

# Hacking Techniques & Intrusion Detection

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# Footprinting

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*Walking the trails to a target*

# Outline

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- External Footprinting
  - Identify External Ranges
  - Passive, and Active
- Internal Footprinting
  - Identify Internal Ranges
  - Passive, and Active

# **External Footprinting**

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# Identify Customer External Ranges

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- The major goals of intelligence gathering during a penetration test is to determine hosts which will be in scope.
- Common techniques to identify:
  - WHOIS searches on the domains and the ranges
  - reverse DNS lookups
  - DNS brute forcing

# Passive Recon - WHOIS Lookups

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- Determine TLD for the domain, and which WHOIS server contains the information we're after.
- WHOIS information is based upon a tree hierarchy.
- ICANN (IANA) is the authoritative registry for all of the TLDs.
- Middle East WHOIS lookup (registrar): **RIPE NCC**, <http://www.ripe.net/lir-services/member-support/info/list-of-members/mideast>
- **DEMO (whois)**

# Passive Recon - NetCraft

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- Internet monitoring company that monitors uptimes and provides server operating system detection.
- Site Report returns information such as:
  - IP address
  - Name servers
  - Reverse DNS
  - Netblock owner
  - DNS admin
  - Domain registry
- DEMO

# Passive Recon - URL(s)

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- Extract list of URLs from a web page
  - list-urls.py
- Search for files in a domain
  - goofile.py
  - FOCA
- DEMO



# Online Tools

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- Central Ops, <http://centralops.net/>
- Wayback Machine: <http://archive.org/>
- Zone-h Defacement Archive, <http://zone-h.org/>
- Domain Tools, <http://www.domaintools.com/>
- DNS Stuff, <http://www.dnsstuff.com>
- MX Toolbox, <http://mxtoolbox.com>
- RIPE, <http://www.ripe.net/data-tools/db>
- WHOIS, <http://www.whois.com/whois/>
- WHOIS, <http://www.whois.sc/>
- What Is My IP, <http://www.whatismyip.com/>
- InterNIC, <http://www.internic.net/>

# Google for Pentesting

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- Check Johnny Long's presentation @Blackhat ...
- Google Dorks, <http://www.exploit-db.com/google-dorks/>
- Google Hacking Database (GHDB), <http://www.hackersforcharity.org/ghdb>
- Assignment #1: Write about 10 Google Dorks.

# ShodanHQ

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- ShodanHQ.com is a computer search engine.
- Examining the response of the devices it contacts on the Internet. Information gathered such as:
  - Target OS, Web server software version
  - Checks if default user/pass are being used
  - Can identify webcam, firewalls, and VoIP devices
  - Can identify network printers
- **Need Help?** [www.shodanhq.com/browse](http://www.shodanhq.com/browse)
- Registration is required to make the most effective use of the site.

# Active Footprinting

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- Port Scanning – Next Week

# DNS Discovery

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- Performed by looking at the WHOIS records for the domain's authoritative nameserver.
- Variations of the main domain name should be checked, and the website should be checked for references to other domains which could be under the target's control.

# DNS Discovery – DNS Types

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- A Host's IP address.
- MX Host/domain's mail exchanger(s)
- NS Host or domain's name server(s)
- CNAME Host's canonical name allowing additional names or aliases
  
- SOA Authority for the domain
- SRV Service location record often used with Session Initiation Protocol (SIP) and the Extensible Messaging and Presence Protocol (XMPP)
  
- RP Responsible person
- PTR Pointer to a canonical name, used for reverse lookups

# Zone Transfers

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- DNS zone transfer, also known as AXFR, is a type of DNS transaction.
- It is a mechanism designed to replicate the databases containing the DNS data across a set of DNS servers.
- Zone transfer comes in two flavors, full (AXFR) and incremental (IXFR).
- Tools commonly used: **host**, **dig**, and **nmap**
- **DEMO**

# Reverse DNS

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- Reverse DNS can be used to obtain valid server names in use within an organizational.
- There is a caveat that it must have a PTR (reverse) DNS record for it to resolve a name from a provided IP address.



# Forward DNS

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- Some call it “DNS Bruteforcing”
- Not only zone transfers!
- Discover additional host names that are not commonly known.
  - fierce.pl
  - dnsenum.pl
  - dnsrecon.py
- DEMO

# SMTP

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- SMTP bounce back, also called a Non-Delivery Report/Receipt (NDR), a (failed) Delivery Status Notification (DSN) message, a Non-Delivery Notification (NDN) or simply a bounce, is an automated electronic mail message from a mail system informing the sender of another message about a delivery problem.
- Done by simply creating a bogus address (Blah\_blah\_address@target.com) within the target's domain.

# SMTP – Tools

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- SMTP User Enumerator, smtp-user-enum
  - `smtp-user-enum.pl -M VRFY -U users.txt -t 10.0.0.1`
- SMTP Scan, smtpscan
- SMTP Relay Checker, smtprc
- Swiss Army Knife for SMTP, swaks
- Nmap NSE script, smtp-enum-users.nse
  
- DEMO (Online Central Ops):
  - Central Ops (Email Dossier), <http://centralops.net/co/>
  - Manually

# Banner Grabbing

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- An enumeration technique used to glean information about computer systems on a network and the services running its open ports.
- Banner grabbing is used to identify network the version of applications and operating system that the target host are running.
- Usually performed on: **HTTP**, **FTP**, and **SMTP**
- Tools commonly used: **Telnet**, **Nmap**, and **Netcat**

# SNMP Sweeps

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- SNMP offer tons of information about a specific system.
- The SNMP protocol is a stateless, datagram oriented protocol.
- Unfortunately SNMP servers don't respond to requests with invalid community strings and the underlying UDP protocol does not reliably report closed UDP ports. This means that "no response" from a probed IP address can mean either of the following:
  - machine unreachable
  - SNMP server not running
  - invalid community string
  - the response datagram has not yet arrived

# Web Application Discovery

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- Identifying weak web applications can be a particularly fruitful activity during a penetration test.
- **More on this when we reach Web Penetration Testing**

# Virtual Host Detection & Enumeration

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- Web servers often host multiple "virtual" hosts to consolidate functionality on a single server.
- If multiple servers point to the same DNS address, they may be hosted on the same server.
- Tools such as Bing search can be used to map an IP address to a set of virtual hosts.

# Establish External Target List

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- Once the activities above have been completed, a list of users, emails, domains, applications, hosts and services should be compiled.
  - Mapping versions
  - Identifying patch levels
  - Looking for weak web applications
  - Identify lockout threshold
  - Error Based
  - Identify weak ports for attack
  - Outdated Systems
  - Virtualization platforms vs VMs
  - Storage infrastructure



# **Internal Footprinting**

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# Passive Footprinting

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- If the tester has access to the internal network, packet sniffing can provide a great deal of information.
- Use techniques like those implemented in **p0f** to identify systems.

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# p0f -o cap.txt -i eth0 -M -V -v -p -t
```

# Identify Customer Internal Ranges

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- Start by identifying the local subnet, then modify slightly to reach other subnets.
- Check routing tables of hosts.
- Most popular technique used is checking DHCP servers.

# Active Footprinting

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- We can perform all the external active footprinting techniques here.

## Port Scanning:

- Internal port scanning differs from external port scanning, because of the higher bandwidth available, and the ability to get more accurate response.

***Next Week***



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- Countermeasure
  - Mitigation
  - Remediation

# Assingment(s)

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## Assignment #2:

- Gathering information about a website from Google cache, is it an Active or Passive Recon?

## Assignment #3:

- Choose a target that you have permission to, maybe yourself and try to gather as much information found publicly as you can. Write a report about that.

# SUMMARY

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- We saw what is intelligence gathering
- The OSINT three
- What corporate info to gather
- What individual info to gather
- Understood the covert gathering types
- What is footprinting
- Difference between active and passive footprinting
- Main external and internal footprinting information resources
- How to use Google when performing intelligence gathering
- Discusses mitigation to footprinting

# References

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- Exploit-DB, Google Dorks,
- NetGlub,
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- WHOIS lookup references
  - ICANN - <http://www.icann.org>
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  - NRO - <http://www.nro.net>
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  - ARIN - <http://ws.arin.net>
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