TrustedSec

INFORMATION SECURITY +
ADVISORY SERVICES CONSULTING

Unix: The Other White Meat

#> whoami

Adam Compton

- Who Am I?

- Simple Answer:
  - Father/Husband/Son/Brother
  - Programmer/Pentester/Researcher
  - Hillbilly

#> whoami

David Boyd

- Pen Tester/Red Teamer
- Christian
- Husband
- Father
- US Army
- Geek, Gamer

#> cat agenda.txt

- **DO**:
  - Talk about Unix
  - Show Common Exploit Vectors
- **NOT:**
  - Teach all of Unix
  - Get in to debate of VI vs Emacs vs nano vs ….

A Brief History of Unix

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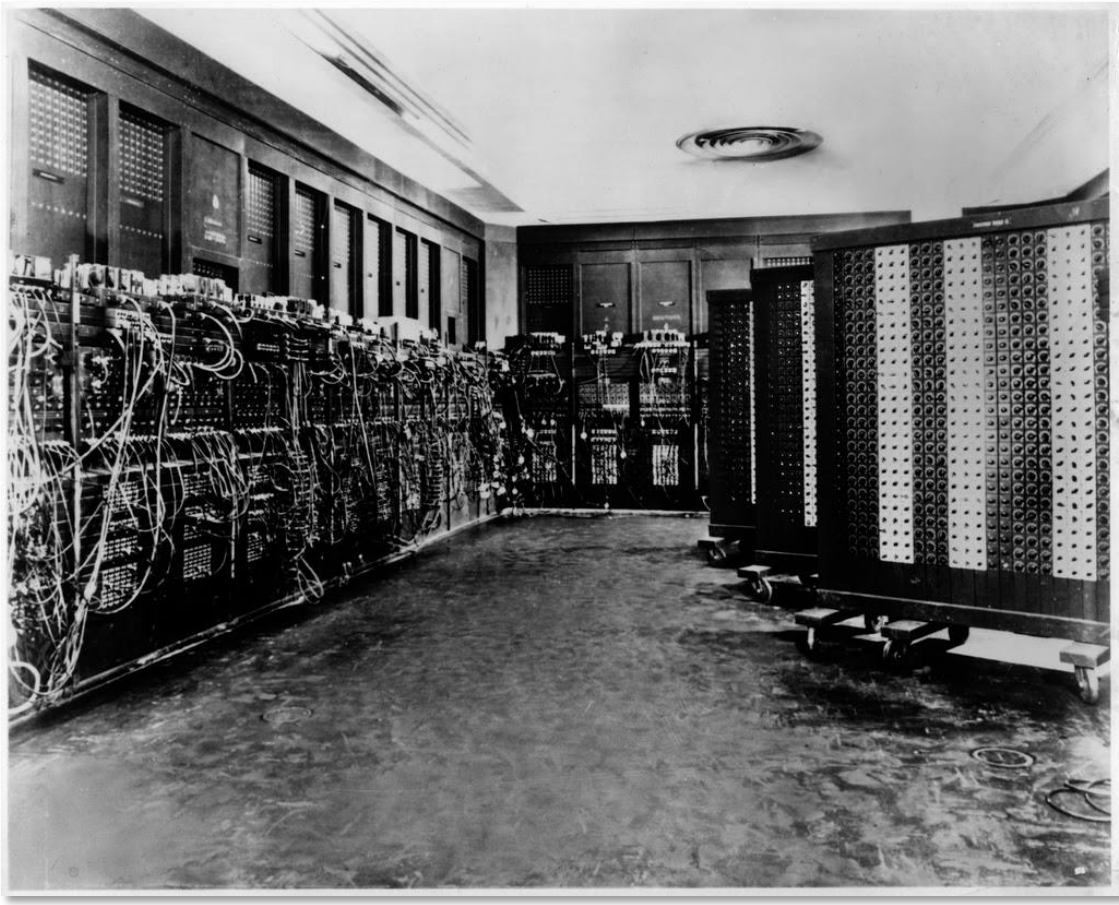
- 1945 - ENIAC (1st* Large-Scale General Purpose Computer)



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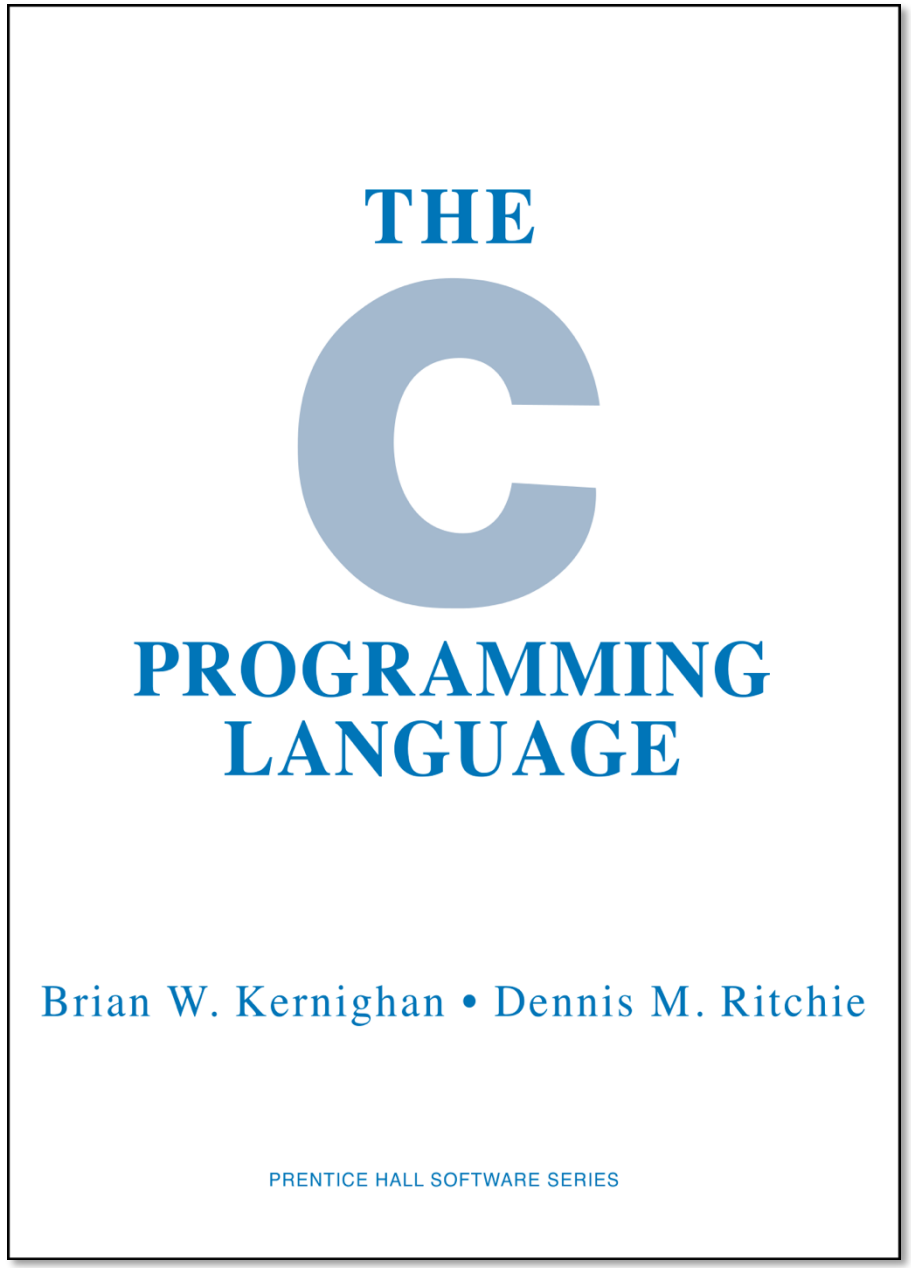

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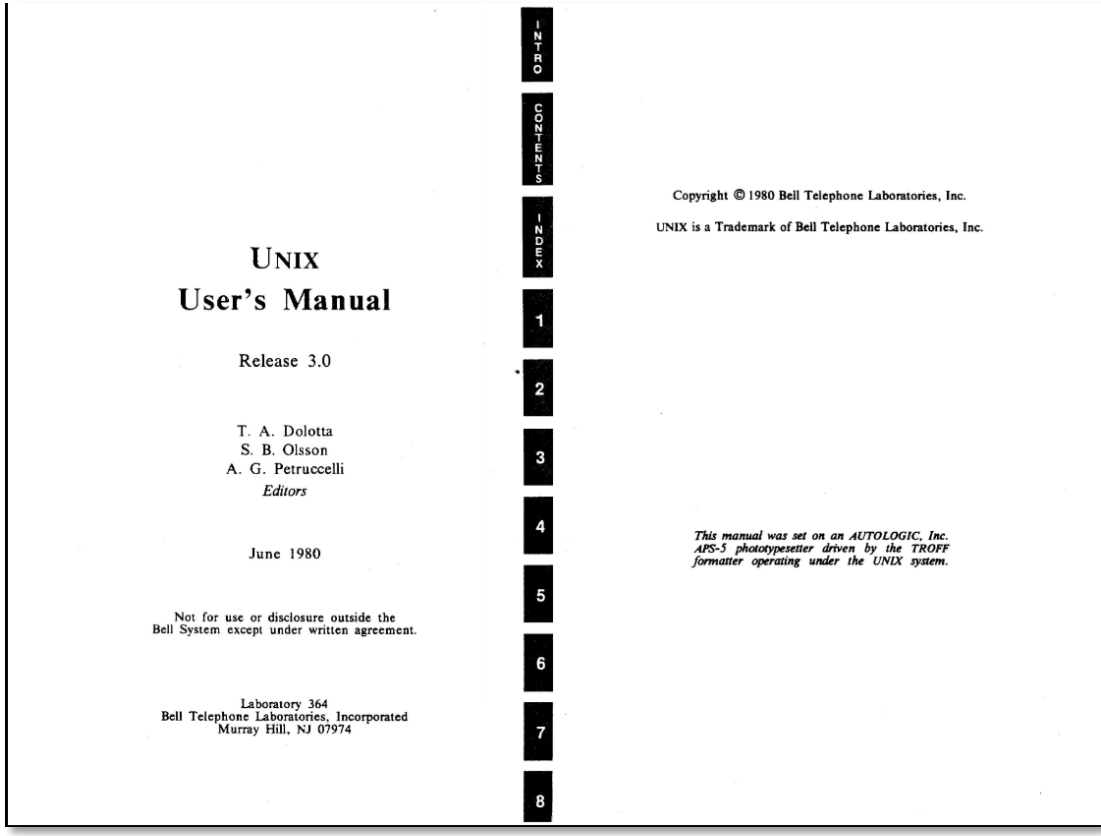
- 1982 - AT&T's UNIS System Group releases System III, the first public release outside Bell Lab



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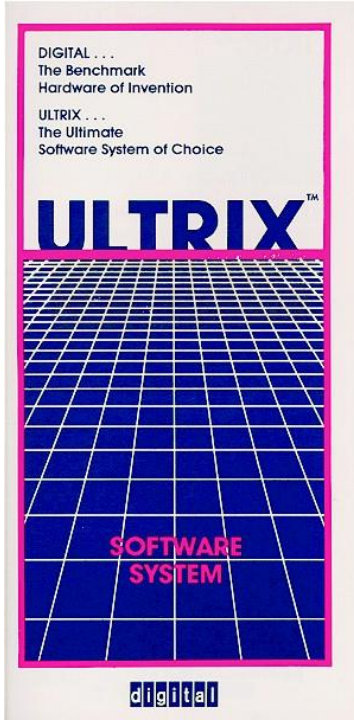

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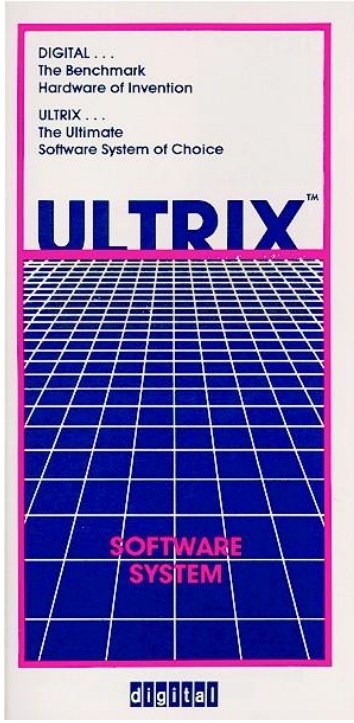

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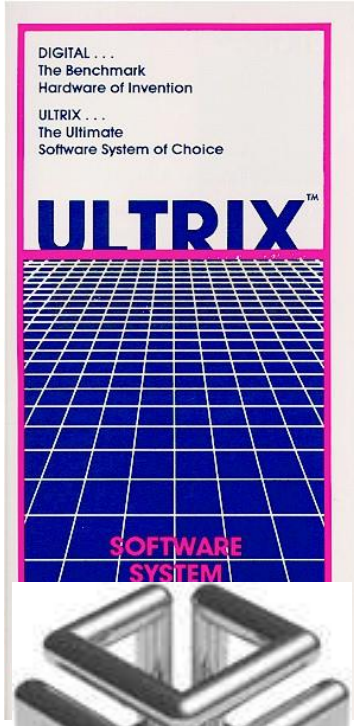

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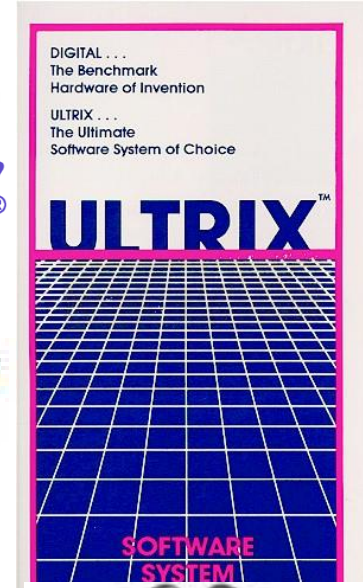

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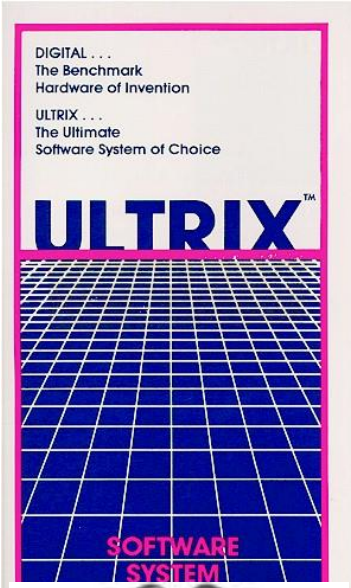

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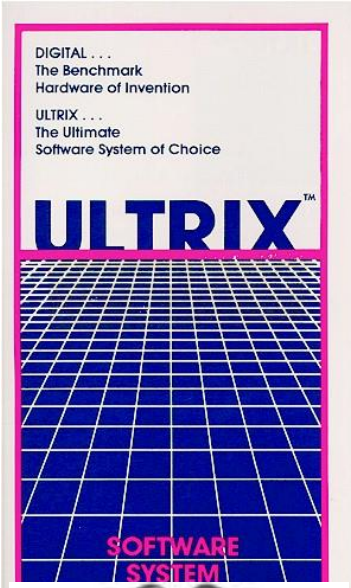

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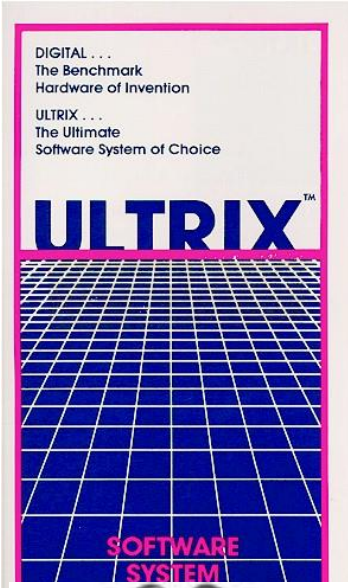
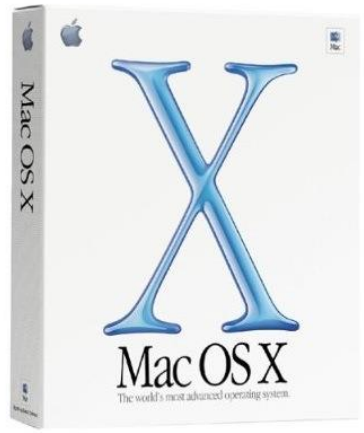
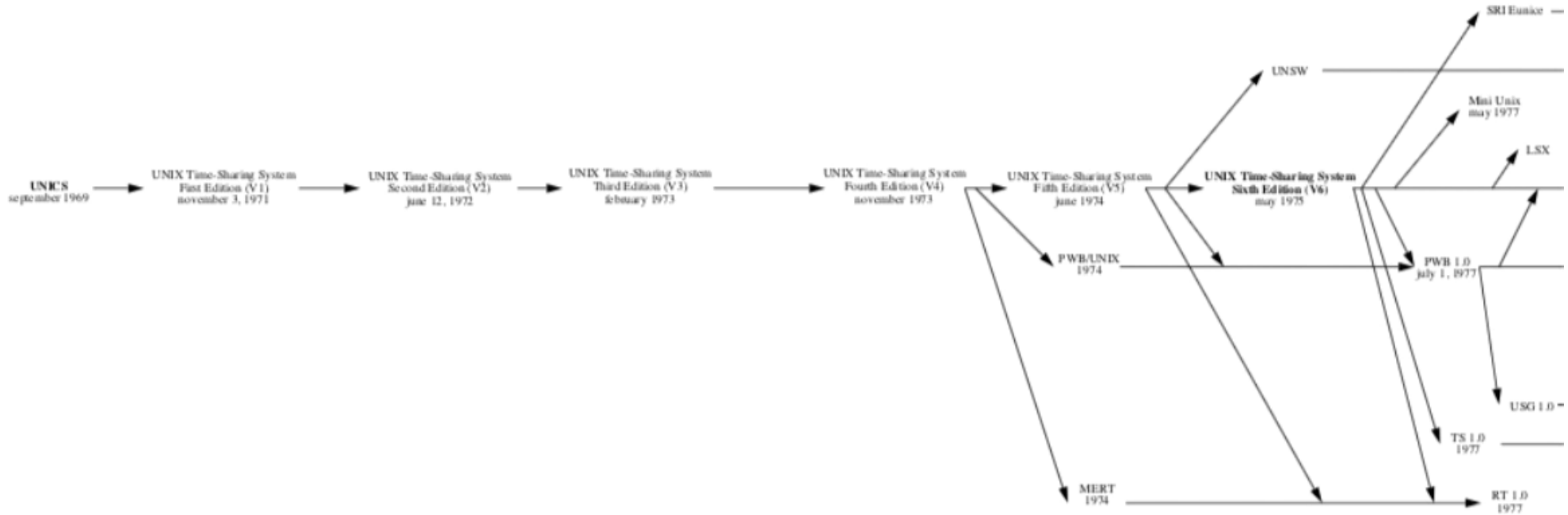
- 2001 - OSX 10 released





1969 1970 1971 1972 1973 1974 1975 1976 1977

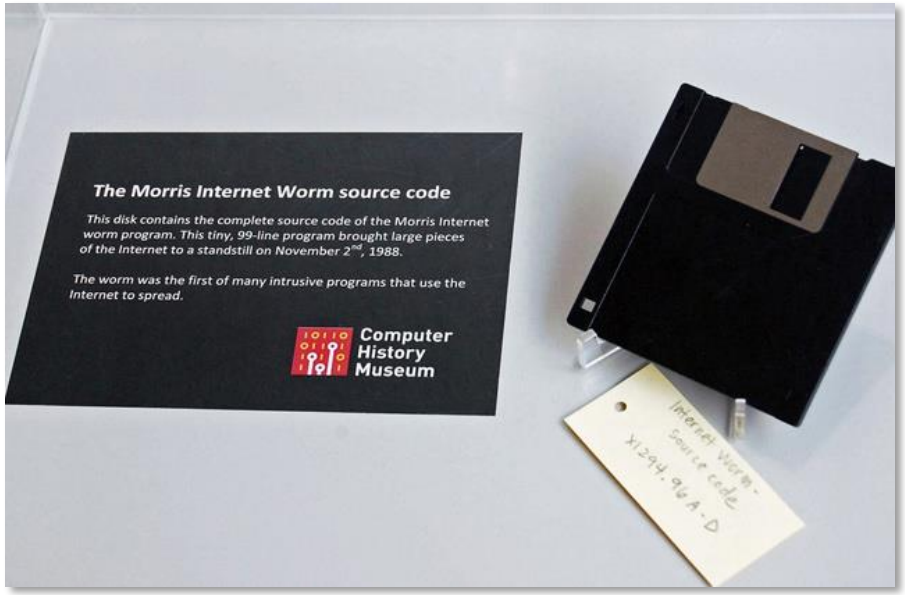


#> grep issues changelog.txt

- Passwords
- File Permissions
- Trust Relationships
- Application Flaws (BOF, HOF, etc…)

#> apropos "Morris Worm"

- Morris Worm (1988)
- targeted sendmail, finger, rsh/rexec, weak passwords
- Written by: Robert Tappan Morris @ Cornell University



#> cat /etc/passwd

/etc/passwd

<username>:<encrypted password>:<UID>:<GID>:<full name>:<home dir>:<shell>

<encrypted password> = crypt(plaintext password)

crypt() used to use DES (with a 12 bit number salt 0-4095)

salt selected based on time of day

converted to 2 character string and prepended to encrypted password

Improvements:

- /etc/shadow
- crypt() -> md5, sha1, sha256

#> ls -la

```
-        r w x    r w x    r w x
|        |        |        |
|        |        |        other
|        |        |
|        |        group
|        |
|        owner
|
type

r        = read access              = 4
w        = write access             = 2
x        = execute access           = 1

-        = normal file
d        = directory
l        = symlink

SETUID   = 4 -> "s" in place of owner "x"; "S" is SETUID and "x"
SETGID   = 2 -> "s" in place of group "x"; "S" if SETGID and "x"
STICKY   = 1 -> "t" in place of other "x"; "T" is STICKY and "x"
```


#> ls -la

Interesting files:

- /etc/password
- /var/log
- /var/mail
- .history
- .rhosts
- .forward
- "any ~/.xxxx File"

SETUID/SETGID Files

find / -perm /4000 -print

find / -perm /2000 -print

#> echo "+ +" > ~/.rhosts

R-Commands

- rsh/rlogin/exec
- Important files:
  - ~/.rhosts
  - /etc/hosts.equiv

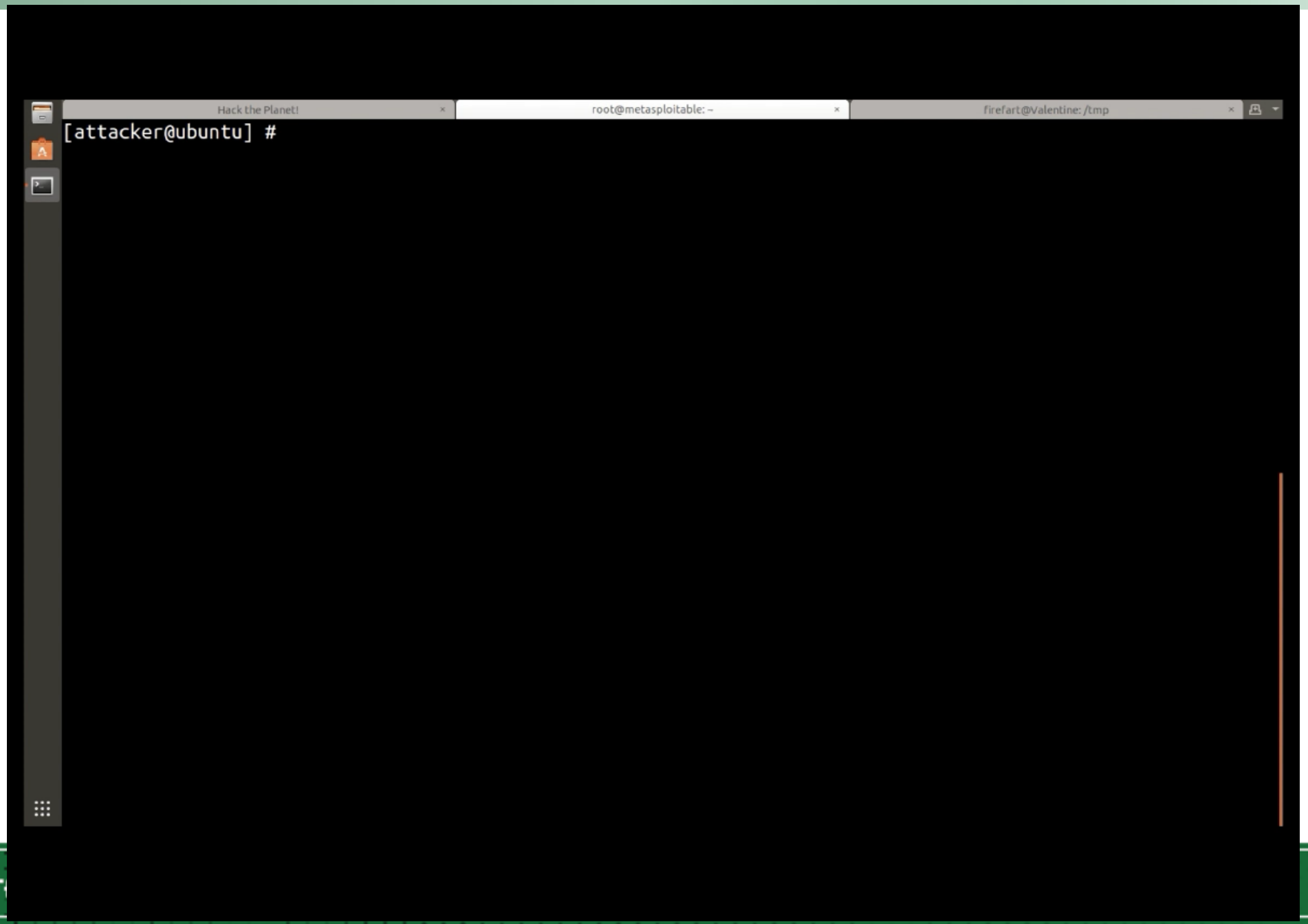
NFS

  - showmount -e
  - /etc/export

SUDO/su

  - sudo -l

DEMO: R - Commands



DEMO: NFS Commands

#> nmap -A -p- 10.0.0.0/24

Services:

- telnetd
- sadmind
- sendmail

Tools:

- Nmap

Web apps:

- phpmyadmin
- tomcat/jboss
- jenkins

DEMO: telnet -l "-fbin" x.x.x.x

Real World Privilege Escalation

#> echo "A Quick Note"

#> cat enum.txt

- Who am I? Who else is logged in? Who are superusers?
- What info do I have access to? What can I do?
- Where can I go?

#> cat example.txt

uname –a – Current kernel version
env – Current environment variable
pwd – Current directory
whoami – Current user
history – Command history for current user
cat ~/.bash_history – Bash history
sudo –l Commands you can run as sudo
cat /etc/sudoers – Who is in sudoers file
cat /etc/passwd – Additional users

#> cat EnumerationScripts.txt

LinEnum

- https://github.com/rebootuser/LinEnum

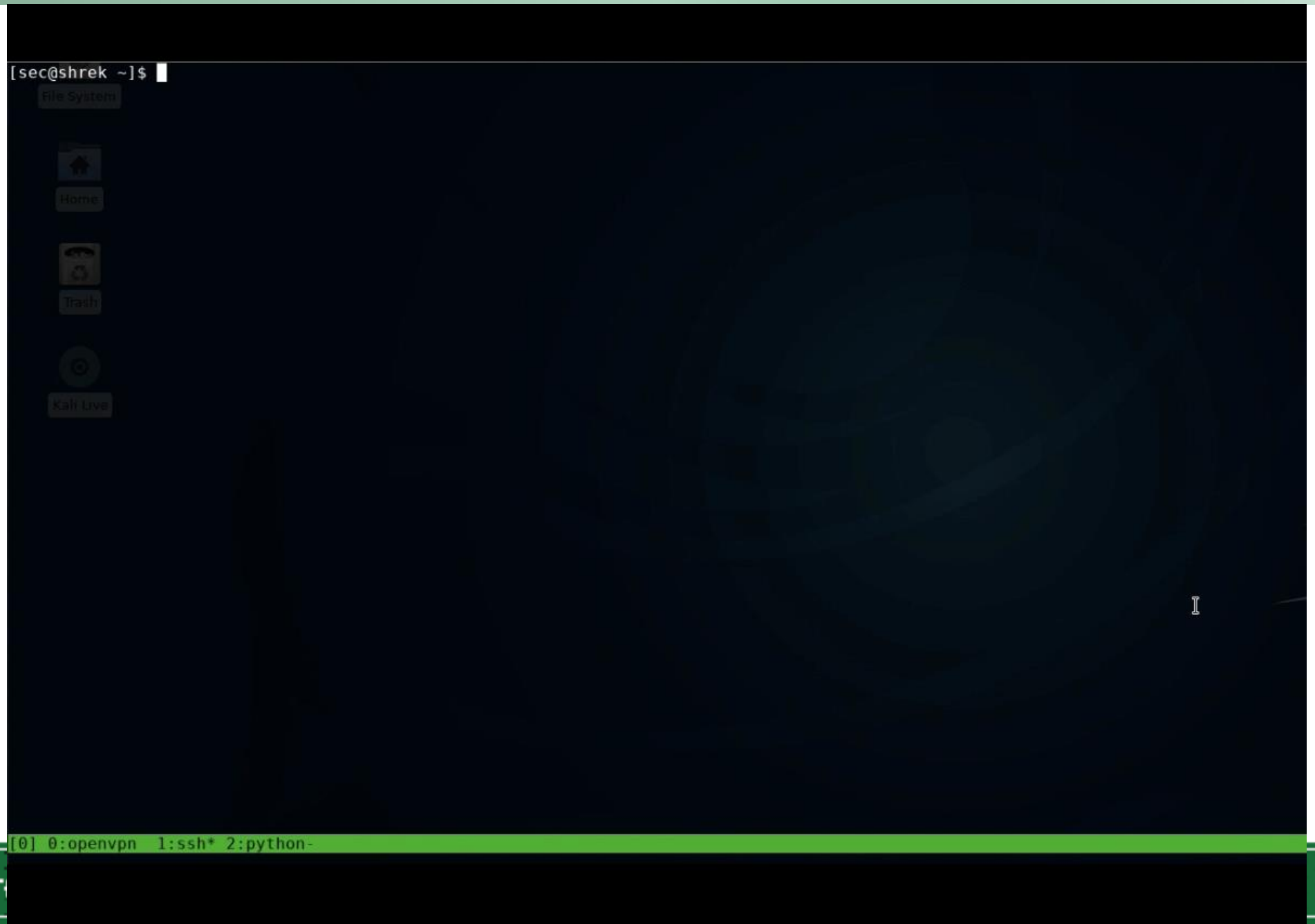
LinuxPrivChecker

- https://github.com/sleventyeleven/linuxprivchecker

UnixPrivescCheck

- https://github.com/pentestmonkey/unix-privesc-check

DEMO: Enumeration Scripts



#> searchsploit -h

Searchsploit is a command line search tool for Exploit-DB that also allows you to take a copy of Exploit Database with you, everywhere you go.

SearchSploit gives you the power to perform detailed off-line searches through your locally checked-out copy of the repository.

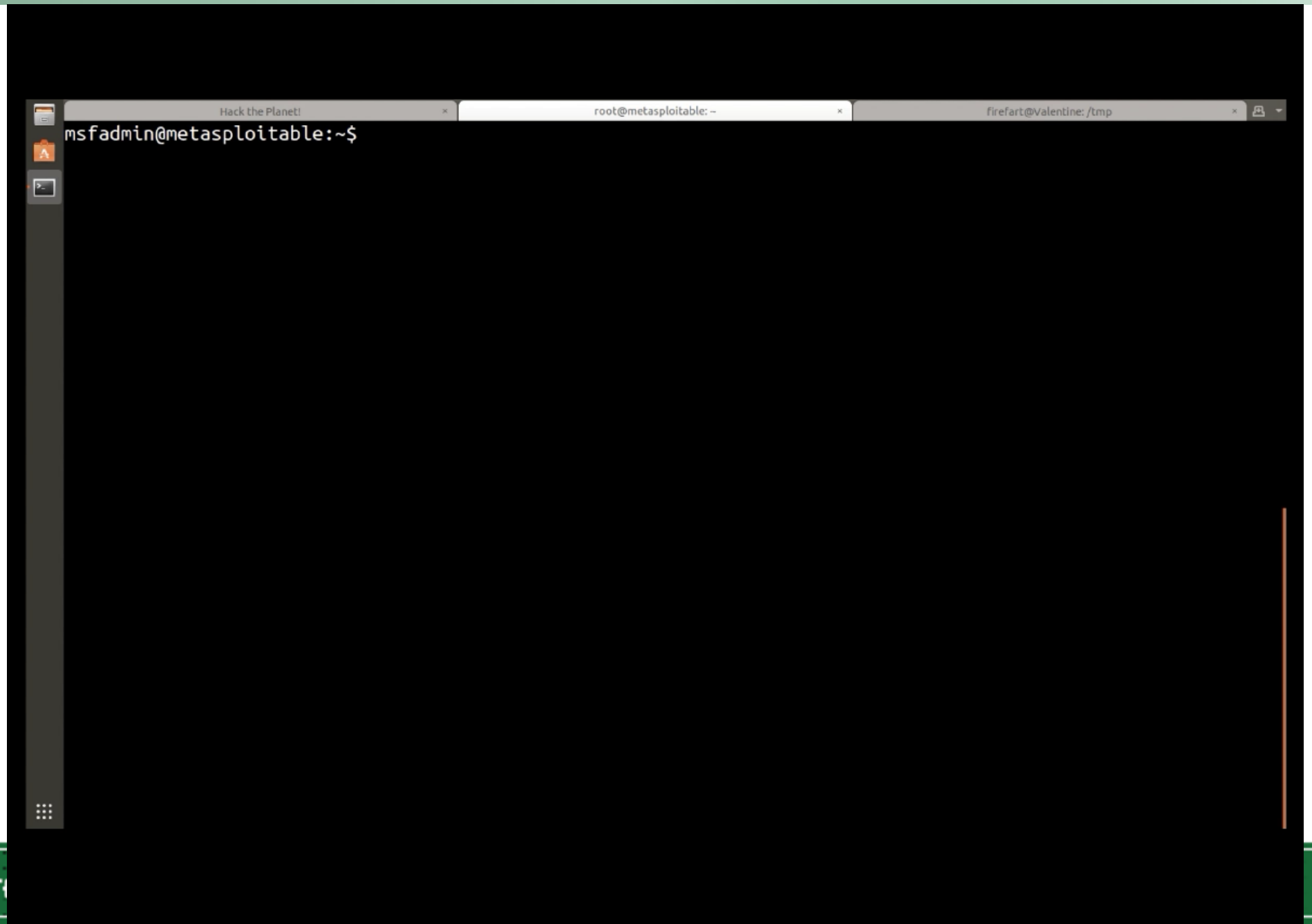
```
root@kali:~# searchsploit dirty
------------------------------------------------------------------------------------------------------------------------ ----------------------------------------
 Exploit Title                                                                                                          |  Path
                                                                                                                        | (/usr/share/exploitdb/)
------------------------------------------------------------------------------------------------------------------------ ----------------------------------------
Linux Kernel - 'The Huge Dirty Cow' Overwriting The Huge Zero Page (1)                                                  | exploits/linux/dos/43199.c
Linux Kernel - 'The Huge Dirty Cow' Overwriting The Huge Zero Page (2)                                                  | exploits/linux/dos/44305.c
Linux Kernel 2.6.22 < 3.9 (x86/x64) - 'Dirty COW /proc/self/mem' Race Condition Privilege Escalation (SUID Method)     | exploits/linux/local/40616.c
Linux Kernel 2.6.22 < 3.9 - 'Dirty COW /proc/self/mem' Race Condition Privilege Escalation (/etc/passwd Method)        | exploits/linux/local/40847.cpp
Linux Kernel 2.6.22 < 3.9 - 'Dirty COW PTRACE_POKEDATA' Race Condition (Write Access Method)                            | exploits/linux/local/40838.c
Linux Kernel 2.6.22 < 3.9 - 'Dirty COW' 'PTRACE_POKEDATA' Race Condition Privilege Escalation (/etc/passwd Method)     | exploits/linux/local/40839.c
Linux Kernel 2.6.22 < 3.9 - 'Dirty COW' /proc/self/mem Race Condition (Write Access Method)                            | exploits/linux/local/40611.c
Quick and Dirty Blog (qdblog) 0.4 - 'categories.php' Local File Inclusion                                               | exploits/php/webapps/4603.txt
Quick and Dirty Blog (qdblog) 0.4 - SQL Injection / Local File Inclusion                                                | exploits/php/webapps/3729.txt
snapd < 2.37 (Ubuntu) - 'dirty_sock' Local Privilege Escalation (1)                                                    | exploits/linux/local/46361.py
snapd < 2.37 (Ubuntu) - 'dirty_sock' Local Privilege Escalation (2)                                                    | exploits/linux/local/46362.py
------------------------------------------------------------------------------------------------------------------------ ----------------------------------------
Shellcodes: No Result
root@kali:~#
```

#> find / -perm /4000 -ls

SUID (Set owner User ID up on execution) is a special type of file permissions given to a file. Normally in Linux/Unix when a program runs, it inherits access permissions from the logged in user. SUID is defined as giving temporary permissions to a user to run a program/file with the permissions of the file owner rather that the user who runs it.

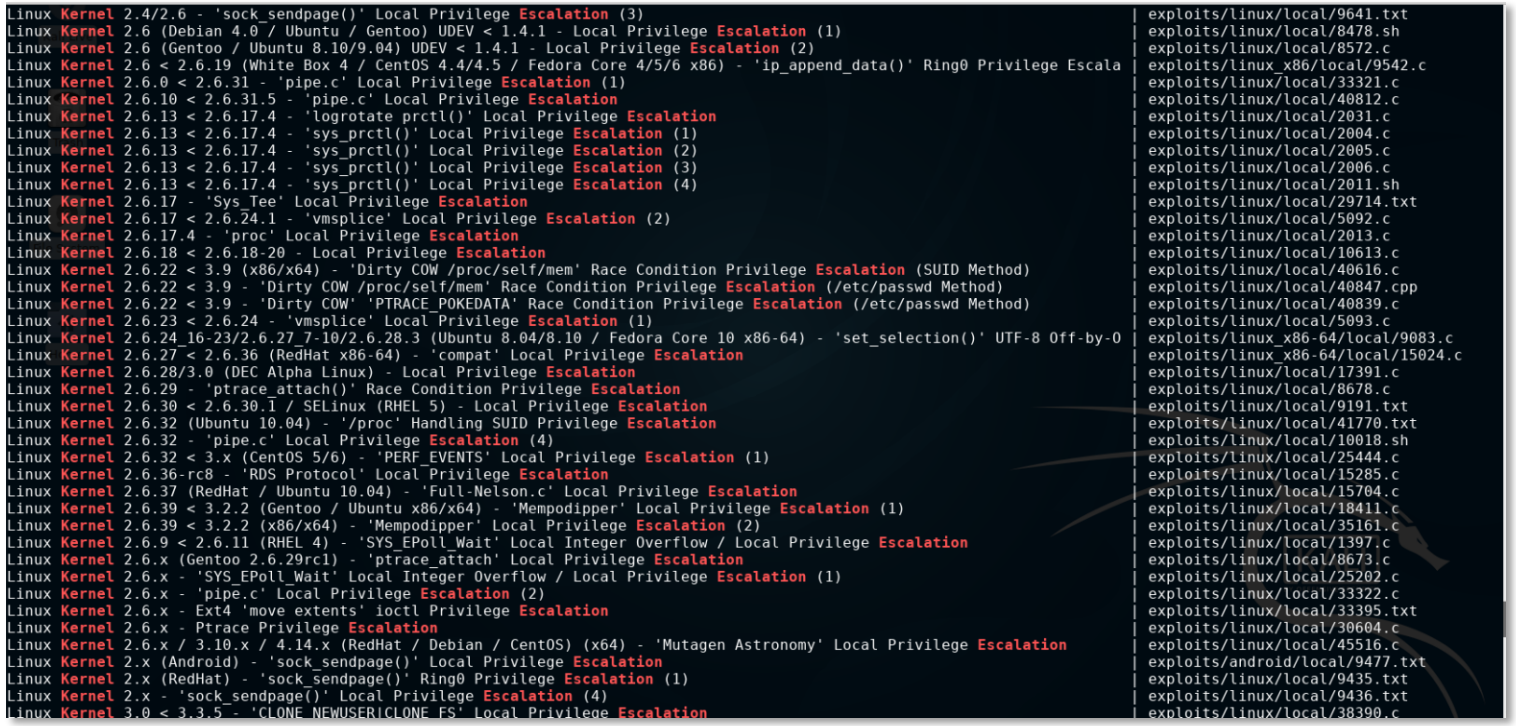
In simple words, users will get file owners permissions as well as owner UID and GID when executing a file/program/command.

DEMO: SETUID

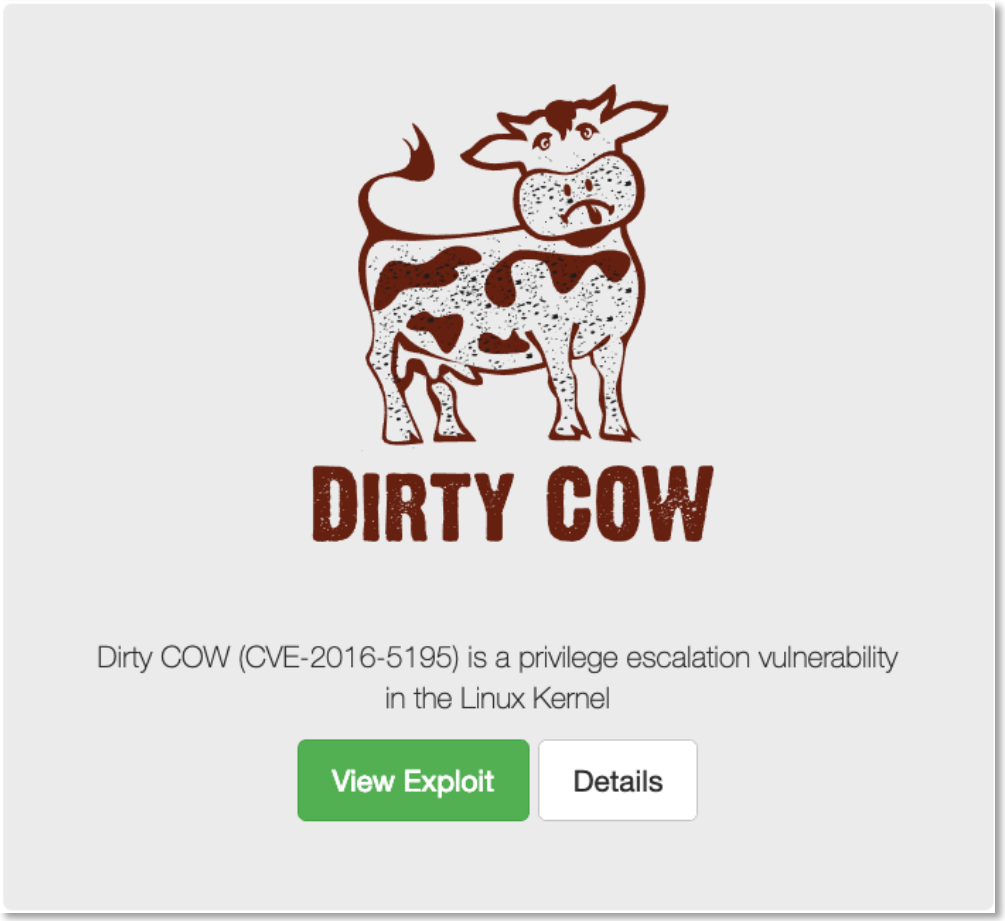

Hack the Planet!
root@metasploitable: ~
firefart@Valentine: /tmp
msfadmin@metasploitable:~$

#> ls /boot/vmlinuz*

- Mempodipper
- DirtyCow
- sendpage
- Dirty_Sock



#> apropos DirtyCow



#> apt-get update

Ubuntu

- 4.8.0-26.28 for Ubuntu 16.10
- 4.4.0-45.66 for Ubuntu 16.04 LTS
- 3.13.0-100.147 for Ubuntu 14.04 LTS
- 3.2.0-113.155 for Ubuntu 12.04 LTS

Debian

- 3.16.36-1+deb8u2 for Debian 8
- 3.2.82-1 for Debian 7
- 4.7.8-1 for Debian unstable

Arch

- 4.4.26-1 for ArchLinux (linux-lts package)
- 4.8.3 for ArchLinux (linux package)

DEMO: DirtyCow

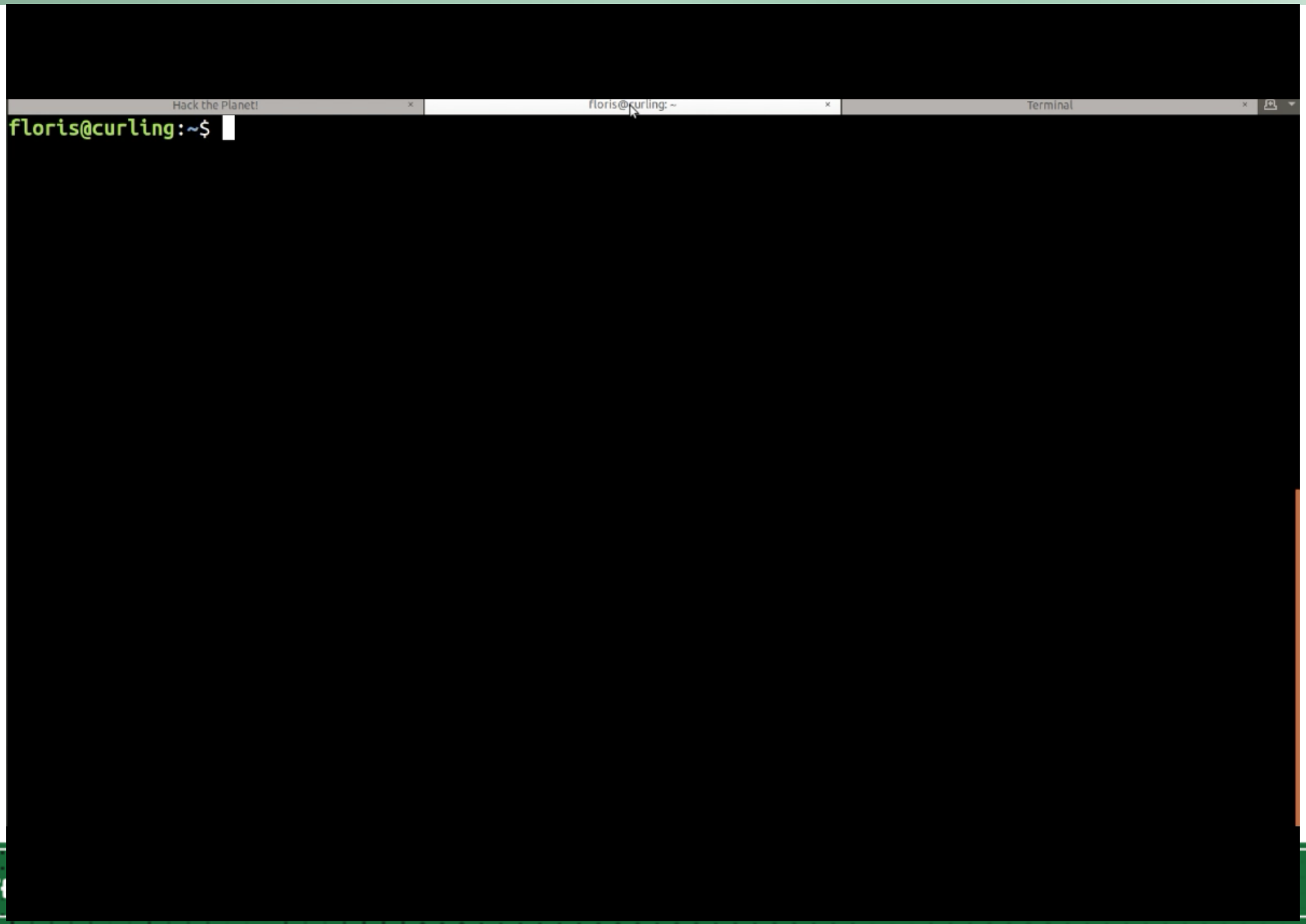
#> apropos DirtySock

- https://initblog.com/2019/dirty-sock/

- A privilege escalation vulnerability in default installations of Ubuntu Linux. This was due to a bug in the ‘snapd’ API, a default service. Any local user could exploit this vulnerability to obtain immediate root access to the system.

- Affects snapd versions < 2.37.1

DEMO: DirtySock



Final Thoughts

#> cat Additional_Resources.txt

Basic Linux Privilege Escalation – G0tmi1k

- https://blog.g0tmi1k.com/2011/08/basic-linux-privilege-escalation/

BSides Augusta – Jake Williams

- https://www.youtube.com/watch?v=dk2wsyFiosg

Tradecraft Security Weekly

- https://www.youtube.com/watch?v=oYHAi0cgur4

#> echo "Try Harder"

HackTheBox

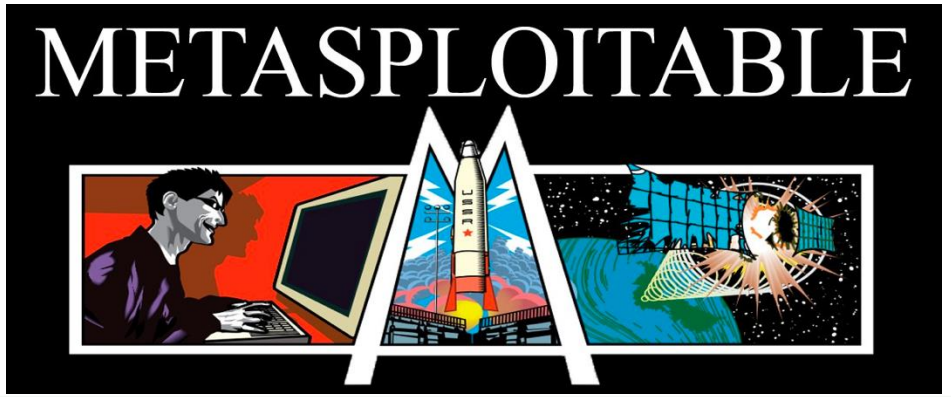
- https://www.hackthebox.eu/

VulnHub

- https://www.vulnhub.com/

Metasploitable

- https://information.rapid7.com/download-metasploitable-2017.html



Contact Us!

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