Zero to Zeek

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> quser

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Previously…

HOST
FORENSICS
NETWORK
MALWARE ANALYST
(H|N)IDS
INCIDENT RESPONDER
THREAT HUNTER
INTELLIGENCE
SOC MANAGER
SECURITY
ENGINEER

Education/Certifications

- BS Computer Engineering & Computer Science (CNU)
- GSE, GRID, GNFA, GCFA, GCIH, GCIA, GREM, GAWN, GSEC (GOLD), CISSP

Why NSM?

- Essential for identifying and measuring risk in a computer network
- Provides a "high-ground" advantage for Defensive Operators
- Complementary to observed endpoint activity
- Provides coverage where endpoint telemetry is lacking
- **Opportunity to detect threat actor <u>before</u> endpoint compromise**
  - **Learn from missed ~~activity~~** *opportunities*
  - **Push further up the TA Kill Chain**

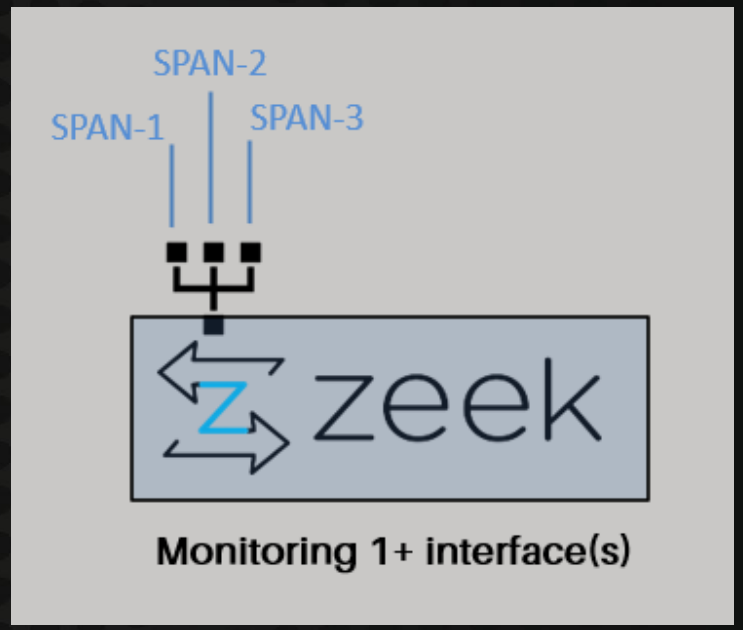
What is Zeek?

- About Zeek IDS
  - Developed by Vern Paxson
  - 30+ years old
  - IDS but more…
- Meta-data all the net
- Built on frameworks
- Rule logic constructe

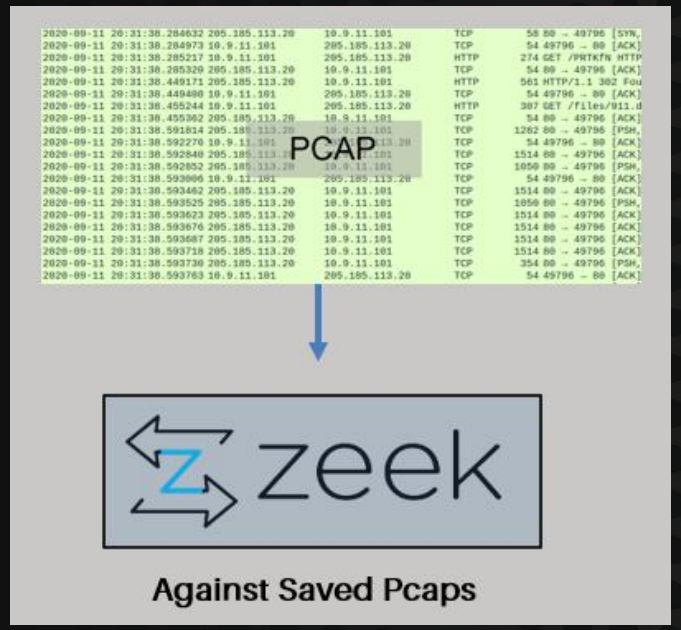
> *"Bro is not strictly an intrusion detection system that generates alerts, like Snort. Rather, Bro generates a range of NSM data, including session data, transaction data, extracted content data, statistical data, and even alerts -- if you want them."*
>
> - Richard Bejtlich, TaoSecurity

Modes of Operation

Continuous Monitoring



Processing PCAPs



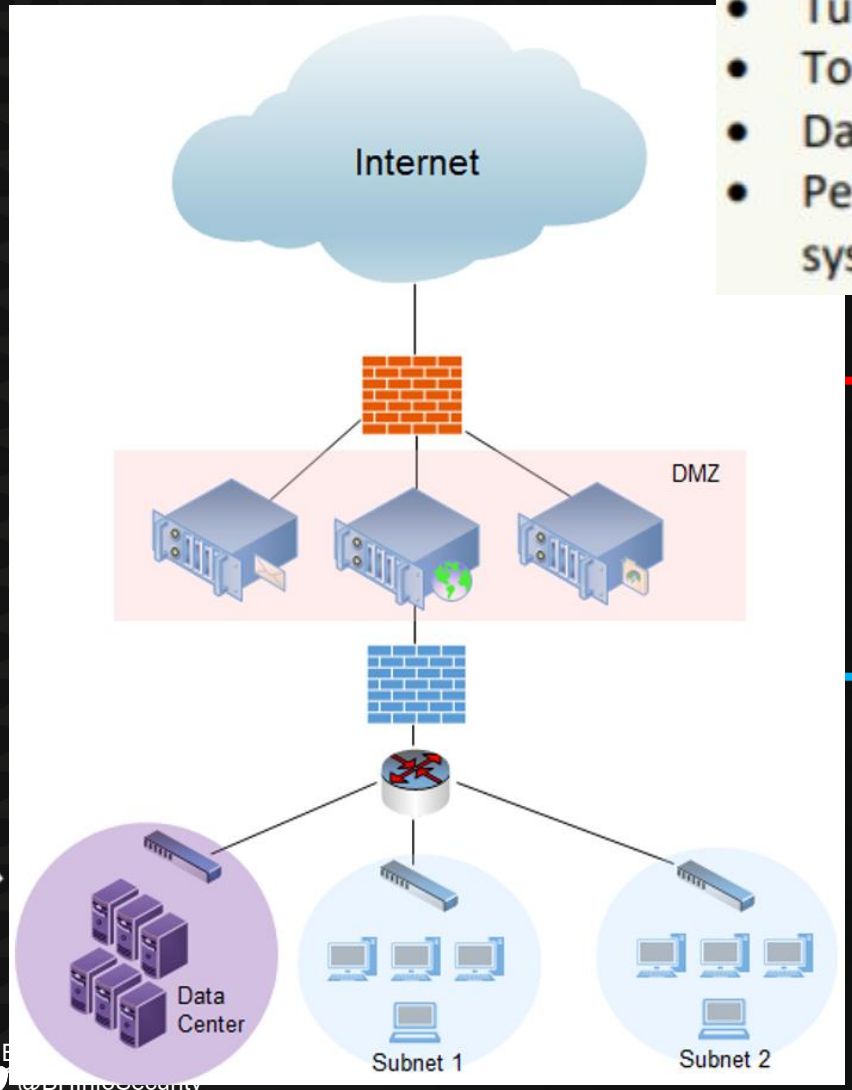
Step 0

Prep Time: ¯_(ツ)_/¯

Install Time: $\frac{1}{¯\_(ツ)_/¯}$

NSM Placement

- Perimeter Device Compromise
- C2
- Tunneling
- Tool/Malware Ingress
- Data Exfiltration
- Perimeter Scanning for exposed systems and services



Public IPs (NAT)

- Beacons
- C2
- Tunneling
- Tool/Malware Ingress
- Data Exfiltration
- Rogue Systems

Private IP Space

Step 0

- Acquire Hardware*
- Install OS
- Identify Monitoring Ports (Network Interfaces)
  - Helpful commands
- Span/Tap Traffic (Placement)

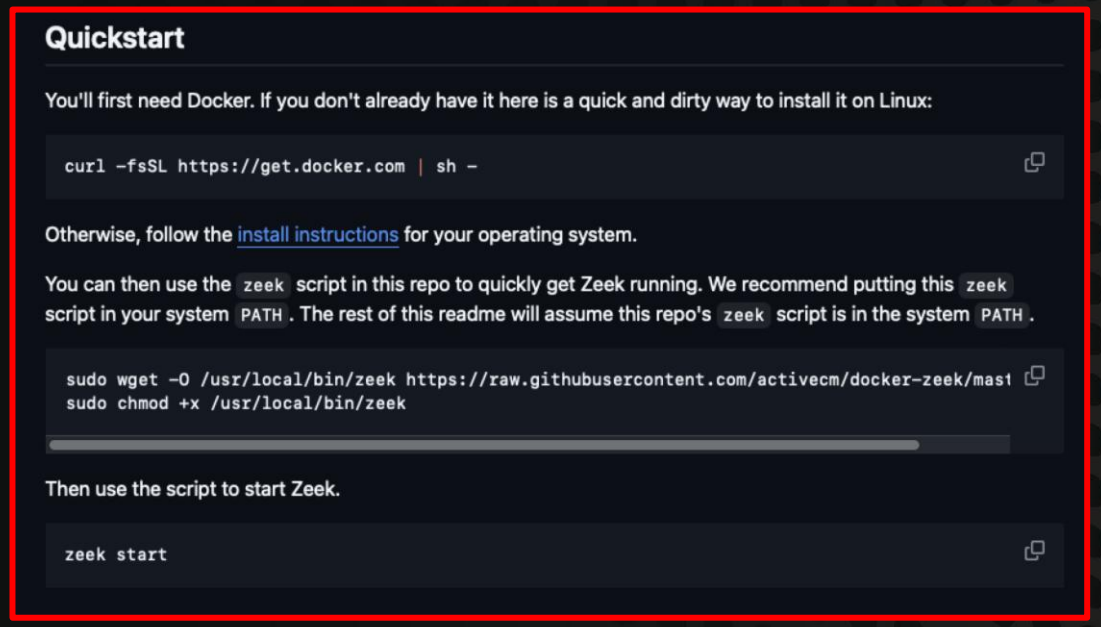
```
# ip a
# ip -h -s link show [int_name]
# ethtool –S [int_name]
```

Step 1

Step 1

Decide the path you want to take:

1. Docker
   - https://github.com/activecm/docker-zeek
2. Source Code | Linux Binaries
   - https://zeek.org/get-zeek/



Step 1.a

ACTIVE COUNTERMEASURES

https://github.com/activecm/docker-zeek

```
$ curl -fsSL https://get.docker.com | sh -

$ sudo wget -O /usr/local/bin/zeek
https://raw.githubusercontent.com/activecm/docker-
zeek/master/zeek

$ sudo chmod +x /usr/local/bin/zeek

$ zeek start
```

Quickstart

You'll first need Docker. If you don't already have it here is a quick and dirty way to install it on Linux:

```
curl -fsSL https://get.docker.com | sh -
```

Otherwise, follow the install instructions for your operating system.

You can then use the `zeek` script in this repo to quickly get Zeek running. We recommend putting this `zeek` script in your system `PATH`. The rest of this readme will assume this repo's `zeek` script is in the system `PATH`.

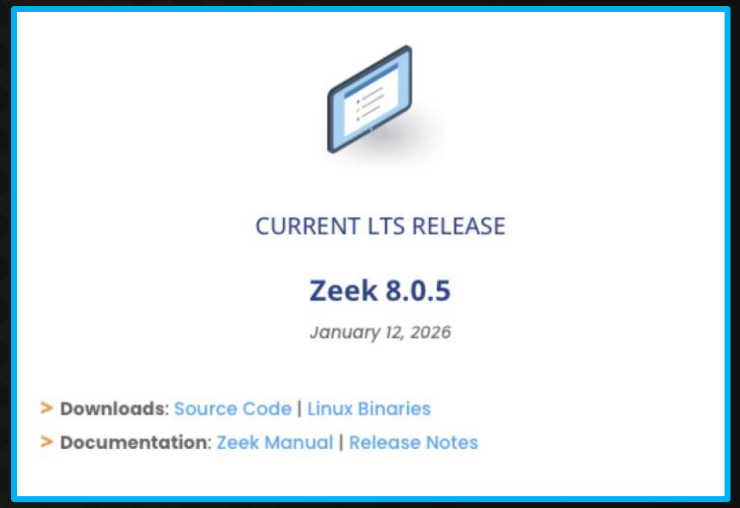
```
sudo wget -O /usr/local/bin/zeek https://raw.githubusercontent.com/activecm/docker-zeek/mas
sudo chmod +x /usr/local/bin/zeek
```

Then use the script to start Zeek.

```
zeek start
```

BLACK HILLS Information Security 2008

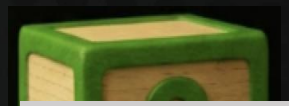
Step 1.b



https://github.com/zeek/zeek/wiki/Binary-Packages

- Debian
- Fedora
- OpenSUSE
- Raspbian
- Ubuntu

Step 2



```
$ curl -fsSL https://get.docker.com | sh -

$ sudo wget -O /usr/local/bin/zeek
https://raw.githubusercontent.com/activecm/docker-
zeek/master/zeek

$ sudo chmod +x /usr/local/bin/zeek

$ zeek start
```

Quickstart

You'll first need Docker. If you don't already have it here is a quick and dirty way to install it on Linux:

```
curl -fsSL https://get.docker.com | sh -
```

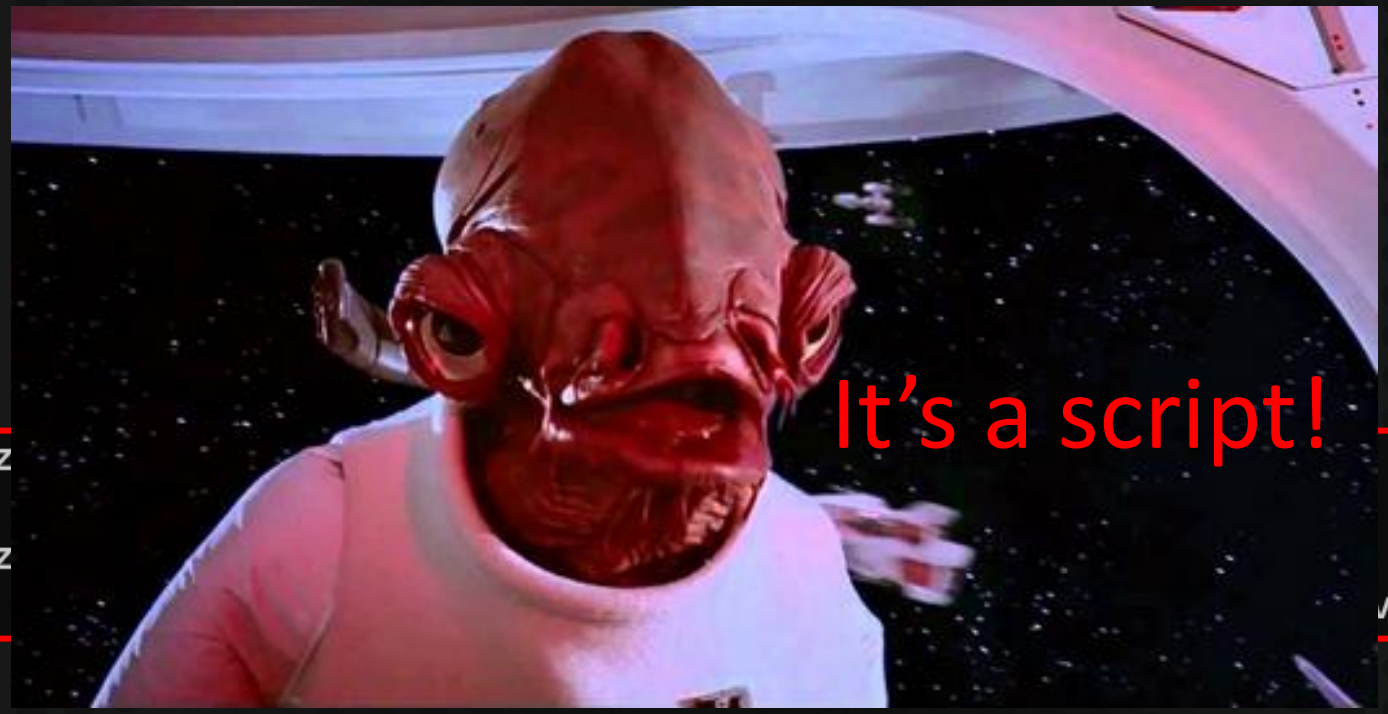
. We recommend putting this `zeek`
's `zeek` script is in the system `PATH`.

```
t.com/activecm/docker-zeek/mast
```

Step ~~3~~ Zeek (install)

```
zuser@zuser-NUC11TNHi7:~$ zeek start
Could not find /opt/zeek/etc/node.cfg. Generating one now.
? Choose your capture interface(s):  [Use arrows to move, space to select, type to filter,
? for more help]
> [ ]  docker0                UP       172.17.0.1
  [x]  enp88s0                UP                -
  [ ]  enp89s0                UP    192.168.0.111  fe80::4a21:bff:fe5f:df4b
  [ ]  lo                     UP        127.0.0.1  ::1
```

Reviewing the Script




```
root@localhost:/opt/z
/usr/local/bin/zeek
root@localhost:/opt/z
/usr/local/bin/zeek:
                                                    very long lines (534)
```

Reviewing the Script

```
35  HOST_ZEEK=${zeek_top_dir:-/opt/zeek}
36  IMAGE_NAME="activecm/zeek:${zeek_release:-latest}"
37
38  # initilizes Zeek directories and config files on the host
39  init_zeek_cfg() {
40      # create a temporary container to run commands
41      local container="zeek-init-$RANDOM"
42      $SUDO docker run \
43          --ulimit nofile=1048576:1048576 \
44          --detach \
45          --name $container \
46          -v "$HOST_ZEEK":"/zeek" \
47          --network host \
48          "$IMAGE_NAME" \
49          sh -c 'while sleep 1; do :; done' >/dev/null 2>&1
50      # ensure the temporary container is removed
51      trap "$SUDO docker rm --force $container >/dev/null 2>&1" EXIT
52
53      # run commands using $SUDO docker to avoid unnecessary sudo calls
54      # create directories required for running Zeek
55      $SUDO docker exec $container mkdir -p \
56          "/zeek/manual-logs" \
57          "/zeek/logs" \
58          "/zeek/spool" \
59          "/zeek/etc" \
60          "/zeek/share/zeek/site/autoload" 2>/dev/null \
61          || true # suppress error code if symlink exists
```

Customizing…


```
root@localhost:/opt/zeek/share/zeek/site/autoload# ls -1
001-unload-scripts.zeek
100-default.zeek
200-inactivity_timeout.zeek
900-zkg.zeek
```

Customizing…moar

Install a Plugin

You can install Zeek packages from https://packages.zeek.org/ using the Zeek Package Manager, `zkg`. For example, to install the `hassh` plugin:

```
# Run `zeek start` if you haven't already
docker exec -it zeek zkg install hassh
# Restart Zeek to activate plugin
zeek restart
```

Note: Currently only plugins that don't require compiling can be installed.

```
root@localhost:/opt/zeek/spool/manager# docker volume ls
DRIVER    VOLUME NAME
local     zeek-zkg-plugin
local     zeek-zkg-script
local     zeek-zkg-state
```

Customizing…moarrr

```
@load policy/tuning/json-logs.zeek
```

```
event zeek_init() {
  Log::disable_stream(Syslog::LOG);
}
```

Cleanup

```
$ sudo curl -o /usr/local/bin/zeek_log_clean.sh \
  https://raw.githubusercontent.com/activecm/zeek-log-
clean/main/zeek_log_clean.sh

$ sudo chmod +x /usr/local/bin/zeek_log_clean.sh

$ echo "* * * * * root flock -n /tmp/zeek-log-clean
/usr/local/bin/zeek_log_clean.sh" \
  | sudo tee /etc/cron.d/zeek-log-clean
```

Docker-Zeek Recap

- **/usr/local/bin/zeek** – Docker-Zeek handler script (just type **zeek** as a shortcut)
  - **zeek restart** – Restarts the docker container
- **/opt/zeek/** – Zeek's top level directory
- **/opt/zeek/etc/** - Zeek sensor configuration
  - /opt/zeek/etc/node.cfg contains the entry for which interface Zeek will attach its network processing from (interface=af_packet::eth1)
- **/opt/zeek/logs/** - Contains Zeek's archived logs, where logs older than one hour are rotated to.
  - For example: /opt/zeek/logs/2025-10-31/ will contain all the logs for October 31, 2025.
- **/opt/zeek/spool/manager/** - Contains the current hour logs (log roll to /opt/zeek/logs/ at the top of each hour)
- **/opt/zeek/share/zeek/site/autoload/** - Contains additional Zeek configurations that support persistent customizations (i.e., will reapply when the container restarts).
  - For example, this is where we configured the logs to be in JSON format and disabled syslog.log logging by zeek

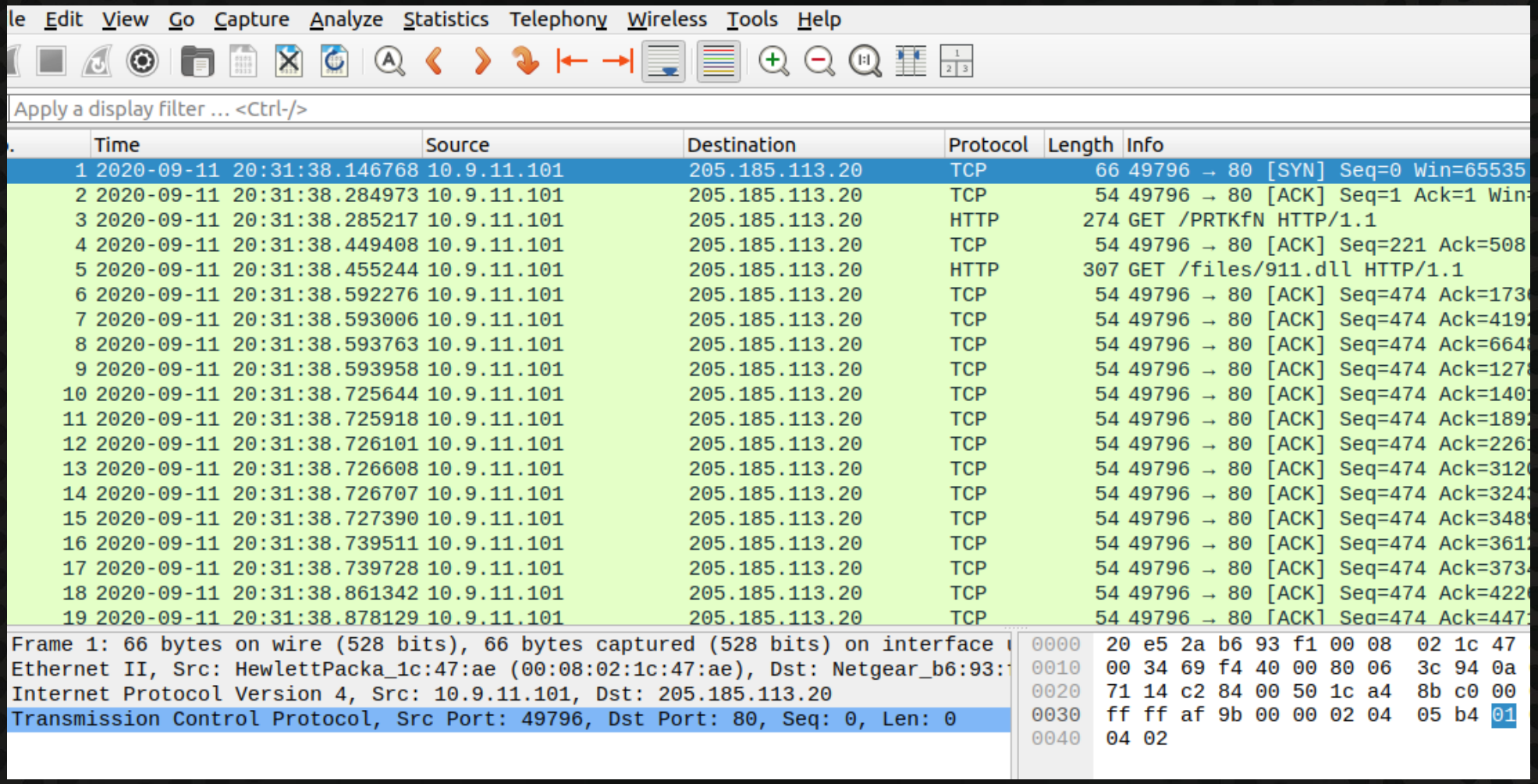
Docker-Zeek Recap

- **/usr/local/bin/zeek_log_clean.sh** – Runs every 60s to ensure no more than 90% disk utilization

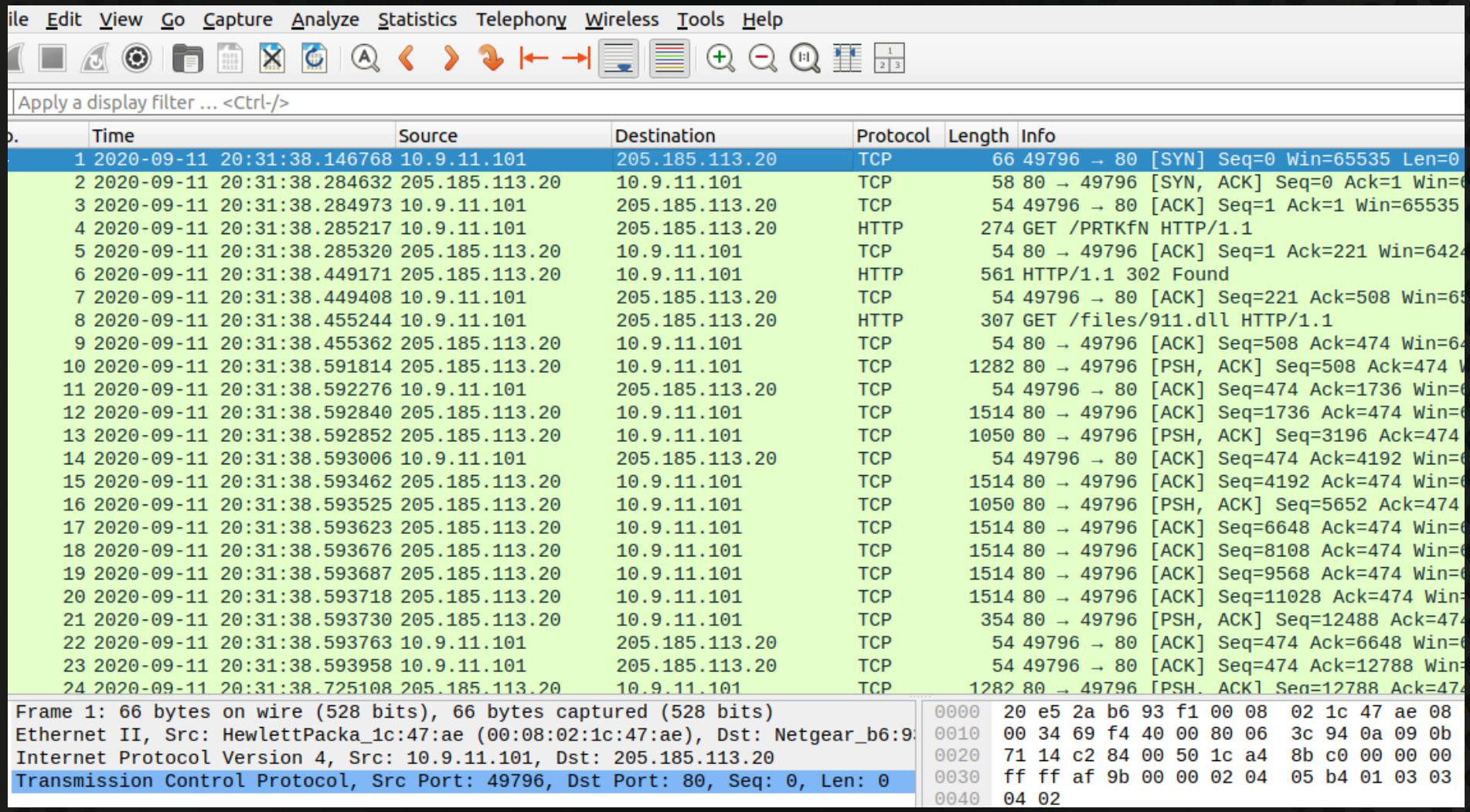
- **# docker exec –it zeek /bin/bash** – Enter docker-zeek container in an interactive bash shell

- **# zeek restart** – Restart docker-zeek container
- **# zeek start** – Start docker-zeek container
- **# zeek stop** – Stop dockre-zeek container
- **# zeek update** – Update to the latest docker-zeek container instance

Story Time



Story Time



!(src/dst) IP

!(Source/Destination) - instead: Originator/Responder

		id.orig_h		id.resp_h				
1599856316.795735	C4hwc83kYBVlkBkbul	10.9.11.101	55080	10.9.11.1	53	udp	dns	0.329710
1599856316.864111	CGje492TWZQlwJIaQk	10.9.11.101	56241	10.9.11.1	53	udp	dns	0.152311
1599856321.780000	CYRrsD3lSZ1fAansVb	10.9.11.101	49810	52.114.128.69	443	tcp	ssl	0.602856
1599856317.457680	CeRAwk3sI8BlbXZQJ7	10.9.11.101	52454	10.9.11.1	53	udp	dns	0.094578
1599856318.919963	CnQvb02n4DqFRuS8Ie	10.9.11.101	49809	65.52.108.90	443	tcp	ssl	4.079217
1599856318.446434	CLzOR43VB8DKCoDcx4	10.9.11.101	56743	10.9.11.1	53	udp	dns	0.059654
1599856318.850775	CkMGwq2stJPrYaf4O1	10.9.11.101	55832	10.9.11.1	53	udp	dns	0.067695
1599856324.270197	Crybsd31Hc2CkZNBph	10.9.11.101	49811	52.114.128.69	443	tcp	ssl	1.003278
1599856317.033366	CVxxoUMaa34zATyA1	10.9.11.101	49802	23.219.226.88	443	tcp	ssl	10.014538
1599856317.033425	CdoZ3J1d05T3Epfl4d	10.9.11.101	49801	23.219.226.88	443	tcp	ssl	10.014605
1599856326.615444	CNkyNJdxym9OO6jd3	10.9.11.101	49812	52.114.128.69	443	tcp	ssl	0.645213
1599856324.135401	CaJce23eCmrRd5FHq1	10.9.11.101	59241	10.9.11.1	53	udp	dns	0.132686
1599856347.864813	CJaGJ03bJIhqGWIrNg	10.9.11.101	49813	52.109.4.5	443	tcp	ssl	0.774984
1599856347.668890	CRq74L2liayk0ad0gd	10.9.11.101	52325	10.9.11.1	53	udp	dns	0.195472
1599856366.144543	CqgYkUEvNeaSM07mj	10.9.11.101	62705	10.9.11.1	53	udp	dns	3.015339
1599856371.706935	CkV00egcpHJMHLCOh	10.9.11.101	63404	10.9.11.1	53	udp	dns	0.119682
1599856373.024140	CTywoc3eJSR1Ba8alf	10.9.11.101	54510	10.9.11.1	53	udp	dns	0.075406
1599856373.548449	CZUpta2tmB4gt02q3e	10.9.11.101	60917	10.9.11.1	53	udp	dns	0.067894
1599856324.713508	C3SYmFzwuEr6zNl18	10.9.11.101	138	10.9.11.255	138	udp	-	- -
1599856383.607662	CjrmZjyaFKiWQDXF3	10.9.11.101	49820	31.184.253.244	80	tcp	http	0.523879
1599856384.139041	CSZ0mUG7iYY7AMQgi	10.9.11.101	49821	31.184.253.244	80	tcp	http	1.566584
1599856386.025612	CPLDdKHWgij9LhKf3	10.9.11.101	49826	31.184.253.244	80	tcp	http	1.009726

Resources

- https://zeek.org/
- https://github.com/activecm/docker-zeek
- https://github.com/activecm/zeek-log-clean
- https://corelight.com/hubfs/resources/zeek-cheatsheets/corelight-cheatsheet-poster.pdf
- https://www.blackhillsinfosec.com/introduction-to-zeek-log-analysis-wrap/
  https://www.youtube.com/watch?v=a2Cp6VYQuvU

Upcoming Training!

Foundations of Network Forensics and Analysis (4h – PFWYC)

- Workshop: January 30, 2026 (Remote)

https://www.antisyphontraining.com/product/workshop-foundations-of-network-forensics-and-analysis-with-troy-wojewoda/

Network Forensics & Incident Response (2Day Course)

- WWHF @Mile High: February 10 & 11 2026 (Denver, CO/Remote)

https://wildwesthackinfest.com/wild-west-hackin-fest-mile-high-2026-pre-con/

- SOC Summit: March 30 & 31 (Remote)

https://www.antisyphontraining.com/product/network-forensics-and-incident-response-with-troy-wojewoda/

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