stretch out the observing to SQL Server, as well as other social information base and NoSQL information stores, utilizing the proper applications and additional items.
- You can run and save look against every one of the information it gathers, inspecting a blend of critical 'occasions' gathered over the equivalent time period, maybe corelating SQL Server execution measurements and log information with point by point foundation information. You assemble visual dashboards from the outcomes so you can detect patterns, relationships between's various measurements, bizarre way of behaving, and begin to figure out the significant reasons for execution issues, vacation, and other framework issues.

4. Creating visualizations:-

Whenever you make a dashboard board, you select how the board shows the consequences of a hunt or report with a representation.

- Perceptions are graphical portrayals of your information, like a diagram, table, or outline. You can change your perception determination with the Dashboard Board Proofreader.
- Add a perception to a pursuit and save as a dashboard board
- Change a perception on a dashboard board
- View, send out, investigate or revive a perception

1. Open your desired dashboard to alter for altering.
2. Click the Add Graph symbol .
3. Select an outline that you need to use to envision your information. For instance, select Line to add a line diagram.
4. Click Drop in the New Information Source board.
5. In the Arrangement board, click + Arrangement Essential Information Source.
6. Select one of the information sources that you made.
7. (Optional) Add a title and a portrayal for the representation.
8. (Optional) Alter the position and size of the representation.
9. (Optional) Change other perception settings.
10. Click Run and Save to run the pursuit and save the perception settings.
11. Click the dashboard name to see the dashboard or snap the Add Graph symbol to add an extra perception.

5. Create dashboards in Splunk :-

There are multiple ways of making dashboards in Splunk.

- Make a dashboard from the Dashboards page, and afterward add boards or contributions to the dashboard.
- Use prebuilt boards to make a dashboard.
- Clone a current dashboard.
- Make a dashboard from the Dashboards page, and afterward add boards from searches, reports, or prebuilt boards.

1. In your Splunk Light instance, select Dashboards in the menu bar.
2. Click Make New Dashboard.
3. (Optional) Enter a Title.
4. Enter an ID.
5. (Optional) Enter a Portrayal.
6. Click a consent level.
7. Click Make Dashboard.
8. On the Alter Dashboard page, add boards or contributions to your dashboard.
9. Click Save.
10. (Optional) To affirm that you have saved the dashboard, click Dashboards in the menu bar to see the dashboard recorded on the Dashboards page.

6. Create a real-time alert with per-result triggering:-

Constant cautions with per-result setting off are sometimes known by result alerts. This caution type and setting off use a relentless consistent pursuit to look for events. Each result sets off the wariness.

- Alert: In the event that have Splunk Venture high-accessibility arrangement, use per-result setting off with alert. In the event that a friend isn't accessible, an ongoing hunt doesn't caution that the inquiry may be fragmented. To keep away from this issue, utilize a booked caution

Follow these means to make a continuous caution with per-result setting off.

1. Move to the Pursuit page in Hunt & Revealing application.
2. Create a new pursuit.
3. Click on Save As and then Alert.
4. Enter title and discretionary portrayal.
5. Determine consents.
6. Select that Continuous alarm type.
7. Supplant the Terminates setting. This kinds of setting controls the future of established off alert standards, which appear on the Set off Cautions page.
8. Select the Per-Result trigger decision.
9. Arrange a trigger choking period.
10. Select something like one intolerable demonstration that happens when the alert triggers.
11. Click Save.

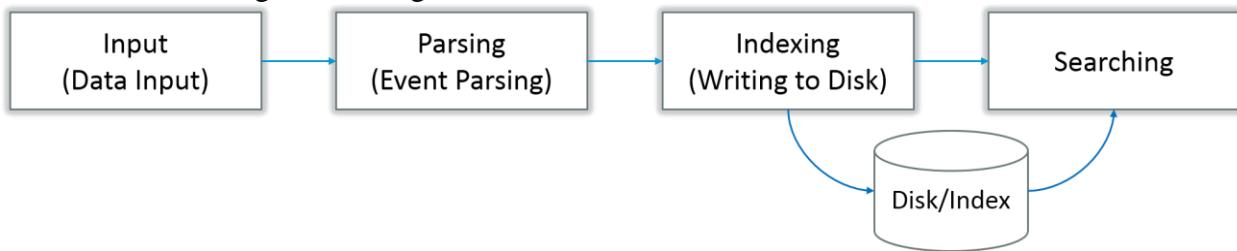
Email alert function

Send an email alert to the beneficiaries shown when the alarm goes off. Email notifications may include data from list items, query function, and alert setup. Splunk can send email notification using search page or search command.

6.1.2 Flow of Project

Data pipeline stages proceeds in three flows

- The input stage
- The storage stage for data
- The searching of data stage



1. Data Information Stage

At this stage, Splunk editing uses the stream of raw information from its source, breaks it into 64K squares, and specifies each square with metadata keys. Metadata keys include hostname, a type of unlimited source of information. Keys similarly can include attributes that are used internally, for example, coding information for distribution information and values that control information management during the order phase, for example, the record at which times should be discarded.

Data Capacity Stage

- The data limit consists of two phases: Analysis and editing.
- In the analysis phase, the Splunk system evaluates, evaluates, and modifies data to separate only important information. This is often called event management. It is during this stage that Splunk editing breaks the data stream into individual events. The stages are many sub-sections:
 1. Divide the increase in data in each row
 2. Identifying, sorting, and setting time stamps
 3. Defining each event with a metadata copied to a broad source key
 4. Modifying event data and metadata according to regex change rules
 5. In the order section, the Splunk system makes the filtered events a summary on the plate. It makes both aggregated data and a separate record report. The advantage of ordering is that the data can be successfully retrieved during the scan.

2. Data Looking through Stage

This stage controls how the client gets to, perspectives, and utilizations the recorded information. As a component of the pursuit work, Splunk programming stores client made information objects, for example, reports, occasion types, dashboards, cautions and field extractions. The hunt work likewise deals with the inquiry cycle.

SQL Injection:-

SQL injection is sequel query language injection which exploits the database by inserting such data as user input which act as a part of query and perform action accordingly which result in great impact of data leakage.

Sqlmap:-

sqlmap is an entrance testing gadget that automates the technique associated with perceiving and exploiting SQL mixture deformities and taking over of data base servers. It goes with a solid area engine, various specialty features for an authoritative entry analyzer and a broad extent of switches persevering from informational index fingerprinting, over data getting from the informational index, to getting to the crucial record system and executing orders on the functioning structure all through of-band affiliations.

DOS:-

- Denial of Service (DoS) attack is kind of attack which is generated by multiple parallel processing result in losing accessibility and performance of the victim system.
- During the DOS attack, they additionally get to restricted intel. These PCs are then used to wage a DoS Assault in attacker's PC.
- Through various wellbeing endeavors have been taken to stop DOS Assault to shield our data, the aggressors have developed new techniques and attack reasoning. Consequently, it is fundamental that rather than answering new attacks, it is vital to manufacture an absolute DoS plan that will make preparations for a wide scope of DoS attacks. Along these lines, the experts ought to understand the web and methodologies used to hinder the DoS attacks.
- The proposed structure gives an exceptional method to perceive DoS attack using Splunk. We propose two techniques for counteraction of DoS assault.
- One is utilizing Haphazardly created Manual human tests and other one is utilizing Linux slam content to forestall DoS attack via naturally impeding IP of the client, who is sending different solicitation at a time.

Getting everything rolling with DOS assaults utilizing hping3:

To install hping3 on a linux based system fire the command: **apt install hping3 -y**

A simple dos attack performed by: **sudo hping3 -S -flood -V -p 80 170.155.9.185**

sudo: gives required honors to run hping3.

hping3: command calls hping3 program.

-S: in the command indicates the SYN bundles.

-flood: take shots at carefulness, answers will be disregarded (that is the reason answers wont be shown) and parcels will be sent quick as could really be expected.

-V: stands for level of Verbosity.

-p 80: is the port number dedicated to 80

170.155.9.185: is IPof the target system.

CHAPTER: 7 CONCLUSIONS AND FUTURE WORK

CHAPTER 7 CONCLUSION AND FUTURE WORK

Challenges and how we overcame it

The splunk enterprise came up with the feature to run any script that could prevent simple attacks or help the system with security incident and event management, but lately the feature was depreciated. Splunk doesn't allow to run any script in desired environment. So a manual bash file was created by us that run the python script which would build a SSH connection with remote system and generate a trigger alert notification.

Conclusion

Splunk is now an industry standard for examining continuous information and trigger subsequent activities. Splunk is being utilized all around the world by government offices, business specialist co-ops, colleges to dissect and comprehend business and client conduct continuously. It can set off alarms in the event of any network safety extortion, and working on the presentation of the help being given, while lessening the expense for the everyday tasks in any association.

Future work

In future for this project we will be using splunk apps and gathering data from various sources and work with different features provided by Splunk Enterprise.

CHAPTER: 8 REFERENCES

CHAPTER 8

REFERENCES

- 1) <https://docs.splunk.com/Documentation>
- 2) <https://sqlmap.org/>
- 3) <http://www.hping.org/>
- 4) <https://www.ibm.com/security/enterprise-mobility-management>

ibm report

by Priyansh Gupta

Submission date: 27-Apr-2022 09:49PM (UTC+0530)

Submission ID: 1821983094

File name: G04_IBM_SIEM_Plagarism.docx (3.8M)

Word count: 5082

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CHAPTER: 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

Security Information & Event Management

SIEM is advanced security data framework that examines security alarms and information created from gadgets on an organization progressively. Associations use SIEM instruments to distinguish security occurrences, log security information, oversee episode reaction, and create reports for consistence. The term SIEM was first utilized in 2005 by Imprint Nicolett and Amrit Williams. SIEM as an idea was proposed by them by consolidating the idea of safety data the board (SIM) and security occasion the executives (SEM).

P/V 

Splunk:-

Splunk is an undeniable, flexible, and effective level that records and searches log logos set aside in the building. Research machine-generated data to provide useful information. The legal advantage of using Splunk is that it does not have to worry about any data source to store its data, as it usually uses its own records to store data.

Splunk is a device often used to view, monitor, and evaluate large-scale machine information by using web-based interaction. Splunk enables the acquisition, solicitation, and comparison of consistent data in an available manager where it can create drafts, reports, alerts, dashboards, and exposures. It hopes to make digitized data available through the organization and can detect data systems, generate estimates, investigate. With the help of Splunk programs, searching for specific data on more complex data is fundamental. As you may know, in log reports, finding out which configuration is right now works. To make this clearer, there is a breach of the Splunk process that helps the client by separating archive issues and identifying ongoing applications.

Prep. 

CHAPTER: 2 PROJECT SCOPE

CHAPTER 2 PROJECT SCOPE

SIEM is a product framework that gathers and totals information and occasions from different systems administration gadgets and assets across IT foundation. As of now, the SIEM market esteem is around \$4.2 billion and is supposed to develop to \$5.5 billion by 2025.

P/V 

Decide your business-basic information sources

When you have a handle of the ideal task scope, you can then recognize log sources inside the extension to decide how to acquire the pertinent information required. For instance, firewalls, interruption identification frameworks, and antivirus programming act as prime information hotspots for SIEM security use cases. However, there are some more, including switches, web channels, area regulators, application servers, information bases, and other carefully associated resources. It is pivotal that you focus on the sources included to guarantee the SIEM gives the ideal information to help the chosen use cases.

Article Error 

Word is Confused 

Distinguish the high need occasions and cautions

With regards to safeguarding an association against insider and outer dangers, security groups face a steadily developing rundown of safety occasions that should be dissected and followed up on. To get through the clamour, SIEM programming can be utilized to make occasions and information more sagacious. In any case, organizations should initially decide their high need occasions and how to get them from applications and gadgets inside the framework. Along these lines, security groups can utilize the SIEM to invest more energy on episodes and cautions that might be more basic to the business and its information.

Pinpoint your key achievement measurements

An effective SIEM execution lines up with your business objectives. Key achievement measurements not entirely settled before arrangement to guarantee greatest return for capital invested. For instance, decreasing information robbery or further developing how organizations identify expected breaks or insider dangers might be measurements to lay out. Organizations should figure out how achievement affects them and how SIEM security use cases can be utilized to accomplish it.

TOP 3 SIEM TOOLS IN INDUSTRY

1. Solar Winds

- Gives unified log assortment and standardization, mechanized danger recognition and reaction.
- It can perform progressed search and criminological examination.
- With occasion time recognition of dubious action, there will be quicker ID of dangers. Reaction is amazingly quick
- It has administrative consistence preparation. For this, it upholds HIPAA, PCI, DSS, SOX, DISA, STIG, and so on.
- Simple Establishment
- Maverick USB Information Misfortune and Robbery Insurance

Article Error (ETS)

Article Error (ETS)

Cons

- Needs support for observing public cloud administrations' IaaS or SaaS. Doesn't uphold custom report composing and customization of out-of-the-case consistence report formats. Coming up short on UEBA and security stage.

Missing "?" (ETS)

Decision:

- Solar winds upholds Windows, Linux, Macintosh, and Solaris. According to the surveys, Sun powered Breezes doesn't have a total security suite however it gives great elements and capacities to danger identification. It very well may be a decent answer for SMEs.

2. Splunk

- It can work with any machine information, regardless of whether it is from the cloud or on-premises.
- Robotized activities and work processes for fast and exact reaction.
- Utilizes progressed security examination, which incorporate both solo AI and client conduct abilities.
- It has the capacity of occasion sequencing.
- Fast identification of noxious dangers.
- Cautions the executives and hazard scores.

Article Error (ETS)

Cons

- Utilizes fundamental predefined connection rules for observing and revealing necessities. Response capacities are restricted to email warnings. Requires coordination with outsider applications for assignment and work process robotization.

Decision:

- All together, to give you noteworthy and prescient bits of knowledge, Splunk utilizes artificial intelligence and AI. Dashboards and perceptions are adjustable. According to the client audits, it is a costly instrument and subsequently it is best for the undertakings.

Article Error (ETS)

3. IBM QRadar

- Progressed rule connection motor and social profiling innovation.
- Adaptable and profoundly versatile stage with huge out-of-the-crate usefulness and presets for various use cases. Sp. ETS
- QRadar permits you to focus on security cautions utilizing danger insight.
- Can pass judgment on the effect on an organization, in light of reproduced assaults
- Has a basic yet viable point of interaction
Missing "", ETS

Cons:

- Needs incorporations into other Take off and SIEM stages
- Upgrades could be quicker Proofread ETS

Decision:

- IBM Qradar offers various highlights for information assortment, log movement, network action, and resources. It offers help to IE, Firefox, and Chrome programs. According to the client surveys, it centers around basic episodes.

Article Error ETS

2

CHAPTER: 3 SOFTWARE AND HARDWARE REQUIREMENTS

CHAPTER 3 SOFTWARE AND HARDWARE REQUIREMENTS

Minimum Hardware Requirements for IBM

Splunk Components	Indexer	Search Head	Master Node	Deployment Server
RAM	4 GB	4 GB	4 GB	4 GB
CPU Core	16	16	8	8
Hard Disk	2000 GB	2000 GB	200 GB	200 GB

Table 3.1 Minimum Hardware Requirements

Minimum Software Requirements for IBM

Operating System	Linux/Window 64 bits
Programming language	Python
Other tools & tech	Splunk

Table 3.2 Minimum Software Requirements

CHAPTER: 4 PROCESS MODEL

CHAPTER 4 PROCESS MODEL

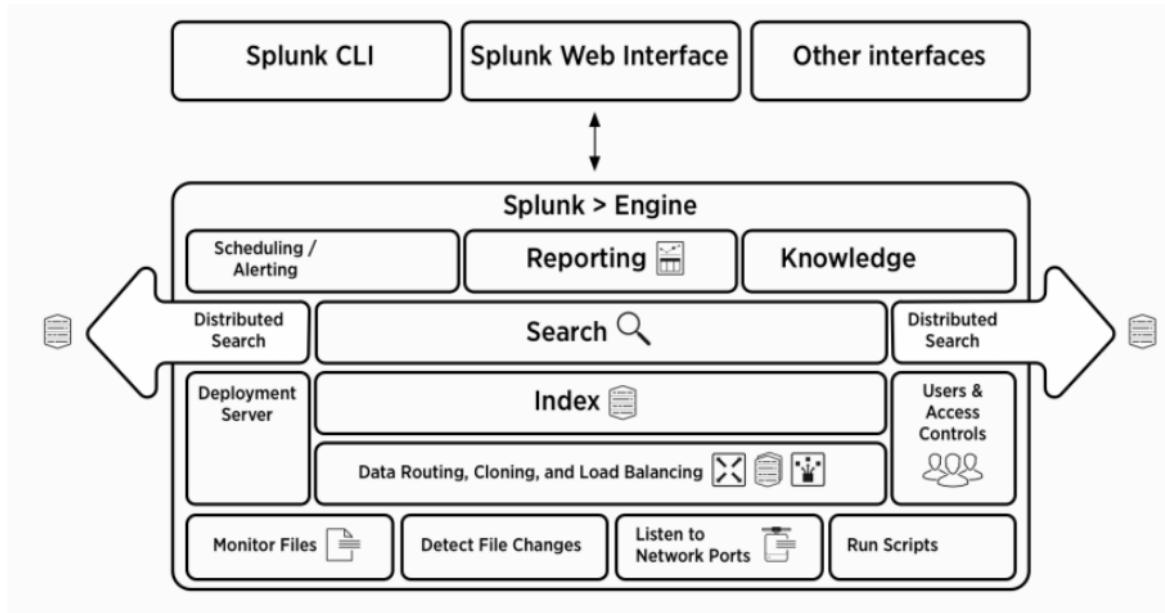


Figure 4.1 Process Model of Project

Splunk Components:-

By accepting that you are looking at the bottom of the image, you will capture the different data pipe sections where the Splunk parts fall under them.

There are **3 sections** of rules in Splunk:

- **Splunk Forwarder**, used to send data
- **Splunk Indexer**, used to sort and order data
- **Head Search**, is a GUI used for viewing, testing and disclosure

1. Splunk Forwarder

- Splunk Forwarder is the part you need to get social media logs. Accept, you want to assemble the logs on a remote machine, then, you can achieve that by using Splunk remote transmitters released from the Splunk special event.
- In all honesty, you can introduce a number of such transmitters to various machines, which will transfer log data to Splunk Indexer for you to take care of and collect. Imagine a situation where you want to make a continuous analysis of data. Splunk forwarders can be used with it as well. You can configure transmitters to send data consistently to Splunk indexes. You can present them in different formats and integrate the current data into different machines logically.
- To understand how similar data transfers happen, you can check out my blog on how Domino uses Splunk to get the best performance.
- Out of some common test devices, Splunk Forwarder consumes less than 1-2% CPU. You can successfully extend it to countless remote structures, and consolidate terabytes of data that has a significant impact on performance.
- From now on, let's list the different types of Splunk transmitters
- All inclusive Forwarder - You can select a general forwarder if you have any desire to advance the crude information gathered at the source. It is a straightforward part which performs insignificant handling on the approaching information streams prior to sending them to an indexer.
- Information move is a significant issue with pretty much every device on the lookout. Since there is negligible handling on the information before it is sent, parcel of pointless information is likewise sent to the indexer bringing about execution overheads.
- Why go through the difficulty of moving every one of the information to the Indexers and afterward sift through just the pertinent information? Couldn't it be smarter to send the applicable information to the Indexer and save money on data transmission, time and cash as it were? This can be settled by utilizing Weighty forwarders which I have made sense of beneath.

Weighty Forwarder - You can utilize a Weighty forwarder and dispose of a portion of your concerns, since one degree of information handling occurs at the actual source prior to sending information to the indexer. Weighty Forwarder regularly does parsing and ordering at the source and furthermore cleverly courses the information to the Indexer saving money on data transfer capacity and extra room. So when a weighty forwarder parses the information, the indexer just has to deal with the ordering section

Universal Forwarder – You can choose a widespread forwarder if you have any desire to advance the crude information gathered at the source. It is a basic part which performs insignificant handling on the approaching information streams prior to sending them to an indexer.

Information move is a significant issue with pretty much every apparatus on the lookout. Since there is insignificant handling on the information before it is sent, parcel of superfluous information is additionally sent to the indexer bringing about execution overheads.

Why go through the difficulty of moving every one of the information to the Indexers and afterward sift through just the applicable information? Couldn't it be smarter to send the significant information to the

Indexer and save money on data transmission, time and cash as it were? This can be tackled by utilizing Weighty forwarders which I have made sense of beneath.

Sp. ETS

Heavy Forwarder – You can utilize a Weighty forwarder and kill a portion of your concerns, since one degree of information handling occurs at the actual source prior to sending information to the indexer. Weighty Forwarder commonly does parsing and ordering at the source and furthermore shrewdly courses the information to the Indexer saving money on data transfer capacity and extra room. So when a weighty forwarder parses the information, the indexer just has to deal with the ordering fragment

Sp. ETS

2. Splunk Indexer:-

Indexer is part of the Splunk that you should use to request and maintain data from the transmitter. The splunk case converts incoming data into events and saves it in documents so that search operations can be performed efficiently. When you receive data from the General Transfer, the index will first separate the data and then record it. Data analysis was performed to kill unfortunate data. However, if you get data from Weighty forwarder, the index will automatically list the data. As the Splunk model records your data, create separate archives. These records contain one of the following:

Wrong Article ETS

- Crude information in packed structure
- Lists that highlight crude information (record documents, likewise alluded to as tsidx records), in addition to some metadata records. These records dwell in sets of catalogs called containers. Allow me now to let you know how Ordering functions.

Splunk is processing future data to include faster applications and testing. Works on data in a variety of ways such as:

- Divide the distribution of data into individual, open events
- Making or seeing time stamps
- Extract fields such as host, source, and source type
- Performing client-defined tests on future data, for example, custom field recognition, encryption of sensitive data, creating new or modified keys, applying complex multi-line event rules, filtering disturbing events, and managing events on displayed documents or servers.

Another advantage of Splunk Indexer is data duplication. You do not have to worry about losing data when you consider how Splunk keeps various copies of recorded data. This integration is called file duplication or Indexer integration. This is achieved with the help of the Indexer package, which is a social networking event that is designed to speed up each other's data.

1. Search Head

The pursuit head is the part that permits you to work with Splunk. It provides clients with a graphical user interface for accomplishing various tasks. You can search and inquire about the information stored in the Indexer by entering search words, and you will get the expected result. The inquiry head can be used on its own or in conjunction with other Splunk components on a single server. There is no separate installation record for the search head; all you need to do is enable Splunk web administration on the Splunk server. A Splunk event can be used as both a pursuit head and a hunt peer. A devoted inquiry head is indeed a pursuit head who does nothing but look and does not order. During this time, an inquiry peer is in charge of ordering and distributing information

Putting it All Together: Splunk Architecture

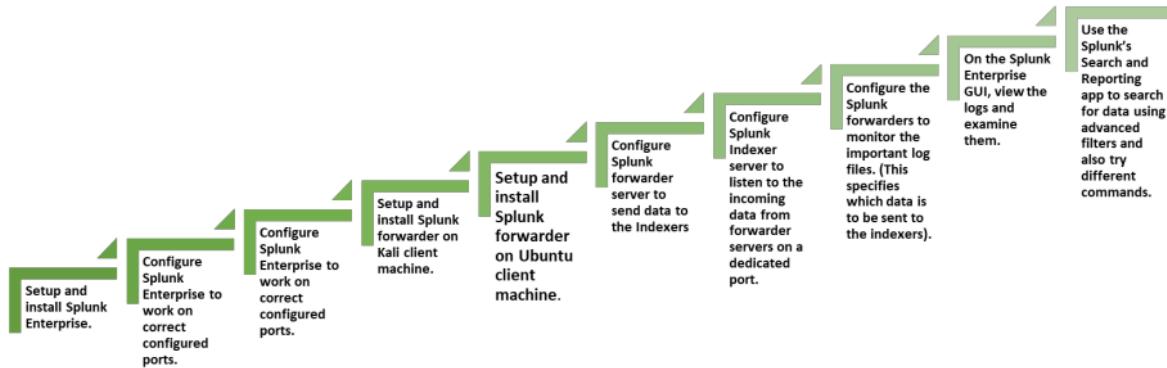
- Splunk accumulates logs by observing records, identifying document changes, tuning in on ports or running contents to gather log information - these are done by the Splunk forwarder.
- The ordering component, made out of at least one indexer, processes the information, or may get the information pre-handled by the forwarders. P/Wrong Article ETS Article Error ETS
- The arrangement server oversees indexers and search heads, setup and strategies across the whole Splunk organization.
- Client access and controls are applied at the indexer level - every indexer can be utilized for an alternate information store, which might have different client authorizations.
- The hunt head is utilized to give on-request search usefulness, and furthermore drives planned look through started via programmed reports.
- The client can characterize Planning, Announcing and Information objects to plan look and make cautions.
- Information can be gotten to from the UI, the Splunk CLI, or APIs incorporating with various outer frameworks. Confused ETS

²
CHAPTER: 5 PROJECT PLAN

CHAPTER 5 PROJECT PLAN

5.1 List out the tasks

- Task1:** Setup and install Splunk Enterprise.
- Task2:** Configure Splunk Enterprise to work on correct configured ports.
- Task 3:** Start the Splunk GUI and explore the interface.
- Task 4:** Setup and install Splunk forwarder on Kali client machine.
- Task 5:** Setup and install Splunk forwarder on Ubuntu client machine.
- Task 6:** Configure Splunk forwarder server to send data to the Indexers
- Task 7:** Configure Splunk Indexer server to listen to the incoming data from forwarder servers on a dedicated port.
- Task 8:** Configure the Splunk forwarders to monitor the important log files. (This specifies which data is to be sent to the indexers).
- Task 9:** On the Splunk Enterprise GUI, view the logs and examine them.
- Task 10:** Use the Splunk's Search and Reporting app to search for data using advanced filters and also try different commands.



5.2 List of Major Activities

Task1: Configure Splunk Indexer server to listen to the incoming data from forwarder servers on a dedicated port.

Sp. ETS

Task2: Configure the Splunk forwarders to monitor the important log files. (This specifies which data is to be sent to the indexers).

Sp. ETS

Task 3: Hosting a webserver with bWAPP on kali machine

Sp. ETS

Task 4: Performing SQL Injection using SQLMAP from ubuntu machine on kali machine

Sp. ETS

Task 5: Capturing SQL data in splunk

Article Error ETS

Task 6: Analyzing the SQL logs

Sp. ETS

Task 7: Advanced search queries

Task 8: Creating visualizations

Task 9: Creating dashboards

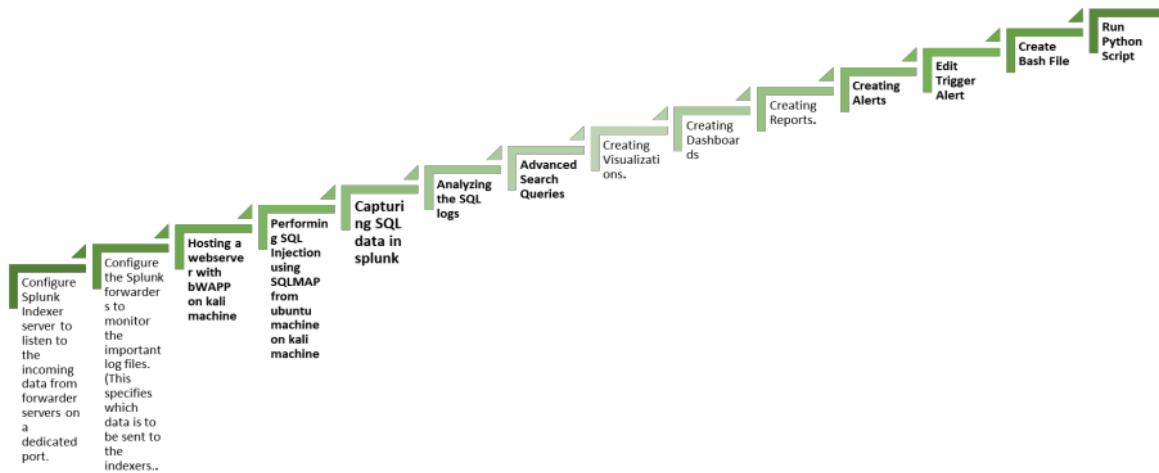
Task 10: Creating reports

Task 11: Creating alert

Task 12: Edit Trigger Alert

Task 13: Create Bash File

Task 14: Run Python Script



²
CHAPTER: 6 IMPLEMENTATION DETAILS

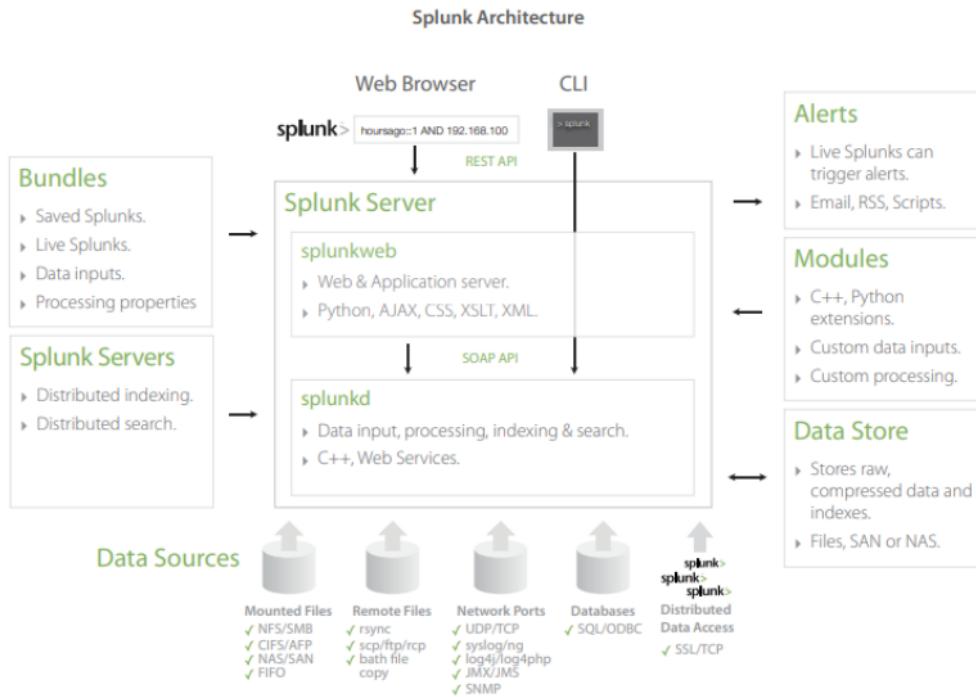
CHAPTER 6 IMPLEMENTATION DETAIL

2

6.1.1 Data Collection



Figure 6.2 Method of Data Collection



Step 1: Start the Splunk server using Splunk CLI

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19044.1466]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>E:
E:>cd Splunk Enterprise
E:\Splunk Enterprise>cd bin
E:\Splunk Enterprise\bin>splunk start
splunk> Needle. Haystack. Found.

Checking prerequisites...
    Checking http port [5000]: open
    Checking mgmt port [5089]: open
    Checking appserver port [127.0.0.1:5065]: open
    Checking kvstore port [5191]: open
    Checking configuration... Done
    Checking critical directories... Done
    Checking indexes... Done
        (skipping validation of index paths because not running as LocalSystem)
        Validated: _audit _internal _introspection _metrics _metrics_rollup _telemetry _thefishbucket history main summary
    Done
    Checking filesystem compatibility... Done
    Checking conf files for problems...
    Done
    Checking default conf files for edits...
        Validating installed files against hashes from 'E:\Splunk Enterprise\splunk-8.0.4-767223ac207f-windows-64-manifest'
File 'E:\Splunk Enterprise\etc\system\default\limits.conf' changed,
File 'E:\Splunk Enterprise\etc\system\default\web.conf' changed.
    Problems were found, please review your files and move customizations to local
All preliminary checks passed.

starting splunk server daemon (splunkd)...
Splunkd: Starting (pid 8396)
Done

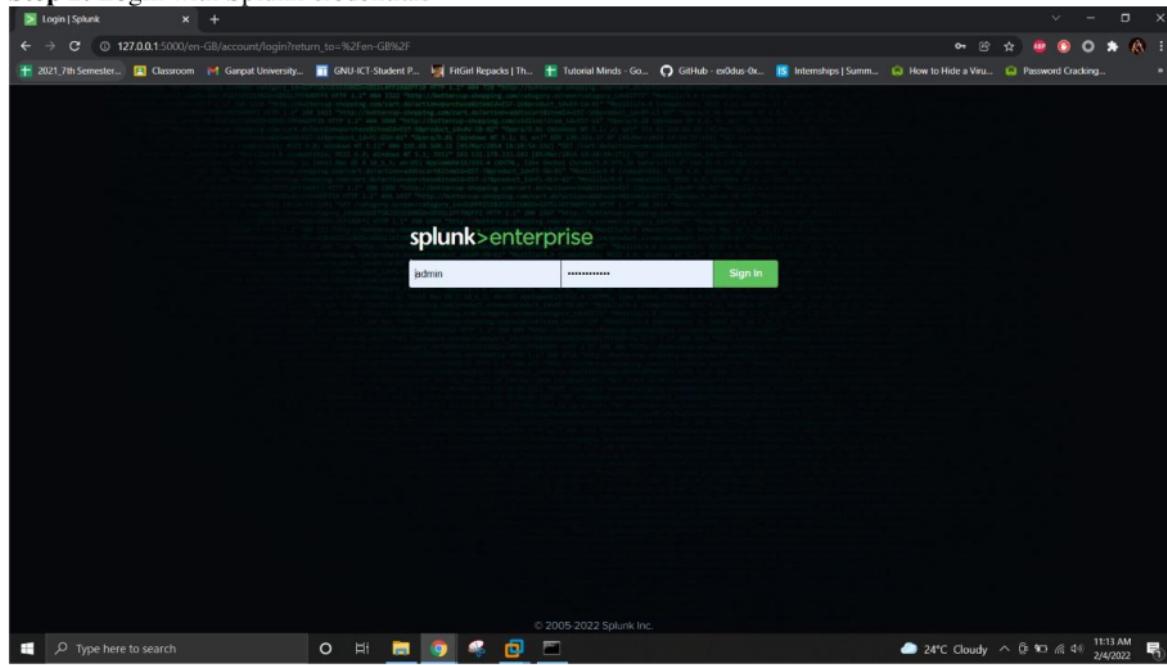
waiting for web server at http://127.0.0.1:5000 to be available. Done

If you get stuck, we're here to help.
Look for answers here: http://docs.splunk.com

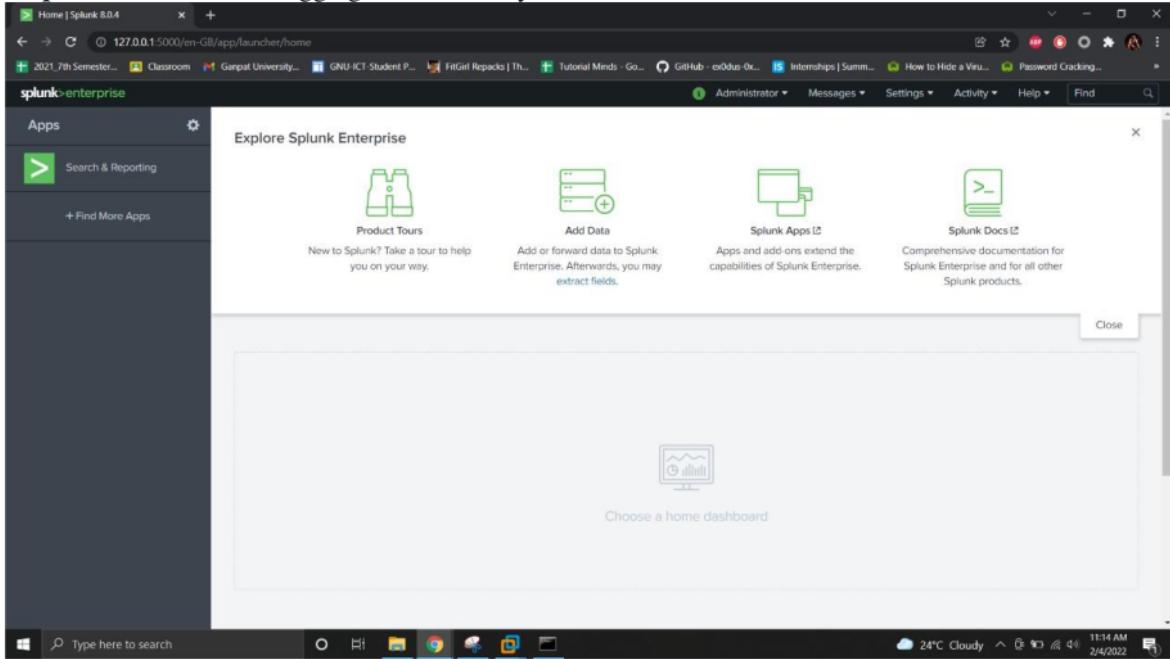
The Splunk web interface is at http://DESKTOP-AQ9RVJ1:5000

E:\Splunk Enterprise\bin>
```

Step 2: Login with Splunk credentials



Step 3: Dashboard after logging in successfully



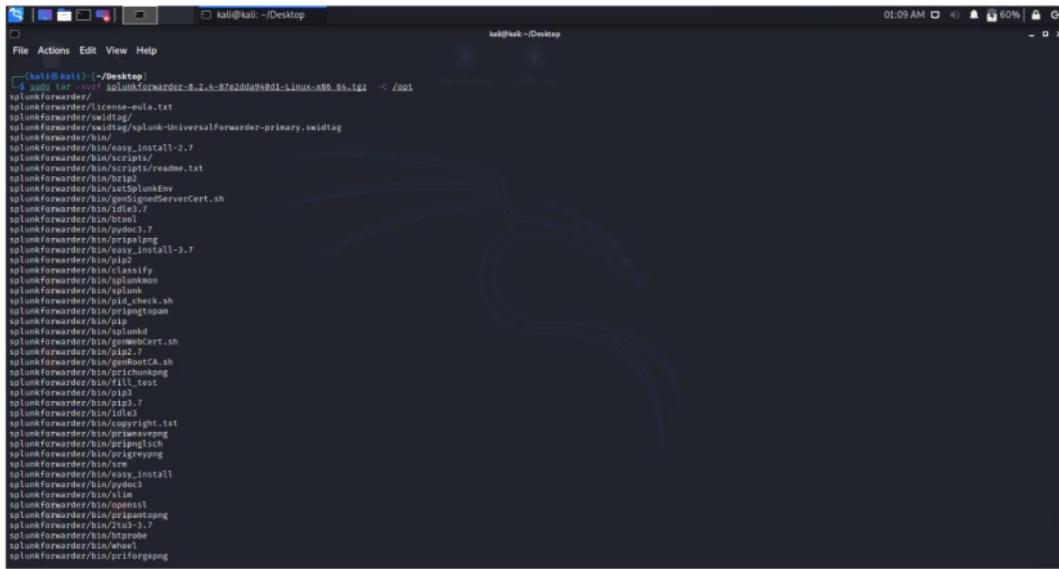
Now, we want to collect data from remote sources in the network. Hence, we will have to setup a listener on a dedicated port to be able to collect different logs from different data sources.

Step 4: Setup a listener to splunk by entering following command:

A screenshot of a Windows Command Prompt window titled 'Administrator: Command Prompt'. The command entered is 'E:\Splunk Enterprise\bin>splunk enable listen 9997 -auth admin:password'. The output shows 'Listening for Splunk data on TCP port 9997.' The window has a purple header bar with the text 'Article Error' and a small 'ETS' logo.

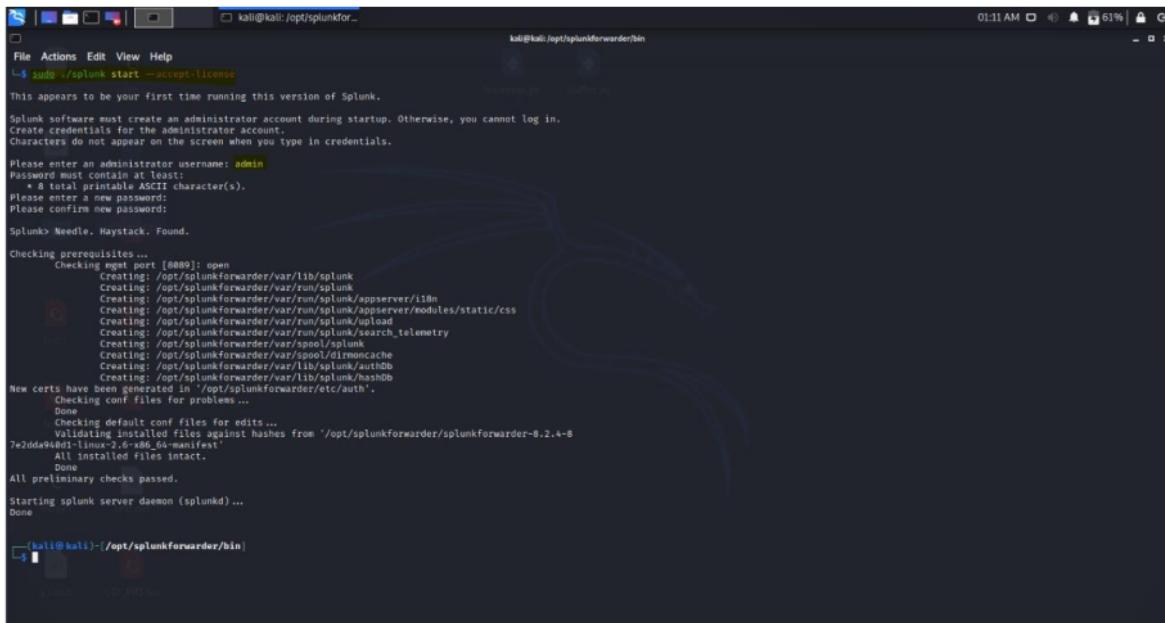
Now, to collect data from remote sources, we need to configure SPLUNK forwarder modules on either the machine themselves or within a forwarder server in the network.

Step 5: Setting up SPLUNK forwarders:



```
(kali㉿kali)-[~/Desktop]
└─$ tar -xvf splunkforwarder-8.2.4-87e200990d1-linux-x86_64.tgz -C /opt
```

The terminal shows the extraction of a Splunk Forwarder package (splunkforwarder-8.2.4-87e200990d1-linux-x86_64.tgz) into the /opt directory. The extracted files include various configuration scripts, Python modules (pydsc3, pydsc4), and system integration files like /etc/init.d/splunk and /etc/init/splunk.conf.



```
kali㉿kali:/opt/splunkfor...
└─$ sudo ./splunk start --accept-license
This appears to be your first time running this version of Splunk.

Splunk software must create an administrator account during startup. Otherwise, you cannot log in.
Create credentials for the administrator account.
Characters do not appear on the screen when you type in credentials.

Please enter an administrator username: admin
Password must contain at least:
* 8 total printable ASCII character(s).
Please enter new password:
Please confirm new password:

Splunk> Needle. Haystack. Found.

Checking prerequisites ...
    Checking mgmt port [8089]: open
    Creating: /opt/splunkforwarder/var/lib/splunk
    Creating: /opt/splunkforwarder/var/run/splunk
    Creating: /opt/splunkforwarder/var/run/splunk/appserver/lib
    Creating: /opt/splunkforwarder/var/run/splunk/appserver/modules/static/css
    Creating: /opt/splunkforwarder/var/run/splunk/upload
    Creating: /opt/splunkforwarder/var/run/splunk/search_telemetry
    Creating: /opt/splunkforwarder/var/spool/splunk
    Creating: /opt/splunkforwarder/var/spool/splunk/authnache
    Creating: /opt/splunkforwarder/var/lib/splunk/authdb
    Creating: /opt/splunkforwarder/var/lib/splunk/hashdb
New certs have been generated in '/opt/splunkforwarder/etc/auth'.
    Checking conf files for problems ...
    Done
    Checking default conf files for edits ...
    Validating installed files against hashes from '/opt/splunkforwarder/splunkforwarder-8.2.4-87e2dd940d1-linux-x86_64-manifest'
        All installed files intact.
    Done
All preliminary checks passed.

Starting splunk server daemon (splunkd) ...
Done
```

The terminal shows the initial configuration of the Splunk Forwarder. It prompts for an administrator username (admin) and password. It then performs several checks: prerequisites (including port 8089), configuration files, and installed files against a manifest. Finally, it starts the splunkd daemon.

```

kali㉿kali:/opt/splunkforwarder/bin
File Actions Edit View Help
Creating: /opt/splunkforwarder/var/run/splunk/upload
Creating: /opt/splunkforwarder/var/run/splunk/search_telemetry
Creating: /opt/splunkforwarder/var/spool/splunk
Creating: /opt/splunkforwarder/var/lib/splunkcache
Creating: /opt/splunkforwarder/var/lib/splunk/auth
Creating: /opt/splunkforwarder/var/lib/splunk/hashdb
New certs have been generated in '/opt/splunkforwarder/etc/auth'.
Checking conf files for problems ...
Done
Checking default conf files for edits...
Validating installed files against hashes from '/opt/splunkforwarder/splunkforwarder-8.2.4-8
7e2dd940d1-linux-2.6-x86_64-manifest'
All installed files intact.
Done
All preliminary checks passed.

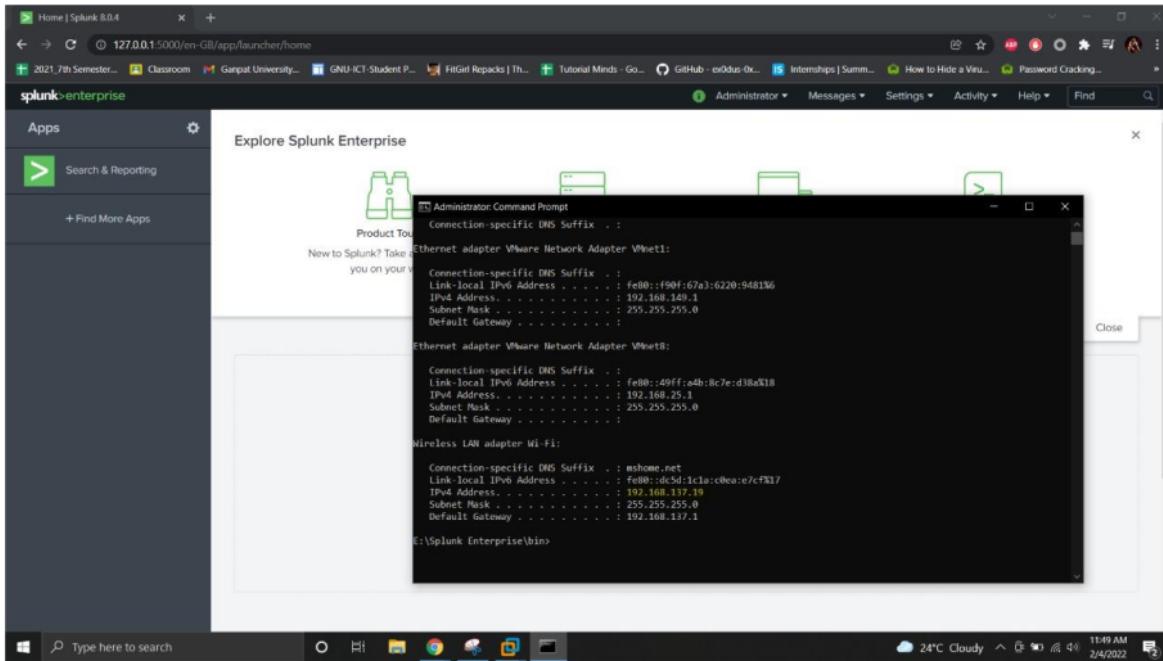
Starting splunk server daemon (splunkd)...
Done

[Kali㉿kali]-(/opt/splunkforwarder/bin)
└─# sudo ./splunk add forward-server 192.168.137.19:9997
Your session is invalid. Please login.
Splunk username: admin
Password:
Added forwarding to: 192.168.137.19:9997.

[Kali㉿kali]-(/opt/splunkforwarder/bin)

```

Note: The IP provided here to add **forwarder server** is the IP of our SPLUNK enterprise machine, where the SPLUNK indexer resides.



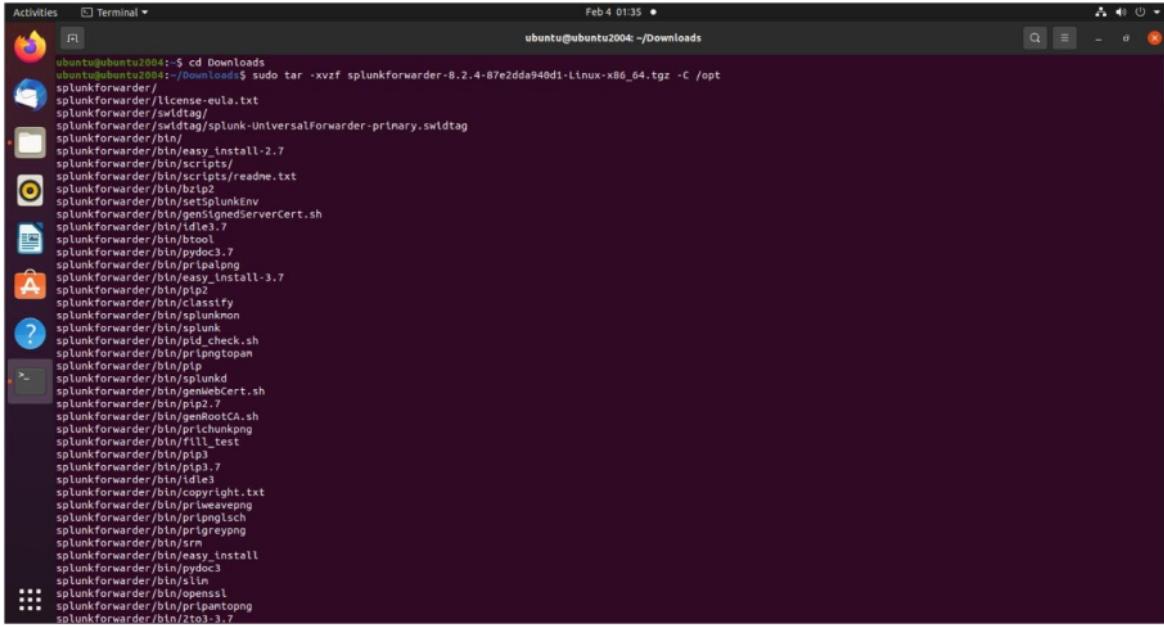
Once the **forwarder server** is configured, we will now specify the data source, I.e., which data to be sent to SPLUNK in order to monitor and analyze.

```
kali㉿kali: /opt/splunkforwarder/bin
└─$ ls /var/log
alternatives.log           boot.log        daemon.log      dpkg.log       inetsim
alternatives.log.1         boot.log.1     daemon.log.1    dpkg.log.1     inetsim
alternatives.log.7         boot.log.7     daemon.log.7    dpkg.log.7     inetsim
apt                       boot.log.9     daemon.log.9    dpkg.log.9     inetsim
auth.log                   boot.log.5     debug          dpkg.log.5     inetsim
auth.log.1                 boot.log.6     debug          dpkg.log.6     inetsim
auth.log.2                 boot.log.7     debug          dpkg.log.7     inetsim
auth.log.3                 boot.log.8     debug          dpkg.log.8     inetsim
auth.log.4                 boot.log.9     debug          dpkg.log.9     inetsim
boot.log                  kern.log       kern.log.1     messages
boot.log.1                kern.log.2     kern.log.2     messages.1
boot.log.2                kern.log.3     kern.log.3     messages.2
boot.log.3                kern.log.4     kern.log.4     messages.3
boot.log.4                kern.log.5     kern.log.5     messages.4
boot.log.5                kern.log.6     kern.log.6     messages.5
boot.log.6                kern.log.7     kern.log.7     messages.6
boot.log.7                kern.log.8     kern.log.8     messages.7
boot.log.8                kern.log.9     kern.log.9     messages.8
boot.log.9                log            faillog       lastlog       mongoDB
btmp.1                    log            faillog       lastlog       mongod
btmp.1.debug              log            faillog       lastlog       mongod
btmp.1.debug.gz            log            faillog       lastlog       mongod
fontconfig.log             log            faillog       lastlog       mongod
lightdm                  mongoDB       mongod       stunnel4     unattended-upgrades
syslog                   mysql          mysql        syslog      user.log
syslog.1                 nginx         nginx       syslog.1   user.log.1
syslog.2                 ntpstats      ntpstats     syslog.2   user.log.2
syslog.3                 openvpn       openvpn     syslog.3   user.log.3
syslog.4                 openvpn.2    openvpn.2   syslog.4   user.log.4
syslog.5                 openvpn.3    openvpn.3   syslog.5   user.log.5
syslog.6                 openvpn.4    openvpn.4   syslog.6   user.log.6
syslog.7                 openvpn.5    openvpn.5   syslog.7   user.log.7
syslog.8                 openvpn.6    openvpn.6   syslog.8   user.log.8
syslog.9                 openvpn.7    openvpn.7   syslog.9   user.log.9
syslog.10                openvpn.8   openvpn.8   syslog.10  user.log.10
syslog.11                openvpn.9   openvpn.9   syslog.11  user.log.11
syslog.12                openvpn.10  openvpn.10  syslog.12  user.log.12
syslog.13                openvpn.11  openvpn.11  syslog.13  user.log.13
syslog.14                openvpn.12  openvpn.12  syslog.14  user.log.14
syslog.15                openvpn.13  openvpn.13  syslog.15  user.log.15
syslog.16                openvpn.14  openvpn.14  syslog.16  user.log.16
syslog.17                openvpn.15  openvpn.15  syslog.17  user.log.17
syslog.18                openvpn.16  openvpn.16  syslog.18  user.log.18
syslog.19                openvpn.17  openvpn.17  syslog.19  user.log.19
syslog.20                openvpn.18  openvpn.18  syslog.20  user.log.20
syslog.21                openvpn.19  openvpn.19  syslog.21  user.log.21
syslog.22                openvpn.20  openvpn.20  syslog.22  user.log.22
syslog.23                openvpn.21  openvpn.21  syslog.23  user.log.23
syslog.24                openvpn.22  openvpn.22  syslog.24  user.log.24
syslog.25                openvpn.23  openvpn.23  syslog.25  user.log.25
syslog.26                openvpn.24  openvpn.24  syslog.26  user.log.26
syslog.27                openvpn.25  openvpn.25  syslog.27  user.log.27
syslog.28                openvpn.26  openvpn.26  syslog.28  user.log.28
syslog.29                openvpn.27  openvpn.27  syslog.29  user.log.29
syslog.30                openvpn.28  openvpn.28  syslog.30  user.log.30
syslog.31                openvpn.29  openvpn.29  syslog.31  user.log.31
syslog.32                openvpn.30  openvpn.30  syslog.32  user.log.32
syslog.33                openvpn.31  openvpn.31  syslog.33  user.log.33
syslog.34                openvpn.32  openvpn.32  syslog.34  user.log.34
syslog.35                openvpn.33  openvpn.33  syslog.35  user.log.35
syslog.36                openvpn.34  openvpn.34  syslog.36  user.log.36
syslog.37                openvpn.35  openvpn.35  syslog.37  user.log.37
syslog.38                openvpn.36  openvpn.36  syslog.38  user.log.38
syslog.39                openvpn.37  openvpn.37  syslog.39  user.log.39
syslog.40                openvpn.38  openvpn.38  syslog.40  user.log.40
syslog.41                openvpn.39  openvpn.39  syslog.41  user.log.41
syslog.42                openvpn.40  openvpn.40  syslog.42  user.log.42
syslog.43                openvpn.41  openvpn.41  syslog.43  user.log.43
syslog.44                openvpn.42  openvpn.42  syslog.44  user.log.44
syslog.45                openvpn.43  openvpn.43  syslog.45  user.log.45
syslog.46                openvpn.44  openvpn.44  syslog.46  user.log.46
syslog.47                openvpn.45  openvpn.45  syslog.47  user.log.47
syslog.48                openvpn.46  openvpn.46  syslog.48  user.log.48
syslog.49                openvpn.47  openvpn.47  syslog.49  user.log.49
syslog.50                openvpn.48  openvpn.48  syslog.50  user.log.50
syslog.51                openvpn.49  openvpn.49  syslog.51  user.log.51
syslog.52                openvpn.50  openvpn.50  syslog.52  user.log.52
syslog.53                openvpn.51  openvpn.51  syslog.53  user.log.53
syslog.54                openvpn.52  openvpn.52  syslog.54  user.log.54
syslog.55                openvpn.53  openvpn.53  syslog.55  user.log.55
syslog.56                openvpn.54  openvpn.54  syslog.56  user.log.56
syslog.57                openvpn.55  openvpn.55  syslog.57  user.log.57
syslog.58                openvpn.56  openvpn.56  syslog.58  user.log.58
syslog.59                openvpn.57  openvpn.57  syslog.59  user.log.59
syslog.60                openvpn.58  openvpn.58  syslog.60  user.log.60
syslog.61                openvpn.59  openvpn.59  syslog.61  user.log.61
syslog.62                openvpn.60  openvpn.60  syslog.62  user.log.62
syslog.63                openvpn.61  openvpn.61  syslog.63  user.log.63
syslog.64                openvpn.62  openvpn.62  syslog.64  user.log.64
syslog.65                openvpn.63  openvpn.63  syslog.65  user.log.65
syslog.66                openvpn.64  openvpn.64  syslog.66  user.log.66
syslog.67                openvpn.65  openvpn.65  syslog.67  user.log.67
syslog.68                openvpn.66  openvpn.66  syslog.68  user.log.68
syslog.69                openvpn.67  openvpn.67  syslog.69  user.log.69
syslog.70                openvpn.68  openvpn.68  syslog.70  user.log.70
syslog.71                openvpn.69  openvpn.69  syslog.71  user.log.71
syslog.72                openvpn.70  openvpn.70  syslog.72  user.log.72
syslog.73                openvpn.71  openvpn.71  syslog.73  user.log.73
syslog.74                openvpn.72  openvpn.72  syslog.74  user.log.74
syslog.75                openvpn.73  openvpn.73  syslog.75  user.log.75
syslog.76                openvpn.74  openvpn.74  syslog.76  user.log.76
syslog.77                openvpn.75  openvpn.75  syslog.77  user.log.77
syslog.78                openvpn.76  openvpn.76  syslog.78  user.log.78
syslog.79                openvpn.77  openvpn.77  syslog.79  user.log.79
syslog.80                openvpn.78  openvpn.78  syslog.80  user.log.80
syslog.81                openvpn.79  openvpn.79  syslog.81  user.log.81
syslog.82                openvpn.80  openvpn.80  syslog.82  user.log.82
syslog.83                openvpn.81  openvpn.81  syslog.83  user.log.83
syslog.84                openvpn.82  openvpn.82  syslog.84  user.log.84
syslog.85                openvpn.83  openvpn.83  syslog.85  user.log.85
syslog.86                openvpn.84  openvpn.84  syslog.86  user.log.86
syslog.87                openvpn.85  openvpn.85  syslog.87  user.log.87
syslog.88                openvpn.86  openvpn.86  syslog.88  user.log.88
syslog.89                openvpn.87  openvpn.87  syslog.89  user.log.89
syslog.90                openvpn.88  openvpn.88  syslog.90  user.log.90
syslog.91                openvpn.89  openvpn.89  syslog.91  user.log.91
syslog.92                openvpn.90  openvpn.90  syslog.92  user.log.92
syslog.93                openvpn.91  openvpn.91  syslog.93  user.log.93
syslog.94                openvpn.92  openvpn.92  syslog.94  user.log.94
syslog.95                openvpn.93  openvpn.93  syslog.95  user.log.95
syslog.96                openvpn.94  openvpn.94  syslog.96  user.log.96
syslog.97                openvpn.95  openvpn.95  syslog.97  user.log.97
syslog.98                openvpn.96  openvpn.96  syslog.98  user.log.98
syslog.99                openvpn.97  openvpn.97  syslog.99  user.log.99

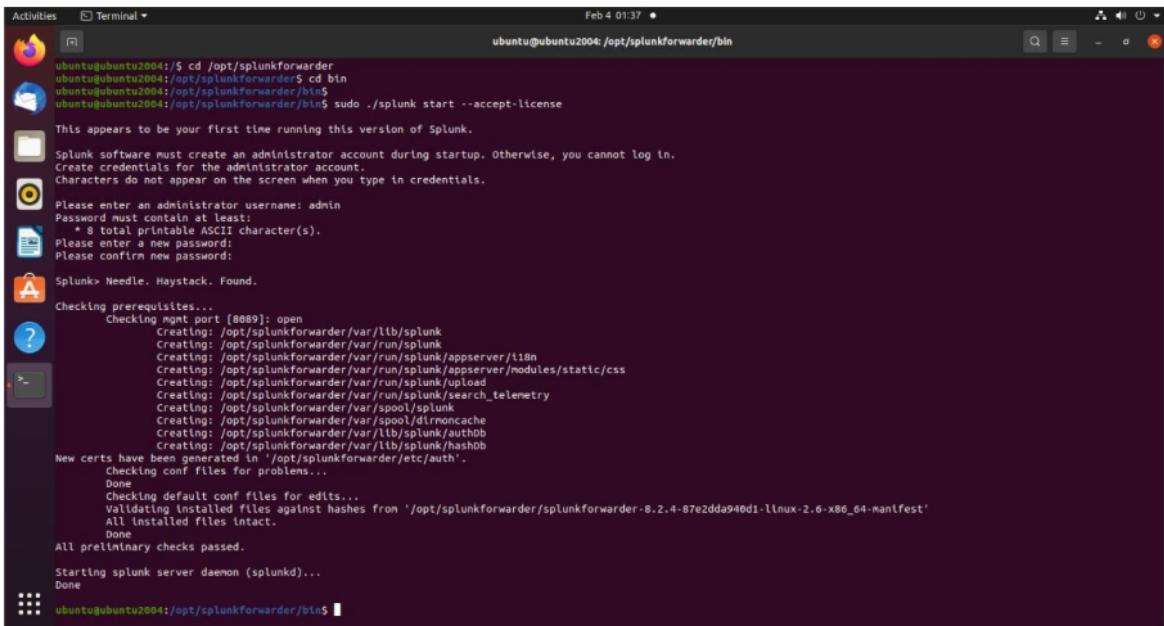
(kali㉿kali: /opt/splunkforwarder/bin
└─$ sudo ./splunk add monitor /var/log/syslog index main -sourcetype kali_syslogs
Added monitor of '/var/log/syslog'.
```

The remote forwarder is currently arranged. It will send the predetermined information source to the SPLUNK indexer continuously.

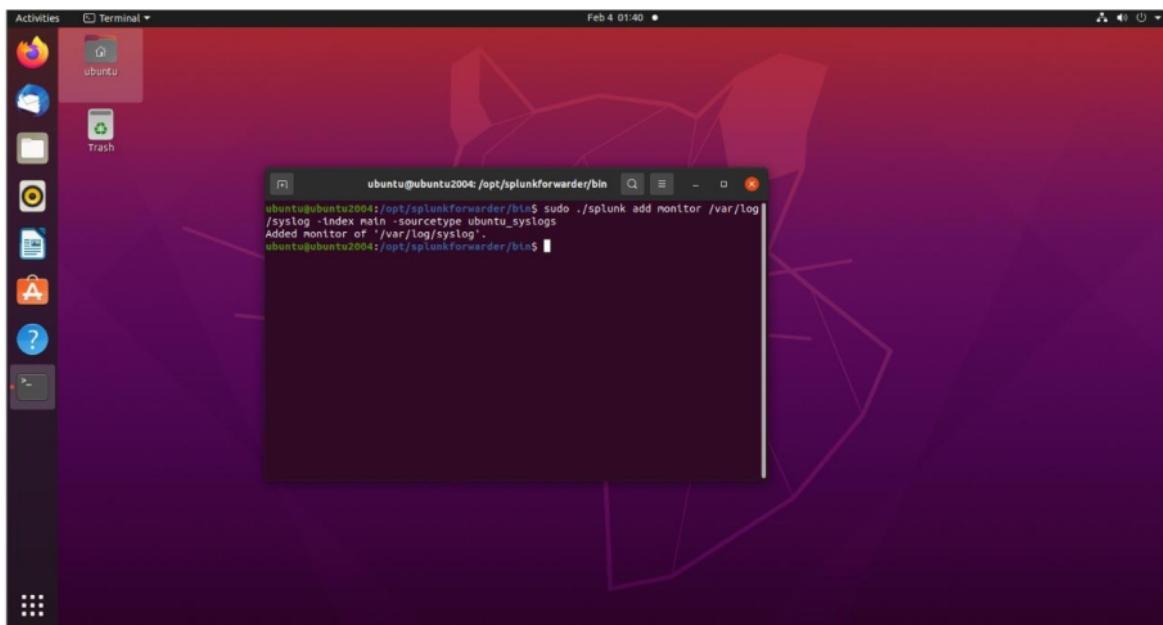
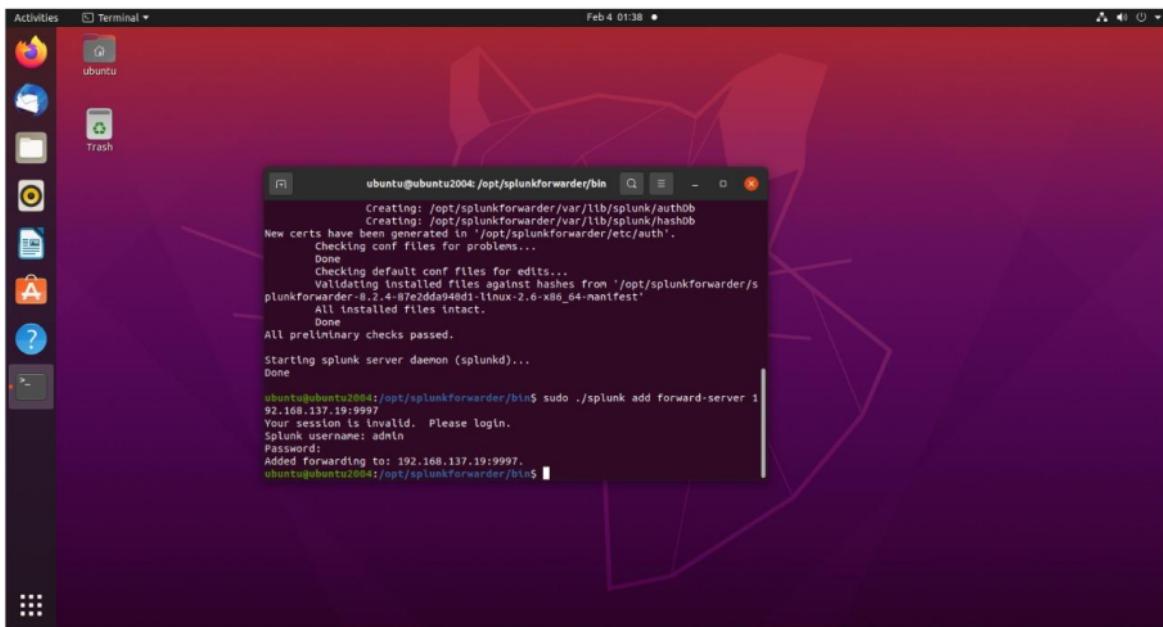
Similarly, doing the same for Ubuntu machine:



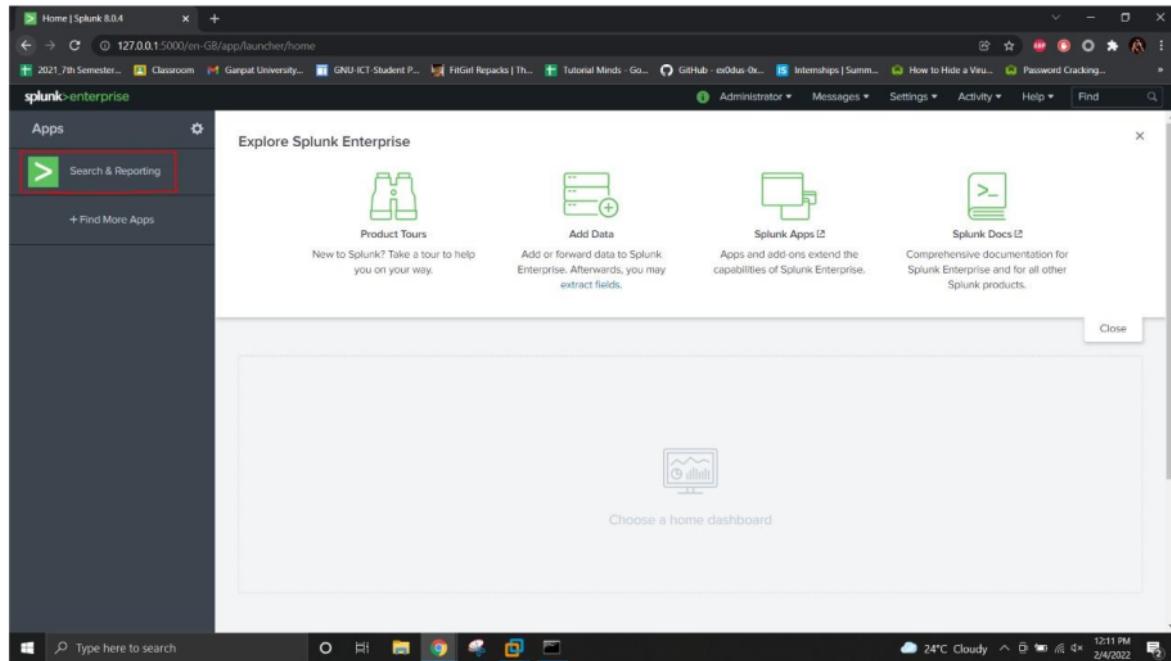
```
Activities Terminal Feb 4 01:35 • ubuntu@ubuntu2004: ~/Downloads
ubuntu@ubuntu2004:~$ cd Downloads
ubuntu@ubuntu2004:~/Downloads$ sudo tar -xvf splunkforwarder-8.2.4-87e2dda940d1-Linux-x86_64.tgz -C /opt
splunkforwarder/
splunkforwarder/license-eula.txt
splunkforwarder/swldtag
splunkforwarder/swldtag/splunk-UniversalForwarder-primary.swldtag
splunkforwarder/bin/
splunkforwarder/bin/easy_install-2.7
splunkforwarder/bin/scripts/
splunkforwarder/bin/scripts/readme.txt
splunkforwarder/bin/bzip2
splunkforwarder/bin/setSplunkEnv
splunkforwarder/bin/genSignedServerCert.sh
splunkforwarder/bin/idle3.7
splunkforwarder/bin/threadc1
splunkforwarder/bin/threadc3.7
splunkforwarder/bin/pipa.png
splunkforwarder/bin/easy_install-3.7
splunkforwarder/bin/pt2_
splunkforwarder/bin/classify
splunkforwarder/bin/splunkmon
splunkforwarder/bin/splunk
splunkforwarder/bin/pld_check.sh
splunkforwarder/bin/ptpingtopam
splunkforwarder/bin/splunk
splunkforwarder/bin/splunkd
splunkforwarder/bin/genwebcert.sh
splunkforwarder/bin/pt2_
splunkforwarder/bin/genrootCA.sh
splunkforwarder/bin/pitchunkpng
splunkforwarder/bin/fill_test
splunkforwarder/bin/pl3
splunkforwarder/bin/pl3_
splunkforwarder/bin/thread
splunkforwarder/bin/threadbright.txt
splunkforwarder/bin/picaevpng
splunkforwarder/bin/ptpinglisch
splunkforwarder/bin/picreypng
splunkforwarder/bin/sr
splunkforwarder/bin/easy_install
splunkforwarder/bin/pydoc3
splunkforwarder/bin/slim
splunkforwarder/bin/openssl
splunkforwarder/bin/ptpingtopng
splunkforwarder/bin/ztol-3.7
```



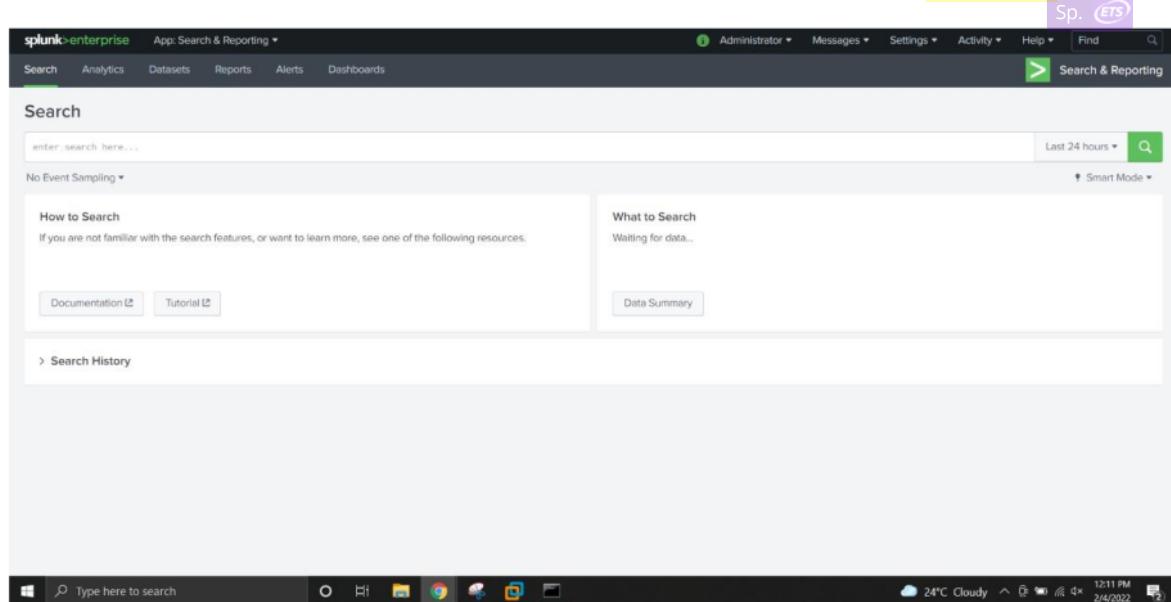
```
Activities Terminal Feb 4 01:37 • ubuntu@ubuntu2004: /opt/splunkforwarder/bin
ubuntu@ubuntu2004:~/Downloads$ cd /opt/splunkforwarder
ubuntu@ubuntu2004:/opt/splunkforwarder$ cd bin
ubuntu@ubuntu2004:/opt/splunkforwarder/bin$ ./splunk start --accept-license
This appears to be your first time running this version of Splunk.
Splunk software must create an administrator account during startup. Otherwise, you cannot log in.
Create credentials for the administrator account.
Characters do not appear on the screen when you type in credentials.
Please enter an administrator username: admin
Password must contain at least:
    * 8 total printable ASCII character(s).
Please enter a new password:
Please confirm new password:
Splunk> Needle. Haystack. Found.
Checking prerequisites...
Checking mgmt port [8089]: open
Creating: /opt/splunkforwarder/var/ltb/splunk
Creating: /opt/splunkforwarder/var/run/splunk
Creating: /opt/splunkforwarder/var/run/splunk/appserver/t18n
Creating: /opt/splunkforwarder/var/run/splunk/appserver/nodules/static/css
Creating: /opt/splunkforwarder/var/run/splunk/upload
Creating: /opt/splunkforwarder/var/run/splunk/search_telemetry
Creating: /opt/splunkforwarder/var/spool/splunk
Creating: /opt/splunkforwarder/var/spool/dirmncache
Creating: /opt/splunkforwarder/var/ltb/splunk/authdb
Creating: /opt/splunkforwarder/var/ltb/splunk/hashdb
New certs have been generated in '/opt/splunkforwarder/etc/auth'.
Checking conf files for problems...
Done
Checking default conf files for edits...
Validating installed files against hashes from '/opt/splunkforwarder/splunkforwarder-8.2.4-87e2dda940d1-Linux-x86_64-manifest'
All installed files intact.
Done
All preliminary checks passed.
Starting splunk server daemon (splunkd)...
Done
ubuntu@ubuntu2004:/opt/splunkforwarder/bin$
```

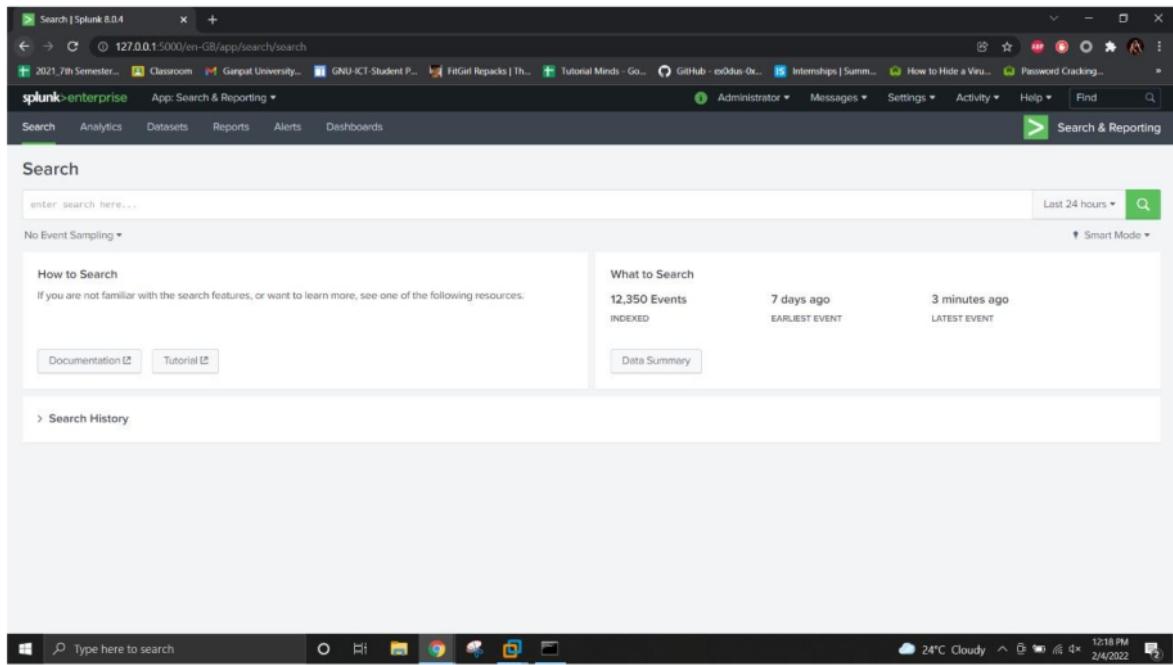


Step 6: Now, go to SPLUNK indexer server that is the web GUI for SPLUNK Enterprise and go to the app "Search and Reporting": Article Error 

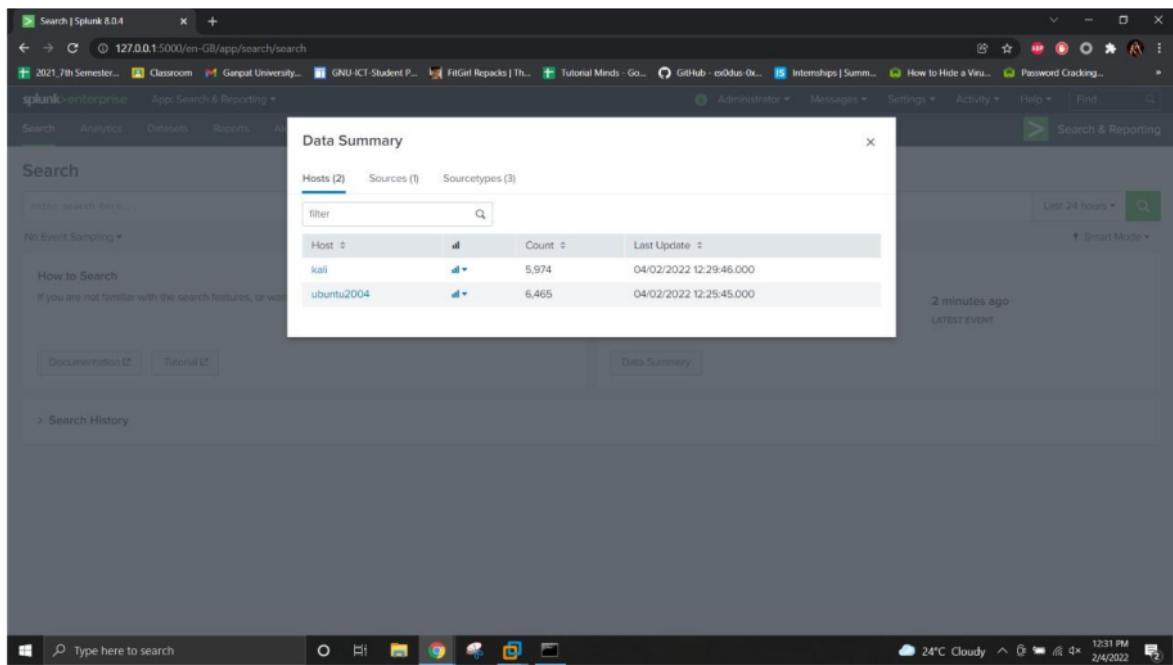


Step 7: Wait for the SPLUNK indexer to receiver to receive data from the remote forwarders: 





Step 8: Click on Data summary and view different stats.



The screenshot shows two side-by-side views of the Splunk 8.0.4 Data Summary interface. Both views are identical, displaying the 'Sources' tab under the 'Data Summary' card.

Sources Tab Data:

Source	Count	Last Update
/var/log/syslog	12,439	04/02/2022 12:29:46.000

Sourcetypes Tab Data:

Sourcetype	Count	Last Update
kali_syslogs	5,291	04/02/2022 12:29:46.000
syslog	2,147	04/02/2022 12:09:11.000
ubuntu_syslogs	5,001	04/02/2022 12:25:45.000

Both interfaces include a 'Documentation' and 'Tutorial' link at the bottom left, and a 'Data Summary' button at the bottom right. The top navigation bar shows 'Search & Reporting' and various system icons.

Step 9: Using SPLUNK search module to search and view the received data:

Index="main"

The screenshot shows the Splunk 8.0.4 search interface. The search bar at the top contains the query "Index='main'". Below the search bar, a message says "2,379 events (03/02/2022 12:30:00.000 to 04/02/2022 12:36:26.000) No Event Sampling". The main pane displays a list of log events from a host named "kali". The first few events are:

- Feb 4 02:05:10 kali upowerd[985]: energy 14.290000 bigger than full 14.230000 host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 02:05:10 kali CRON[239]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1) host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 01:59:45 kali systemd[1]: NetworkManager-dispatcher.service: Succeeded. host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 01:59:34 kali systemd[1]: Started Network Manager Script Dispatcher Service. host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 01:59:34 kali dbus-daemon[504]: [system] Successfully activated service 'org.freedesktop.nm_dispatcher' host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 01:59:34 kali systemd[1]: Starting Network Manager Script Dispatcher Service... host=kali source=/var/log/syslog sourcetype=kali_syslogs
- Feb 4 01:59:34 kali NetworkManager[585]: <Info> [1643957973.8267] dhcp4 (eth8): state changed extended -> extended host=kali source=/var/log/syslog sourcetype=kali_syslogs

The interface includes tabs for Events (2,379), Patterns, Statistics, and Visualization. A timeline at the bottom shows a green bar representing the event count over time.

splunk>enterprise App: Search & Reporting

The screenshot shows the Splunk enterprise search interface. The search bar at the top contains the query "Index='main'". Below the search bar, a message says "2,379 events (03/02/2022 12:30:00.000 to 04/02/2022 12:36:26.000) No Event Sampling". The main pane displays a list of log events from a host named "ubuntu2004". The first few events are:

- Feb 4 01:54:18 ubuntu2004 NetworkManager[725]: <Info> [1643957658.4904] manager: NetworkManager state is now CONNECTED_GLOBAL host=ubuntu2004 source=/var/log/syslog sourcetype=ubuntu_syslogs
- Feb 4 01:54:18 ubuntu2004 systemd[1]: Started Network Manager Script Dispatcher Service. host=ubuntu2004 source=/var/log/syslog sourcetype=ubuntu_syslogs
- Feb 4 01:54:18 ubuntu2004 dbus-daemon[724]: [system] Successfully activated service 'org.freedesktop.nm_dispatcher' host=ubuntu2004 source=/var/log/syslog sourcetype=ubuntu_syslogs
- Feb 4 01:54:17 ubuntu2004 systemd[1]: Starting Network Manager Script Dispatcher Service... host=ubuntu2004 source=/var/log/syslog sourcetype=ubuntu_syslogs
- Feb 4 01:54:17 ubuntu2004 whoopsie[954]: [01:54:17] offline host=ubuntu2004 source=/var/log/syslog sourcetype=ubuntu_syslogs

The interface includes tabs for Search, Analytics, Datasets, Reports, Alerts, and Dashboards. A timeline at the bottom shows a green bar representing the event count over time.

According to different hosts:

Screenshot of the Splunk 8.0.4 interface showing search results for the host 'kali'. The search bar contains 'host=kali'. The results table shows 845 events from February 4, 2022, between 12:30:00.000 and 12:37:47.000. The table includes columns for i (icon), Time, and Event. The first few events are:

i	Time	Event
>	04/02/2022 12:37:10.000	Feb 4 02:07:10 kali upowerd[985]: energy 14.370000 bigger than full 14.290000 host = kali source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:35:10.000	Feb 4 02:05:10 kali upowerd[985]: energy 14.290000 bigger than full 14.230000 host = kali source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:35:01.000	Feb 4 02:05:01 kali CRON[2397]: (root) CMD (command -v debian-sal > /dev/null && debian-sal 1 1) host = kali source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:45.000	Feb 4 01:59:45 kali systemd[1]: NetworkManager-dispatcher.service: Succeeded. host = kali source = /var/log/syslog sourcetype = kali_syslogs
>	04/02/2022 12:29:34.000	Feb 4 01:59:34 kali systemd[1]: Started Network Manager Script Dispatcher Service. host = kali source = /var/log/syslog sourcetype = kali_syslogs

Screenshot of the Splunk 8.0.4 interface showing search results for the host 'ubuntu2004'. The search bar contains 'host=ubuntu2004'. The results table shows 1,567 events from February 4, 2022, between 12:30:00.000 and 12:38:36.000. The table includes columns for i (icon), Time, and Event. The first few events are:

i	Time	Event
>	04/02/2022 12:37:20.000	Feb 4 02:07:20 ubuntu2004 systemd[1]: NetworkManager-dispatcher.service: Succeeded. host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:37:10.000	Feb 4 02:07:10 ubuntu2004 systemd[1]: Started Network Manager Script Dispatcher Service. host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:37:00.000	Feb 4 02:07:00 ubuntu2004 dbus-daemon[724]: [system] Successfully activated service 'org.freedesktop.nm_dispatcher' host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:37:00.000	Feb 4 02:07:10 ubuntu2004 systemd[1]: Starting Network Manager Script Dispatcher Service... host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs
>	04/02/2022 12:37:10.000	Feb 4 02:07:10 ubuntu2004 NetworkManager[725]: <info> [1643958430.2222] dhcpc4 (ens3): state changed extended -> extended host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_syslogs

According to Data source

The screenshot shows the Splunk 8.0.4 interface with a search bar containing "source=*var/log/syslog*". The results pane displays 2,417 events from March 2, 2022, to April 2, 2022. The results are filtered by sourcetype=kali_syslogs. The log entries show various system activities, such as PHP session cleanup and cron jobs.

Time	Event
Feb 4 02:09:10	kali upowerd[985]: energy 14.440000 bigger than full 14.370000
Feb 4 02:09:09	kali systemd[1]: Finished Clean php session files.
Feb 4 02:09:09	kali systemd[1]: phpsessionclean.service: Succeeded.
Feb 4 02:09:09	kali systemd[1]: Starting Clean php session files...
Feb 4 02:09:01	CRON[2462]: (root) CMD [/usr/lib/php/sessionclean] && if [! -d /run/systemd/system]; then /usr/lib/php/sessionclean; fi

According to source type

The screenshot shows the Splunk 8.0.4 interface with a search bar containing "sourcetype=kali_syslogs". The results pane displays 167 events from March 2, 2022, to April 2, 2022. The results are filtered by sourcetype=kali_syslogs. The log entries show various system activities, such as PHP session cleanup and cron jobs.

Time	Event
Feb 4 02:09:10	kali upowerd[985]: energy 14.440000 bigger than full 14.370000
Feb 4 02:09:09	kali systemd[1]: Finished Clean php session files.
Feb 4 02:09:09	kali systemd[1]: phpsessionclean.service: Succeeded.
Feb 4 02:09:09	kali systemd[1]: Starting Clean php session files...
Feb 4 02:09:01	CRON[2462]: (root) CMD [/usr/lib/php/sessionclean] && if [! -d /run/systemd/system]; then /usr/lib/php/sessionclean; fi

The screenshot shows the Splunk 8.0.4 search interface. The search bar contains the query `sourcetype="ubuntu_sysLogs"`. The results table shows 104 events from 03/02/2022 to 04/02/2022. The first few events are:

Time	Event
Feb 4 02:10:40 2022	ubuntu2004 systemd-resolved[879]: Server returned error NXDOMAIN, mitigating potential DNS violation DVE-2018-0001, retrying transaction with reduced feature level UDP.
Feb 4 02:10:40 2022	source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs
Feb 4 02:10:40 2022	host = ubuntu2004 source = /var/log/syslog sourcetype = ubuntu_sysLogs

According to event type

The screenshot shows the Splunk 8.0.4 search interface. The search bar contains the query `eventtype="splunkd-log" host="kali"`. The results table shows 622 events from 03/02/2022 to 04/02/2022. The first few events are:

Time	Event
02-04-2022 02:15:59.117	0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.12:4559.117 19:9997, reuse=1.
02-04-2022 02:15:42.314	source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
02-04-2022 02:15:42.314	host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
02-04-2022 02:15:29.255	0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.12:4529.255 19:9997, reuse=1.
02-04-2022 02:15:12.314	source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
02-04-2022 02:15:12.314	host = kali source = /opt/splunkforwarder/var/log/splunk/splunkd.log sourcetype = splunkd
02-04-2022 02:14:59.159	0500 INFO AutoLoadBalancedConnectionStrategy [1903 TcpOutEloop] - Found currently active indexer. Connected to idx=192.168.137.12:4559.159 19:9997, reuse=1.

SPLUNK supports more such advanced search commands.

Project Approach: Splunk Enterprise

Splunk Enterprise is item thing that engages you to look, separate, and picture the data gathered from the pieces of your IT structure or business. Splunk Endeavor learns from locales, applications, sensors, contraptions, and so on. After you describe the data source, Splunk Endeavor records the data stream and parses it into a movement of individual events that you can view and look. Most clients partner with Splunk Undertaking with a web program and use Splunk Web to control their association, administer and make data objects, run look, make turns and reports, and so on. We can moreover use the request line association highlight deal with your Splunk Venture association. You can loosen up the Splunk Venture environment to fit the specific necessities of your relationship by using applications. An application is a combination of arrangements, data articles, points of view, and dashboards that unexpected spikes sought after for the Splunk stage. A single Splunk Venture foundation can run different application.

Article Error (ETS)

1. Hosting a webserver with bWAPP on kali machine:-

bWAPP is vulnerable web application for testing purpose , so we download and host the site on apache server.

Article Error (ETS)

Download the bwapp and navigate to the location

-Cd downloads

Sp. (ETS)

Now we unzip the zip file directly in apache web folder using following command

-sudo unzip -d /var/www/html bwapp.zip

Article Error (ETS)

Navigate to apache web folder

Sp. (ETS)

-cd /var/www/html

Article Error (ETS)

Then check the required bwapp files in the folder

-ls

Sp. (ETS)

Start the required services of apache and mysql server

-sudo service apache2 start

Sp. (ETS)

-sudo service mysql start

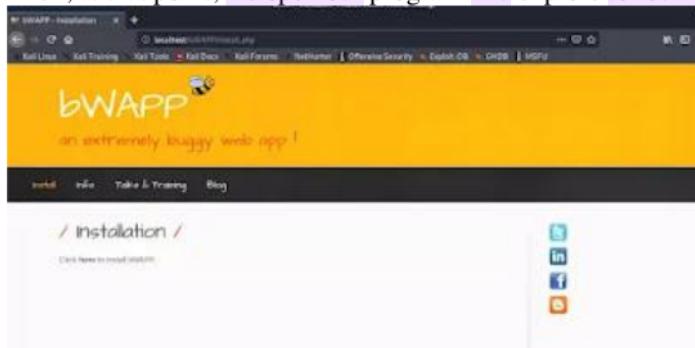
Configure the required mysql settings

-cd /bwapp/admin

Sp. (ETS)

3

Then, at that point, we open our program and explore to localhost/bWAPP/install.php



Here we click for introduce it. On the off chance that the setup is awesome, it ought to effectively introduce.

Proofread (ETS)

The screenshot shows the main landing page of the bWAPP application. The header features the text "an extremely buggy web app!" with a small bee icon. Below the header is a dark navigation bar with white text containing links for "Login", "New User", "Info", "Tutorials & Training", and "Blog".

Then, at that point, we go to login page tapping on the menu bar.

The screenshot shows the login interface of bWAPP. It includes a "User" input field, a "Password" input field, and a "Remember me?" checkbox. Below the form are several social media sharing icons (Twitter, LinkedIn, Facebook, and Google+). A banner for "MME Security Tools & Training" is visible, featuring the text "Scan your website for XSS and SQL Injection vulnerabilities".

The default username is honey bee and the default secret phrase is bug. Utilizing those we click on login with low security level.

The screenshot shows the "Portal" section of bWAPP. At the top, it displays a summary of bugs found: "1 AS - Injection / 1 HTML Injection - Reflected (GET) / 1 HTML Injection - Reflected (POST) / 1 HTML Injection - Reflected (Current URL) / 1 HTML Injection - Stored (Bugs) / 1 PHP Injection / 1 LDAP Injection (Search) / 1 Mail Header Injection (SMTP)". Below this is a "Set your security level" dropdown set to "low". A "Welcome Bee" message is displayed. The bottom of the page includes a footer with social media links (Twitter, LinkedIn, Facebook, and YouTube) and a license notice: "bWAPP is licensed under the MIT License © 2014 MME BVBA / Follow @bWAPP on Twitter and look for our cheat sheet containing all solutions / Need an exclusive bWAPP?".

2. Performing SQL Injection using SQLMAP from ubuntu machine on kali machine:-

Article Error 

- sqlmap is an open source login device that enables the process involved in detecting and implementing SQL installation imperfections and managing data set servers.
- Incorporates a powerful local engine, various expert features for direct introduction analysis, and a wide range of switches that include a set of fingerprint data, data acquisition data sets, approval of a basic record framework, and outsourcing orders through external organizations.

3. Capturing and Analyzing the SQL logs in splunk:-

One of the numerous capacities of Splunk is constant observing of IT framework.

- In particular, Splunk can be utilized to screen SQL Server examples
- Splunk information authorities assemble the information from your information sources (logs, takes care of, measurements, documents, etc) across a scope of various stages, organizations, servers, applications, data sets and administrations. Anything information you want to gather, you'll probably find an application or extra that is preconfigured to gather it, or can arrange it physically.
- This capacity to file your information to such an extent that it very well may be rapidly and effectively looked is one of Splunk's assets; it is now and again alluded to as a web crawler for machine information and it can assist you with grasping the reason for issues, track accessibility, limit and execution, oversee setup and security of your server components, etc.
- Thus, for instance, you could utilize Splunk to do your framework observing, gathering measurements and log information for Windows servers (in addition to Linux, MacOS), as well as bunches, Docker compartments and the sky is the limit from there.
- You can then stretch out the observing to SQL Server, as well as other social information base and NoSQL information stores, utilizing the proper applications and additional items.
- You can run and save look against every one of the information it gathers, inspecting a blend of critical 'occasions' gathered over the equivalent time period, maybe corelating SQL Server execution measurements and log information with point by point foundation information. You assemble visual dashboards from the outcomes so you can detect patterns, relationships between's various measurements, bizarre way of behaving, and begin to figure out the significant reasons for execution issues, vacation, and other framework issues.

4. Creating visualizations:-

Whenever you make a dashboard board, you select how the board shows the consequences of a hunt or report with a representation.

- Perceptions are graphical portrayals of your information, like a diagram, table, or outline. You can change your perception determination with the Dashboard Board Proofreader Article Error 
- Add a perception to a pursuit and save as a dashboard board
- Change a perception on a dashboard board
- View, send out, investigate or revive a perception

1. Open your desired dashboard to alter for altering.
2. Click the Add Graph symbol .
3. Select an outline that you need to use to envision your information. For instance, select Line to add a line diagram.
4. Click Drop in the New Information Source board.
5. In the Arrangement board, click + Arrangement Essential Information Source.
6. Select one of the information sources that you made.
7. (Optional) Add a title and a portrayal for the representation.
8. (Optional) Alter the position and size of the representation.
9. (Optional) Change other perception settings.
10. Click Run and Save to run the pursuit and save the perception settings.
11. Click the dashboard name to see the dashboard or snap the Add Graph symbol to add an extra perception.

5. Create dashboards in Splunk :-

There are multiple ways of making dashboards in Splunk.

- Make a dashboard from the Dashboards page, and afterward add boards or contributions to the dashboard.
- Use prebuilt boards to make a dashboard.
- Clone a current dashboard.
- Make a dashboard from the Dashboards page, and afterward add boards from searches, reports, or prebuilt boards.

1. In your Splunk Light instance, select Dashboards in the menu bar.
2. Click Make New Dashboard.
3. (Optional) Enter a Title.
4. Enter an ID.
5. Optional) Enter a Portrayal.
6. Click a consent level.
7. Click Make Dashboard.
8. On the Alter Dashboard page, add boards or contributions to your dashboard.
9. Click Save.
10. (Optional) To affirm that you have saved the dashboard, click Dashboards in the menu bar to see the dashboard recorded on the Dashboards page.

6. Create a real-time alert with per-result triggering:-

Constant cautions with per-result setting off are sometimes known by result alerts. This caution type and setting off use a relentless consistent pursuit to look for events. Each result sets off the wariness.

- Alert: In the event that have Splunk Venture high-accessibility arrangement, use per-result setting off with alert. In the event that a friend isn't accessible, an ongoing hunt doesn't caution that the inquiry may be fragmented. To keep away from this issue, utilize a booked caution

Follow these means to make a continuous caution with per-result setting off.

S/V ETS

- Move to the Pursuit page in Hunt & Revealing application.
- Create a new pursuit.
- Click on Save As and then Alert.
- Enter title and discretionary portrayal.
- Determine consents.
- Select that Continuous alarm type.
- Supplant the Terminates setting. This kinds of setting controls the future of established off alert standards, which appear on the Set off Cautions page.
- Select the Per-Result trigger decision.
- Arrange a trigger choking period.
- Select something like one intolerable demonstration that happens when the alert triggers.
- Click Save.

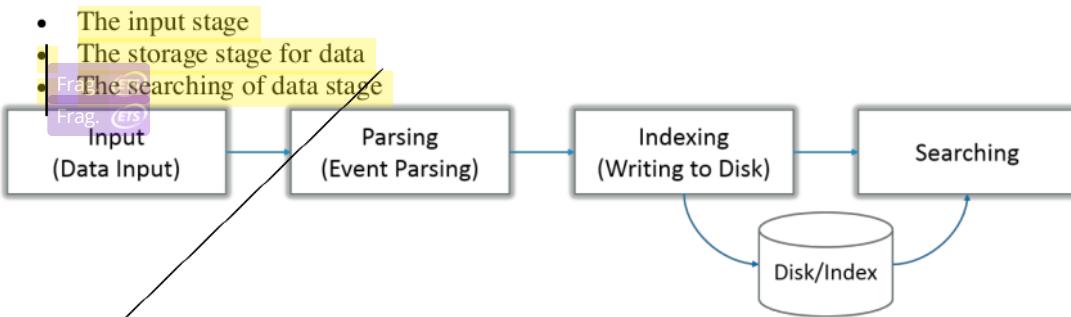
Email alert function

Send an email alert to the beneficiaries shown when the alarm goes off. Email notifications may include data from list items, query function, and alert setup. Splunk can send email notification using search page or search command.

Article Error ETS

6.1.2 Flow of Project

Data pipeline stages proceed in three flows



1. Data Information Stage

At this stage, Splunk editing uses the stream of raw information from its source, breaks it into 64K squares, and specifies each square with metadata keys. Metadata keys include hostname, a type of unlimited source of information. Keys similarly can include attributes that are used internally, for example, coding information for distribution information and values that control information management during the order phase, for example, the record at which times should be discarded.².

Data Capacity Stage

- The data limit consists of two phases: Analysis and editing.
- In the analysis phase, the Splunk system evaluates, evaluates, and modifies data to separate only important information. This is often called event management. It is during this stage that Splunk editing breaks the data stream into individual events. The stages are many sub-sections:
 1. Divide the increase in data in each row
 2. Identifying, sorting, and setting time stamps
 3. Defining each event with a metadata copied to a broad source key
 4. Modifying event data and metadata according to regex change rules
 5. In the order section, the Splunk system makes the filtered events a summary on the plate. It makes both aggregated data and a separate record report. The advantage of ordering is that the data can be successfully retrieved during the scan.

2. Data Looking through Stage

This stage controls how the client gets to, perspectives, and utilizations the recorded information. As a component of the pursuit work, Splunk programming stores client-made information objects, for example, reports, occasion types, dashboards, cautions and field extractions. The hunt work likewise deals with the inquiry cycle.

SQL Injection:-

SQL injection is sequel query language injection which exploits the database by inserting such data as user input which act as a part of query and perform action accordingly which result in great impact of data leakage.

Sqlmap:-

sqlmap is an entrance testing gadget that automates the technique associated with perceiving and exploiting SQL mixture deformities and taking over of data base servers. It goes with a solid area engine, various specialty features for an authoritative entry analyzer and a broad extent of switches persevering from informational index fingerprinting, over data getting from the informational index, to getting to the crucial record system and executing orders on the functioning structure all through of-band affiliations.

DOS:-

- Denial of Service (DoS) attack is kind of attack which is generated by multiple parallel processing result in losing accessibility and performance of the victim system. Article Error (ETS)
- During the DOS attack, they additionally get to restricted intel. These PCs are then used to wage P/a DoS Assault in attacker's PC. Proper Noun (ETS)
- Through various wellbeing endeavors have been taken to stop DOS Assault to shield our data, the aggressors have developed new techniques and attack reasoning. Consequently, it is fundamental that rather than answering new attacks, it is vital to manufacture an absolute DoS plan that will make preparations for a wide scope of DoS attacks. Along these lines, the experts ought to understand the web and methodologies used to hinder the DoS attacks. Article Error (ETS)
- The proposed structure gives an exceptional method to perceive DoS attack using Splunk. We propose two techniques for counteraction of DoS assault. Article Error (ETS)
- One is utilizing Haphazardly created Manual human tests and other one is utilizing Linux slam content to forestall DoS attack via naturally impeding IP of the client, who is sending different solicitation at a time. Article Error (ETS) S/V (ETS)

Getting everything rolling with DOS assaults utilizing hping3:

To install hping3 on a linux based system fire the command: **apt install hping3 -y**

A simple dos attack performed by: **sudo hping3 -S -flood -V -p 80 170.155.9.185**

sudo: gives required honors to run hping3.

hping3: command calls hping3 program Sentence Cap. (ETS)

-S: in the command indicates the SYN bundles. Article Error (ETS)

-flood: take shots at carefulness, answers will be disregarded (that is the reason answers wont be shown) and parcels will be sent quick as could really be expected. Missing Apos. (ETS)

-V: stands for level of Verbosity. Frag. (ETS)

-p 80: is the port number dedicated to 80

170.155.9.185: is IP of the target system.

CHAPTER: 7 CONCLUSIONS AND FUTURE WORK

CHAPTER 7 CONCLUSION AND FUTURE WORK

Challenges and how we overcame it

The splunk enterprise came up with the feature to run any script that could prevent simple attacks or help the system with security incident and event management, but lately the feature was deprecated. Splunk doesn't allow to run any script in desired environment. So a manual bash file was created by us that run the python script which would build a SSH connection with remote system and generate a trigger alert notification.

P/V (ETS)

Confused (ETS)

Article Error (ETS)

Conclusion

Splunk is now an industry standard for examining continuous information and trigger subsequent activities. Splunk is being utilized all around the world by government offices, business specialist co-ops, colleges to dissect and comprehend business and client conduct continuously. It can set off alarms in the event of any network safety extortion, and working on the presentation of the help being given, while lessening the expense for the everyday tasks in any association.

Prep. (ETS)

R/V-CRS (ETS)

Future work

In future for this project we will be using splunk apps and gathering data from various sources and work with different features provided by Splunk Enterprise.

2
CHAPTER: 8 REFERENCES

CHAPTER 8 REFERENCES

- 1) <https://docs.splunk.com/Documentation>
- 2) <https://sqlmap.org/>
- 3) <http://www.hping.org/>
- 4) <https://www.ibm.com/security/enterprise-mobility-management>

ibm report

ORIGINALITY REPORT



PRIMARY SOURCES

1	www.acte.in Internet Source	3%
2	Submitted to Ganpat University Student Paper	2%
3	www.kalilinux.in Internet Source	1%
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P/V You have used the passive voice in this sentence. Depending upon what you wish to emphasize in the sentence, you may want to revise it using the active voice.



P/V You have used the passive voice in this sentence. Depending upon what you wish to emphasize in the sentence, you may want to revise it using the active voice.



Article Error You may need to use an article before this word.



Prep. You may be using the wrong preposition.

PAGE 3

PAGE 4



P/V You have used the passive voice in this sentence. Depending upon what you wish to emphasize in the sentence, you may want to revise it using the active voice.



Article Error You may need to remove this article.



Word Error Did you type "**the**" instead of "**they**," or have you left out a word?



Confused You have used **chose** in this sentence. You may need to use **choice** instead.



Article Error You may need to remove this article.



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word. Consider using the article **the**.

PAGE 5



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word. Consider using the article **the**.



Missing "?" Remember to use a question mark at the end of a question.



Article Error You may need to remove this article.



Article Error You may need to use an article before this word.



Article Error You may need to remove this article.

PAGE 6



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word.



Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.



Missing "," You may need to place a comma after this word.



Wrong Form You may have used the wrong form of this word.



Proofread This part of the sentence contains a grammatical error or misspelled word that makes your meaning unclear.



Article Error You may need to remove this article.

PAGE 7

PAGE 8



Missing "," You may need to place a comma after this word.



Compound These two words should be written as one compound word.

PAGE 9



Confused You have used **Accept** in this sentence. You may need to use **except** instead.



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Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.



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Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.



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Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.

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PAGE 13



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Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.



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Wrong Form You may have used the wrong form of this word.



Proofread This part of the sentence contains a grammatical error or misspelled word that makes your meaning unclear.



Confused You have used **from** in this sentence. You may need to use **form** instead.

PAGE 14

PAGE 15



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Article Error You may need to use an article before this word.

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Article Error You may need to use an article before this word.

PAGE 32

PAGE 33



Article Error You may need to use an article before this word.



Missing "," You may need to place a comma after this word.



Possessive You may need to use an apostrophe to show possession.



Missing "," You may need to place a comma after this word.



Article Error You may need to use an article before this word. Consider using the article **a**.



Article Error You may need to use an article before this word.



Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



Article Error You may need to use an article before this word. Consider using the article **the**.



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Proofread This part of the sentence contains a grammatical error or misspelled word that makes your meaning unclear.



Article Error You may need to use an article before this word.



Missing "," You may need to place a comma after this word.



Missing "," You may need to place a comma after this word.



Missing "," You may need to place a comma after this word.



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word.

PAGE 36



Article Error You may need to use an article before this word.



Prep. You may be using the wrong preposition.



Article Error You may need to remove this article.

PAGE 37



Article Error You may need to use an article before this word.



Article Error You may need to use an article before this word.



P/V You have used the passive voice in this sentence. Depending upon what you wish to emphasize in the sentence, you may want to revise it using the active voice.



S/V This subject and verb may not agree. Proofread the sentence to make sure the subject agrees with the verb.



Wrong Form You may have used the wrong form of this word.



Wrong Article You may have used the wrong article or pronoun. Proofread the sentence to make sure that the article or pronoun agrees with the word it describes.



Prep. You may be using the wrong preposition.



Confused You have used **off** in this sentence. You may need to use **of** instead.



S/V This subject and verb may not agree. Proofread the sentence to make sure the subject agrees with the verb.



Article Error You may need to use an article before this word.

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Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.



Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.



Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.



Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



Run-on This sentence may be a run-on sentence. Proofread it to see if it contains too many independent clauses or contains independent clauses that have been combined without conjunctions or punctuation. Look at the "Writer's Handbook" for advice about correcting run-on sentences.



Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



Article Error You may need to use an article before this word. Consider using the article **the**.



Article Error You may need to use an article before this word.



Wrong Form You may have used the wrong form of this word.



Proofread This part of the sentence contains a grammatical error or misspelled word that makes your meaning unclear.



Article Error You may need to remove this article.



Article Error You may need to use an article before this word.

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P/V You have used the passive voice in this sentence. Depending upon what you wish to emphasize in the sentence, you may want to revise it using the active voice.



Proper Noun If this word is a proper noun, you need to capitalize it.



Article Error You may need to remove this article.



Article Error You may need to use an article before this word.



Article Error You may need to remove this article.



Article Error You may need to remove this article.



S/V This subject and verb may not agree. Proofread the sentence to make sure the subject agrees with the verb.



Article Error You may need to use an article before this word. Consider using the article **the**.



Sentence Cap. Remember to capitalize the first word of each sentence.



Article Error You may need to remove this article.



Missing Apos. Since this is a contraction, you need to use an apostrophe to form it.



Frag. This sentence may be a fragment or may have incorrect punctuation. Proofread the sentence to be sure that it has correct punctuation and that it has an independent clause with a complete subject and predicate.

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Sp. This word is misspelled. Use a dictionary or spellchecker when you proofread your work.



Article Error You may need to use an article before this word. Consider using the article **the**.



Confused You have a spelling mistake near the word **a** that makes **a** appear to be a confused-word error.



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