

Experiment–07

7.1 Aim:

Vulnerability Scanning with OpenVAS/Nessus Essentials: Use an automated scanner to identify potential vulnerabilities on target systems to enhance system security and patch management.

7.2 Course Outcome:

Apply vulnerability scanning techniques using automated tools to detect system weaknesses, assess potential risks, and recommend appropriate mitigations.

7.3 Lab Objective:

To scan a target system using OpenVAS or Nessus Essentials and analyze the discovered vulnerabilities for severity, type, and remediation strategies.

7.4 Requirements:

Operating System: Linux (Kali Linux, Ubuntu) / Windows / macOS

Tools:

- OpenVAS (Greenbone Vulnerability Management) or Nessus Essentials (Tenable)
- Web browser interface for managing scans
- Target system (could be localhost or a test VM)
- Internet connection for vulnerability database updates

7.5 Theory:

Vulnerability scanning is an automated process that detects known weaknesses in systems, applications, and configurations. It is a critical component of a cybersecurity defense strategy, helping organizations proactively fix exploitable flaws before attackers can leverage them.

OpenVAS (now part of Greenbone) and **Nessus Essentials** are two widely used vulnerability scanners that offer detailed insights, including:

- CVE (Common Vulnerabilities and Exposures) identification
- CVSS (Common Vulnerability Scoring System) severity ratings
- Affected ports/services
- Suggested patches or mitigations

Vulnerability scanners perform tasks such as:

- Host discovery
- Port scanning
- Service enumeration
- Vulnerability database matching
- Report generation

7.6 Tasks:

1. Install and configure OpenVAS or Nessus Essentials on your machine or VM.
2. Update the vulnerability database (important for accurate detection).
3. Define the target system IP (e.g., localhost, internal server, or test VM).
4. Initiate a **Full System Scan** or **Basic Network Scan**.
5. Monitor the progress and wait for the scan to complete.
6. After scanning, open the report and review:
 - Vulnerability names and severity (Low/Medium/High/Critical)
 - CVE IDs and references
 - Description and risk level
 - Affected services and ports
 - Suggested remediation steps
7. Export or save the vulnerability report in PDF or HTML format.
8. Optionally, rescan after patching to verify if vulnerabilities were mitigated.

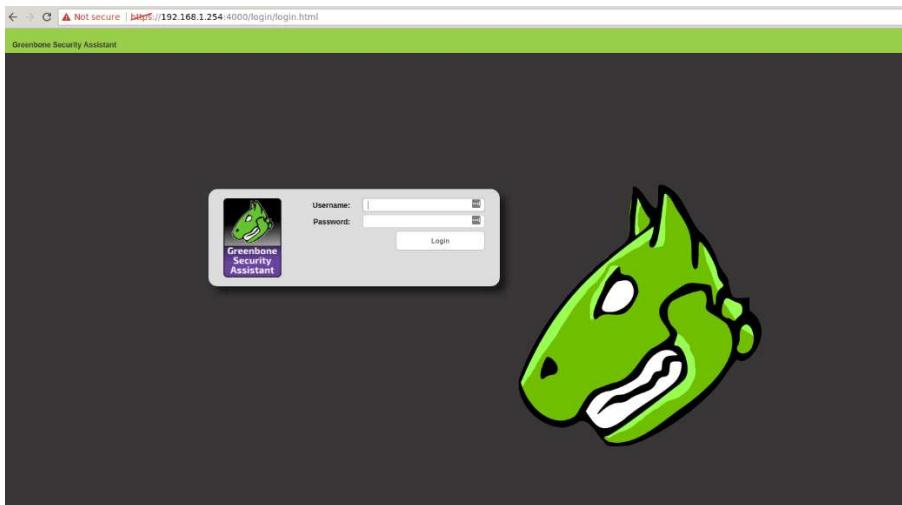
7.7 Output Screenshots:

- OpenVAS/Nessus dashboard
- Scan configuration setup
- Scan results summary (severity breakdown)
- Detailed view of a critical vulnerability
- Exported report snippet
- Before and after scan comparison (optional)

```
(hassen@hannachi)-[~]
$ sudo apt-get update
Get:1 http://kali.download/kali kali-rolling InRelease [41.5 kB]
Get:2 http://kali.download/kali kali-rolling/main amd64 Packages [19.9 MB]
Get:3 http://kali.download/kali kali-rolling/main amd64 Contents (deb) [47.3 MB]
Get:4 http://kali.download/kali kali-rolling/contrib amd64 Packages [121 kB]
Get:5 http://kali.download/kali kali-rolling/contrib amd64 Contents (deb) [261 kB]
Get:6 http://kali.download/kali kali-rolling/non-free amd64 Packages [194 kB]
Get:7 http://kali.download/kali kali-rolling/non-free amd64 Contents (deb) [885 kB]
Get:8 http://kali.download/kali kali-rolling/non-free-firmware amd64 Packages [33.0 kB]
Get:9 http://kali.download/kali kali-rolling/non-free-firmware amd64 Contents (deb) [16.8 kB]
Fetched 68.8 MB in 33s (2,115 kB/s)
Reading package lists... Done
```

```
(hassen@hannachi)-[~]
$ sudo apt upgrade
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  libboost-dev libboost1.83-dev libopenblas-dev libopenblas-pthread-dev libopenblas0 libpython3-all-dev
  libpython3.12 libpython3.12-dev libxsimd-dev python3-all-dev python3-beniget python3-gast
  python3-pythran python3.12-dev xtl-dev
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  libgck-2-2 libgcr-4-4 libjq1 libonig5 python3-pyasyncore
The following packages will be upgraded:
  adwaita-icon-theme autopsy bind9-dnsutils bind9-host bind9-libs binutils binutils-common
  binutils-x86-64-linux-gnu binwalk colord colord-data console-setup console-setup-linux debconf
  debconf-i18n dnsmasq-base exploitdb firefox-esr firmware-linux-free fontconfig fontconfig-config
  fonts-lyx gdal-data gdal-plugins geoip-database gir1.2-gstreamer-1.0 gir1.2-nm-1.0 gir1.2-vte-2.91
  glib-networking glib-networking-common glib-networking-services go-l2tp gsettings-desktop-schemas
  gstreamer1.0-gl gstreamer1.0-libav gstreamer1.0-plugins-bad gstreamer1.0-plugins-base
  gstreamer1.0-plugins-good gstreamer1.0-x gvfs gvfs-backends gvfs-common gvfs-daemons gvfs-fuse
  gvfs-libs iputils-ping isc-dhcp-client isc-dhcp-common iso-codes keyboard-configuration kmod
  libadwaita-1-0 libappstream5 libatkmm-1.6-1v5 libaudio2 libavif16 libbinutils libboost-dev
  libbison-1.0-0 libc-ares2 libcapstone-dev libcapstone4 libcolor2 libcolorhug2 libcompress-raw-lzma-perl
  libctf-nobfd0 libctf0 libdavid7 libdaxctl1 libeac3 libencode-perl libfontconfig1 libgdal34
  libgdata-common libgdata22 libgprofng0 libgstreamer-gli1.0-0 libgstreamer-plugins-bad1.0-0
  libgstreamer-plugins-base1.0-0 libgstreamer1.0-0 libgtk-layer-shell0 libgtop-2.0-11 libgtop2-common
  libhogweed6 libkmod2 libldb2 liblua5.4-0 libmanette-0.2-0 libmd4c0 libmpeg2fr libmpfr6 libmplex2-2.1-0 libmtdev1 libmujs3 libndctl6
  libnet-dns-perl libnetcdf19 libnettle8 libnhttp3-3 libnm0 libnpth0 libnspr4 libnss3 libnvme1
  libnvmf1 libnvmf2 libnvmf3 libnvmf4 libnvmf5 libnvmf6 libnvmf7 libnvmf8 libnvmf9 libnvmf10 libnvmf11 libnvmf12 libnvmf13 libnvmf14 libnvmf15 libnvmf16 libnvmf17 libnvmf18 libnvmf19 libnvmf20 libnvmf21 libnvmf22 libnvmf23 libnvmf24 libnvmf25 libnvmf26 libnvmf27 libnvmf28 libnvmf29 libnvmf30 libnvmf31 libnvmf32 libnvmf33 libnvmf34 libnvmf35 libnvmf36 libnvmf37 libnvmf38 libnvmf39 libnvmf40 libnvmf41 libnvmf42 libnvmf43 libnvmf44 libnvmf45 libnvmf46 libnvmf47 libnvmf48 libnvmf49 libnvmf50 libnvmf51 libnvmf52 libnvmf53 libnvmf54 libnvmf55 libnvmf56 libnvmf57 libnvmf58 libnvmf59 libnvmf60 libnvmf61 libnvmf62 libnvmf63 libnvmf64 libnvmf65 libnvmf66 libnvmf67 libnvmf68 libnvmf69 libnvmf70 libnvmf71 libnvmf72 libnvmf73 libnvmf74 libnvmf75 libnvmf76 libnvmf77 libnvmf78 libnvmf79 libnvmf80 libnvmf81 libnvmf82 libnvmf83 libnvmf84 libnvmf85 libnvmf86 libnvmf87 libnvmf88 libnvmf89 libnvmf90 libnvmf91 libnvmf92 libnvmf93 libnvmf94 libnvmf95 libnvmf96 libnvmf97 libnvmf98 libnvmf99 libnvmf100 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libnvmf918 libnvmf919 libnvmf920 libnvmf921 libnvmf922 libnvmf923 libnvmf924 libnvmf925 libnvmf926 libnvmf927 libnvmf928 libnvmf929 libnvmf930 libnvmf931 libnvmf932 libnvmf933 libnvmf934 libnvmf935 libnvmf936 libnvmf937 libnvmf938 libnvmf939 libnvmf940 libnvmf941 libnvmf942 libnvmf943 libnvmf944 libnvmf945 libnvmf946 libnvmf947 libnvmf948 libnvmf949 libnvmf950 libnvmf951 libnvmf952 libnvmf953 libnvmf954 libnvmf955 libnvmf956 libnvmf957 libnvmf958 libnvmf959 libnvmf960 libnvmf961 libnvmf962 libnvmf963 libnvmf964 libnvmf965 libnvmf966 libnvmf967 libnvmf968 libnvmf969 libnvmf970 libnvmf971 libnvmf972 libnvmf973 libnvmf974 libnvmf975 libnvmf976 libnvmf977 libnvmf978 libnvmf979 libnvmf980 libnvmf981 libnvmf982 libnvmf983 libnvmf984 libnvmf985 libnvmf986 libnvmf987 libnvmf988 libnvmf989 libnvmf989 libnvmf990 libnvmf991 libnvmf992 libnvmf993 libnvmf994 libnvmf995 libnvmf996 libnvmf997 libnvmf998 libnvmf999 libnvmf1000 libnvmf1001 libnvmf1002 libnvmf1003 libnvmf1004 libnvmf1005 libnvmf1006 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libnvmf1415 libnvmf1416 libnvmf1417 lib
```

```
(hassen@hannachi)~]$ sudo apt install openvas
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Note, selecting 'gvm' instead of 'openvas'
The following packages were automatically installed and are no longer required:
  libboost-dev libboost1.83-dev libopenblas-dev libopenblas-pthread-dev libopenblas0 libpython3-all-dev
  libpython3.12 libpython3.12-dev libxsimd-dev python3-all-dev python3-beniget python3-gast
  python3-pytran python3.12-dev xtl-dev
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  greenbone-security-assistant gsad gvm-tools libmicrohttpd12
The following NEW packages will be installed:
  greenbone-security-assistant gsad gvm gvm-tools libmicrohttpd12
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 5,153 kB of archives.
After this operation, 20.9 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
```



Greenbone Security A... +

https://127.0.0.1:9392/omp?r=1&i 80% | Search

No auto-refresh | Logged in as Admin admin | Logout Fri Apr 13 12:36:49 2018 UTC

Dashboard Scans Assets SecInfo Configuration Extras Administration Help

Dashboard

Tasks by Severity Class (Total: 0)

Tasks by status (Total: 0)

CVEs by creation time (Total: 104997)

Hosts topology

NVTs by Severity Class (Total: 51123)

No hosts with topology selected

CVEs / year

Total CVEs

Year	CVEs
1990	~1000
1995	~2000
2000	~5000
2005	~15000
2010	~40000
2015	~110000

High: 14889
Medium: 21378
Low: 3002
Log: 1919

New Task

Name: unnamed

Comment:

Scan Targets: Target for immediate scan of IP 127.0.0.1

Alerts:

Schedule: -- Once

Add results to Assets: yes

Apply Overrides: yes

Min QoD: 70 %

Alterable Task: no

Auto Delete Reports: Do not automatically delete reports

Scanner: OpenVAS Default

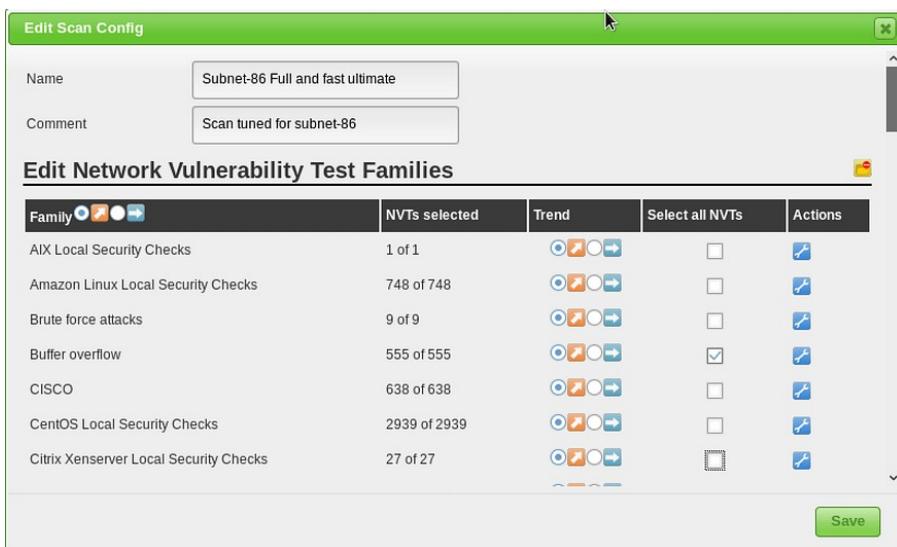
Scan Config: Full and fast

Network Source Interface:

Order for target hosts: Sequential

Maximum concurrently executed NVTs per host: 4

Maximum concurrently scanned hosts: 20



#	Vulnerability / CVE (example)	Severity	Affected Service / Port	Brief description	Suggested remediation
1	CVE-2021-3449 (OpenSSL)	Critical	HTTPS / 443	Remote code execution / TLS vulnerability	Update OpenSSL to patched version; apply vendor patch; restart service
2	CVE-2020-25712 (SSH)	High	SSH / 22	Weak SSH configuration / outdated SSH server	Upgrade SSH server; disable weak ciphers; enforce key-based auth
3	CVE-2019-(Apache)	High	HTTP / 80	Directory traversal / outdated module	Apply vendor patch; update Apache; review modules
4	Missing MS Patch KB	Medium	SMB / 445	Known privilege escalation	Apply Windows update KB

5	Outdated PHP library	Medium	HTTP (PHP-FPM)	Known vulnerabilities in library versions	Update PHP libraries / composer packages
6	Information disclosure	Low	FTP / 21	Banner reveals version info	Hide version banners; minimize exposed info
7	Weak TLS cipher supported	Low	HTTPS / 443	Use of TLS 1.0 / weak ciphers	Disable TLS1.0/1.1; enable TLS1.2+; update cipher suite

7.8 Conclusion:

In this experiment we used an automated vulnerability scanner (Nessus Essentials / OpenVAS) to identify and analyze security weaknesses on a target system. The scan produced a prioritized list of findings categorized by severity (Critical → Low) and provided CVE identifiers, affected services, and recommended remediation steps. The most significant finding was a critical OpenSSL-related vulnerability that could allow remote compromise; immediate patching of the affected library was recommended and verified via a rescan.