SIEM: Windows Client Monitoring with Splunk

September 8, 2020 By Raj Chandel

In our previous article, we have covered with Splunk master server setup with a brief demonstration of Dashboard setup or Log monitoring you can visit that article from **here**. Once done with a complete server setup we need to focus on how to bring the logs from the network environment into Splunk for indexing. We are going to import data from the client machine or a network of 100 or 1000's of pc into the Splunk server that we set up previously and what else needs to be indexed.

Now let us see how to forward the logs or Data from client-server to Splunk Enterprise.

SIEM: Log Monitoring Lab Setup with Splunk

Table of Content

Prerequisites

To configure Splunk universal Forwarder on your client-server, there are some prerequisites required for installation.

- Windows, Linux systems, or cloud servers with admin access.
- Splunk Universal forwarder
- Attacker: Kali Linux

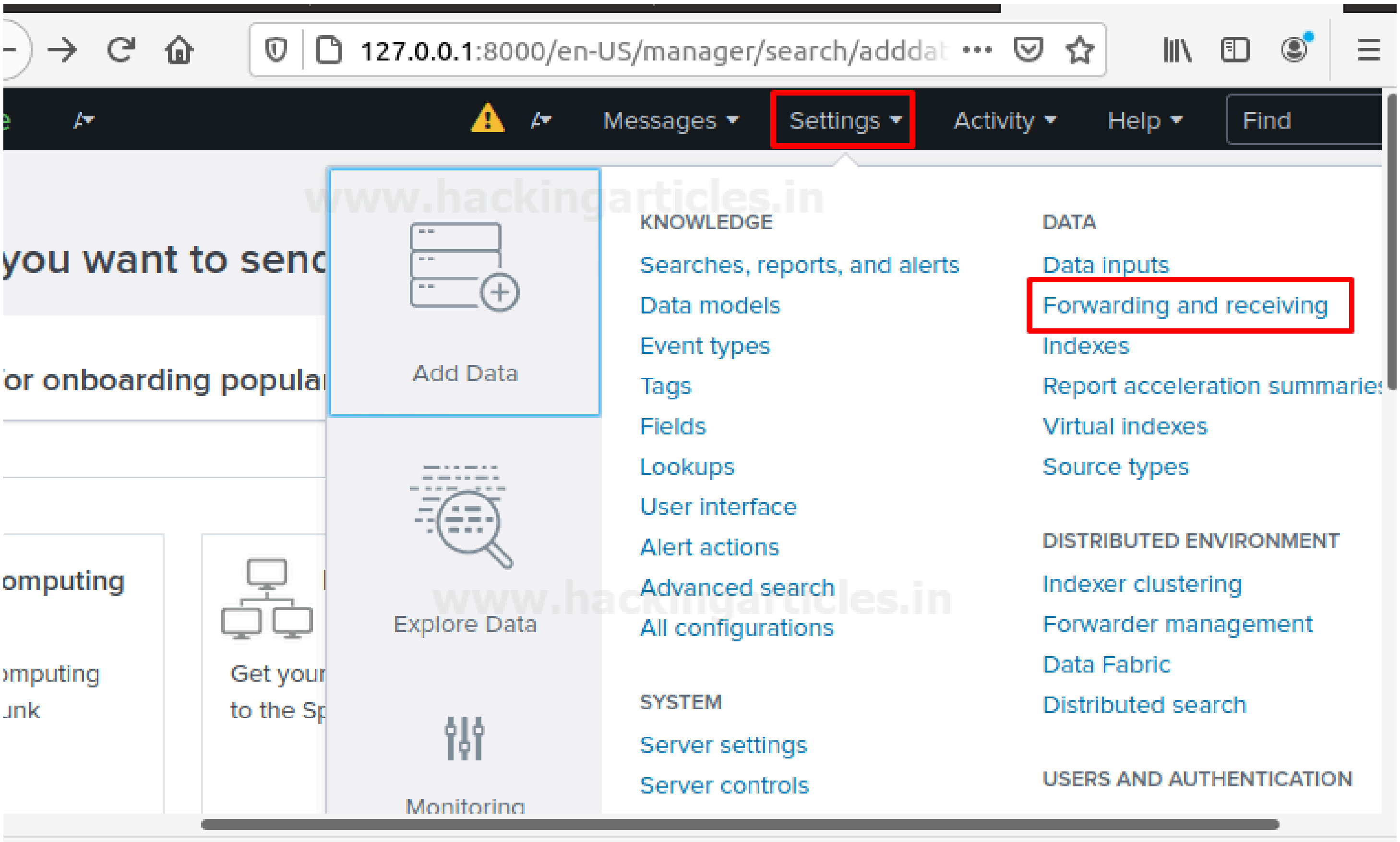
Configure a Receiving on Splunk Enterprise

On your Splunk Dashboard, you must configure an indexer to receive data before you can send data to it. If you did not do this, then your data not going anywhere.

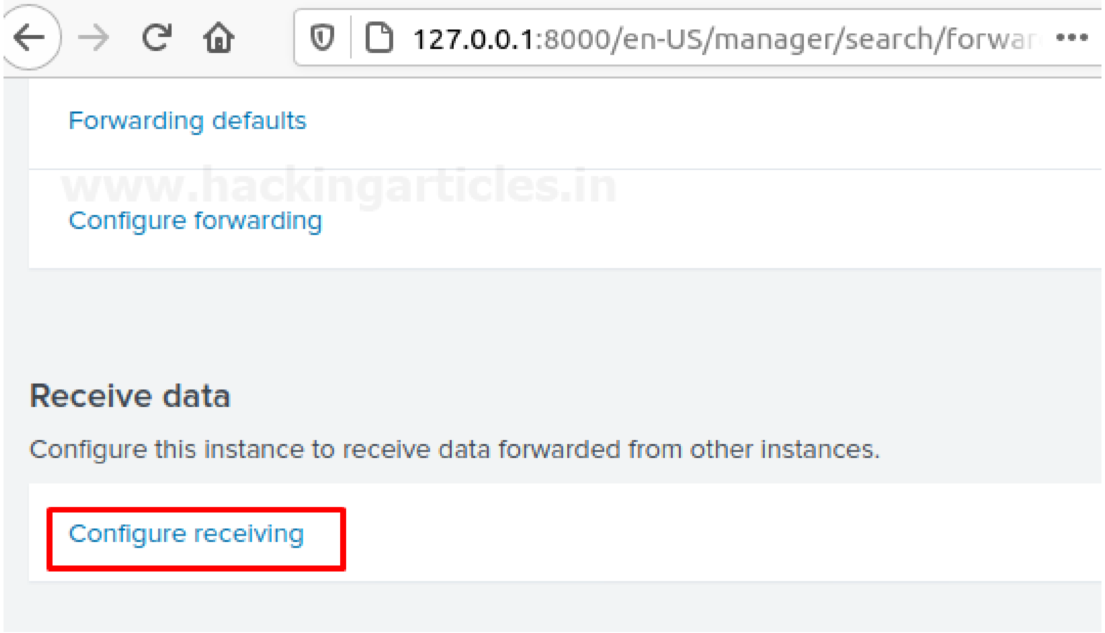
Use the Splunk web interface to configure a receiver for Splunk-to-Splunk (S2S) communication. To do this follow the below steps

- Log into Splunk web using your credentials

- On Splunk web go to **Settings > Forwarding and Receiving**



Select “configure Receiving”.

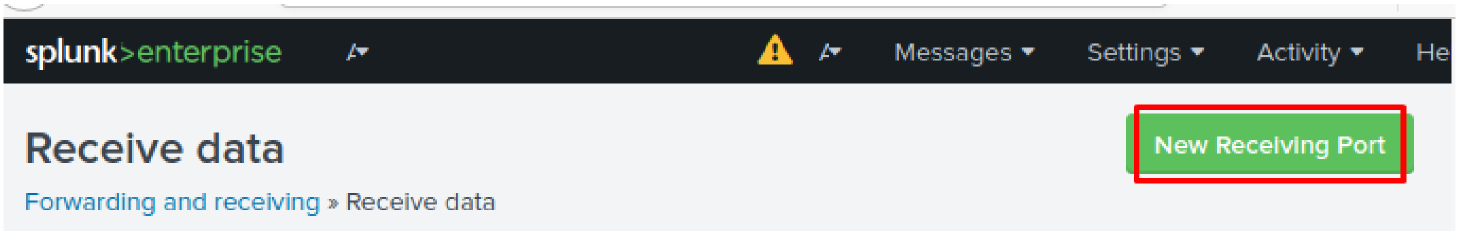


Receive data

Configure this instance to receive data forwarded from other instances.

Verify the existing ports are open or not. If there are no ports available, then add a port also you cannot create a duplicate receiver port. The most suitable receiver port on indexers is **port 9997**.

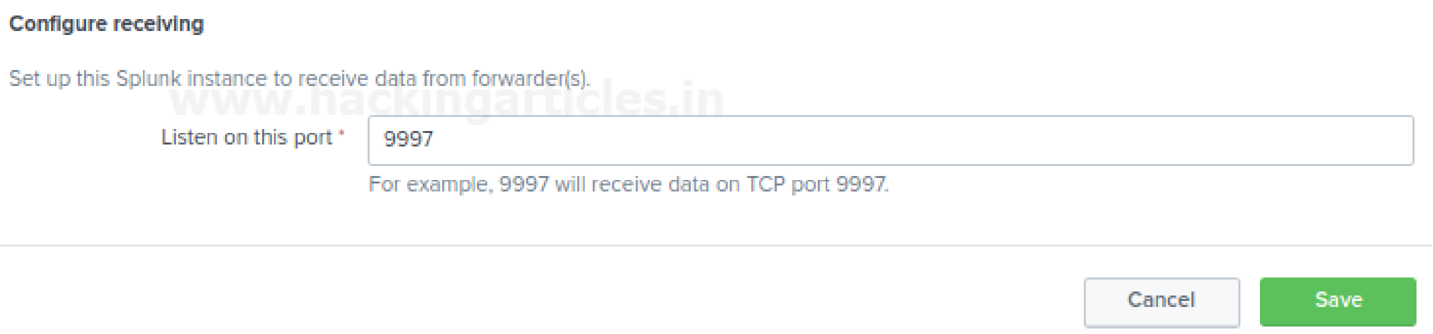
Select “New receiving port.”



Receive data

Forwarding and receiving » Receive data

- Add a port number and save and do not forget to verify that port is available or not reserved to any other service or instance.



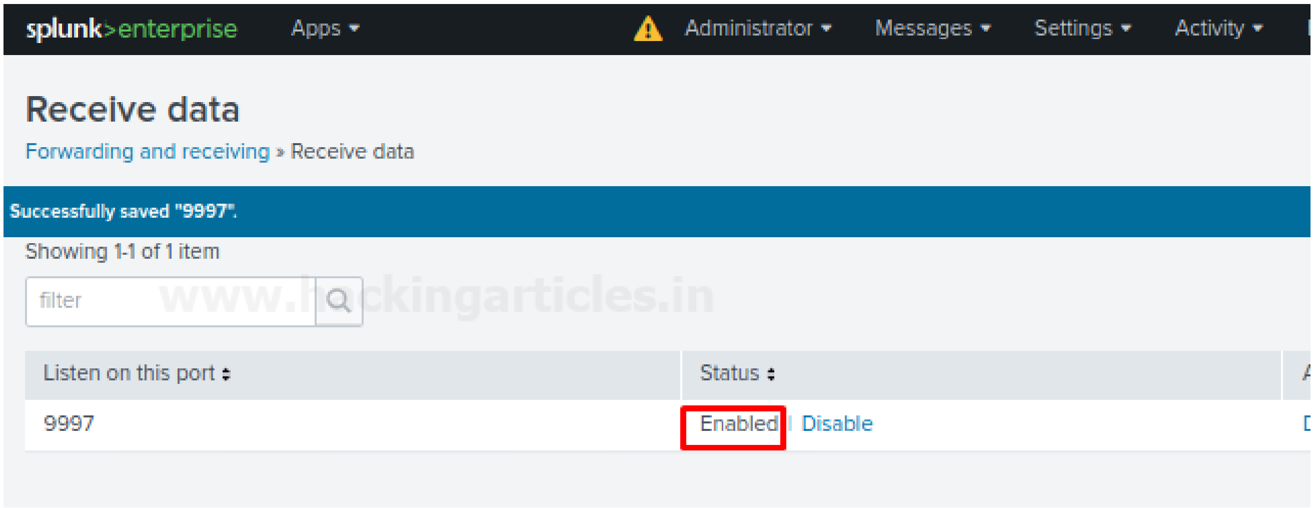
Configure receiving

Set up this Splunk instance to receive data from forwarder(s).

Listen on this port * 9997

For example, 9997 will receive data on TCP port 9997.

Check the status for receiving port, it should enable for listening to the traffic.



Receive data

Forwarding and receiving » Receive data

Successfully saved "9997".

Showing 1-1 of 1 item

Listen on this port	Status
9997	Enabled | Disable

Alternative method: Configure a receiver using the command line

Use the command-line interface with Admin privilege in windows 10 or terminal with root user to configure a receiver for S2S communications. To do this follow the steps as described below.

- Open a shell with admin rights or the terminal with root user
- Change the path to $SPLUNK_HOME/bin
- (For Linux) Type:

```
./splunk enable listen 9997 -auth admin:password
```

- (For windows) Type:

```
Splunk enables listen 9997 -auth admin: password
```

- Restart Splunk for the changes to take effect by going into Splunk web interface **setting > server control > restart Splunk.**

or

Alternative method: Configure a receiver using a Configuration file

For windows

Configure inputs**.conf** file for S2S communication:

- Open a shell prompt
- Change the path to $SPLUNK_HOME/etc/system/local
- Edit the **conf** file.
- Edit the input.conf file with [splunktcp]stanza and define the receiving port. Example:

[splunktcp://9997]

disabled = 0

- Save the file.
- Restart Splunk to take effect of the saved changes.

For Linux

Open the Splunk forwarder directory wherever it installs and locate the file named **input.conf** and make changes as described above or as per your requirements.

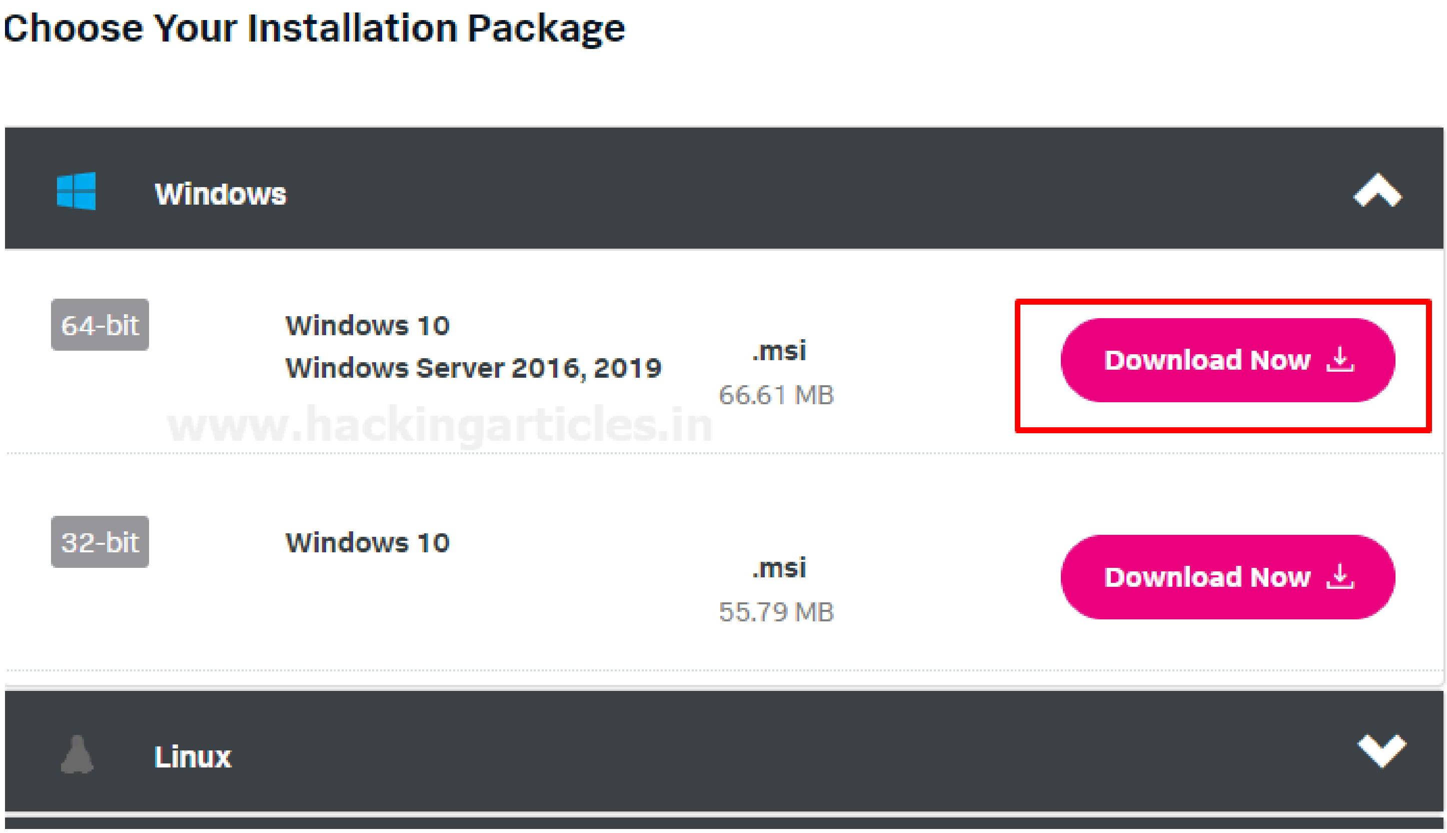
Environment

In this blog, we will target to install a **Splunk Universal Forwarder** on a **Windows Machine** or server. You can download Splunk forwarder by following the below link.

https://www.splunk.com/en_us/download/universal-forwarder.html

Choose your installation package

- Create a Splunk Account and download Splunk universal forwarder for Windows version by the given above link.
- We choose **Windows 10 64 bit .msi** Package for the installation in windows. You can choose it as per your system requirements.



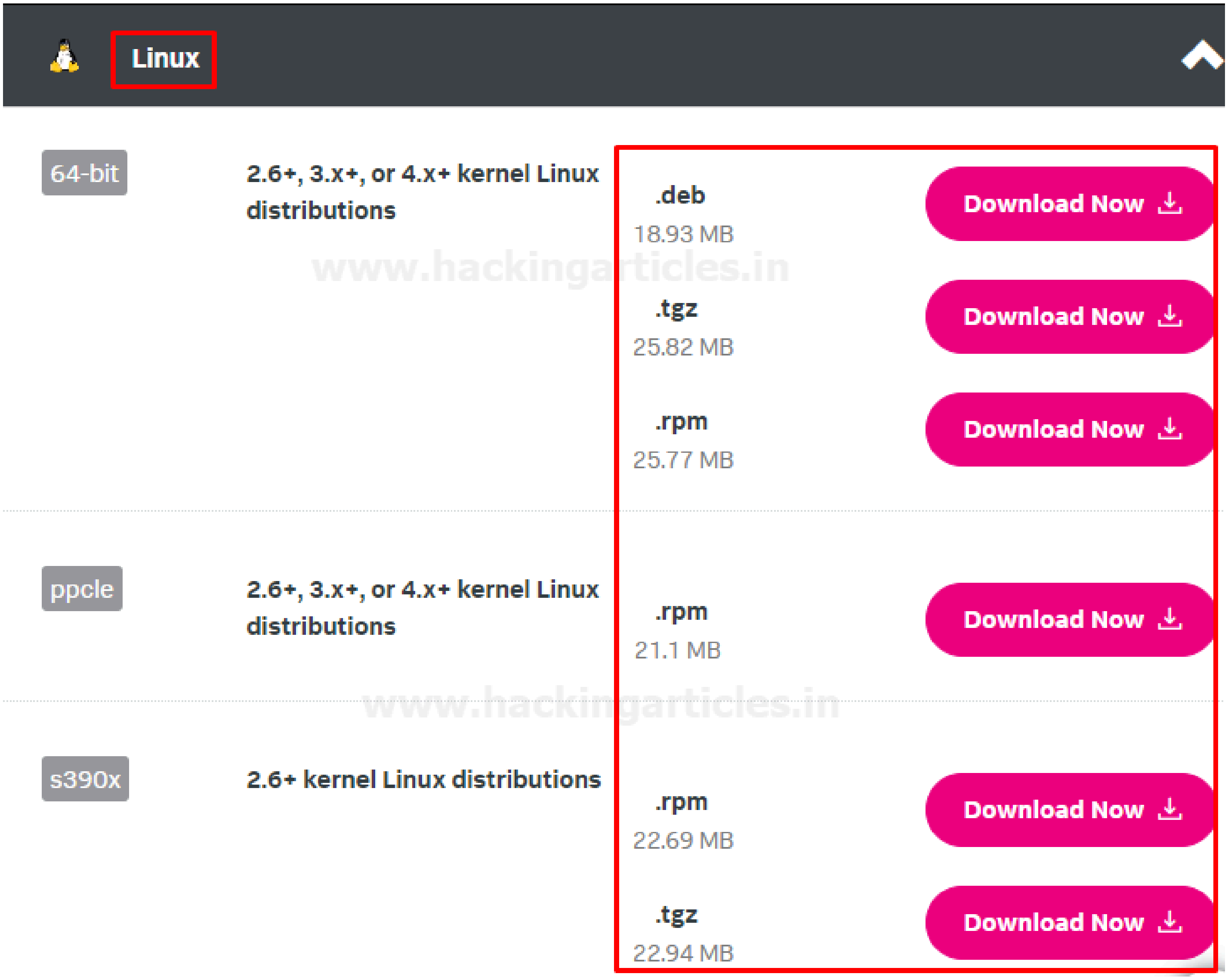
Choose Your Installation Package

Windows

64-bit	Windows 10 Windows Server 2016, 2019	.msi 66.61 MB	Download Now
32-bit	Windows 10	.msi 55.79 MB	Download Now

Linux

Or also for **Linux systems**, you can go with the options are available to download on the Splunk website by drop down the option Linux then select and download package as per your choice as shown below.



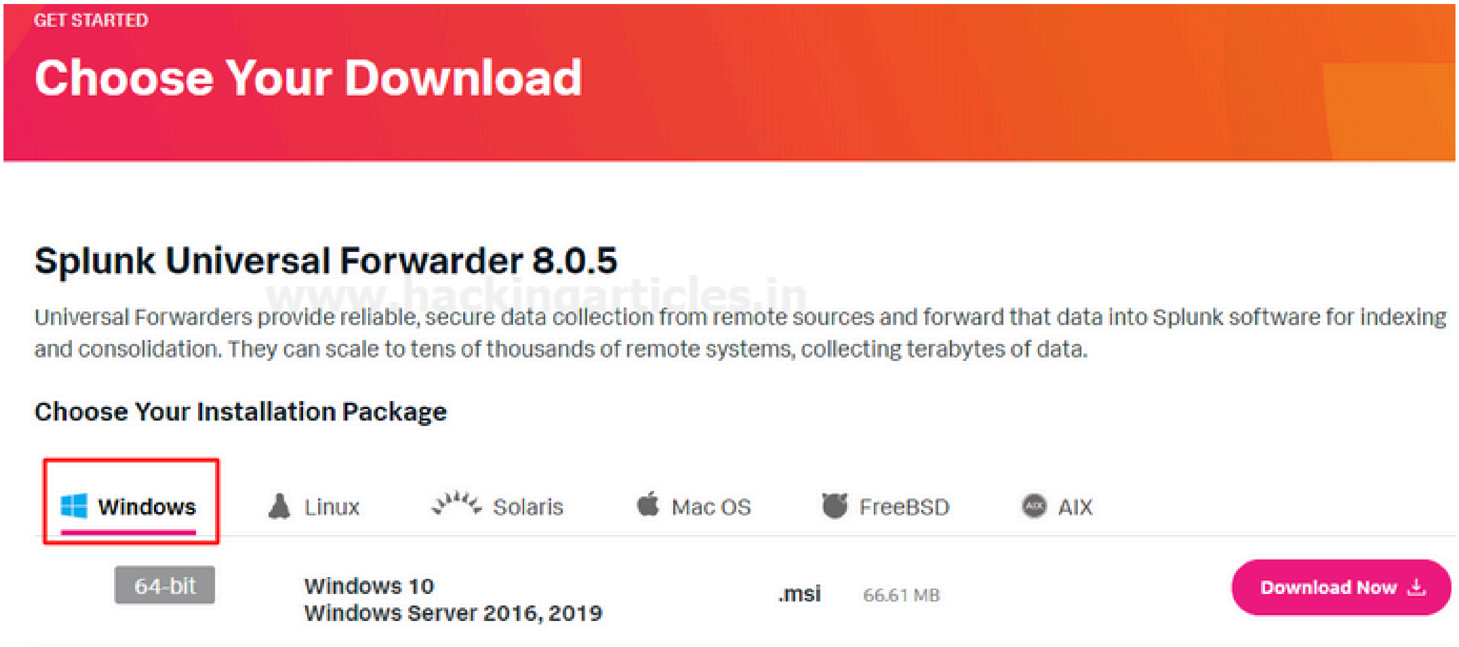
Linux

64-bit	2.6+, 3.x+, or 4.x+ kernel Linux distributions	.deb 18.93 MB	Download Now
		.tgz 25.82 MB	Download Now
		.rpm 25.77 MB	Download Now
ppcle	2.6+, 3.x+, or 4.x+ kernel Linux distributions	.rpm 21.1 MB	Download Now
s390x	2.6+ kernel Linux distributions	.rpm 22.69 MB	Download Now
		.tgz 22.94 MB	Download Now

Install Splunk Universal Forwarder on Windows 10

To install Universal forwarder into your operating systems, follow the steps as described below:

Visit the Splunk official website and select and download universal forwarder for **Windows 10 .msi file.** It will download a Zip file into your downloads as shown below.


GET STARTED

Choose Your Download

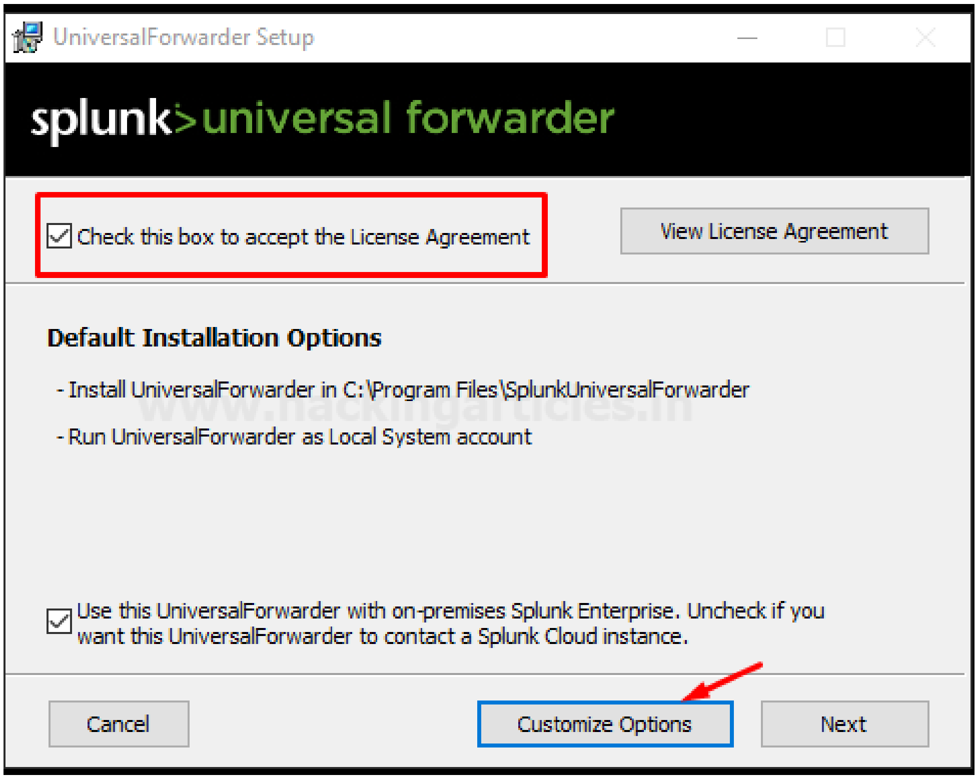
Splunk Universal Forwarder 8.0.5

Universal Forwarders provide reliable, secure data collection from remote sources and forward that data into Splunk software for indexing and consolidation. They can scale to tens of thousands of remote systems, collecting terabytes of data.

Choose Your Installation Package

64-bit	Windows 10 Windows Server 2016, 2019	.msi	66.61 MB	Download Now

When it gets downloaded open it and start the installation process and accept the license agreement then go to **customize options** as shown below:



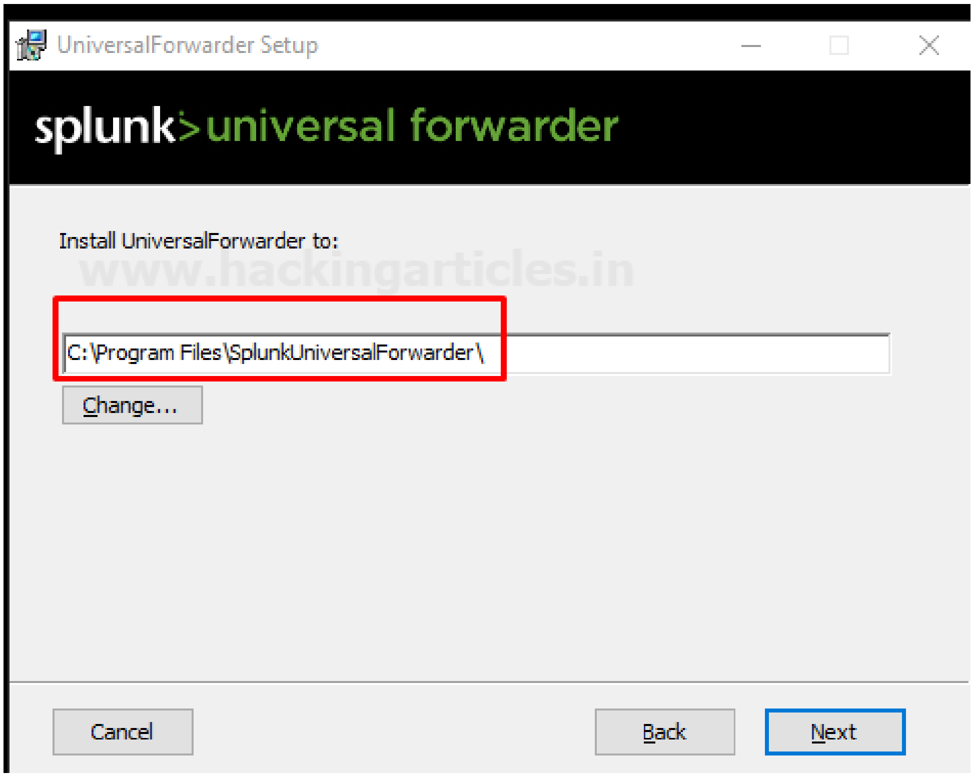
☑ Check this box to accept the License Agreement

Default Installation Options

- Install UniversalForwarder in C:\Program Files\SplunkUniversalForwarder
- Run UniversalForwarder as Local System account

☑ Use this UniversalForwarder with on-premises Splunk Enterprise. Uncheck if you want this UniversalForwarder to contact a Splunk Cloud instance.

Further, select the installation directory wherever you want to install it as shown below

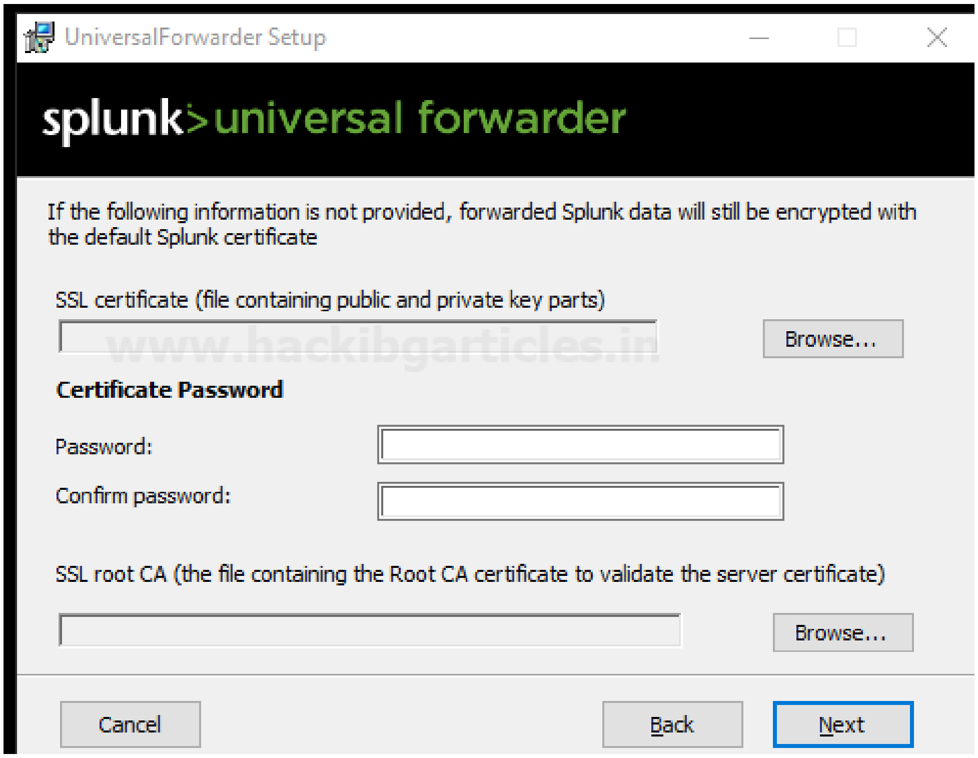

UniversalForwarder Setup

splunk>universal forwarder

Install UniversalForwarder to:

C:\Program Files\SplunkUniversalForwarder\

Further, it will ask you to for an SSL certificate for the encryption with your encryption key if you do not have the SSL certificate then don’t worry forwarded Splunk data will still be encrypted with the default Splunk certificate all you need to do is go with **Next** option.


UniversalForwarder Setup

splunk>universal forwarder

If the following information is not provided, forwarded Splunk data will still be encrypted with the default Splunk certificate

SSL certificate (file containing public and private key parts)

Certificate Password

Password:

Confirm password:

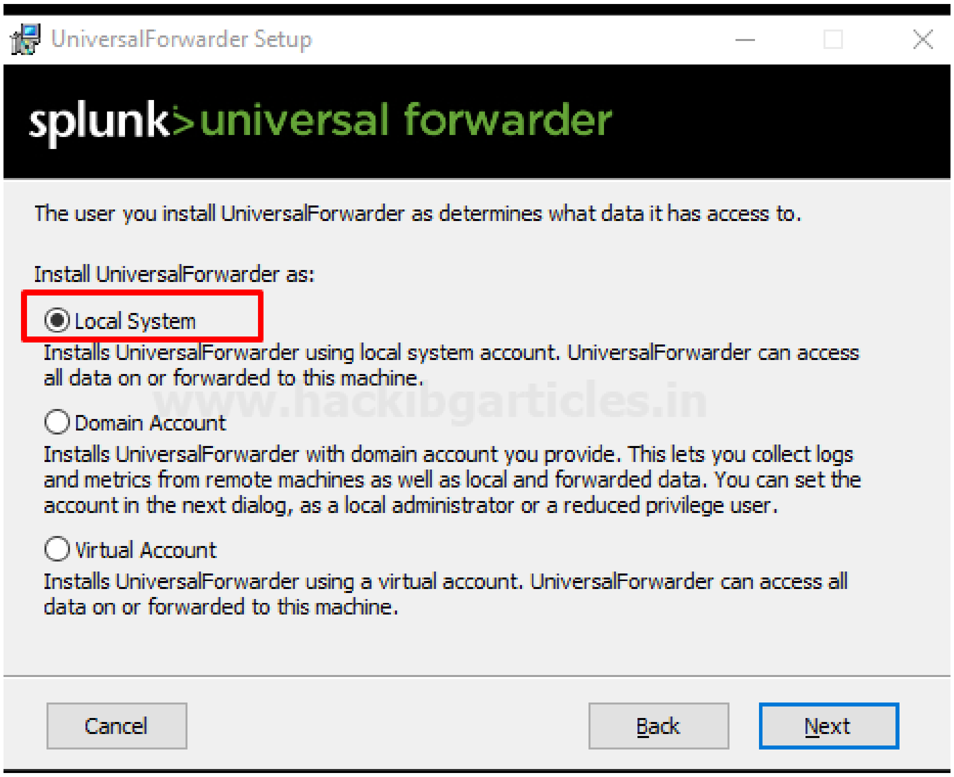
SSL root CA (the file containing the Root CA certificate to validate the server certificate)

On the next dialogue you will have two options:

- Local System. If you specify the Local System user during the installation process, the universal forwarder can access all your data on that is available on your local system or forwarded to this machine.
- Domain account. This option installs the forwarder as the Windows user specifies this lets you collect logs and metrics from remote machines as well as local and forwarded data. You can set the permissions of account in the next dialogue, as a local administrator or a reduced privilege user It does not collect data from resources that the Windows user does not have access to.

So, we go with the option **Local Systems** and Install the forwarder as a Local account to do any of the following:

- Read Event Logs remotely
- It Collects all your system performance counters remotely
- Read network shares for log files
- It can Access the Active Directory schema, using **Active Directory monitoring** if you select it



The user you install UniversalForwarder as determines what data it has access to.

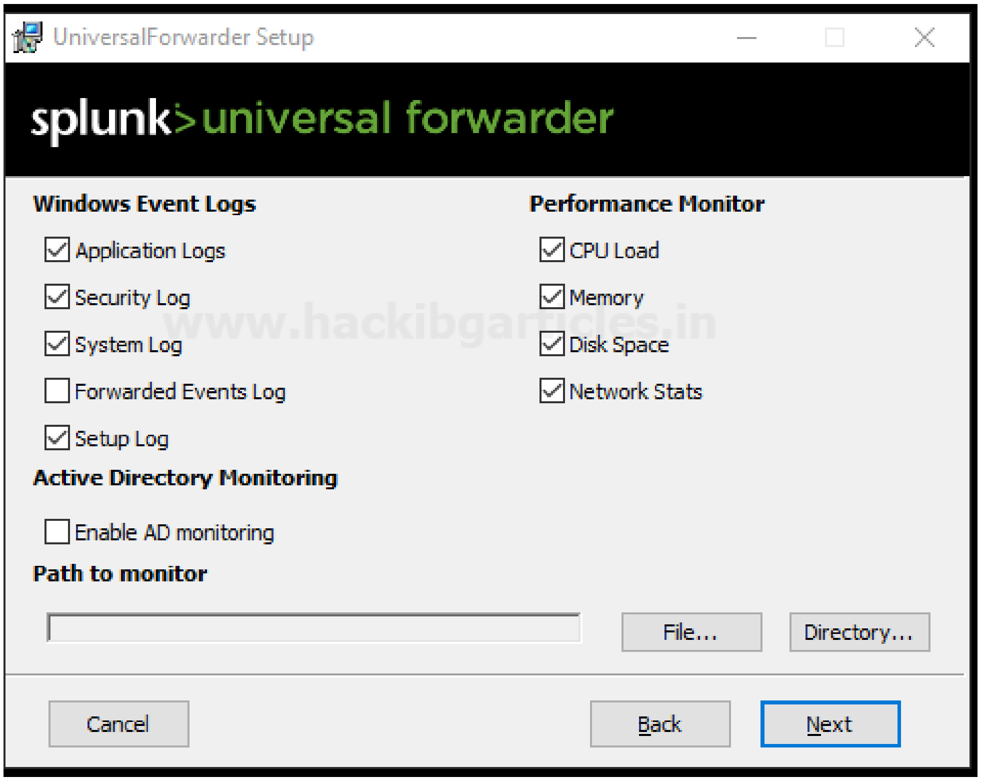
Install UniversalForwarder as:

● Local System
Installs UniversalForwarder using local system account. UniversalForwarder can access all data on or forwarded to this machine.

○ Domain Account
Installs UniversalForwarder with domain account you provide. This lets you collect logs and metrics from remote machines as well as local and forwarded data. You can set the account in the next dialog, as a local administrator or a reduced privilege user.

○ Virtual Account
Installs UniversalForwarder using a virtual account. UniversalForwarder can access all data on or forwarded to this machine.

Then, it will ask you to select the applications or log files that you want to forward to Splunk Enterprise or receiver and then proceed with the next option as shown below.



Windows Event Logs

☑ Application Logs
☑ Security Log
☑ System Log
☐ Forwarded Events Log
☑ Setup Log

Performance Monitor

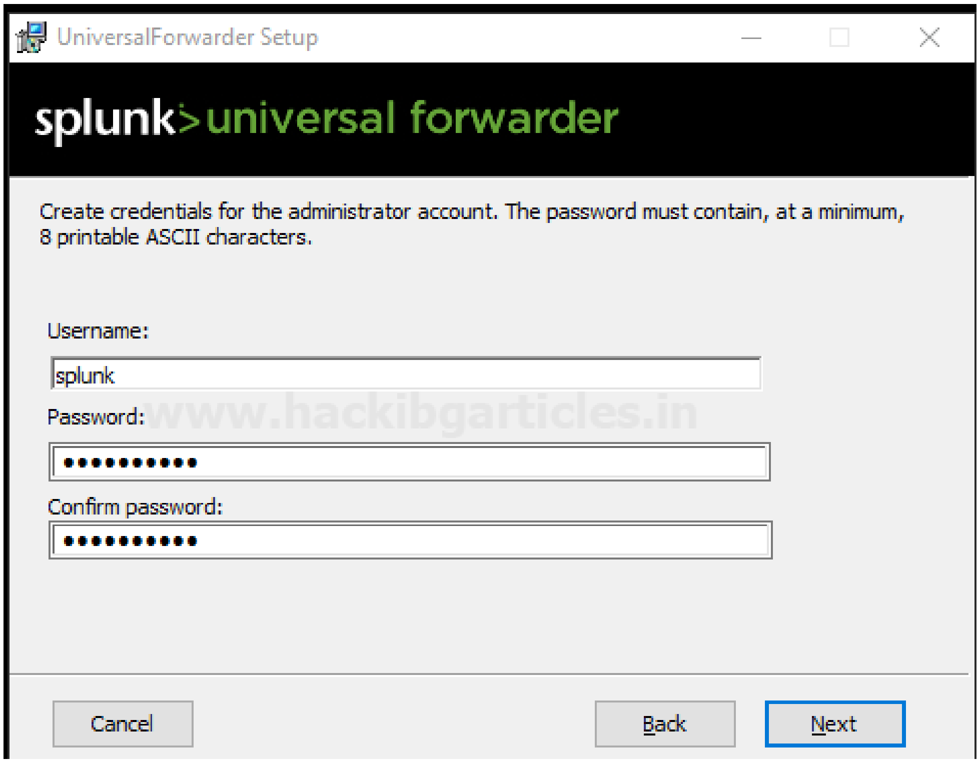
☑ CPU Load
☑ Memory
☑ Disk Space
☑ Network Stats

Active Directory Monitoring

☐ Enable AD monitoring

Path to monitor

In the next dialogue, it will ask you to create credentials for the administrator account to encrypt all your files on Splunk Enterprise.



Create credentials for the administrator account. The password must contain, at a minimum, 8 printable ASCII characters.

Username: splunk

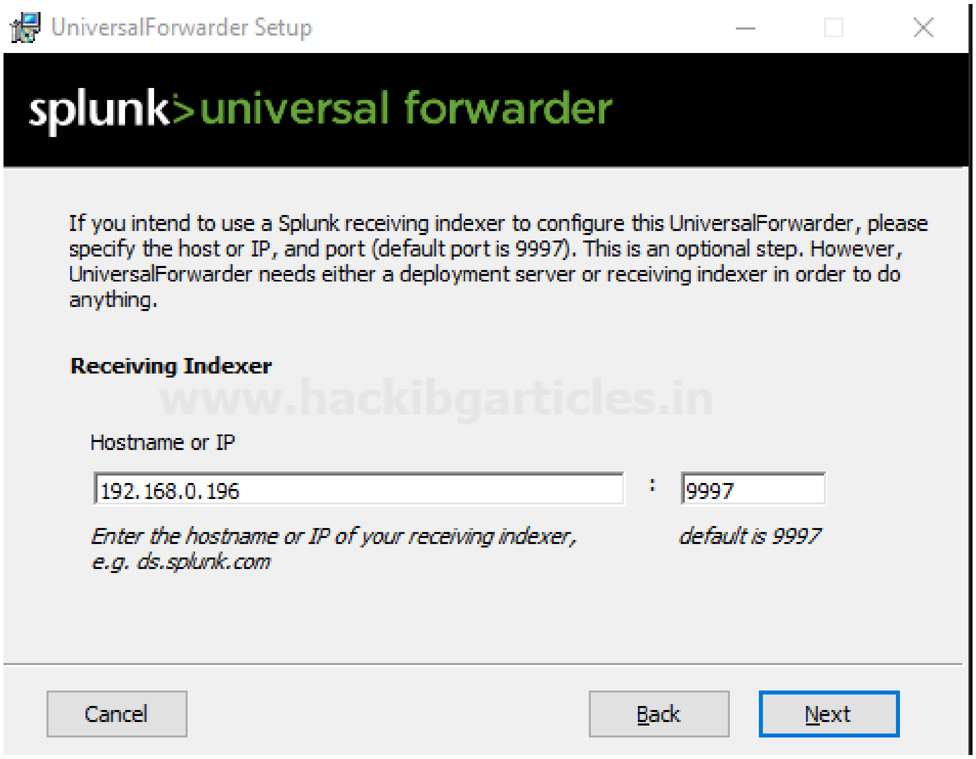
Password: ●●●●●●●●●●●

Confirm password: ●●●●●●●●●●●

On the next dialogue, it will be (optional) to configure your forwarder as a deployment server if you choose it then enter the hostname or IP address and management port for your deployment server and click next

In my case, I will leave it blank and prefer to go with the next option.

On the next dialogue setup Receiving indexer by entering the Hostname or IP and port as shown below



UniversalForwarder Setup

splunk>universal forwarder

If you intend to use a Splunk receiving indexer to configure this UniversalForwarder, please specify the host or IP, and port (default port is 9997). This is an optional step. However, UniversalForwarder needs either a deployment server or receiving indexer in order to do anything.

Receiving Indexer

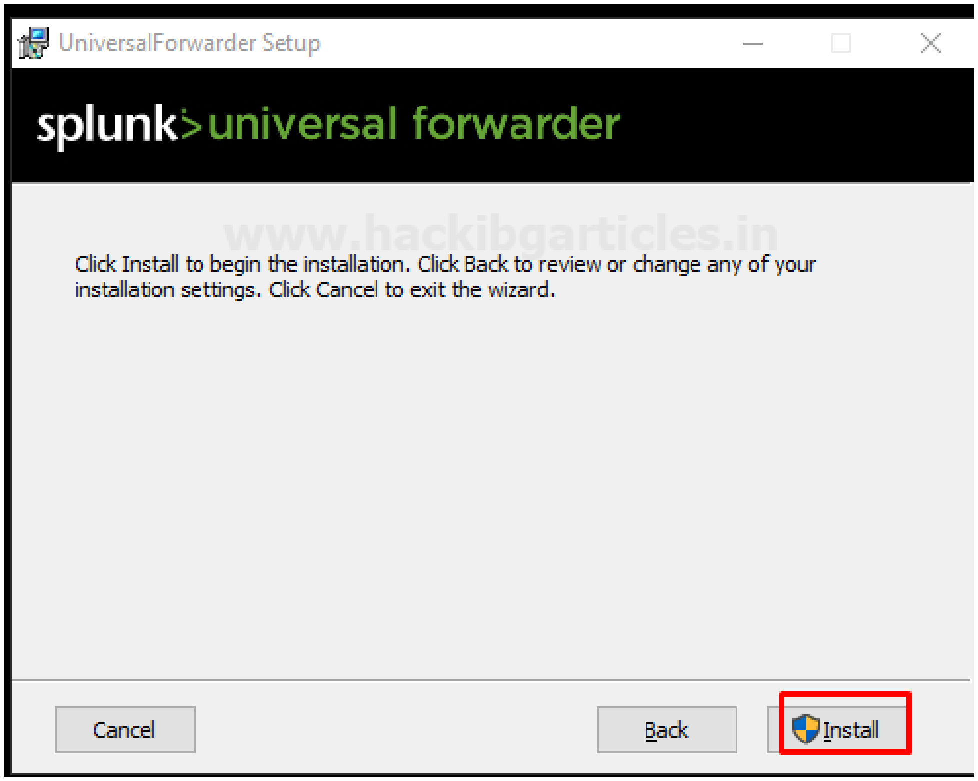
Hostname or IP

192.168.0.196 : 9997

Enter the hostname or IP of your receiving indexer, e.g. ds.splunk.com

default is 9997

And then finally select option Install it will install Splunk forwarder in your windows environment

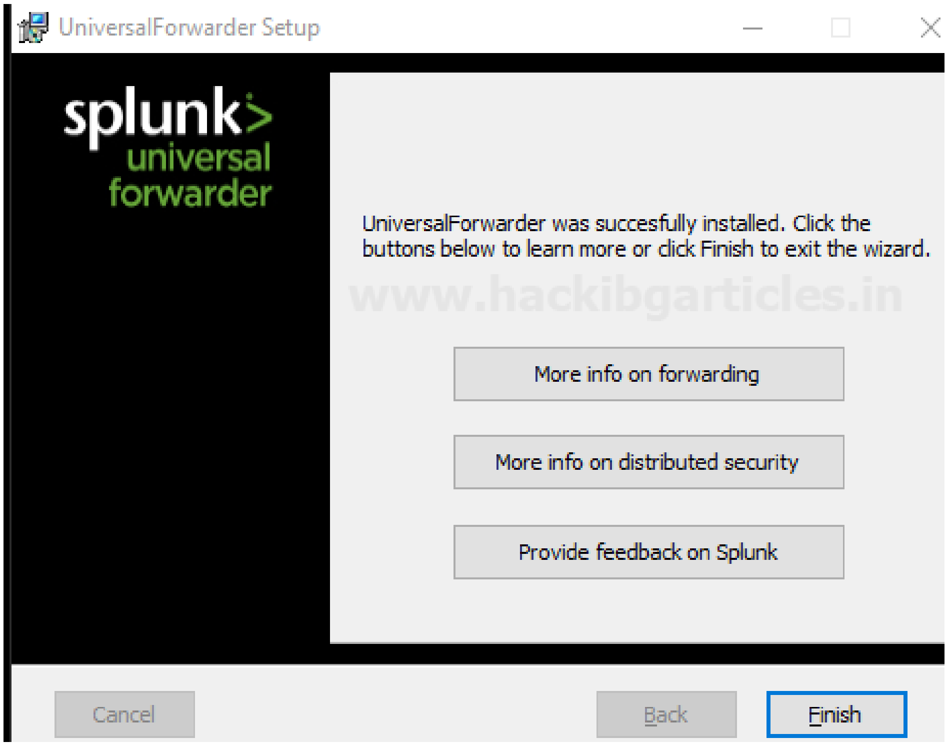


UniversalForwarder Setup

splunk>universal forwarder

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

After that finish, the installation process.


UniversalForwarder Setup
splunk> universal forwarder

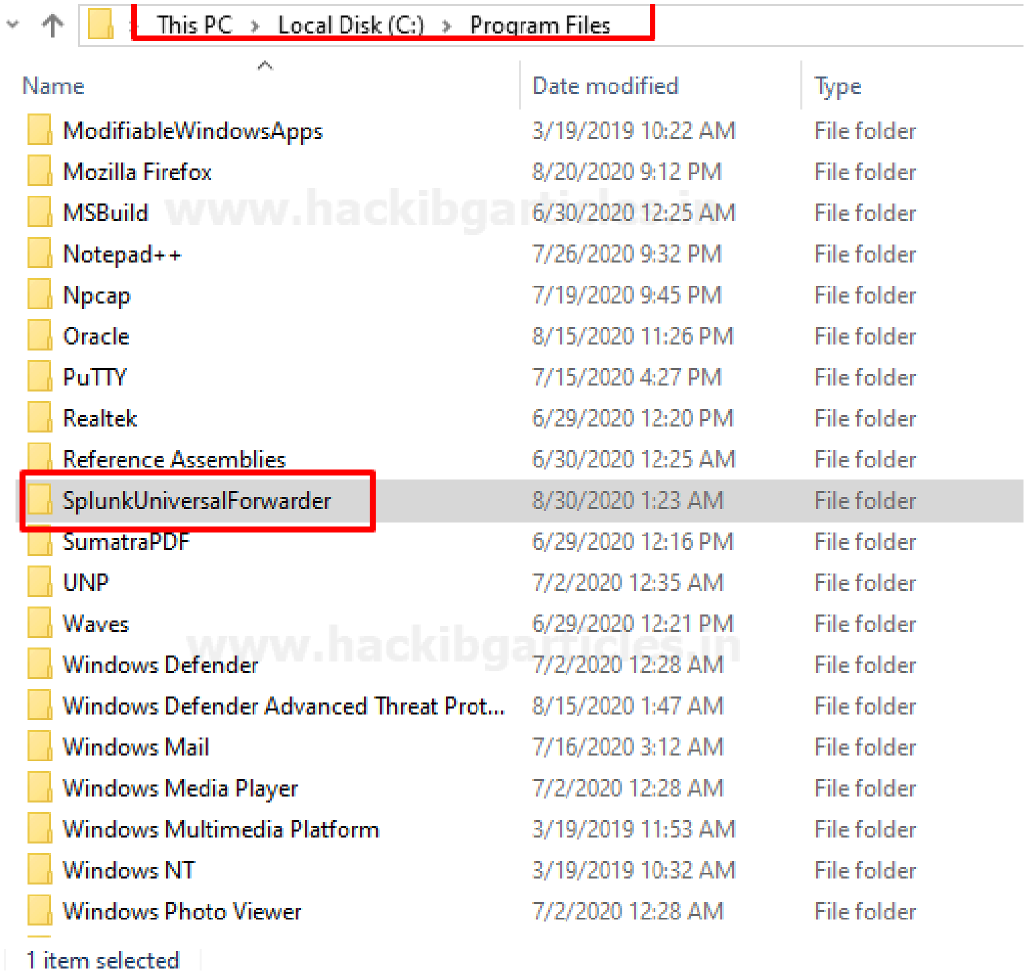
UniversalForwarder was succesfully installed. Click the buttons below to learn more or click Finish to exit the wizard.

More info on forwarding
More info on distributed security
Provide feedback on Splunk
Cancel
Back
Finish

Let’s verify the output.conf file to check is it forwarded to the Receiver or not.

To do this follow the steps as described below.

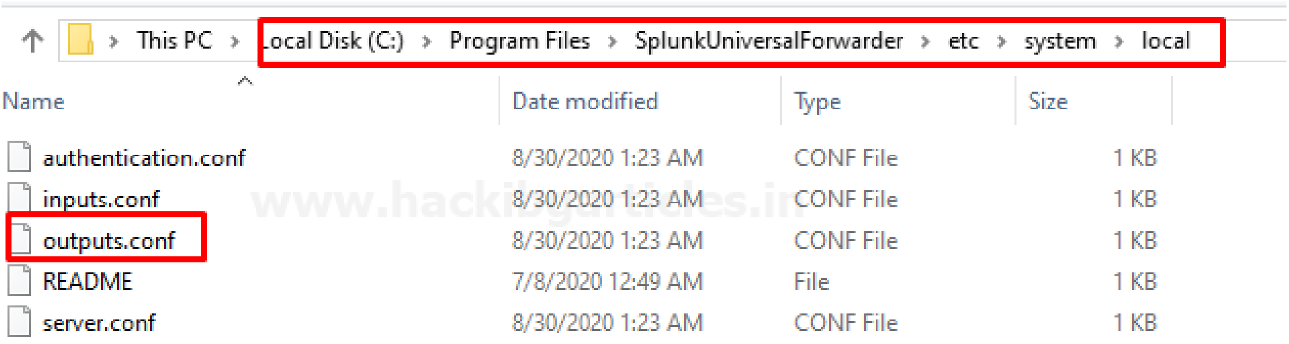
Go to file manager and open the directory where Splunk Universal forwarder installed.



This PC > Local Disk (C:) > Program Files

Name	Date modified	Type
ModifiableWindowsApps	3/19/2019 10:22 AM	File folder
Mozilla Firefox	8/20/2020 9:12 PM	File folder
MSBuild	6/30/2020 12:25 AM	File folder
Notepad++	7/26/2020 9:32 PM	File folder
Npcap	7/19/2020 9:45 PM	File folder
Oracle	8/15/2020 11:26 PM	File folder
PuTTY	7/15/2020 4:27 PM	File folder
Realtek	6/29/2020 12:20 PM	File folder
Reference Assemblies	6/30/2020 12:25 AM	File folder
SplunkUniversalForwarder	8/30/2020 1:23 AM	File folder
SumatraPDF	6/29/2020 12:16 PM	File folder
UNP	7/2/2020 12:35 AM	File folder
Waves	6/29/2020 12:21 PM	File folder
Windows Defender	7/2/2020 12:28 AM	File folder
Windows Defender Advanced Threat Prot...	8/15/2020 1:47 AM	File folder
Windows Mail	7/16/2020 3:12 AM	File folder
Windows Media Player	7/2/2020 12:28 AM	File folder
Windows Multimedia Platform	3/19/2019 11:53 AM	File folder
Windows NT	3/19/2019 10:32 AM	File folder
Windows Photo Viewer	7/2/2020 12:28 AM	File folder

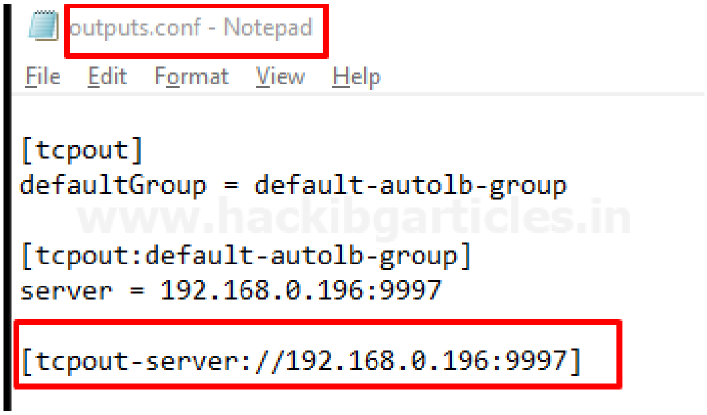
Open the file SplunkUniversalForwarder file and then open the output.conf file it will be found in under **etc > system > local**



This PC › Local Disk (C:) › Program Files › SplunkUniversalForwarder › etc › system › local

Name	Date modified	Type	Size
authentication.conf	8/30/2020 1:23 AM	CONF File	1 KB
inputs.conf	8/30/2020 1:23 AM	CONF File	1 KB
outputs.conf	8/30/2020 1:23 AM	CONF File	1 KB
README	7/8/2020 12:49 AM	File	1 KB
server.conf	8/30/2020 1:23 AM	CONF File	1 KB

By opening it we can verify it either it is redirected to the correct IP or not as entered during the installation process if not you can make changes by editing it.

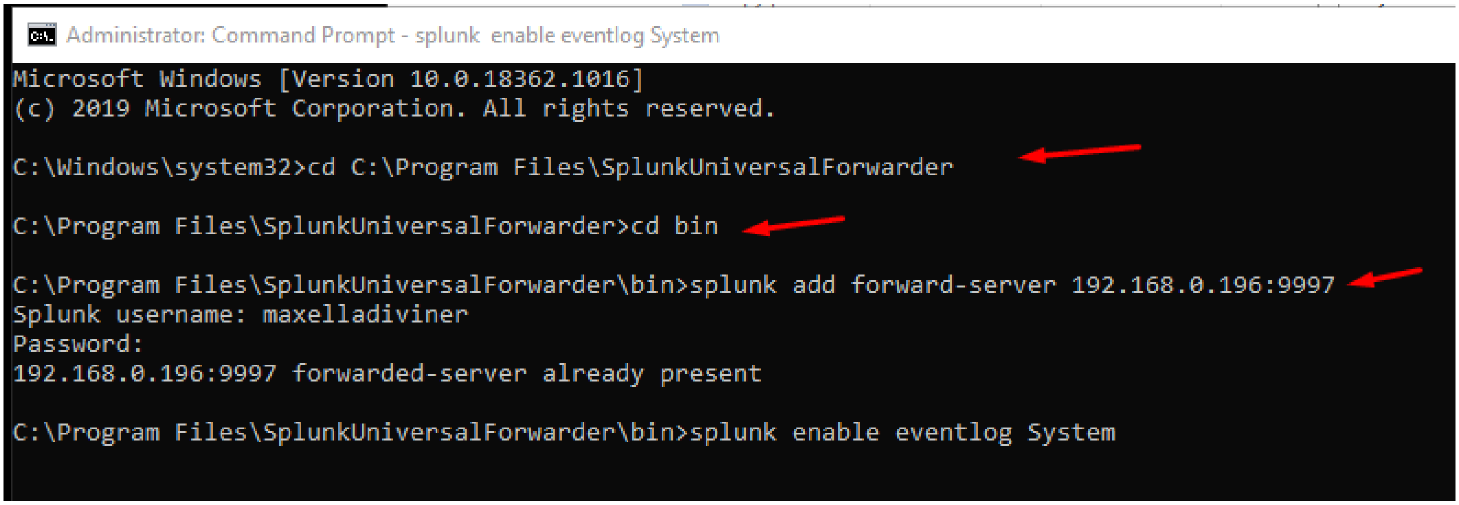


```
[tcpout]
defaultGroup = default-autolb-group

[tcpout:default-autolb-group]
server = 192.168.0.196:9997

[tcpout-server://192.168.0.196:9997]
```

Configure Universal Forwarder to Send Data to Splunk Enterprise

Open CMD as Admin privilege and follow the steps described below:

```
cd c:\Program Files\SplunkUniversalForwarder
cd bin
splunk add-forward-server 192.168.0.196:9997
splunk enable eventlog system
splunk restart
```

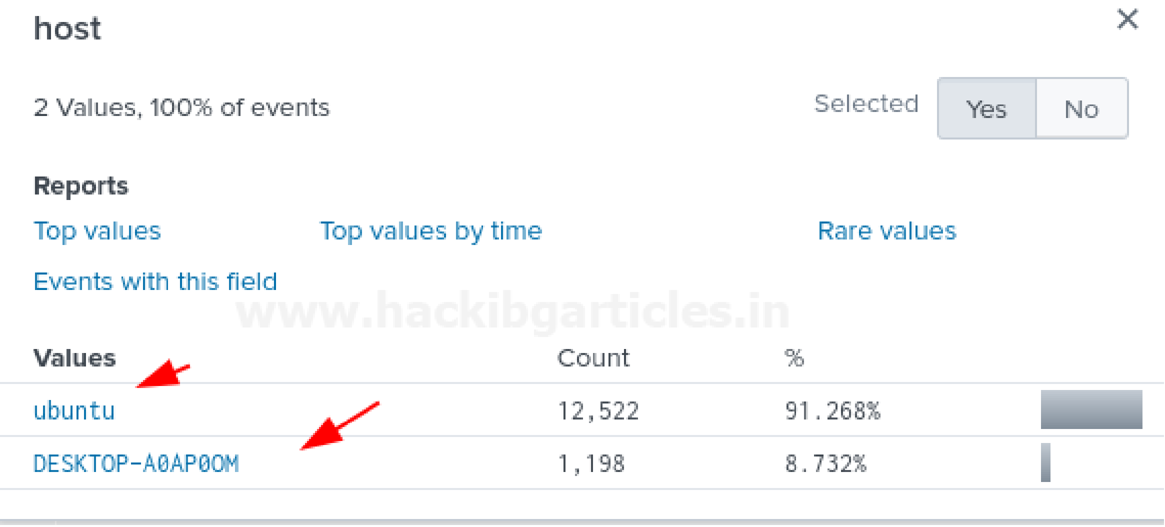


Administrator: Command Prompt - splunk enable eventlog System

```
Microsoft Windows [Version 10.0.18362.1016]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Windows\system32>cd C:\Program Files\SplunkUniversalForwarder

C:\Program Files\SplunkUniversalForwarder>cd bin

C:\Program Files\SplunkUniversalForwarder\bin>splunk add forward-server 192.168.0.196:9997
Splunk username: maxelladiviner
Password:
192.168.0.196:9997 forwarded-server already present

C:\Program Files\SplunkUniversalForwarder\bin>splunk enable eventlog System
```

Congratulations! You have successfully added Windows as a client

Let’s check what happens to the Splunk GUI interface is it added or not



host

2 Values, 100% of events

Selected [✓ Yes] No

Reports

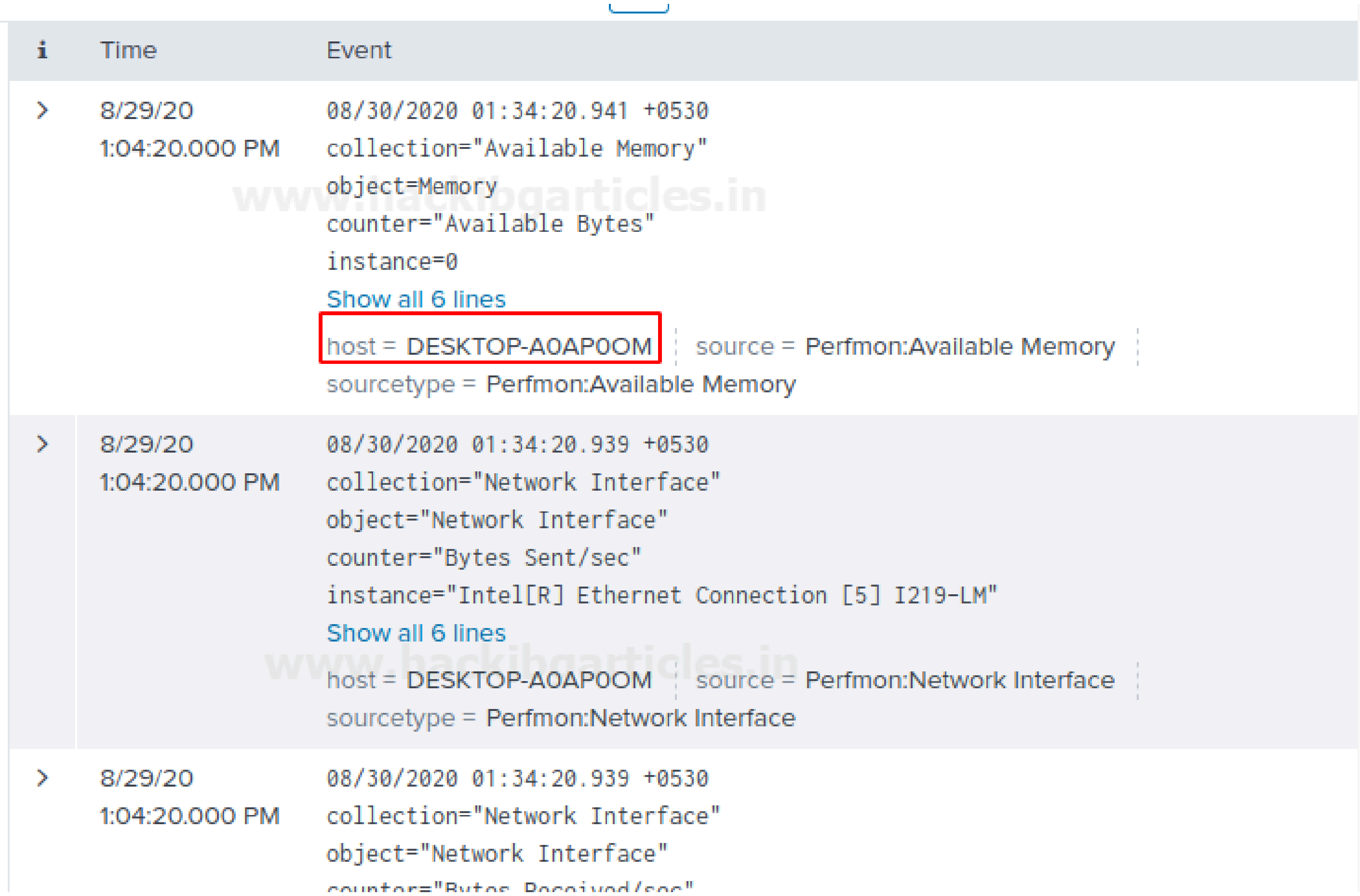
Top values   Top values by time   Rare values

Events with this field

Values	Count	%
ubuntu	12,522	91.268%
DESKTOP-A0AP0OM	1,198	8.732%

As you can see our client is successfully added

Now search your client into Search and reporting application by simply running a query index=”main”



i	Time	Event

>	8/29/20
	1:04:20.000 PM
		08/30/2020 01:34:20.941 +0530
		collection="Available Memory"
		object=Memory
		counter="Available Bytes"
		instance=0
		Show all 6 lines
		host = DESKTOP-A0AP0OM source = Perfmon:Available Memory
		sourcetype = Perfmon:Available Memory

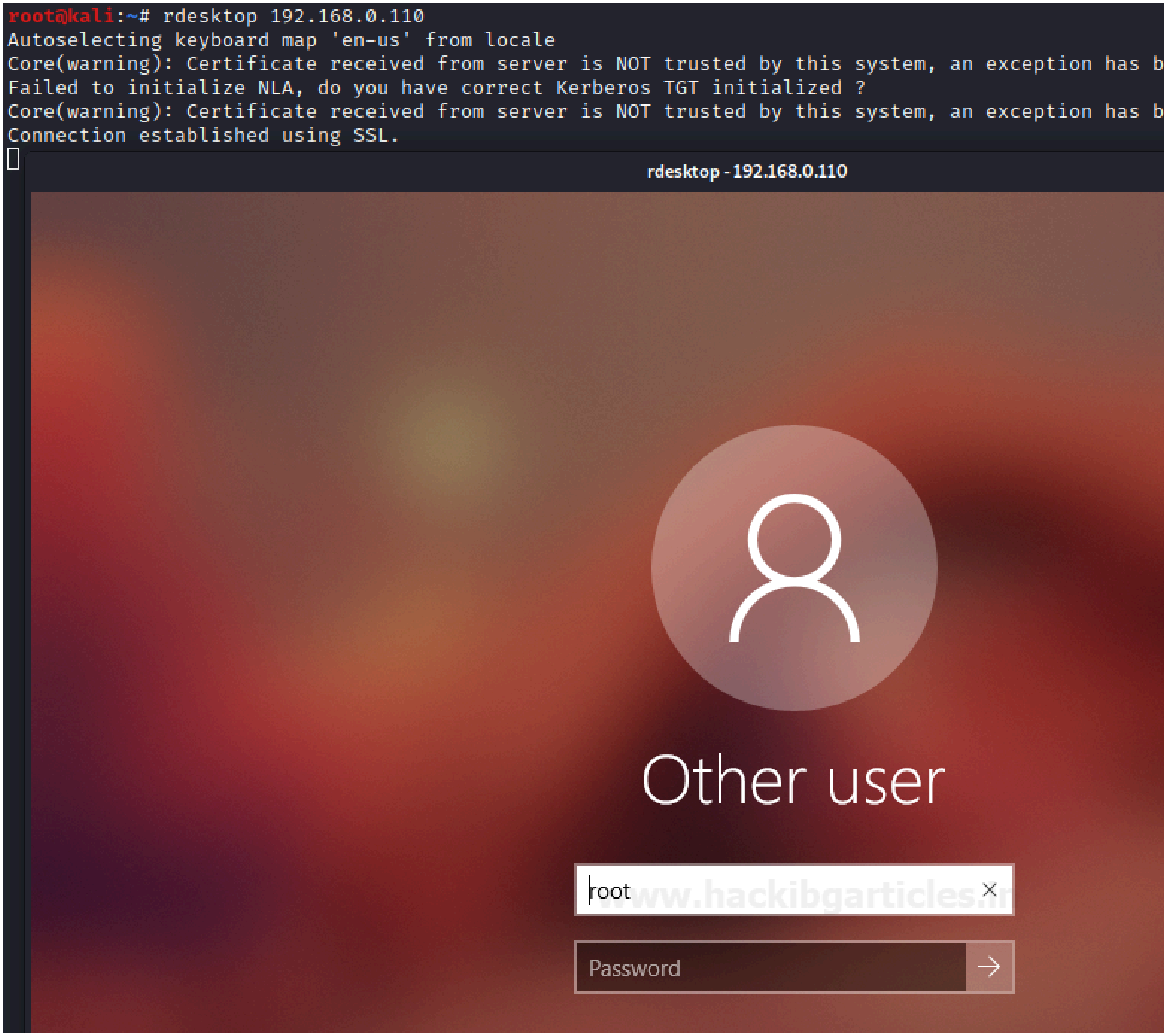
>	8/29/20
	1:04:20.000 PM
		08/30/2020 01:34:20.939 +0530
		collection="Network Interface"
		object="Network Interface"
		counter="Bytes Sent/sec"
		instance="Intel[R] Ethernet Connection [5] I219-LM"
		Show all 6 lines
		host = DESKTOP-A0AP0OM source = Perfmon:Network Interface
		sourcetype = Perfmon:Network Interface

>	8/29/20
	1:04:20.000 PM
		08/30/2020 01:34:20.939 +0530
		collection="Network Interface"
		object="Network Interface"
		counter="Bytes Received/sec"

Windows Log Monitoring

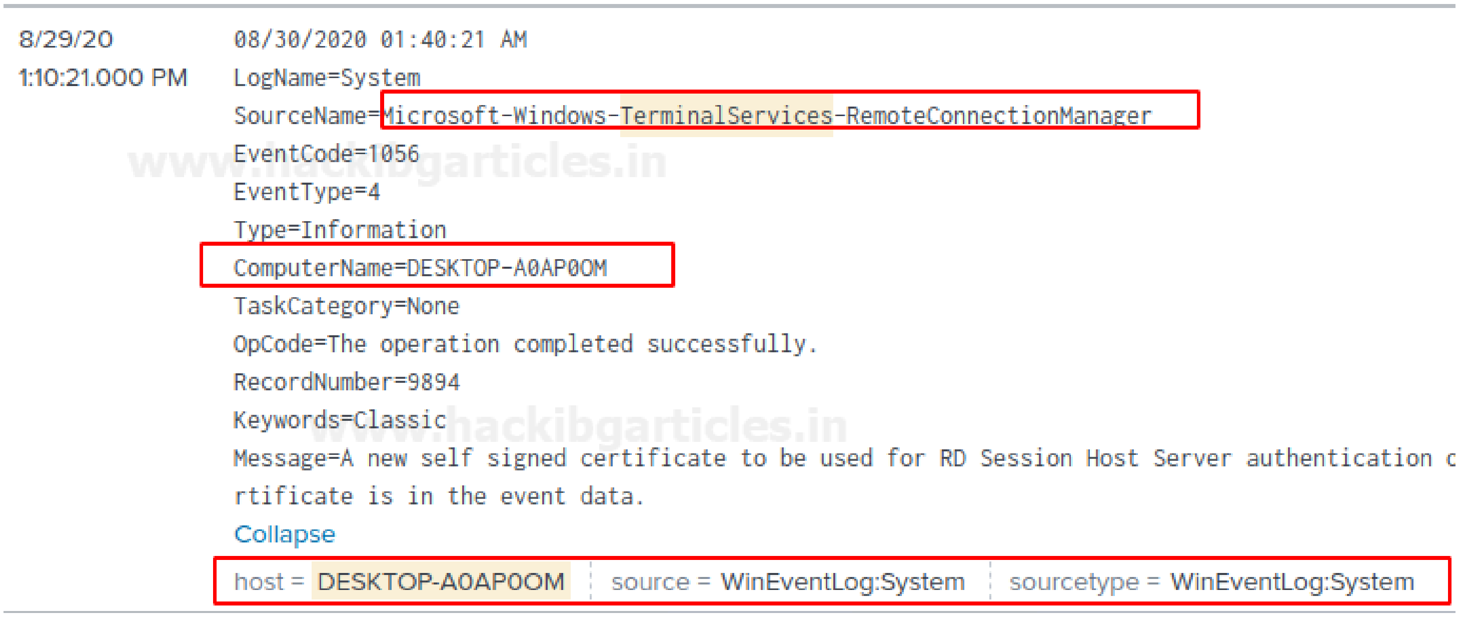
Let’s check it shows or not suspicious activity happened on our client end

To do this I m going take RDP session of my client



```
root@kali:~# rdesktop 192.168.0.110
Autoselecting keyboard map 'en-us' from locale
Core(warning): Certificate received from server is NOT trusted by this system, an exception has b
Failed to initialize NLA, do you have correct Kerberos TGT initialized ?
Core(warning): Certificate received from server is NOT trusted by this system, an exception has b
Connection established using SSL.
```

Now I have an RDP session of my Client let’s check what happens on Splunk web



```
8/29/20              08/30/2020 01:40:21 AM
1:10:21.000 PM       LogName=System
                     SourceName=Microsoft-Windows-TerminalServices-RemoteConnectionManager
                     EventCode=1056
                     EventType=4
                     Type=Information
                     ComputerName=DESKTOP-A0AP0OM
                     TaskCategory=None
                     OpCode=The operation completed successfully.
                     RecordNumber=9894
                     Keywords=Classic
                     Message=A new self signed certificate to be used for RD Session Host Server authentication c
                     rtificate is in the event data.
                     Collapse
                     host = DESKTOP-A0AP0OM | source = WinEventLog:System | sourcetype = WinEventLog:System
```

Whoa! It works ?

Great!

Now you can Dig down deeper it with running search Queries.

Threat Monitoring

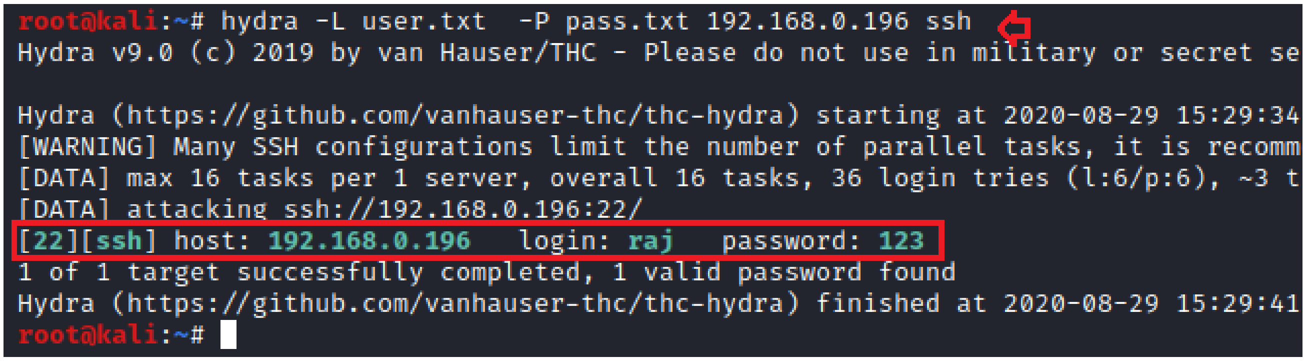
Let’s monitor what illegal or suspicious activity happens on your client end or server

To do this I m going to perform a brute-force attack with the help of an Attacker machine: Kali Linux

To perform this attack run the following command below.

```
hydra -L user.txt -P pass.txt 192.168.0.196 ssh
```

where 192.168.0.196 is my client-server IP

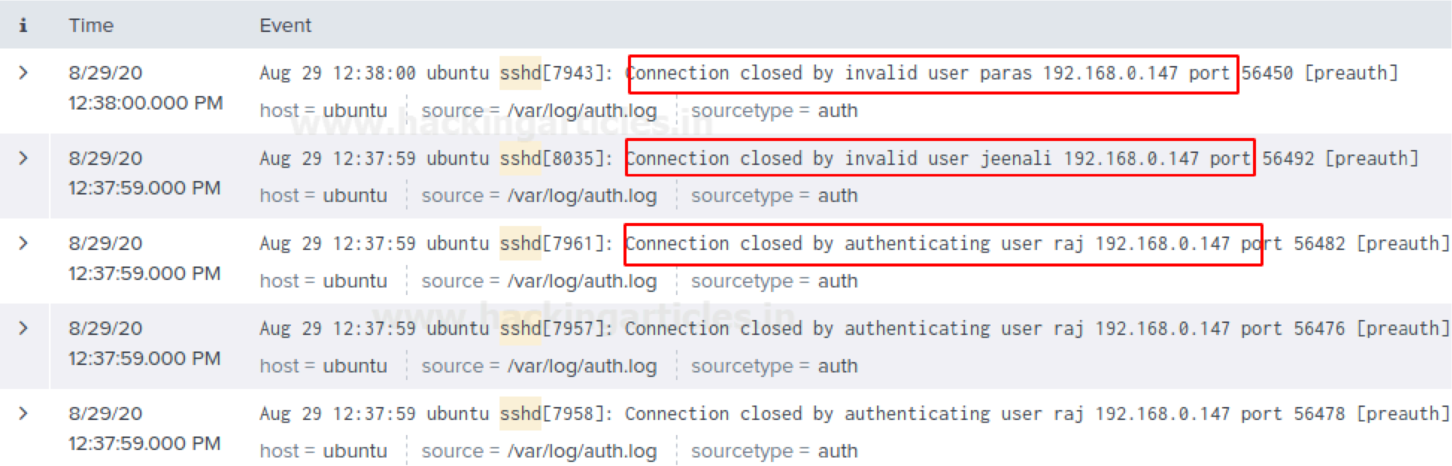


```
root@kali:~# hydra -L user.txt  -P pass.txt 192.168.0.196 ssh
Hydra v9.0 (c) 2019 by van Hauser/THC - Please do not use in military or secret se

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2020-08-29 15:29:34
[WARNING] Many SSH configurations limit the number of parallel tasks, it is recomm
[DATA] max 16 tasks per 1 server, overall 16 tasks, 36 login tries (l:6/p:6), ~3 t
[DATA] attacking ssh://192.168.0.196:22/
[22][ssh] host: 192.168.0.196   login: raj   password: 123
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2020-08-29 15:29:41
root@kali:~# 
```

Let’s check what happens to Splunk web

hold tight! It’s gonna a little bit special

Run a Query in the Application search and Reporting “sshd: session” and then see



i	Time	Event
>	8/29/20 12:38:00.000 PM	Aug 29 12:38:00 ubuntu sshd[7943]: Connection closed by invalid user paras 192.168.0.147 port 56450 [preauth] host = ubuntu source = /var/log/auth.log sourcetype = auth
>	8/29/20 12:37:59.000 PM	Aug 29 12:37:59 ubuntu sshd[8035]: Connection closed by invalid user jeenali 192.168.0.147 port 56492 [preauth] host = ubuntu source = /var/log/auth.log sourcetype = auth
>	8/29/20 12:37:59.000 PM	Aug 29 12:37:59 ubuntu sshd[7961]: Connection closed by authenticating user raj 192.168.0.147 port 56482 [preauth] host = ubuntu source = /var/log/auth.log sourcetype = auth
>	8/29/20 12:37:59.000 PM	Aug 29 12:37:59 ubuntu sshd[7957]: Connection closed by authenticating user raj 192.168.0.147 port 56476 [preauth] host = ubuntu source = /var/log/auth.log sourcetype = auth
>	8/29/20 12:37:59.000 PM	Aug 29 12:37:59 ubuntu sshd[7958]: Connection closed by authenticating user raj 192.168.0.147 port 56478 [preauth] host = ubuntu source = /var/log/auth.log sourcetype = auth

Owsm! AS we can see it have multiple invalid logins Attempts of invalid user

Now you can monitor your whole Environment by using these steps.

Let’s end here.