Footprinting and Reconnaissance

Module 02

Unmask the Invisible Hacker.

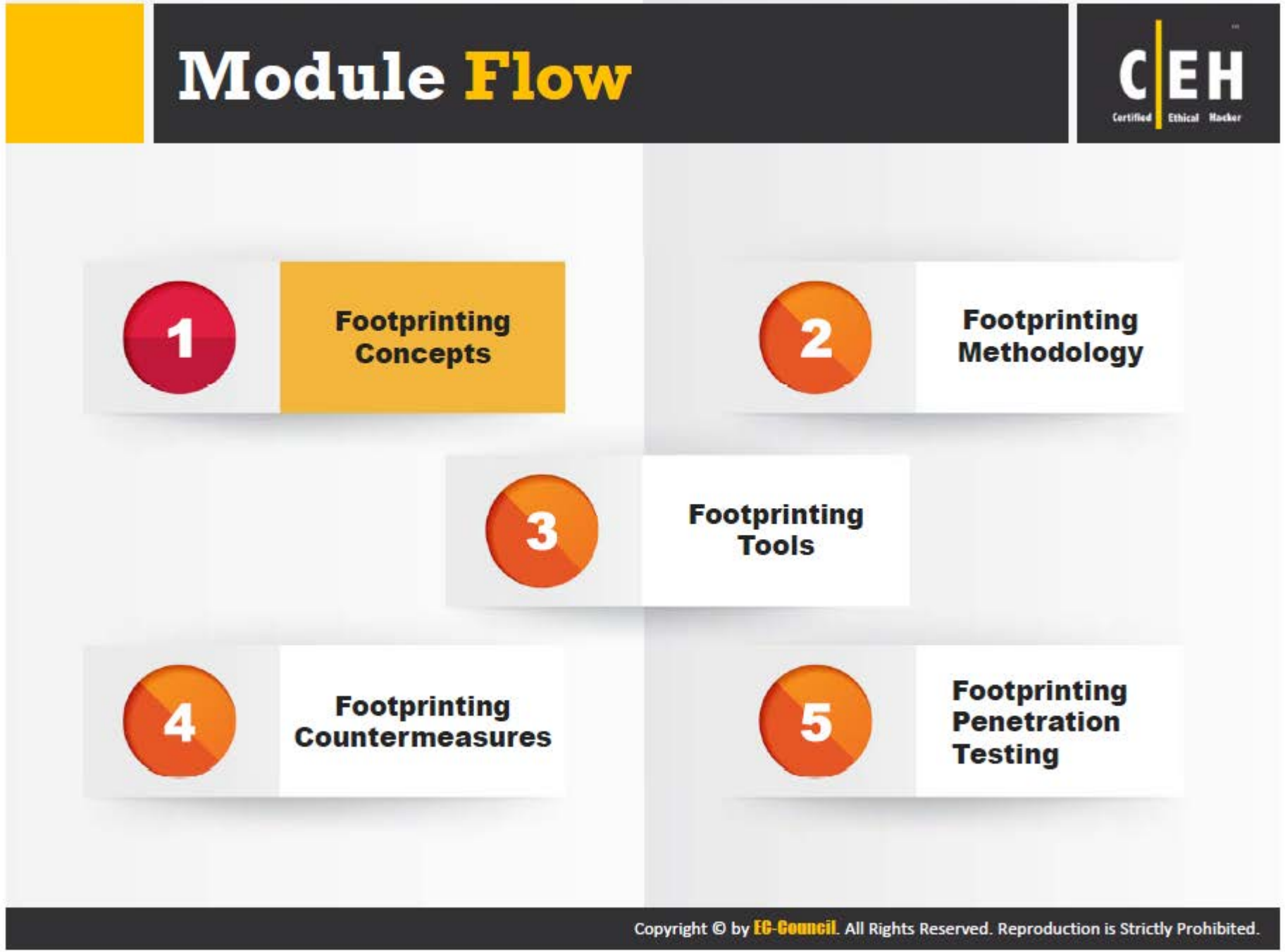
Module Objectives

- Understanding Footprinting Concepts
- Footprinting through Search Engines
- Footprinting Using Advanced Google Hacking Techniques
- Footprinting through Social Networking Sites
- Understanding different techniques for Website Footprinting
- Understanding different techniques for Email Footprinting
- Understanding different techniques of Competitive Intelligence

- Understanding different techniques for WHOIS Footprinting
- Understanding different techniques for DNS Footprinting
- Understanding different techniques for Network Footprinting
- Understanding different techniques of Footprinting through Social Engineering
- Footprinting Tools
- Footprinting Countermeasures
- Overview of Footprinting Pen Testing



Module Flow



What is Footprinting?

- Footprinting is the process of **collecting as much information as possible about a target network**, for identifying various ways to intrude into an organization's network system
- Footprinting is the first step of any attack on information systems; attacker gathers **publicly available sensitive information**, using which he/she performs social engineering, system and network attacks, etc. that leads to huge financial loss and loss of business reputation

Know Security Posture	Reduce Focus Area	Identify Vulnerabilities	Draw Network Map
Footprinting allows attackers to know the **external security posture of the target organization**	It **reduces attacker's focus area** to specific range of IP address, networks, domain names, remote access, etc.	It allows attacker to **identify vulnerabilities** in the target systems in order to select appropriate exploits	It allows attackers to **draw a map or outline the target organization's network infrastructure** to know about the actual environment that they are going to break

Objectives of Footprinting

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Collect Network Information

- Domain name
- Internal domain names
- Network blocks
- IP addresses of the reachable systems
- Rogue websites/private websites
- TCP and UDP services running
- Access control mechanisms and ACL's
- Networking protocols
- VPN Points
- IDSes running
- Analog/digital telephone numbers
- Authentication mechanisms
- System enumeration

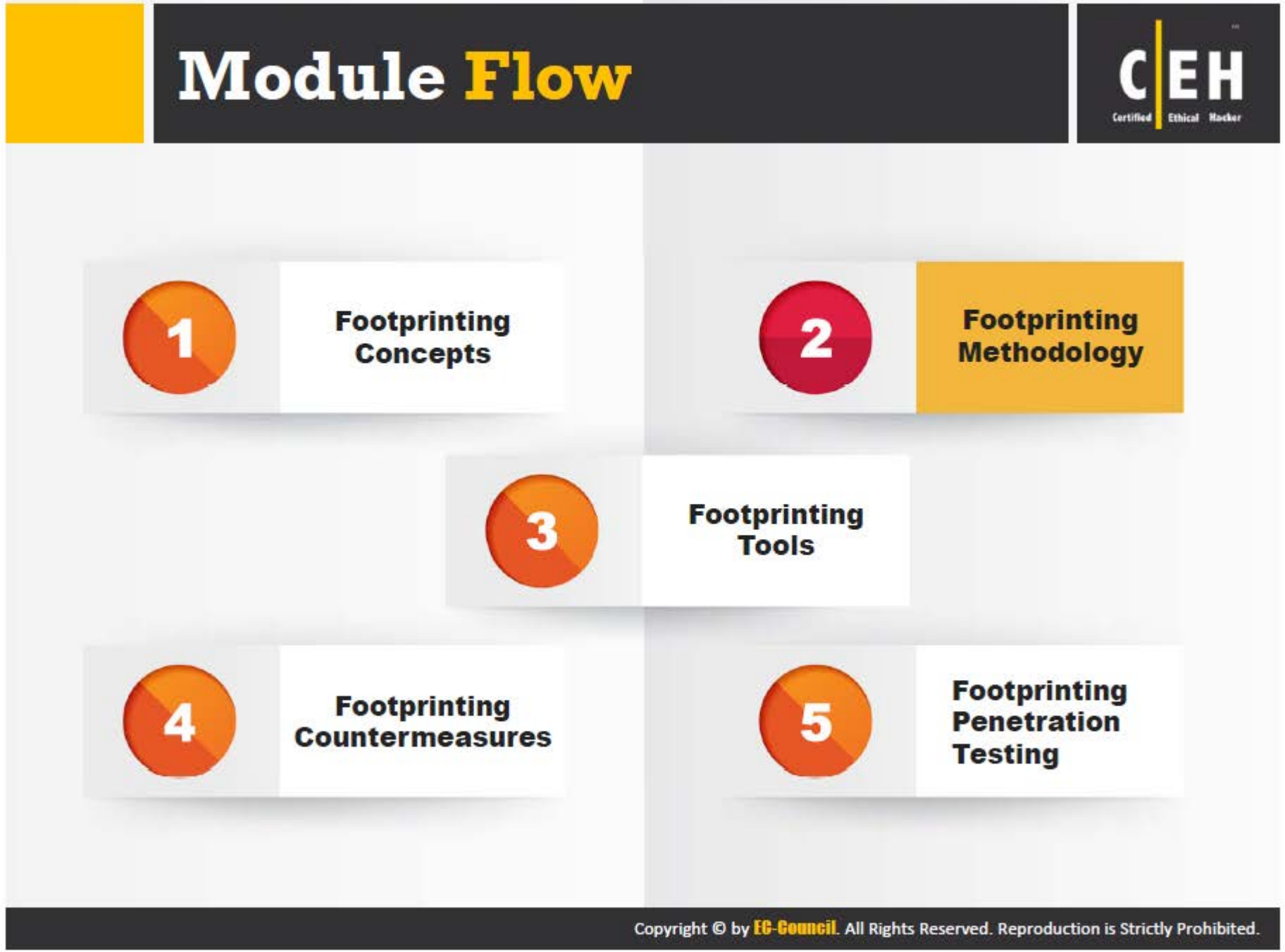
Collect System Information

- User and group names
- System banners
- Routing tables
- SNMP information
- System architecture
- Remote system type
- System names
- Passwords

Collect Organization's Information

- Employee details
- Organization's website
- Company directory
- Location details
- Address and phone numbers
- Comments in HTML source code
- Security policies implemented
- Web server links relevant to the organization
- Background of the organization
- News articles
- Press releases

Module Flow



Footprinting Methodology

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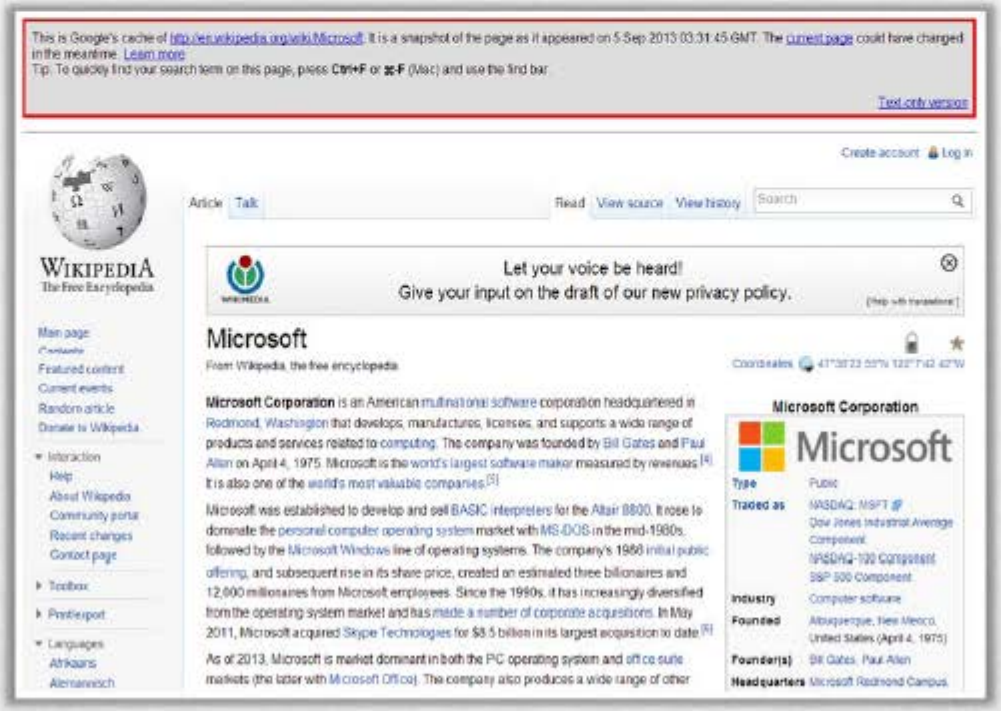
1. Footprinting through Search Engines
2. Footprinting Using Advanced Google Hacking Techniques
3. Footprinting through Social Networking Sites
4. Website Footprinting
5. Email Footprinting
6. Competitive Intelligence
7. WHOIS Footprinting
8. DNS Footprinting
9. Network Footprinting
10. Footprinting through Social Engineering

Footprinting through Search Engines

- Attackers use search engines to **extract information about a target** such as technology platforms, employee details, login pages, intranet portals, etc. which helps in performing social engineering and other types of advanced system attacks
- **Search engine caches** and **internet archives** may also provide sensitive information that has been removed from the World Wide Web (WWW)



Finding Company's Public and Restricted Websites

- Search for the target company's external URL in a search engine such as **Google**, **Bing**, etc.
- Restricted URLs **provide an insight** into different departments and business units in an organization
- You may find a company's restricted URLs **by trial and error method or using a service such as** `http://www.netcraft.com`

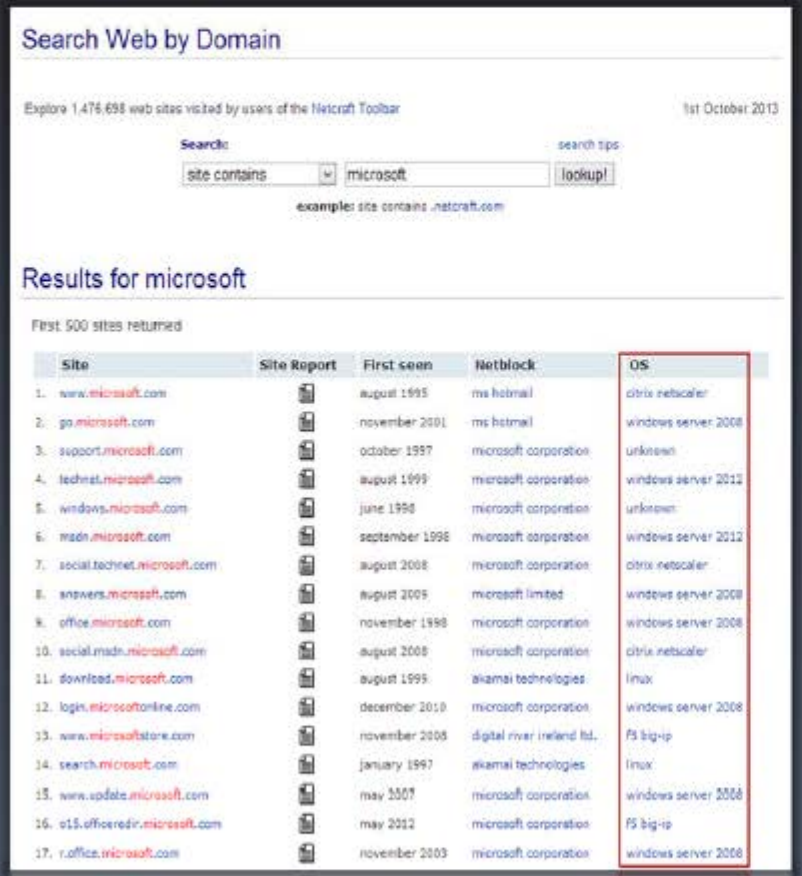
Results for microsoft.com

Found 255 sites

	Site	Site Report	First seen
81.	emails.microsoft.com		june 2015
82.	privacy.microsoft.com		march 2006
83.	images2.store.microsoft.com		april 2009
84.	mvp.microsoft.com		may 2012
85.	i.s-microsoft.com		december 2012
86.	schemas.microsoft.com		june 2002
87.	pinpoint.microsoft.com		september 2008
88.	windowshelp.microsoft.com		january 2010
89.	expertzone.microsoft.com		september 2005
90.	lumiaconversationsuk.microsoft.com		march 2015
91.	shopformusic.microsoft.com		may 2006
92.	licensing.microsoft.com		june 2002
93.	account.webapps.microsoft.com		august 2015
94.	smallbusiness.support.microsoft.com		july 2012
95.	familysafety.microsoft.com		july 2012
96.	powerbi.microsoft.com		june 2015
97.	advertising.microsoft.com		december 2006
98.	wer.microsoft.com		october 2005
99.	curah.microsoft.com		december 2013
100.	oem.microsoft.com		december 1996

Determining the Operating System

Use the Netcraft tool to determine the OSes in use by the target organization



Search Web by Domain

Explore 1,476,698 web sites visited by users of the Netcraft Toolbar

1st October 2013

Search: search tips

site contains | microsoft | lookup!

example: site contains .netcraft.com

Results for microsoft

First 500 sites returned

	Site	Site Report	First seen	Netblock	OS
1.	www.microsoft.com		august 1995	ms hotmail	citrix netscaler
2.	go.microsoft.com		november 2001	ms hotmail	windows server 2008
3.	support.microsoft.com		october 1997	microsoft corporation	unknown
4.	technet.microsoft.com		august 1999	microsoft corporation	windows server 2012
5.	windows.microsoft.com		june 1998	microsoft corporation	unknown
6.	msdn.microsoft.com		september 1998	microsoft corporation	windows server 2012
7.	social.technet.microsoft.com		august 2008	microsoft corporation	citrix netscaler
8.	answers.microsoft.com		august 2009	microsoft limited	windows server 2008
9.	office.microsoft.com		november 1998	microsoft corporation	windows server 2008
10.	social.msdn.microsoft.com		august 2008	microsoft corporation	citrix netscaler
11.	download.microsoft.com		august 1999	akamai technologies	linux
12.	login.microsoftonline.com		december 2010	microsoft corporation	windows server 2008
13.	www.microsoftstore.com		november 2006	digital river ireland ltd.	f5 big-ip
14.	search.microsoft.com		january 1997	akamai technologies	linux
15.	www.update.microsoft.com		may 2007	microsoft corporation	windows server 2008
16.	o15.officeredir.microsoft.com		may 2012	microsoft corporation	f5 big-ip
17.	r.office.microsoft.com		november 2003	microsoft corporation	windows server 2008

Hosting History

Netblock owner	IP address	OS	Web server	Last seen
Microsoft Corp One Microsoft Way Redmond WA US 98052	65.55.58.201	unknown	Microsoft-IIS/7.5	30-Sep-2013
MS Hotmail One Microsoft Way Redmond WA US 98052	64.4.11.37	unknown	Microsoft-IIS/7.5	4-May-2013
Microsoft Corp One Microsoft Way Redmond WA US 98052	65.55.58.201	Citrix Netscaler	Microsoft-IIS/7.5	14-Apr-2013
MS Hotmail One Microsoft Way Redmond WA US 98052	64.4.11.37	unknown	Microsoft-IIS/7.5	12-Apr-2013
Microsoft Corp One Microsoft Way Redmond WA US 98052	65.55.58.201	Citrix Netscaler	Microsoft-IIS/7.5	11-Apr-2013
MS Hotmail One Microsoft Way Redmond WA US 98052	64.4.11.37	unknown	Microsoft-IIS/7.5	10-Apr-2013
Microsoft Corp One Microsoft Way Redmond WA US 98052	65.55.58.201	Citrix Netscaler	Microsoft-IIS/7.5	9-Apr-2013
MS Hotmail One Microsoft Way Redmond WA US 98052	64.4.11.37	unknown	Microsoft-IIS/7.5	8-Apr-2013
Microsoft Corp One Microsoft Way Redmond WA US 98052	65.55.58.201	Citrix Netscaler	Microsoft-IIS/7.5	7-Apr-2013
MS Hotmail One Microsoft Way Redmond WA US 98052	64.4.11.37	unknown	Microsoft-IIS/7.5	6-Apr-2013

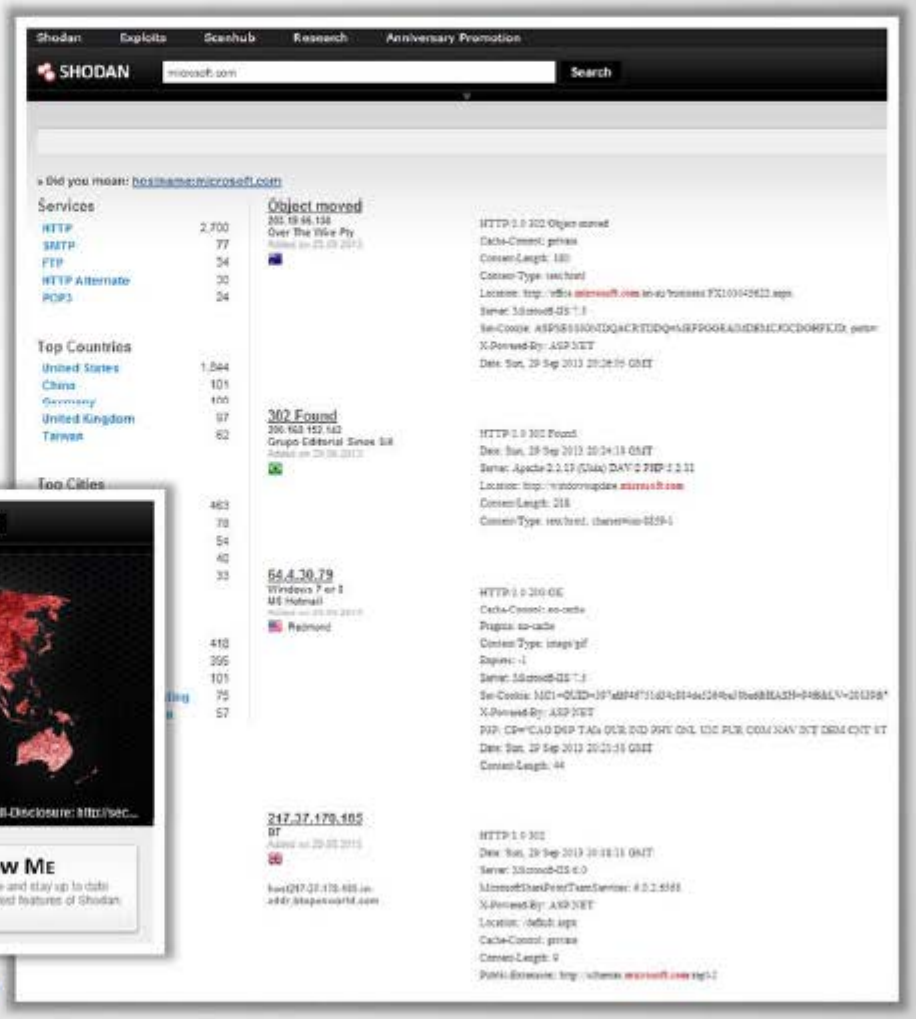
Rank	Site	Organisation	First Seen	Webserver	OS
-	www.encarta.com	unknown	July 1996	Microsoft-IIS/7.5	Windows Server 2008
358	msdn.microsoft.com	unknown	September 1998	Microsoft-IIS/8.0	Citrix Netscaler
241	technet.microsoft.com	unknown	August 1999	Microsoft-IIS/8.0	Citrix Netscaler
-	www.microsoft.be	unknown	February 1999	Microsoft-IIS/7.5	unknown
-	adreport.msn.com	unknown	March 2000	BigIP	F5 BIG-IP
-	www.solomon.com	unknown	October 1995	Microsoft-IIS/7.5	Windows Server 2008
185106	www.itn.co.uk	unknown	June 1997	Microsoft-IIS/8.0	Windows Server 2012
-	www.microsoft.com	unknown	April 1999	Microsoft-IIS/7.5	Windows Server 2008
-	www.microsoft.com	unknown	July 2008	Microsoft-IIS/7.0	Windows Server 2008
138898	microsoft.de	unknown	January 2002	Microsoft-IIS/7.5	unknown
-	ads.msn.com	unknown	January 1997	Microsoft-IIS/7.5	unknown
-	www.1hotmail.com	unknown	September 1999	Microsoft-IIS/7.5	Windows Server 2008
191698	Watson.Microsoft.Com	unknown	March 2002	Microsoft-IIS/8.0	unknown
425919	schemas.xmlsoap.org	unknown	November 2001	Microsoft-IIS/7.5	unknown
-	biztalk.org	unknown	March 2000	Microsoft-IIS/7.5	unknown
-	activedesk.msn.com	unknown	April 1998	Microsoft-IIS/7.5	Citrix Netscaler
-	ads.jp.msn.com	unknown	August 1999	Microsoft-IIS/7.5	unknown
315876	technet.com	unknown	February 2010	Microsoft-IIS/7.5	unknown
17708	www.mastergooddeal.com	unknown	May 2009	Microsoft-IIS/7.5	Windows Server 2008
-	mobile.msn.com	unknown	March 2000	Microsoft-IIS/6.0	unknown

http://www.netcraft.com

Determining the Operating System (Cont'd)

Use SHODAN search engine that lets you **find specific computers** (routers, servers, etc.) using a variety of filters

SHODAN
Computer Search Engine



http://www.shodanhq.com

Collect Location Information

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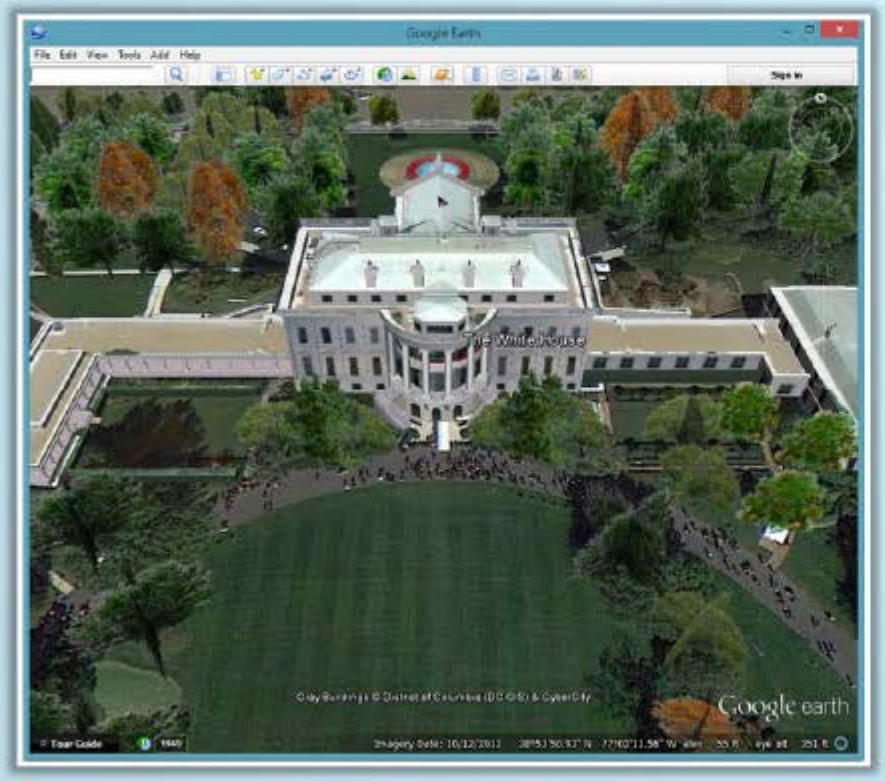
Google Earth

Use Google Earth tool to get the physical location of the target



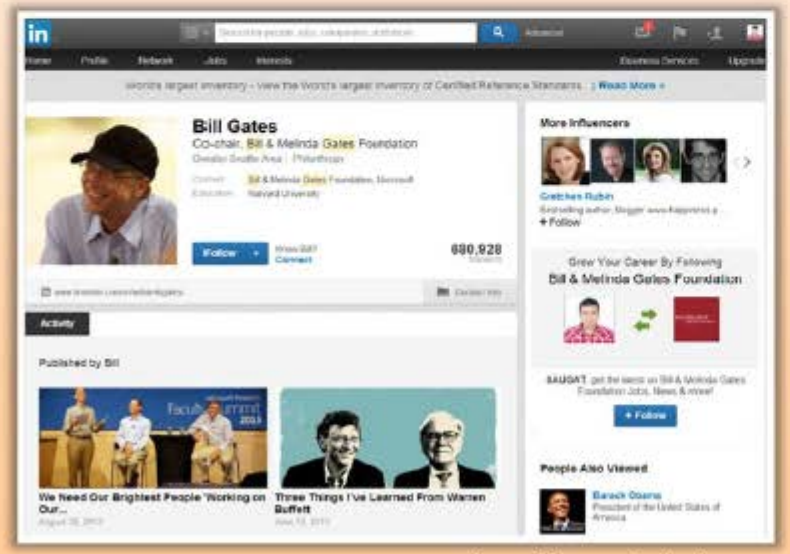
http://www.google.com

Tools for finding the geographical location

- **Google Maps**
  https://maps.google.com
- **Wikimapia**
  http://www.wikimapia.org
- **National Geographic Maps**
  http://maps.nationalgeographic.com
- **Yahoo Maps**
  http://maps.yahoo.com
- **Bing Maps**
  http://www.bing.com/maps

People Search: Social Networking Sites/People Search Services

- Social networking sites are the great source of personal and organizational information
- Information about an individual can be found at various **people search websites**
- The people search returns the following **information about a person or organization**:
  - Residential addresses and email addresses
  - Contact numbers and date of birth
  - Photos and social networking profiles
  - Blog URLs
  - Satellite pictures of private residencies
  - Upcoming projects and operating environment



http://www.linkedin.com

https://pipl.com

People Search Online Services

AnyWho
http://www.anywho.com

US Search
http://www.ussearch.com

Intelius
http://www.intelius.com

411
http://www.411.com

PeopleFinders
http://www.peoplefinders.com

PeopleSmart
http://www.peoplesmart.com

Veromi
http://www.veromi.net

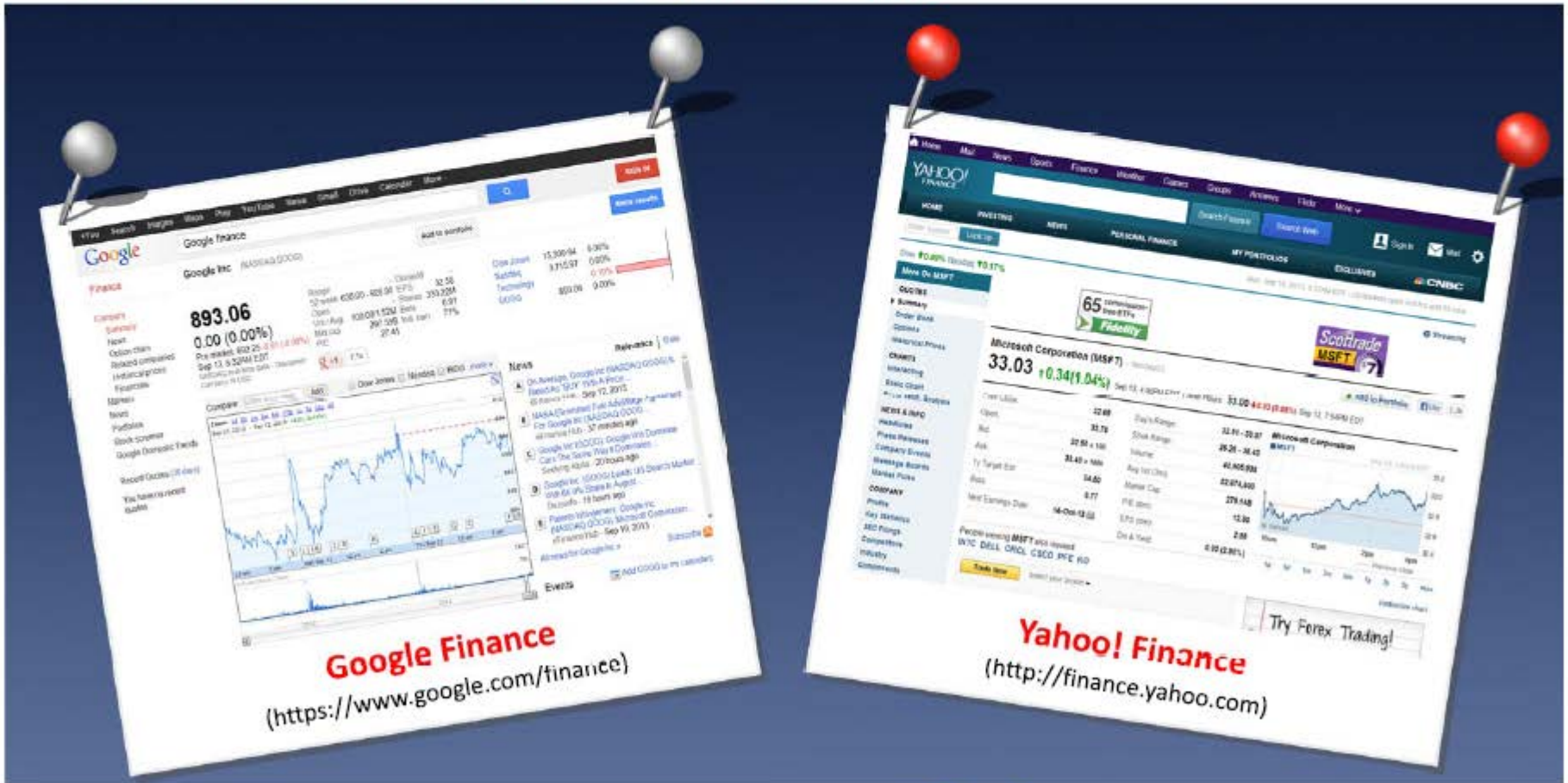
PrivateEye
http://www.privateeye.com

People Search Now
http://www.peoplesearchnow.com

Public Background Checks
http://www.publicbackgroundchecks.com

Gather Information from Financial Services

Financial services provide a useful information about the target company such as the **market value of a company's shares**, **company profile**, **competitor details**, etc.



Footprinting through Job Sites

You can gather **company's infrastructure details** from job postings

Enterprise Applications Engineer/DBA

About Us:
Since 1984, the Word & Brown Family of Companies have been connecting business to industry-leading solutions in every area of health insurance and benefits services. We've built a reputation for providing brokers, carriers, employers, individuals and families with access to the services, tools and technology that help them succeed. We call it providing, "Service of Unequalled Excellence".

We extend this same level of service to our most important asset: our employees! We offer competitive salaries and benefits, but our strength is our family culture. We foster a casual but hard working environment, organize fun monthly events and regularly recognize our employees through a variety of programs. We provide in-house corporate training to sharpen skills so our employees are not only successful in their current jobs, but can follow a career path. We take pride in promoting from within!

If this is the kind of family you would like to be a part of, please check out this employment opportunity and join our team!

Job Description:

The Enterprise Applications Engineer's role is to plan, implement, manage, administer and support core business application software for corporate enterprise needs. This includes, but is not limited to: Microsoft IIS, Microsoft Exchange 2010 and Unified Messaging, Microsoft SharePoint, Microsoft Great Plains, Microsoft CRM, Microsoft SQL Server 2005 and 2008, Microsoft Team Foundation Server 2008 and 2010, Microsoft SCOM, proprietary developed software and open source applications utilized by the company.

Job Knowledge and Skills:

Position requires strong knowledge of Windows server 2003/2008 Active Directory administration and networking (TCP/IP ver4, DNS and DHCP)/. Must have experience with and strong working knowledge of Microsoft SQL 2005 and 2008, Microsoft Exchange 2010 messaging systems, Microsoft SharePoint, Microsoft CRM and Microsoft SCOM. Must have basic programming and scripting skills. Prefer C# and Power Shell scripting experience. Must be knowledgeable of server class hardware and Network infrastructure best practices. MCITP EA, server, messaging, SQL etc. and/or MCTS, MCSE certification preferred. Bachelor degree in Computer Science or Network Engineering, professional training or equivalent experience

POSITION INFORMATION

Company:
Word & Brown Insurance Administrators Inc

Location:
Orange, CA 92868

Job Status/Type:
Full Time Employee

Job Category:
IT/Software Development

Occupations:
Database Development/ Administration
General/Other: IT/Software Development

Industry:
Insurance

Work Experience:
5+ to 7 Years

Career Level:
Experienced (Non-Manager)

Education Level:
Professional

CONTACT INFORMATION

Company:
Word & Brown Insurance Administrators Inc

Reference Code:
IT Operations

Look for these:

- Job requirements
- Employee's profile
- Hardware information
- Software information

Examples of Job Websites

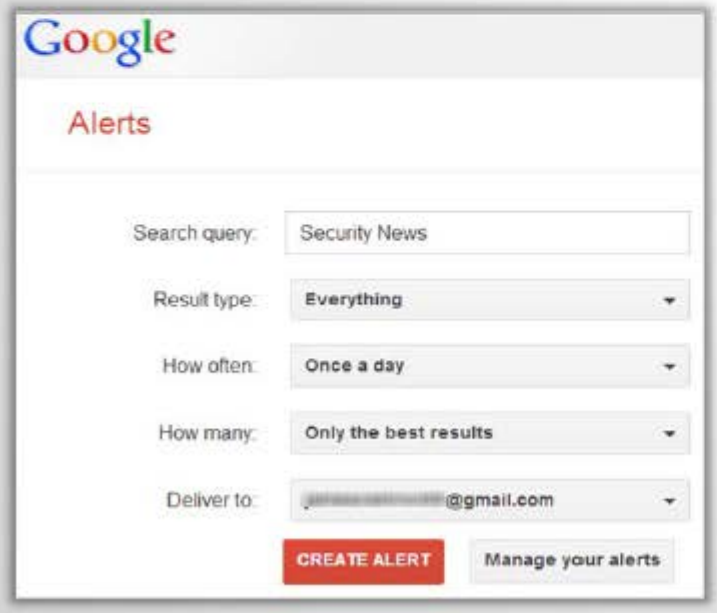
- http://www.linkedin.com
- http://www.monster.com
- http://www.careerbuilder.com
- http://www.dice.com
- http://www.simplyhired.com
- http://www.indeed.com
- http://www.usajobs.gov

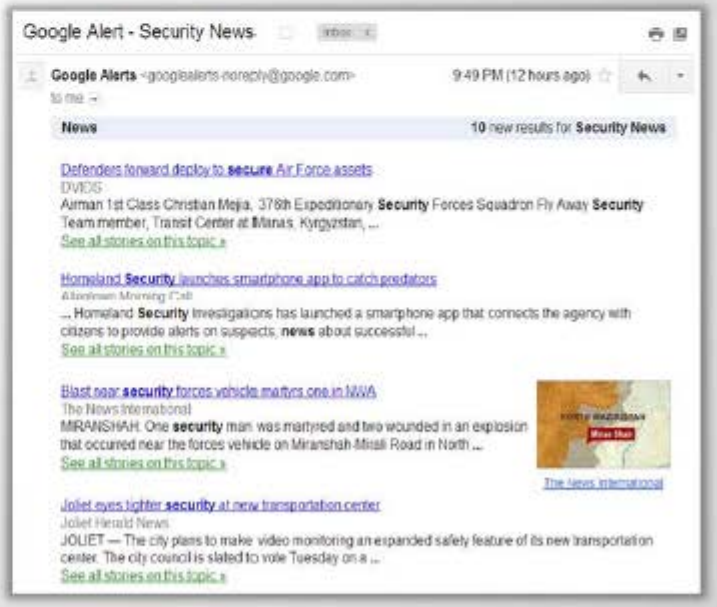
Monitoring Target Using Alerts

Alerts are the **content monitoring services** that provide **up-to-date information** based on your preference usually via email or SMS in an automated manner

Examples of Alert Services

1. Google Alerts - http://www.google.com/alerts
2. Yahoo! Alerts - http://alerts.yahoo.com
3. Twitter Alerts - https://twitter.com/alerts
4. Giga Alert - http://www.gigaalert.com





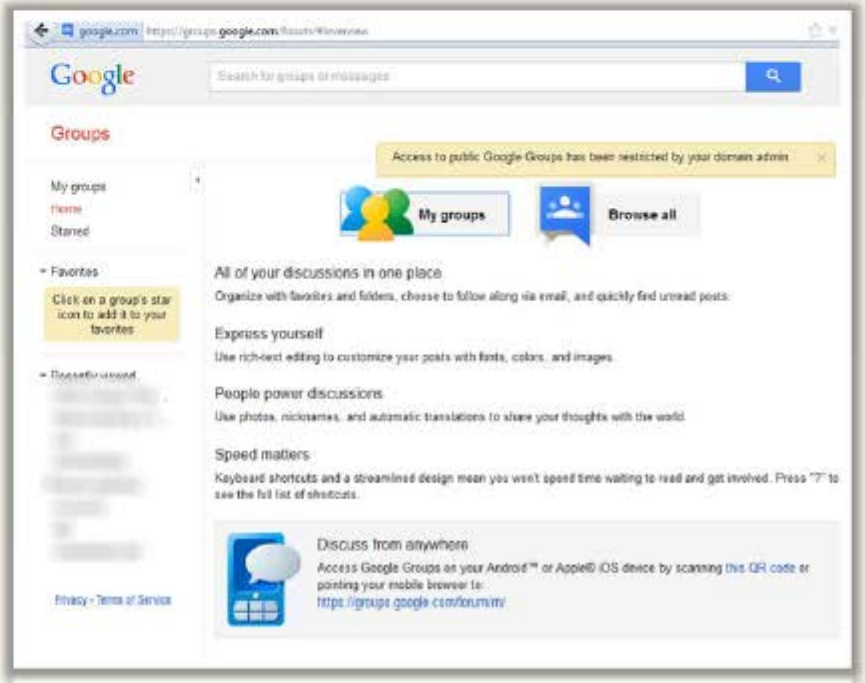
Information Gathering Using Groups, Forums, and Blogs

Groups, forums, and blogs provide sensitive information about a target such as **public network information**, **system information**, **personal information**, etc.

Register with fake profiles in **Google groups**, **Yahoo groups**, etc. and try to join the target organization's employee groups where they share personal and company information

Search for information by Fully Qualified Domain Names (**FQDNs**), **IP addresses**, and **usernames** in groups, forums, and blogs

Google Groups



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Footprint Using Advanced Google Hacking Techniques

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Query String

Google hacking refers to creating complex search queries in order to extract sensitive or hidden information

Vulnerable Targets

It helps attackers to find vulnerable targets

Google Operators

It uses advanced Google search operators to locate specific strings of text within the search results

Google Advance Search Operators

Google supports several advanced operators that help in modifying the search

[cache:]	Displays the web pages stored in the Google cache
[link:]	Lists web pages that have links to the specified web page
[related:]	Lists web pages that are similar to a specified web page
[info:]	Presents some information that Google has about a particular web page
[site:]	Restricts the results to those websites in the given domain
[allintitle:]	Restricts the results to those websites with all of the search keywords in the title
[intitle:]	Restricts the results to documents containing the search keyword in the title
[allinurl:]	Restricts the results to those with all of the search keywords in the URL
[inurl:]	Restricts the results to documents containing the search keyword in the URL

Google Hacking Databases

Google Hacking Database (GHDB)

http://www.hackersforcharity.org

Google Dorks

http://www.exploit-db.com

Information Gathering Using Google Advanced Search

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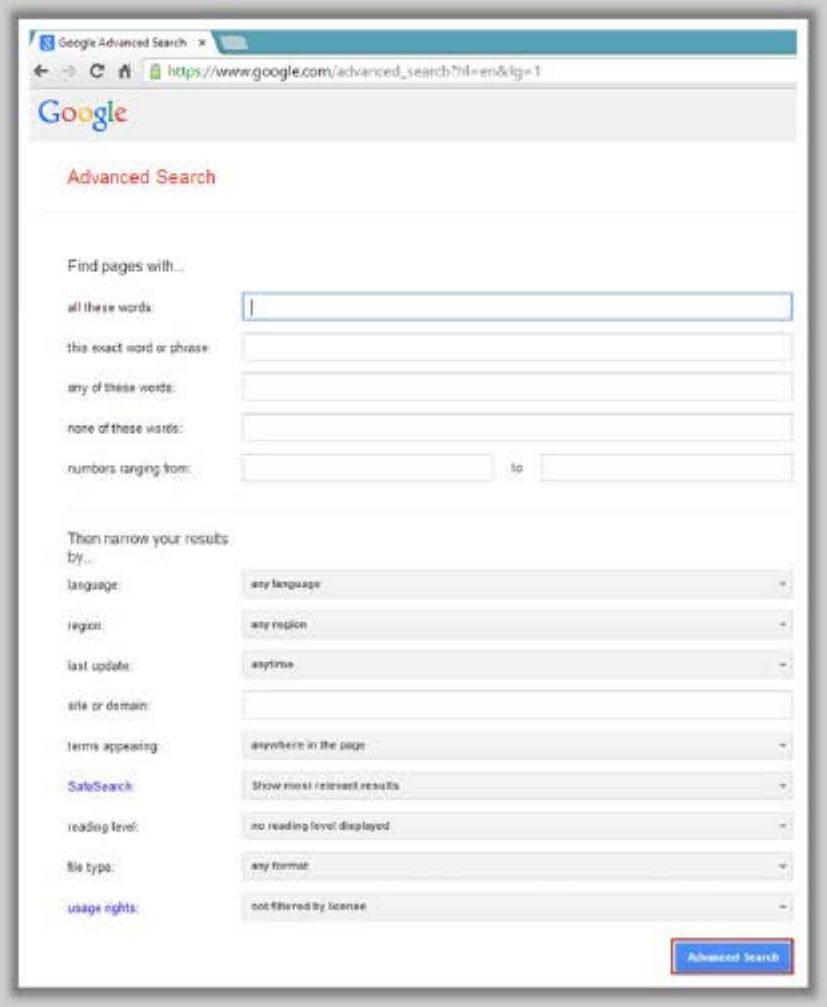
Use Google Advanced Search option to find sites that may link back to the target company's website

This may extract information such as partners, vendors, clients, and other affiliations for target website

With Google Advanced Search option, you can search web more precisely and accurately

Google



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Collect Information through Social Engineering on Social Networking Sites

Attackers use social engineering trick to gather sensitive information from social networking websites such as **Facebook**, **MySpace**, **LinkedIn**, **Twitter**, **Pinterest**, **Google+**, etc.

Attackers create a **fake profile** on social networking sites and then use the false identity to lure the employees to give up their sensitive information

Employees may **post personal information** such as date of birth, educational and employment backgrounds, spouses names, etc. and information about their company such as potential clients and business partners, trade secrets of business, websites, company's upcoming news, mergers, acquisitions, etc.

Attackers collect information about employee's interests by **tracking their groups** and then trick the employee to reveal more information

Information Available on Social Networking Sites

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Website Footprinting

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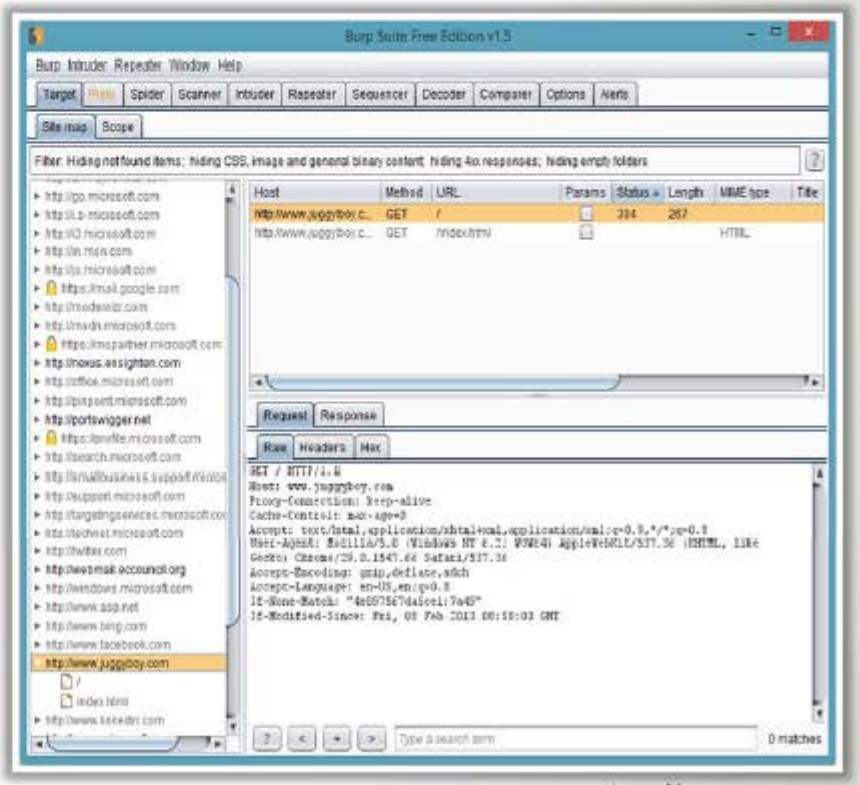
1. Website footprinting refers to **monitoring and analyzing the target organization's website** for information

2. Browsing the target website may provide:
   - Software used and its version
   - Operating system used
   - Sub-directories and parameters
   - Filename, path, database field name, or query
   - Scripting platform
   - Contact details and CMS details

3. Use **Burp Suite**, **Zaproxy**, **Paros Proxy**, **Website Informer**, **Firebug**, etc. to view headers that provide:
   - Connection status and content-type
   - Accept-Ranges
   - Last-Modified information
   - X-Powered-By information
   - Web server in use and its version



http://portswigger.net

Website Footprinting (Cont'd)

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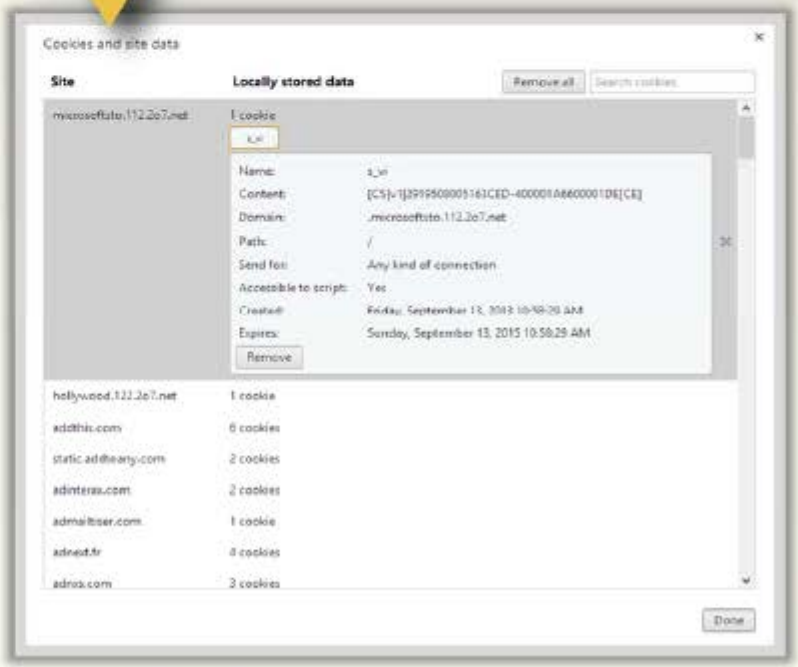
Examining HTML source provide:

- Comments in the source code
- Contact details of web developer or admin
- File system structure
- Script type

Examining cookies may provide:

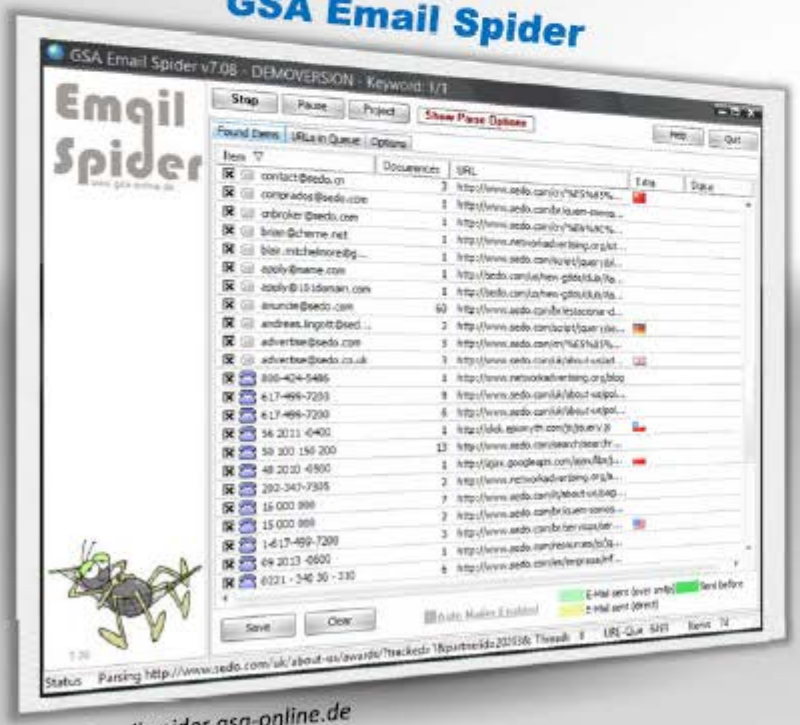
- Software in use and its behavior
- Scripting platforms used



Website Footprinting using Web Spiders

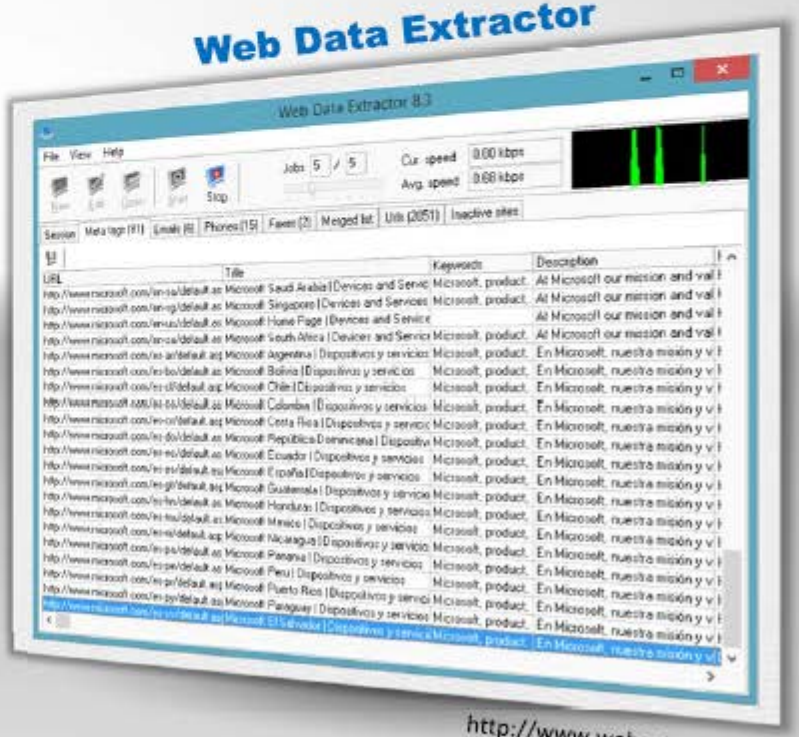
- Web spiders perform automated searches on the target website and collect specified information such as **employee names**, **email addresses**, etc.
- Attackers use the collected information to perform further **footprinting** and **social engineering attacks**

GSA Email Spider



http://email.spider.gsa-online.de

Web Data Extractor



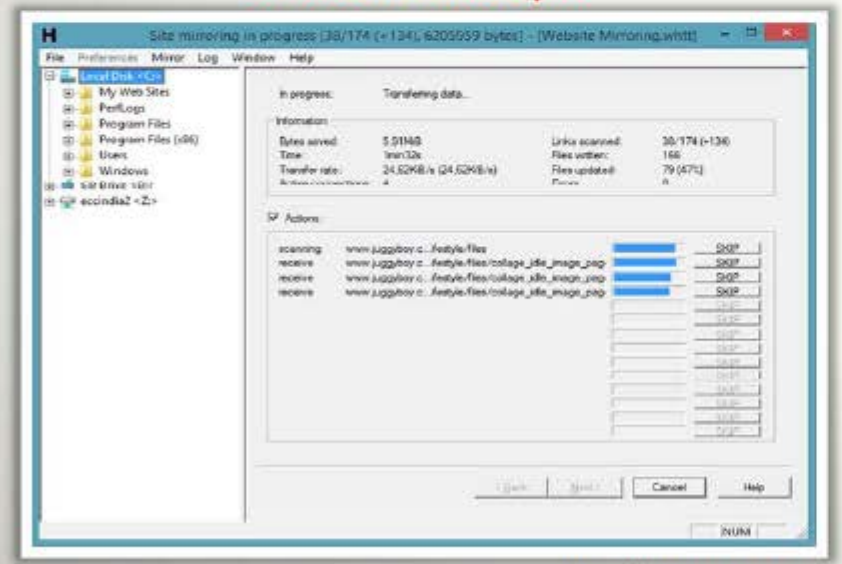
http://www.webextractor.com

Mirroring Entire Website

Mirroring an entire website onto the local system enables an attacker to browse website offline; it also assists in finding **directory structure** and other valuable information from the mirrored copy without multiple requests to web server

Web mirroring tools allow you to **download a website to a local directory**, building recursively all directories, HTML, images, flash, videos, and other files from the server to your computer

HTTrack Web Site Copier



(http://www.httrack.com)

SurfOffline

(http://www.surfoffline.com)

Website Mirroring Tools

BlackWidow
http://softbytelabs.com

NCollector Studio
http://www.calluna-software.com

Website Ripper Copier
http://www.tensons.com

Teleport Pro
http://www.tenmax.com

Portable Offline Browser
http://www.metaproducts.com

PageNest
http://www.pagenest.com

Backstreet Browser
http://www.spadixbd.com

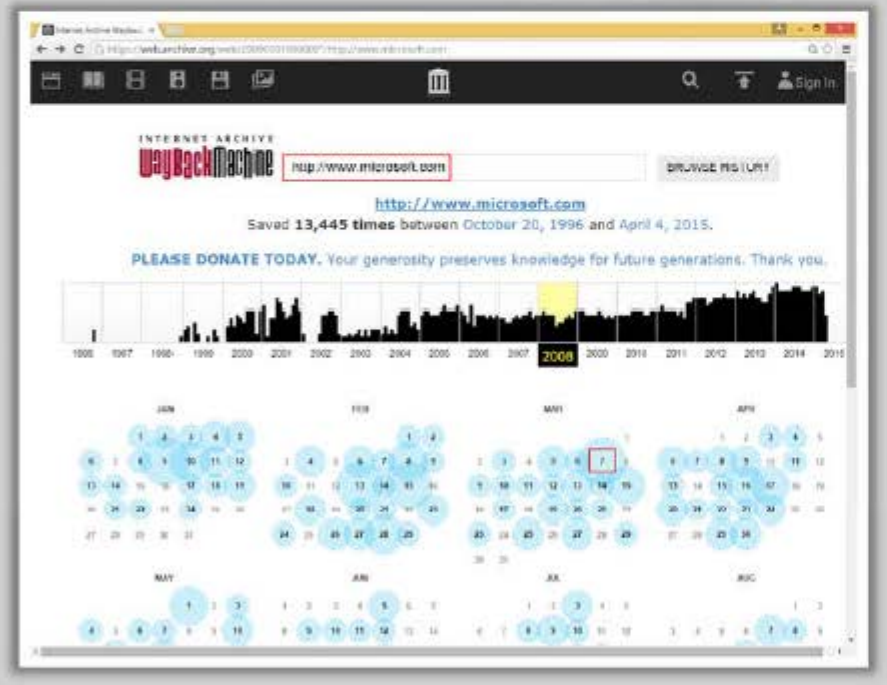
Offline Explorer Enterprise
http://www.metaproducts.com

GNU Wget
http://www.gnu.org

Hooeey Webprint
http://www.hooeeywebprint.com

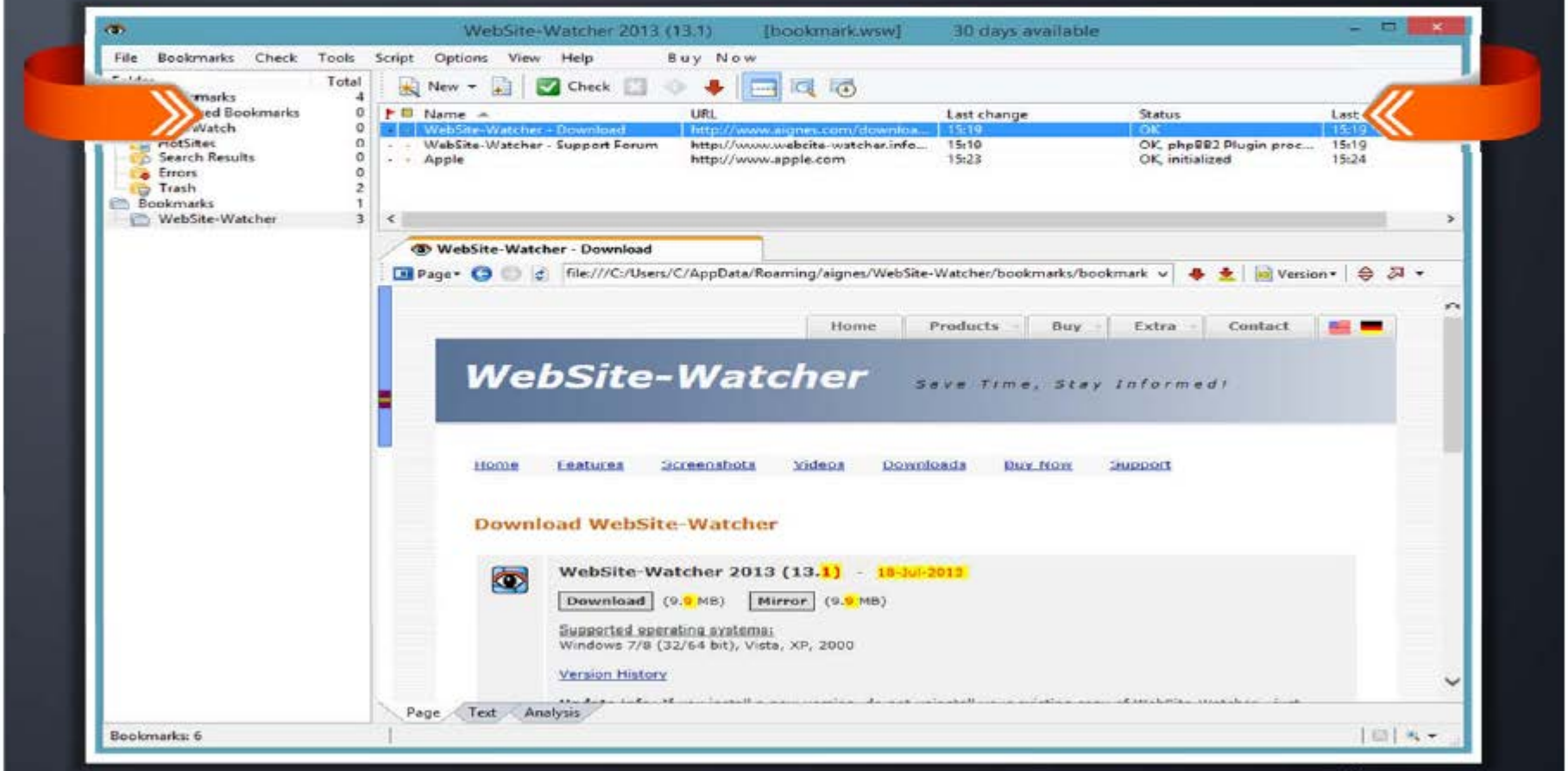
Extract Website Information from http://www.archive.org

Internet Archive's Wayback Machine allows you to visit archived versions of websites



Monitoring Web Updates Using Website-Watcher

Website-Watcher automatically checks web pages for updates and changes



http://aignes.com

Web Updates Monitoring Tools

Change Detection
http://www.changedetection.com

OnWebChange
http://onwebchange.com

Follow That Page
http://www.followthatpage.com

Infominder
http://www.infominder.com

Page2RSS
http://page2rss.com

TrackedContent
http://trackedcontent.com

Watch That Page
http://www.watchthatpage.com

Websnitcher
http://websnitcher.com

Check4Change
https://addons.mozilla.org

Update Scanner
https://addons.mozilla.org

Footprinting Methodology

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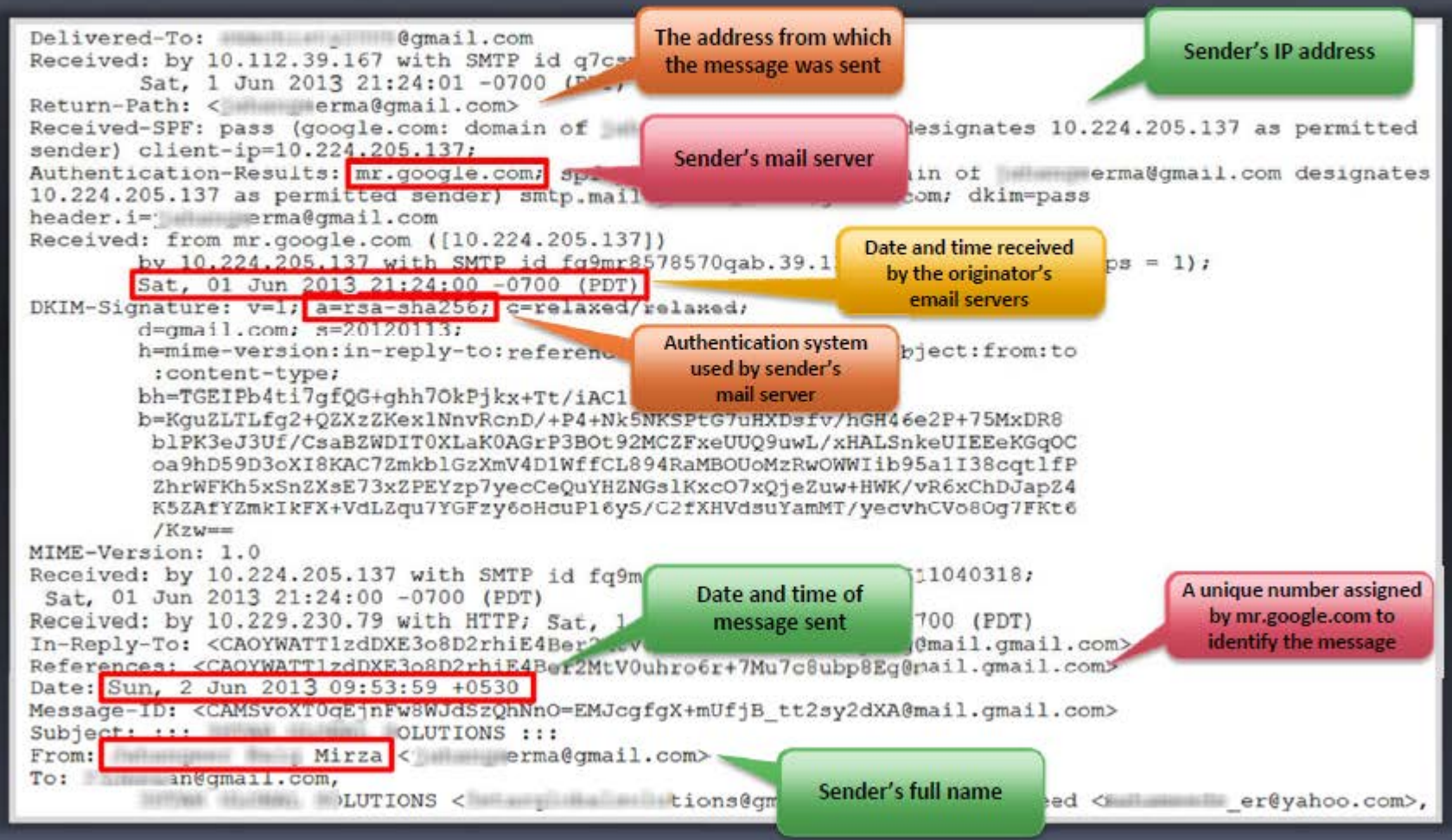
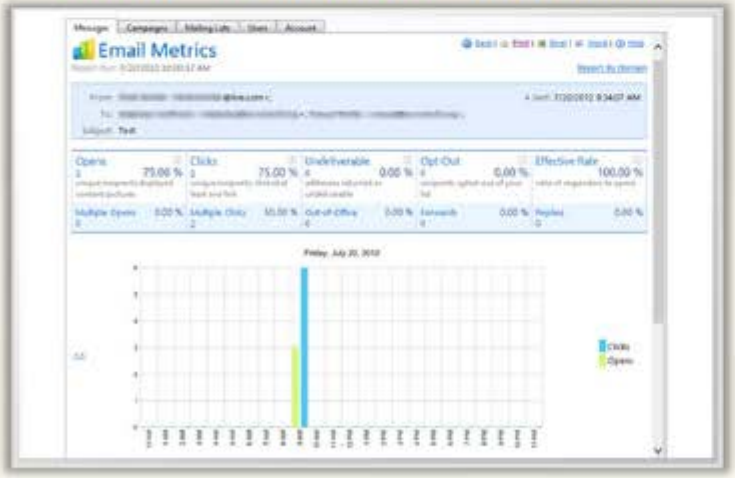
7. WHOIS Footprinting
8. DNS Footprinting
9. Network Footprinting
10. Footprinting through Social Engineering

Collecting Information from Email Header

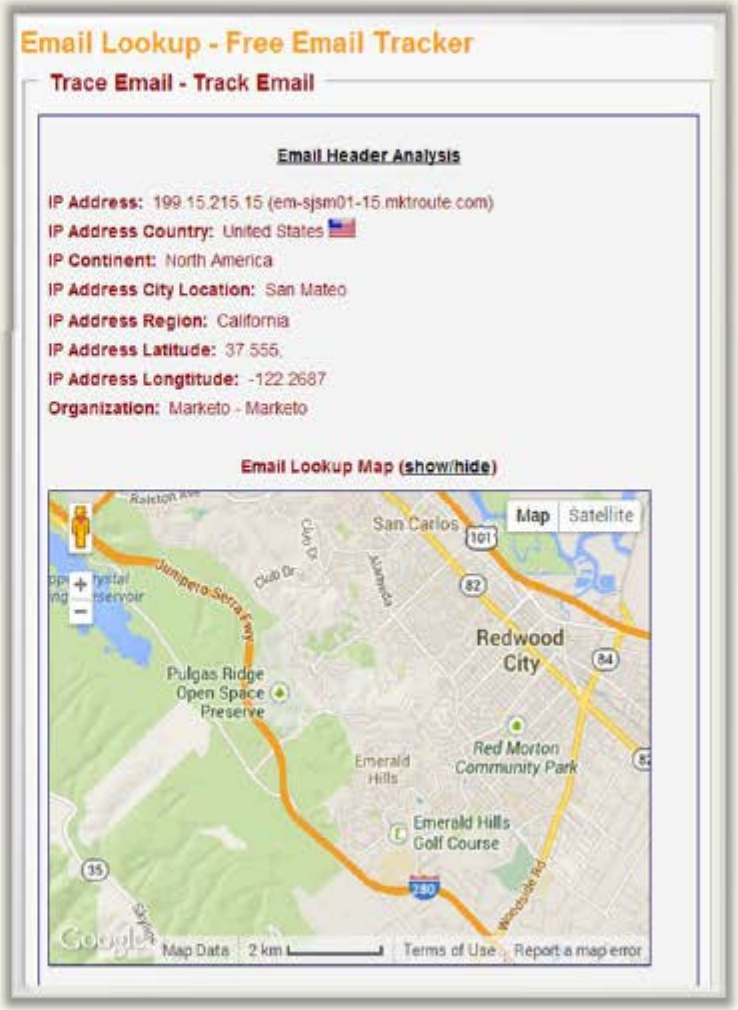


Email Tracking Tools

eMailTrackerPro (*http://www.emailtrackerpro.com*)



PoliteMail (*http://www.politemail.com*)



Email Lookup – Free Email Tracker (*http://www.ipaddresslocation.org*)

Email Tracking Tools (Cont'd)

Yesware
http://www.yesware.com

Zendio
http://www.zendio.com

ContactMonkey
https://contactmonkey.com

Pointofmail
http://www.pointofmail.com

Read Notify
http://www.readnotify.com

WhoReadMe
http://whoreadme.com

DidTheyReadIt
http://www.didtheyreadit.com

GetNotify
http://www.getnotify.com

Trace Email
http://whatismyipaddress.com

G-Lock Analytics
http://glockanalytics.com

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Competitive Intelligence Gathering

- Competitive intelligence gathering is the process of **identifying**, **gathering**, **analyzing**, **verifying**, and using information about your competitors from resources such as the Internet
- Competitive intelligence is **non-interfering** and **subtle in nature**

Sources of Competitive Intelligence

01 Company websites and employment ads

02 Search engines, Internet, and online DB

03 Press releases and annual reports

04 Trade journals, conferences, and newspaper

05 Patent and trademarks

06 Social engineering employees

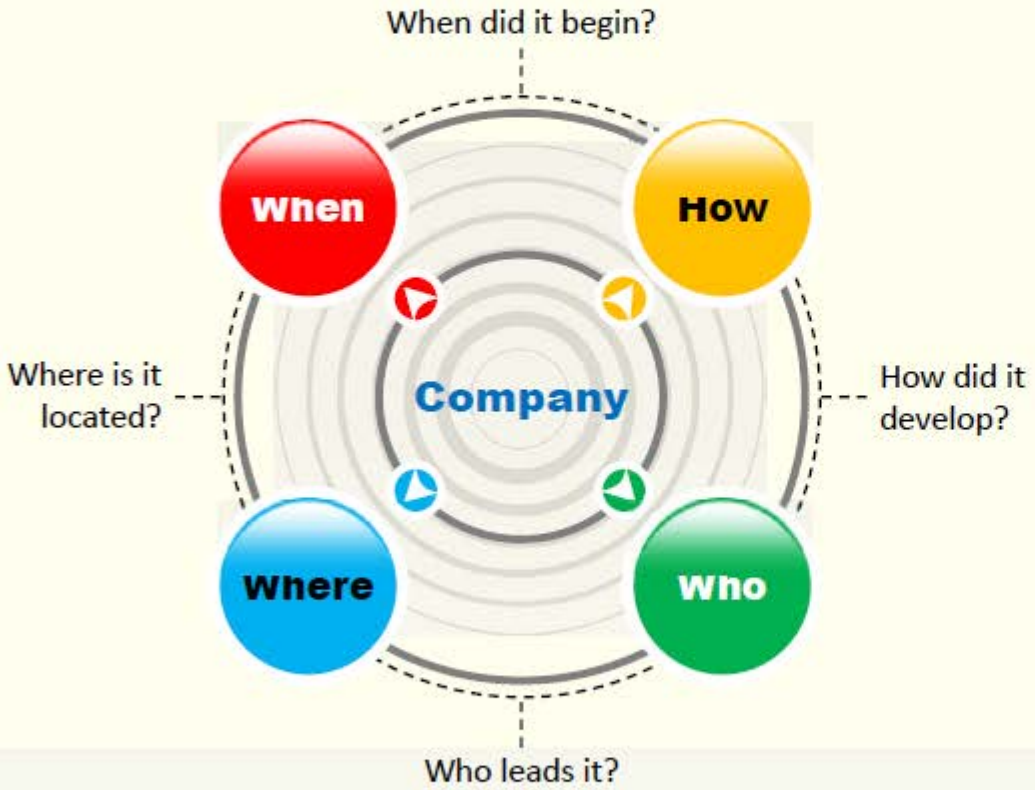
07 Product catalogues and retail outlets

08 Analyst and regulatory reports

09 Customer and vendor interviews

10 Agents, distributors, and suppliers

Competitive Intelligence - When Did this Company Begin? How Did it Develop?



Visit These Sites

01. EDGAR Database

http://www.sec.gov/edgar.shtml

02. Hoovers

http://www.hoovers.com/about-us.html

03. LexisNexis

http://www.lexisnexis.com

04. Business Wire

http://www.businesswire.com

Competitive Intelligence - What Are the Company's Plans?

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01 **Market Watch** (*http://www.marketwatch.com*)

02 **The Wall Street Transcript** (*http://www.twst.com*)

03 **Lipper Marketplace** (*http://www.lippermarketplace.com*)

04 **Euromonitor** (*http://www.euromonitor.com*)

05 **Experian** (*http://www.experian.com*)

06 **SEC Info** (*http://www.secinfo.com*)

07 **The Search Monitor** (*http://www.thesearchmonitor.com*)

Competitive Intelligence - What Expert Opinions Say About the Company

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ABI/INFORM Global

http://www.proquest.com

ProQuest

Compete PRO™

http://www.compete.com

compete

AttentionMeter

http://www.attentionmeter.com

AttentionMeter

Copernic Tracker

http://www.copernic.com

copernic

Jobitorial

http://www.jobitorial.com

Jobitorial

SEMRush

http://www.semrush.com

semrush competitors research

Monitoring Website Traffic of Target Company

- Attacker uses website traffic monitoring tools such as **web-stat**, **Alexa**, **Monitis**, etc. to collect the information about target company

Total visitors

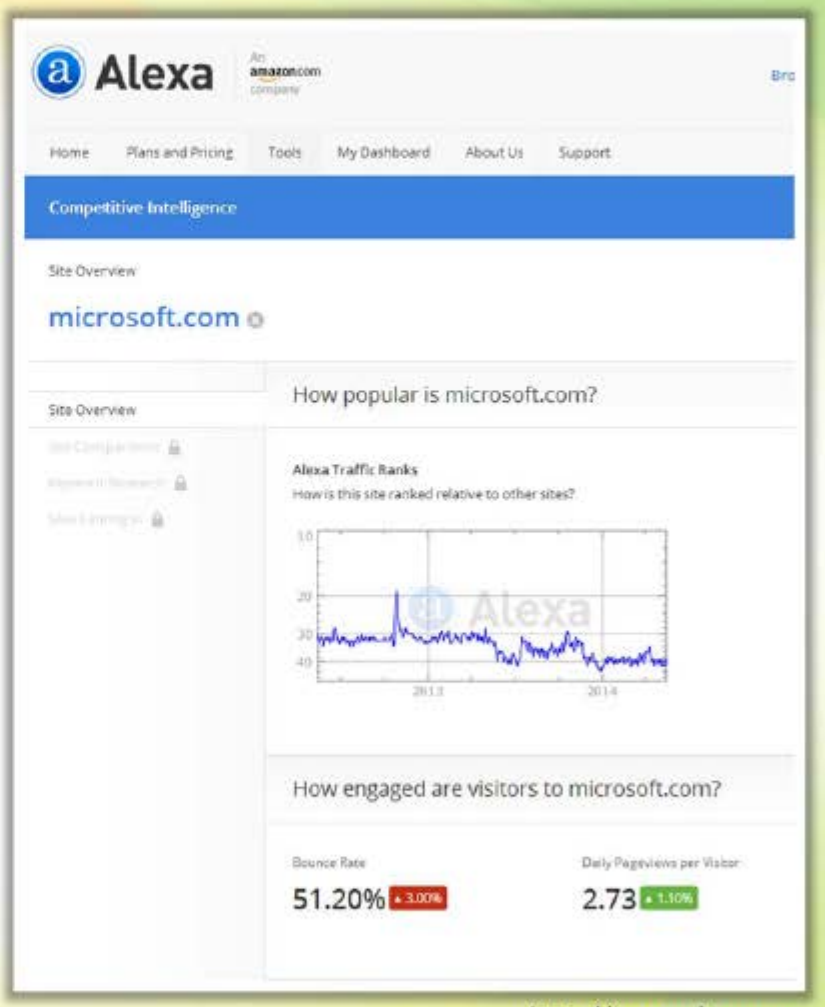
Page views

Bounce rate

Live visitors map

Site ranking

- Traffic monitoring helps to collect information about the **target's customer base** which help attackers to disguise as a customer and launch social engineering attacks on the target



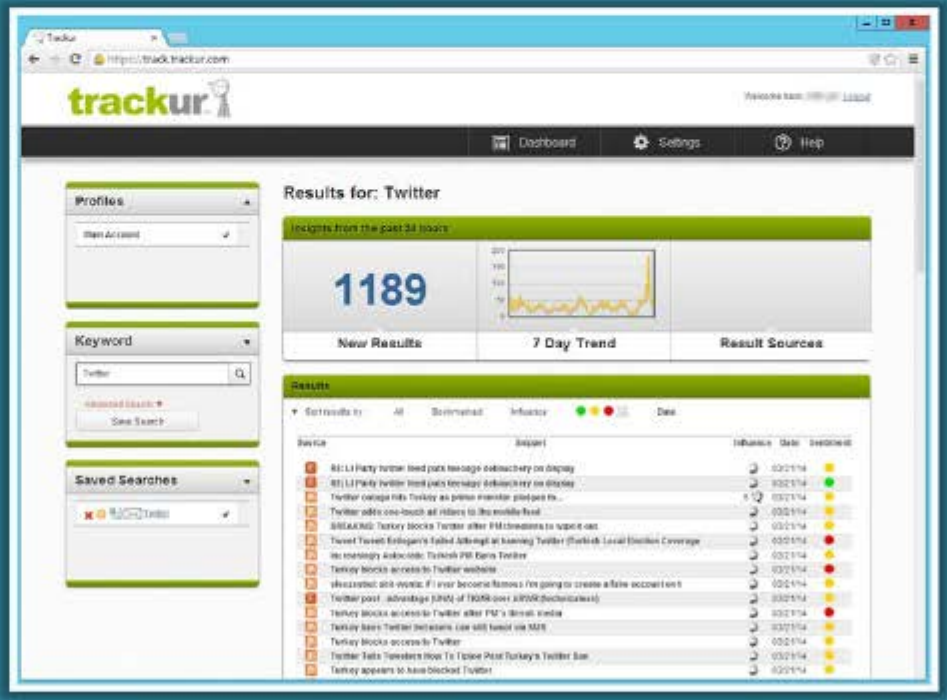
http://www.alexa.com

Tracking Online Reputation of the Target

- Online Reputation Management (ORM) is a process of **monitoring a company's reputation on Internet** and taking certain measures to minimize the negative search results/reviews and thereby improve its brand reputation

An attacker makes use of ORM tracking tools to:

- Track **company's online reputation**
- Collect company's **search engine ranking** information
- Obtain **email notifications** when a company is mentioned online
- Track **conversations**
- Obtain **social news** about the target organization



http://www.trackur.com

Tools for Tracking Online Reputation of the Target

Rankur
http://rankur.com

Google Alerts
http://www.google.com

Social Mention
http://www.socialmention.com

WhosTalkin
http://www.whostalkin.com

ReputationDefender
https://www.reputation.com

PR Software
http://www.cision.com

Naymz
http://www.naymz.com

BrandsEye
http://www.brandseye.com

Brandyourself
https://brandyourself.com

Talkwalker
http://www.talkwalker.com

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WHOIS Lookup

WHOIS databases are maintained by **Regional Internet Registries** and contain the **personal information of domain owners**

WHOIS query returns:

- Domain name details
- Contact details of domain owner
- Domain name servers
- NetRange
- When a domain has been created
- Expiry records
- Records last updated

Information obtained from WHOIS database assists an attacker to:

- Gather personal information that assists to perform social engineering

Regional Internet Registries (RIRs)

ARIN

AFRINIC

RIPE NCC

LACNIC

APNIC

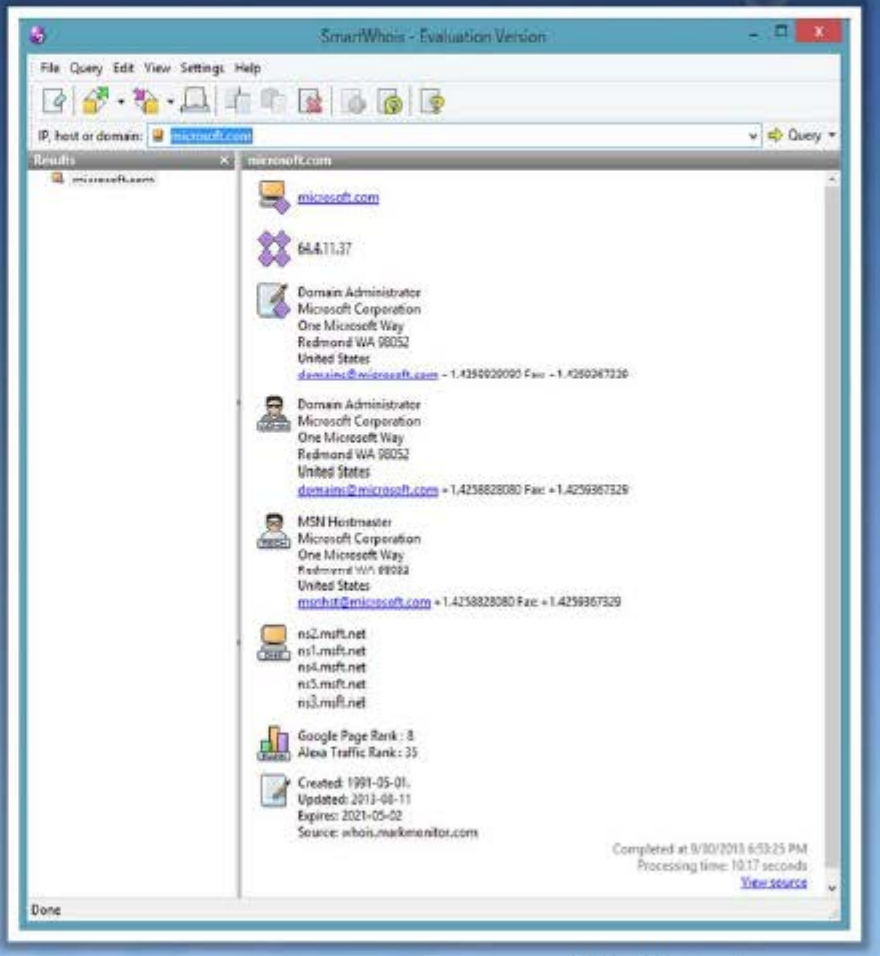
WHOIS Lookup Result Analysis

Whois Record for Microsoft.com

– Whois & Quick Stats

Email	domains@microsoft.com is associated with ~88,592 domains msnhst@microsoft.com is associated with ~44,295 domains abusecomplaints@markmonitor.com is associated with ~659,607 domains
Registrant Org	Microsoft Corporation is associated with ~67,950 other domains
Registrar	MARKMONITOR INC.
Registrar Status	clientDeleteProhibited, clientTransferProhibited, clientUpdateProhibited, serverDeleteProhibited, serverTransferProhibited, serverUpdateProhibited
Dates	Created on 1991-05-02 - Expires on 2021-05-03 - Updated on 2014-10-09
Name Server(s)	NS1.MSFT.NET (has 30,782 domains) NS2.MSFT.NET (has 30,782 domains) NS3.MSFT.NET (has 30,782 domains) NS4.MSFT.NET (has 30,782 domains)
IP Address	23.198.159.184 - 16 other sites hosted on this server
IP Location	- Washington - Seattle - Akamai Technologies Inc.
ASN	AS20940 AKAMAI-ASN1 Akamai International B.V. (registered Jul 10, 2001)
Domain Status	Registered And Active Website
Whois History	4,374 records have been archived since 2001-12-19
IP History	203 changes on 38 unique IP addresses over 11 years
Registrar History	4 registrars

http://whois.domaintools.com



http://www.tamos.com

WHOIS Lookup Tools

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LanWhoIs
http://lantricks.com

Batch IP Converter
http://www.networkmost.com

CallerIP
http://www.callerippro.com

Whols Lookup Multiple Addresses
http://www.sobolsoft.com

Whols Analyzer Pro
http://www.whoisanalyzer.com

HotWhois
http://www.tialsoft.com

ActiveWhois
http://www.johnru.com

WhoisThisDomain
http://www.nirsoft.net

SoftFuse Whois
http://www.softfuse.com

Whois
http://technet.microsoft.com

WHOIS Lookup Tools (Cont'd)

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Domain Dossier
http://centralops.net

Whois
http://tools.whois.net

BetterWhois
http://www.betterwhois.com

DNSstuff
http://www.dnsstuff.com

Whois Online
http://whois.online-domain-tools.com

Network Solutions Whois
http://www.networksolutions.com

Web Wiz
http://www.webwiz.co.uk/domain-tools/whois-lookup.htm

WebToolHub
http://www.webtoolhub.com/tn56138-1-whois-lookup.aspx

Network-Tools.com
http://network-tools.com

UltraTools
https://www.ultratools.com/whois/home

WHOIS Lookup Tools for Mobile

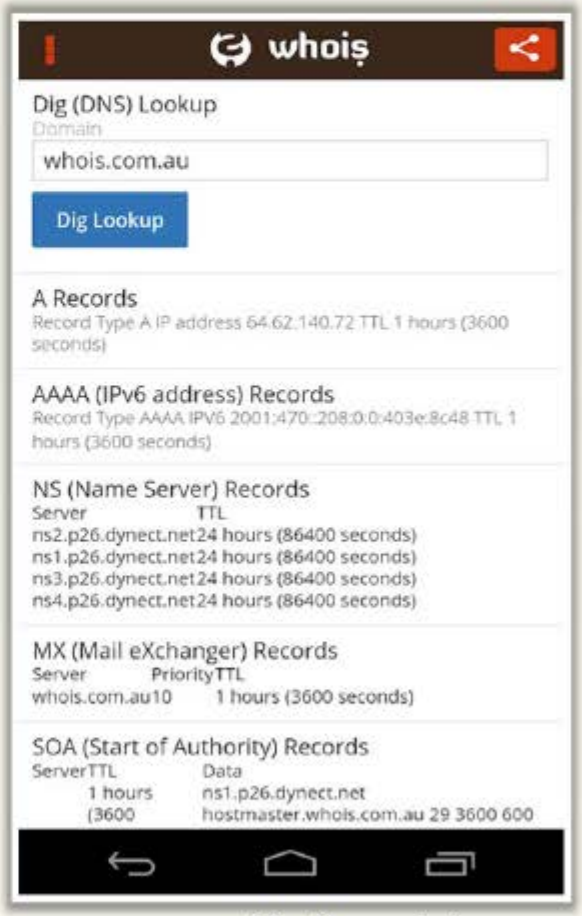
DNS Tools

https://www.dnssniffer.com

UltraTools Mobile

https://www.ultratools.com

Whois® Lookup Tool



http://www.whois.com.au

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Extracting DNS Information

Attacker can gather DNS information to **determine key hosts in the network** and can perform social engineering attacks

Record Type	Description
A	Points to a host's IP address
MX	Points to domain's mail server
NS	Points to host's name server
CNAME	Canonical naming allows aliases to a host
SDA	Indicate authority for domain
SRV	Service records
PTR	Maps IP address to a hostname
RP	Responsible person
HINFO	Host information record includes CPU type and OS
TXT	Unstructured text records

DNS records provide important information about location and type of servers

DNS Interrogation Tools

- http://www.dnsstuff.com
- http://network-tools.com

Extracting DNS Information (Cont'd)

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Domain Dossier

DNS records

name	class	type	data	time to live
yahoo.com	IN	SOA	server: ns1.yahoo.com email: hostmaster@yahoo-inc.com serial: 2015040304 refresh: 3600 retry: 300 expire: 1814400 minimum ttl: 600	1800s (00:30:00)
yahoo.com	IN	A	98.138.253.109	1800s (00:30:00)
yahoo.com	IN	A	206.190.36.45	1800s (00:30:00)
yahoo.com	IN	A	98.139.183.24	1800s (00:30:00)
yahoo.com	IN	MX	preference: 1 exchange: mta5.am0.yahoodns.net	1800s (00:30:00)
yahoo.com	IN	MX	preference: 1 exchange: mta6.am0.yahoodns.net	1800s (00:30:00)
yahoo.com	IN	MX	preference: 1 exchange: mta7.am0.yahoodns.net	1800s (00:30:00)
yahoo.com	IN	NS	ns4.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	NS	ns6.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	NS	ns5.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	NS	ns3.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	NS	ns2.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	NS	ns1.yahoo.com	172800s (2.00:00:00)
yahoo.com	IN	TXT	v=spf1 redirect=_spf.mail.yahoo.com	1800s (00:30:00)
109.253.138.98.in-addr.arpa	IN	PTR	ir1.fp.vip.ne1.yahoo.com	1800s (00:30:00)
253.138.98.in-addr.arpa	IN	NS	ns4.yahoo.com	172800s (2.00:00:00)
253.138.98.in-addr.arpa	IN	NS	ns1.yahoo.com	172800s (2.00:00:00)
253.138.98.in-addr.arpa	IN	NS	ns3.yahoo.com	172800s (2.00:00:00)
253.138.98.in-addr.arpa	IN	NS	ns5.yahoo.com	172800s (2.00:00:00)
253.138.98.in-addr.arpa	IN	NS	ns2.yahoo.com	172800s (2.00:00:00)
253.138.98.in-addr.arpa	IN	TXT	Contact for this domain is Yahoo! NOC, +1 408 349 5555	1800s (00:30:00)
253.138.98.in-addr.arpa	IN	SOA	server: hidden-master.yahoo.com email: hostmaster@yahoo-inc.com serial: 2014101602 refresh: 3600 retry: 600 expire: 5184000 minimum ttl: 1800	600s (00:10:00)

http://centralops.net

DNS Lookup

DNS Lookup for microsoft.com

Searcing for microsoft.com ANY Record at c.root-servers.net [192.33.4.12] refered to f.gtld-servers.net
Searcing for microsoft.com ANY Record at f.gtld-servers.net [192.35.51.30] refered to ns1.msft.net
Searcing for microsoft.com ANY Record at ns1.msft.net [208.84.0.53]

Results from ns1.msft.net [IP: 208.84.0.53] for microsoft.com ANY Record

Domain	Type	Time to Live	Answer
Answer			
microsoft.com	A	3600 [1 Hour]	134.170.188.221
microsoft.com	A	3600 [1 Hour]	134.170.185.46
microsoft.com	NS	172800 [2 Days]	ns4.msft.net
microsoft.com	NS	172800 [2 Days]	ns1.msft.net
microsoft.com	NS	172800 [2 Days]	ns2.msft.net
microsoft.com	NS	172800 [2 Days]	ns3.msft.net
microsoft.com	SOA	3600 [1 Hour]	**Primary Name Server:** ns1.msft.net
			Responsible: msnhst.microsoft.com
			Serial Number: 2015040301
			Refresh: 7200 [2 Hours]
			Retry: 600 [10 Minutes]
			Expire: 2419200 [28 Days]
			Minimum Time to Live: 3600 [1 Hour]
microsoft.com	MX	3600 [1 Hour]	microsoft-com.mail.protection.outlook.com [Preference: 10]
microsoft.com	TXT	3600 [1 Hour]	FbUF6DbkE+Aw1/wi9xgDi8KVrllZus5v8L6tblQZkGrQ/rVQKJ

https://network-tools.webwiz.co.uk

DNS Interrogation Tools

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DIG
http://www.kloth.net

myDNSTools
http://www.mydnstools.info

Professional Toolset
http://www.dnsstuff.com

DNS Records
http://network-tools.com

DNSData View
http://www.nirsoft.net

DNSWatch
http://www.dnswatch.info

DomainTools
http://www.domaintools.com

DNS Query Utility
http://www.dnsqueries.com

DNS Lookup
https://www.ultratools.com

DNS Query Utility
http://www.webmaster-toolkit.com

Locate the Network Range

- Network range information assists attackers to create a **map of the target network**
- Find the **range of IP addresses** using **ARIN whois database search** tool
- You can find the range of IP addresses and the subnet mask used by the target organization from **Regional Internet Registry (RIR)**

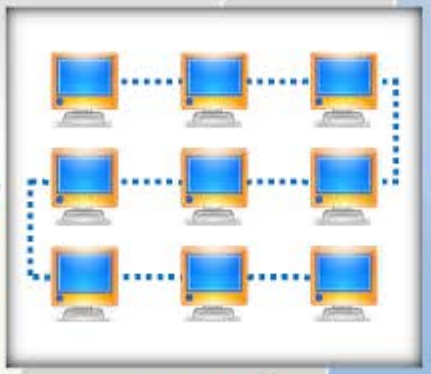
Network Whois Record

Queried whois.arin.net with "207.46.232.182"

Network	
NetRange	207.46.0.0 - 207.46.255.255
CIDR	207.46.0.0/16
Name	MICROSOFT-GLOBAL-NET
Handle	NET-207-46-0-0-1
Parent	NET207 (NET-207-0-0-0-0)
Net Type	Direct Assignment
Origin AS	
Organization	Microsoft Corporation (MSFT)
Registration Date	1997-03-31
Last Updated	2013-08-20
Comments	
RESTful Link	http://whois.arin.net/rest/net/NET-207-46-0-0-1
See Also	Related organization's POC records.
See Also	Related delegations.

Organization	
Name	Microsoft Corporation
Handle	MSFT
Street	One Microsoft Way
City	Redmond
State/Province	WA
Postal Code	98052
Country	US
Registration Date	1998-07-10
Last Updated	2013-08-21
Comments	To report suspected security issues specific to traffic emanating from Microsoft online services, including the distribution of malicious content or other illicit or illegal material through a Microsoft online service, please submit reports to: * https://cert.microsoft.com. For SPAM and other abuse issues, such as Microsoft Accounts, please contact: * abuse@microsoft.com. To report security vulnerabilities in Microsoft products and services, please contact: * secure@microsoft.com. For legal and law enforcement-related requests, please contact: * mandoc@microsoft.com For routing, peering or DNS issues, please contact:

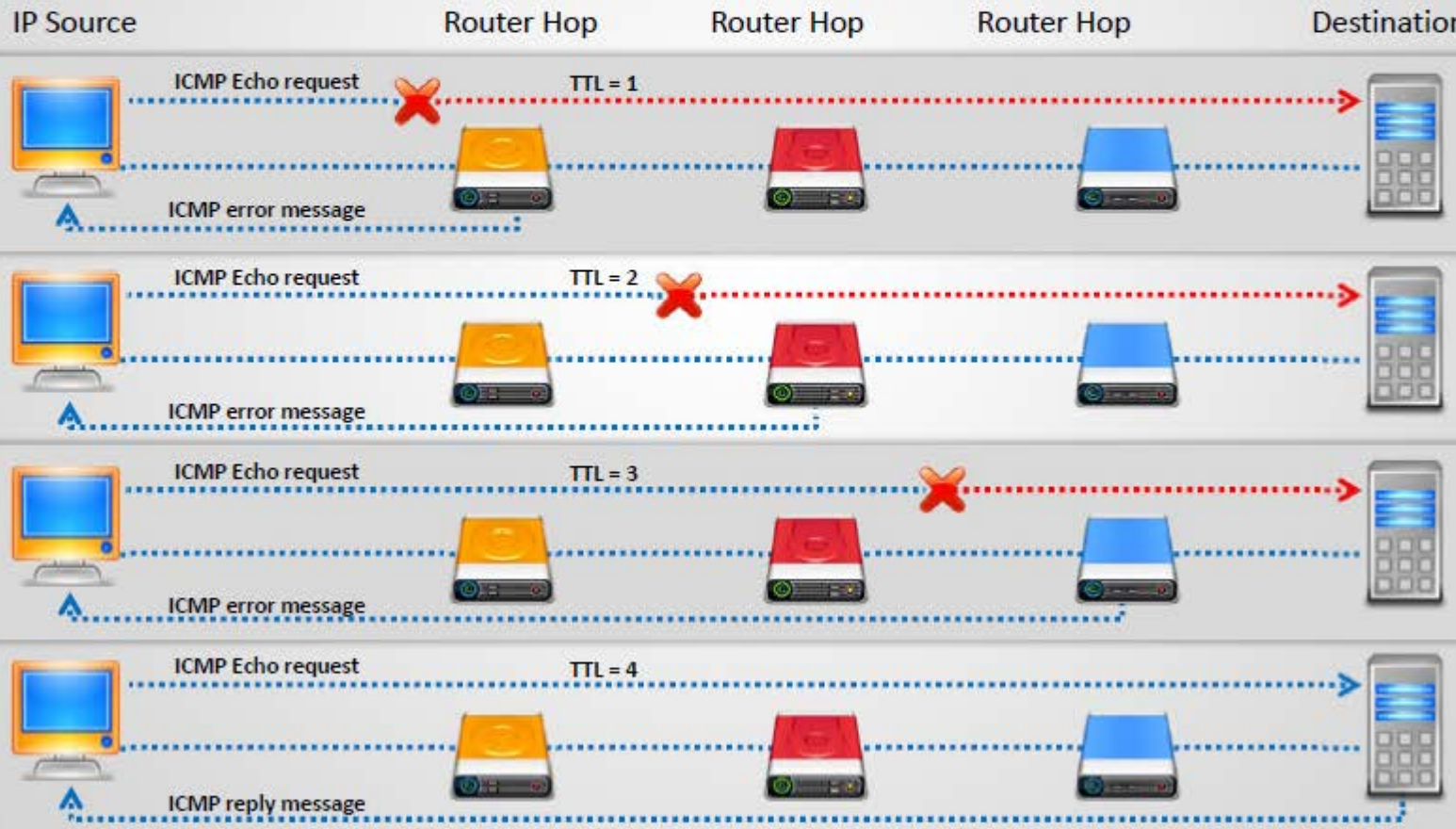
Attacker



Network

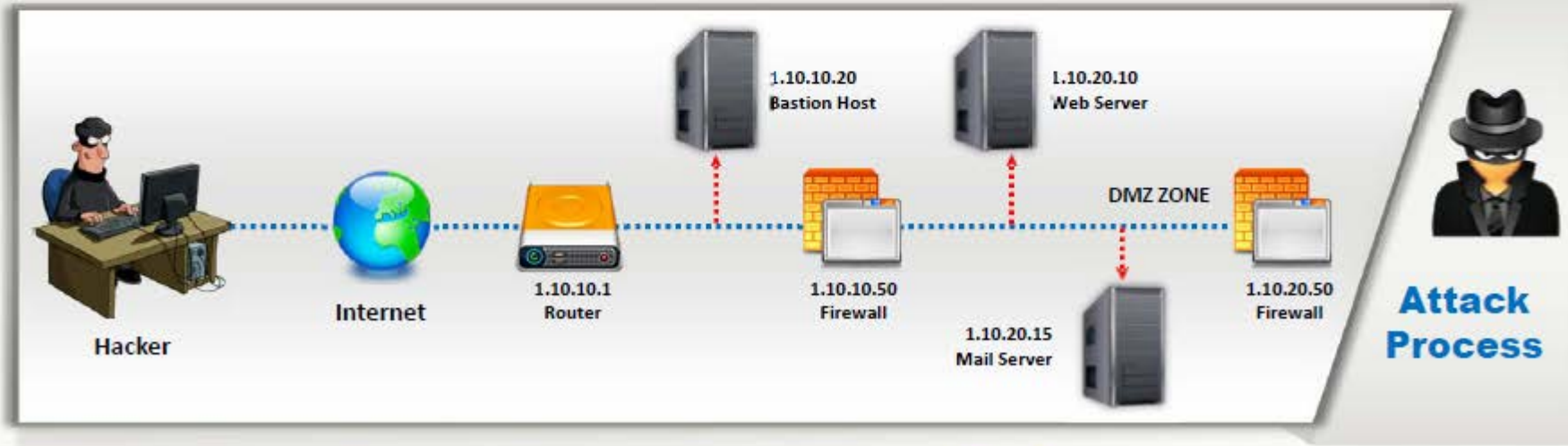
Traceroute

Traceroute programs work on the concept of **ICMP protocol** and **use the TTL field in the header of ICMP packets** to discover the routers on the path to a target host



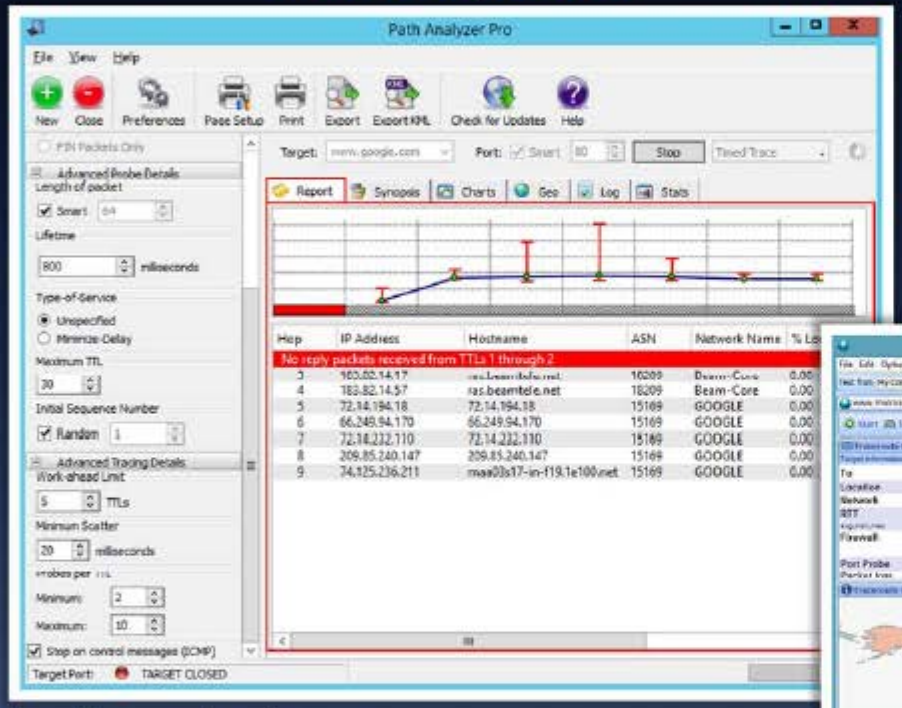
Traceroute Analysis

- Attackers conduct traceroute to extract information about: **network topology**, **trusted routers**, and **firewall locations**
- For example: after running several **traceroutes**, an attacker might obtain the following information:
  - traceroute 1.10.10.20, second to last hop is 1.10.10.1
  - traceroute 1.10.20.10, third to last hop is 1.10.10.1
  - traceroute 1.10.20.10, second to last hop is 1.10.10.50
  - traceroute 1.10.20.15, third to last hop is 1.10.10.1
  - traceroute 1.10.20.15, second to last hop is 1.10.10.50
- By putting this information together, attackers can draw the **network diagram**



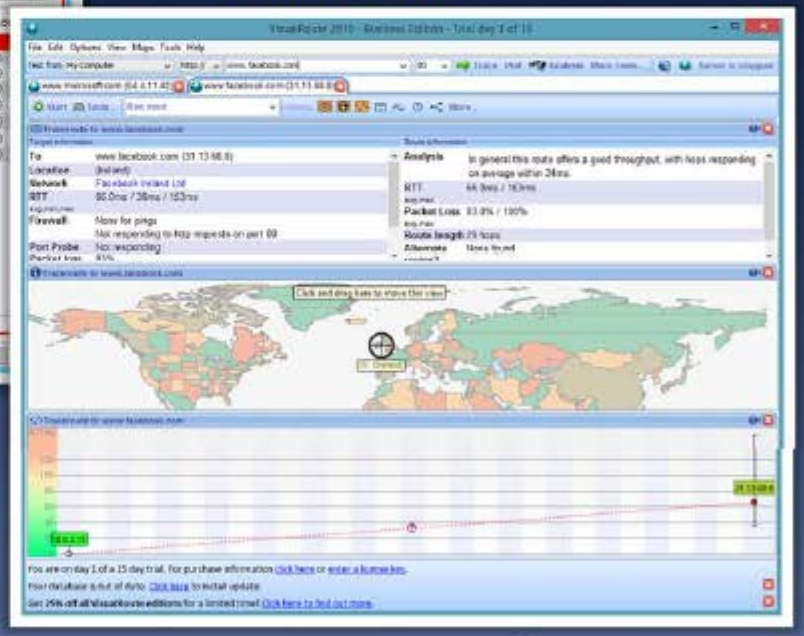
Traceroute Tools

Path Analyzer Pro



http://www.pathanalyzer.com

VisualRoute



http://www.visualroute.com

Traceroute Tools (Cont'd)

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Network Pinger
http://www.networkpinger.com

GEOSpider
http://www.oreware.com

vTrace
http://vtrace.pl

Trout
http://www.mcafee.com

Roadkil's Trace Route
http://www.roadkil.net

Magic NetTrace
http://www.tialsoft.com

3D Traceroute
http://www.d3tr.de

AnalogX HyperTrace
http://www.analogx.com

Network Systems Traceroute
http://www.net.princeton.edu

Ping Plotter
http://www.pingplotter.com

Footprinting Methodology

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1. Footprinting through Search Engines
2. Footprinting Using Advanced Google Hacking Techniques
3. Footprinting through Social Networking Sites
4. Website Footprinting
5. Email Footprinting
6. Competitive Intelligence
7. WHOIS Footprinting
8. DNS Footprinting
9. Network Footprinting
10. Footprinting through Social Engineering

Footprinting through Social Engineering

- Social engineering is an art of exploiting human behaviour to extract confidential information
- Social engineers depend on the fact that people are unaware of their valuable information and are careless about protecting it

Social engineers attempt to gather:

- Credit card details and social security number
- User names and passwords
- Security products in use
- Operating systems and software versions
- Network layout information
- IP addresses and names of servers

Social engineering techniques:

- Eavesdropping
- Shoulder surfing
- Dumpster diving
- Impersonation on social networking sites

Collect Information Using Eavesdropping, Shoulder Surfing, and Dumpster Diving

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Eavesdropping

- Eavesdropping is **unauthorized listening of conversations** or reading of messages
- It is **interception of any form of communication** such as audio, video, or written

Shoulder Surfing

- Shoulder surfing is a technique, where **attackers secretly observes the target** to gain critical information
- Attackers gather information such as **passwords**, **personal identification number**, account numbers, credit card information, etc.

Dumpster Diving

- Dumpster diving is **looking for treasure in someone else's trash**
- It involves collection of **phone bills**, **contact information**, **financial information**, operations related information, etc. from the target company's trash bins, printer trash bins, user desk for sticky notes, etc.

Module Flow

1. Footprinting Concepts
2. Footprinting Methodology
3. Footprinting Tools
4. Footprinting Countermeasures
5. Footprinting Penetration Testing

Footprinting Tool: Maltego

Internet Domain

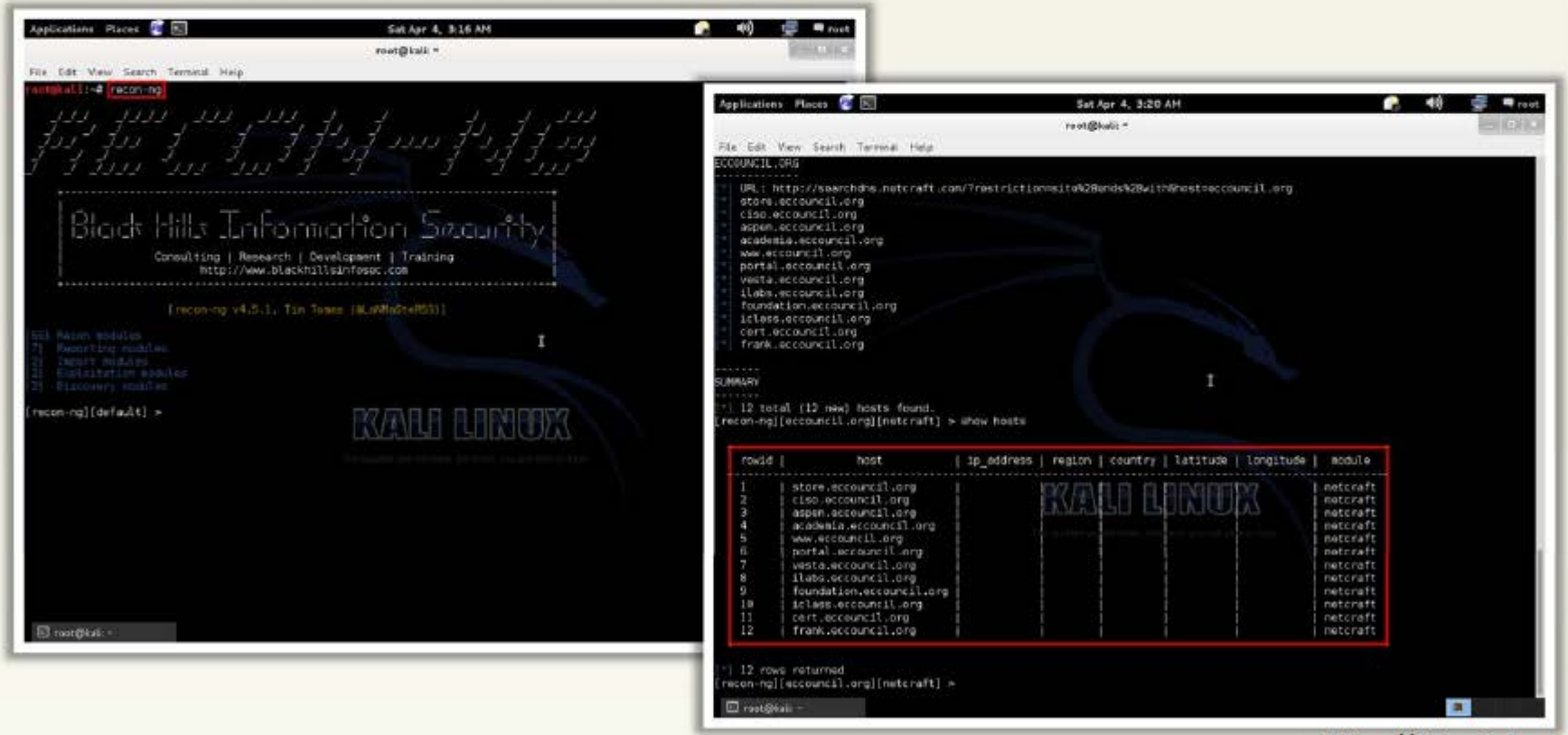
http://www.paterva.com

Maltego is a program that can be used to determine the **relationships and real world links** between people, groups of people (social networks), companies, organizations, websites, Internet infrastructure, phrases, documents, and files

Personal Information

Footprinting Tool: Recon-ng

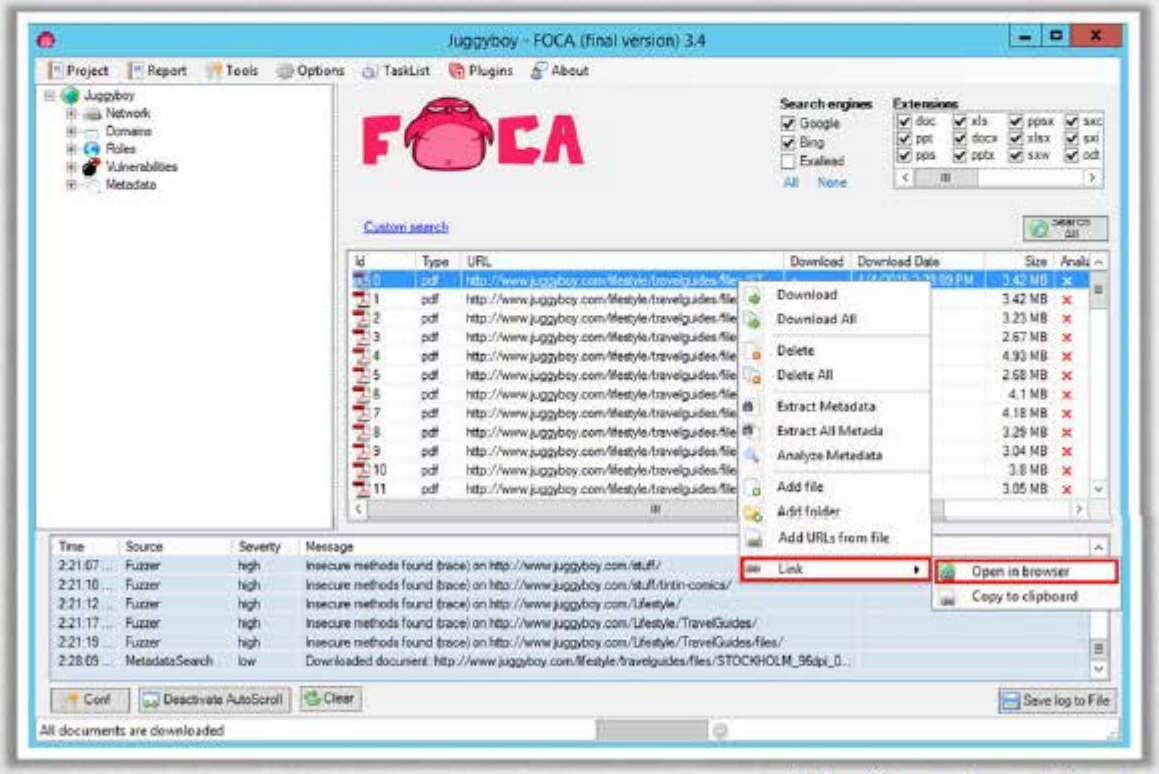
Recon-ng is a **Web Reconnaissance framework** with independent modules, database interaction, built in convenience functions, interactive help, and command completion, that provides an environment in which open source web-based reconnaissance can be conducted



https://bitbucket.org

Footprinting Tool: FOCA

- **FOCA (Fingerprinting Organizations with Collected Archives)** is a tool used mainly to find metadata and hidden information in the documents its scans
- Using FOCA, it is possible to undertake multiple attacks and analysis techniques such as **metadata extraction**, **network analysis**, DNS snooping, proxies search, **fingerprinting**, open directories search, etc.



https://www.elevenpaths.com

Additional Footprinting Tools

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Prefix WhoIs
http://pwhois.org

Netmask
http://www.phenoelit.org

NetScanTools Pro
http://www.netscantools.com

Binging
http://www.blueinfy.com

Tctrace
http://www.phenoelit.org

SearchBug
http://www.searchbug.com

Autonomous System Scanner (ASS)
http://www.phenoelit.org

TinEye
http://www.tineye.com

DNS-Digger
http://www.dnsdigger.com

Robtex
http://www.robtex.com

Additional Footprinting Tools (Cont'd)

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Dig Web Interface
http://www.digwebinterface.com

White Pages
http://www.whitepages.com

Email Tracking Tool
http://www.filley.com

yoName
http://yoname.com

Ping-Probe
http://www.ping-probe.com

SpiderFoot
http://www.spiderfoot.net

NSlookup
http://www.kloth.net

Zaba Search
http://www.zabasearch.com

GeoTrace
http://www.nabber.org

DomainHostingView
http://www.nirsoft.net

Additional Footprinting Tools (Cont'd)

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MetaGoofil
http://www.edge-security.com

GMapCatcher
http://code.google.com

Wikto
http://research.sensepost.com

SearchDiggity
http://www.bishopfox.com

SiteDigger
http://www.mcafee.com

Google HACK DB
http://www.secpoint.com

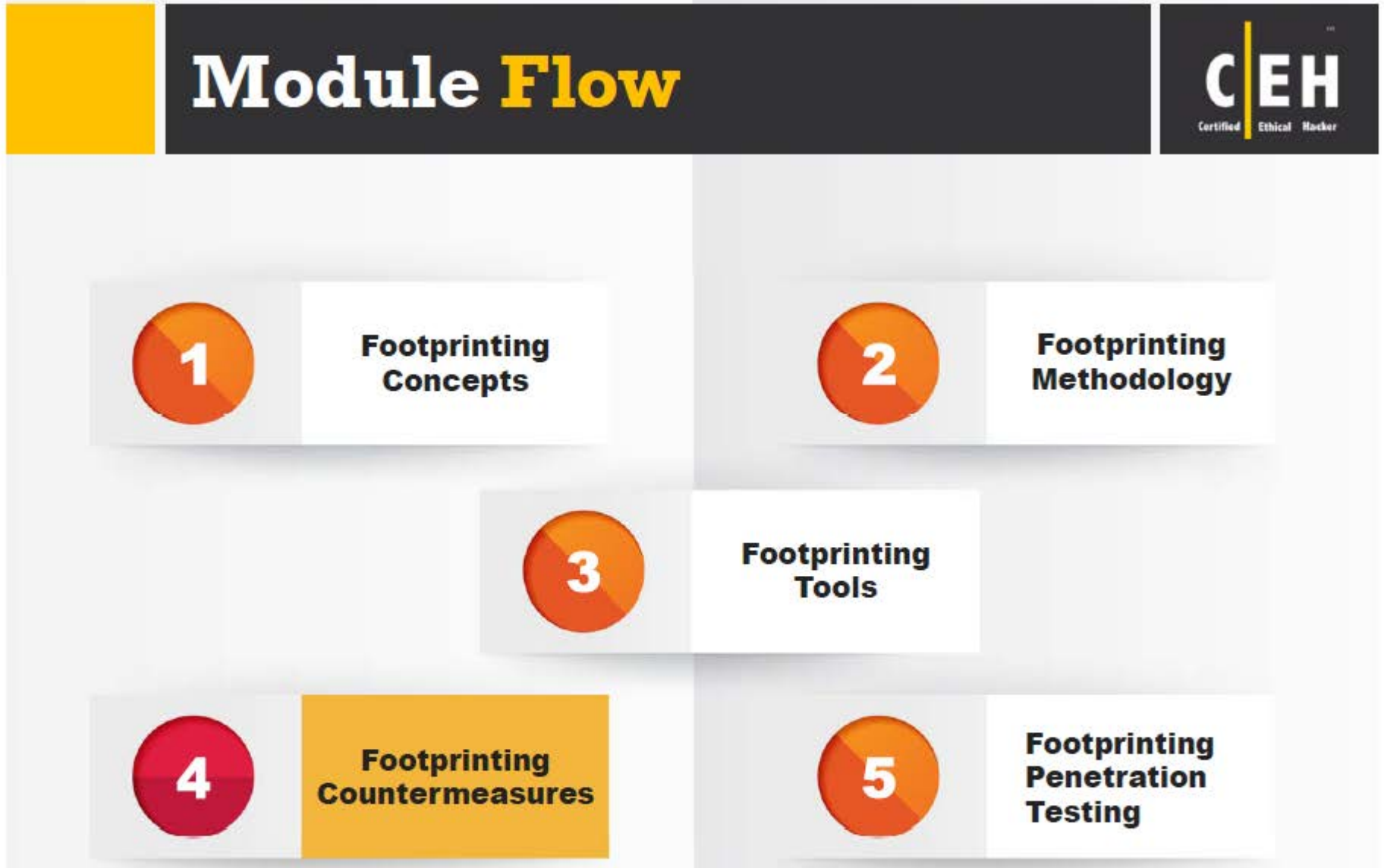
Google Hacks
http://code.google.com

Gooscan
http://www.darknet.org.uk

BiLE Suite
http://www.sensepost.com

Trellian
http://ci.trellian.com

Module Flow



Footprinting Countermeasures

Restrict the employees to access social networking sites from organization's network

Configure web servers to avoid information leakage

Educate employees to use pseudonyms on blogs, groups, and forums

Do not reveal critical information in press releases, annual reports, product catalogues, etc.

Limit the amount of information that you are publishing on the website/ Internet

Use footprinting techniques to discover and remove any sensitive information publicly available

Prevent search engines from caching a web page and use anonymous registration services

Footprinting Countermeasures (Cont'd)

Enforce security policies to regulate the information that employees can reveal to third parties

Set apart internal and external DNS or use split DNS, and restrict zone transfer to authorized servers

Disable directory listings in the web servers

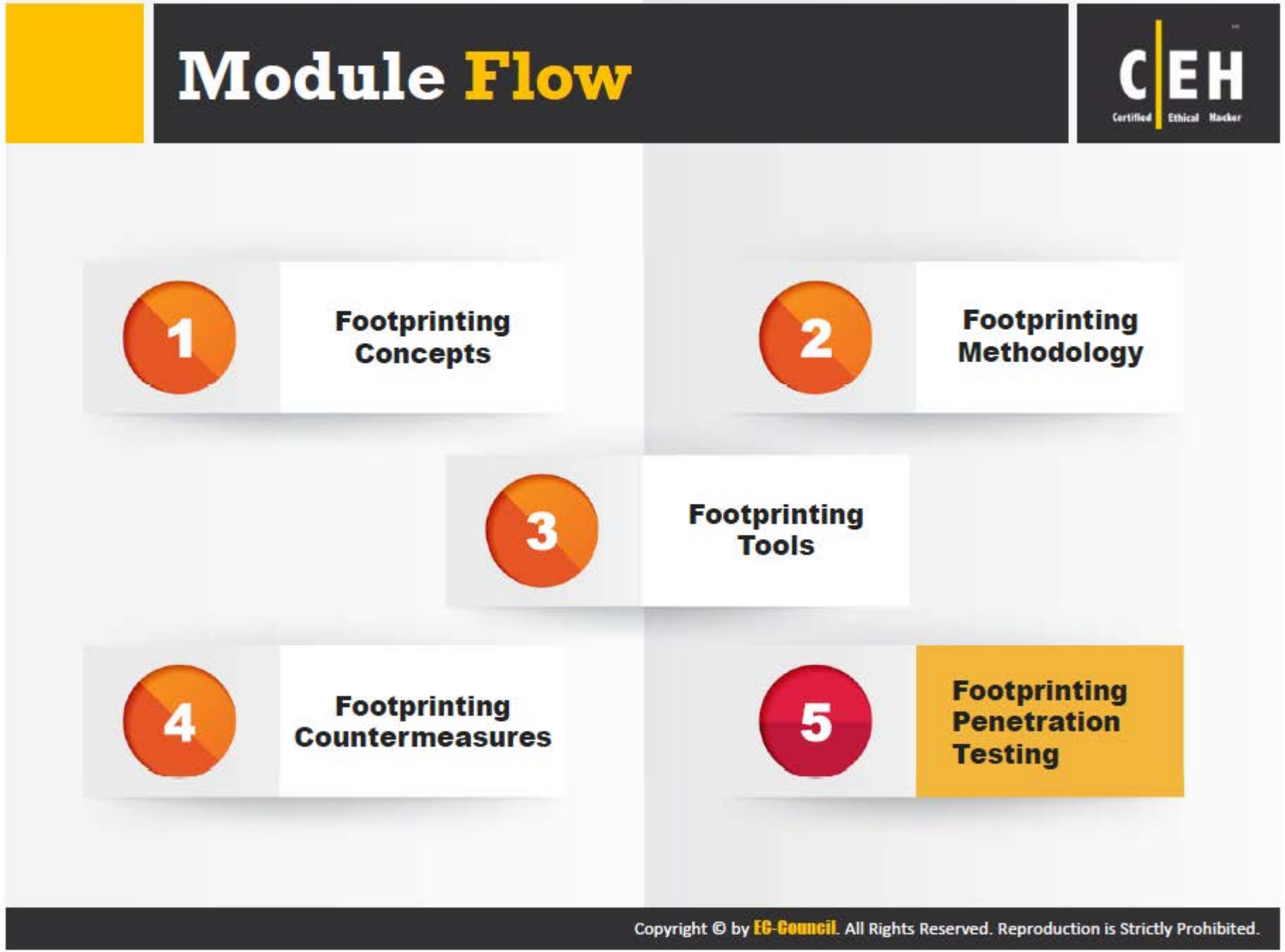
Educate employees about various social engineering tricks and risks

Opt for privacy services on Whois Lookup database

Avoid domain-level cross-linking for the critical assets

Encrypt and password protect sensitive information

Module Flow



Footprinting Pen Testing

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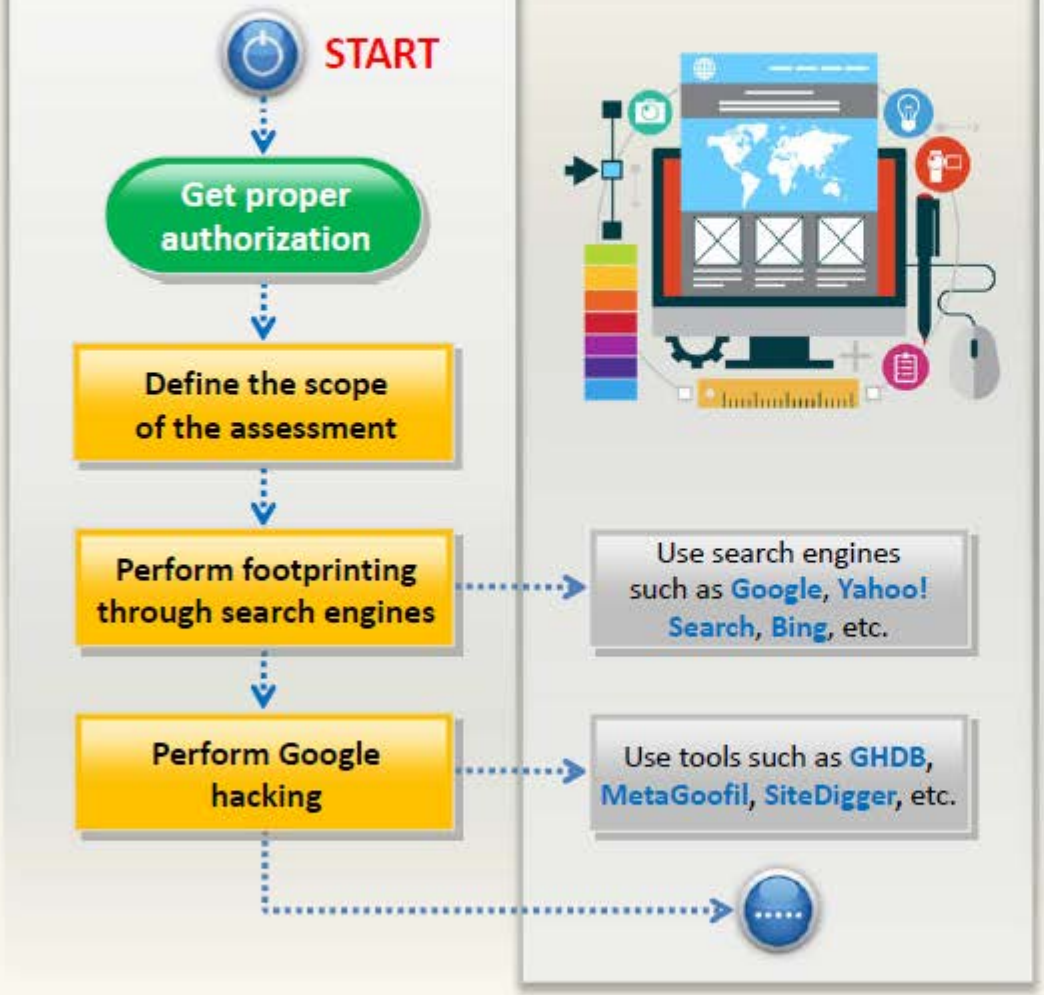
- Footprinting pen testing is used to **determine organization's publicly available information**
- The tester attempts to gather as much information as possible about the target organization from the **Internet and other publicly accessible sources**

Prevent **DNS record retrieval** from publically available servers

Prevent **information leakage**

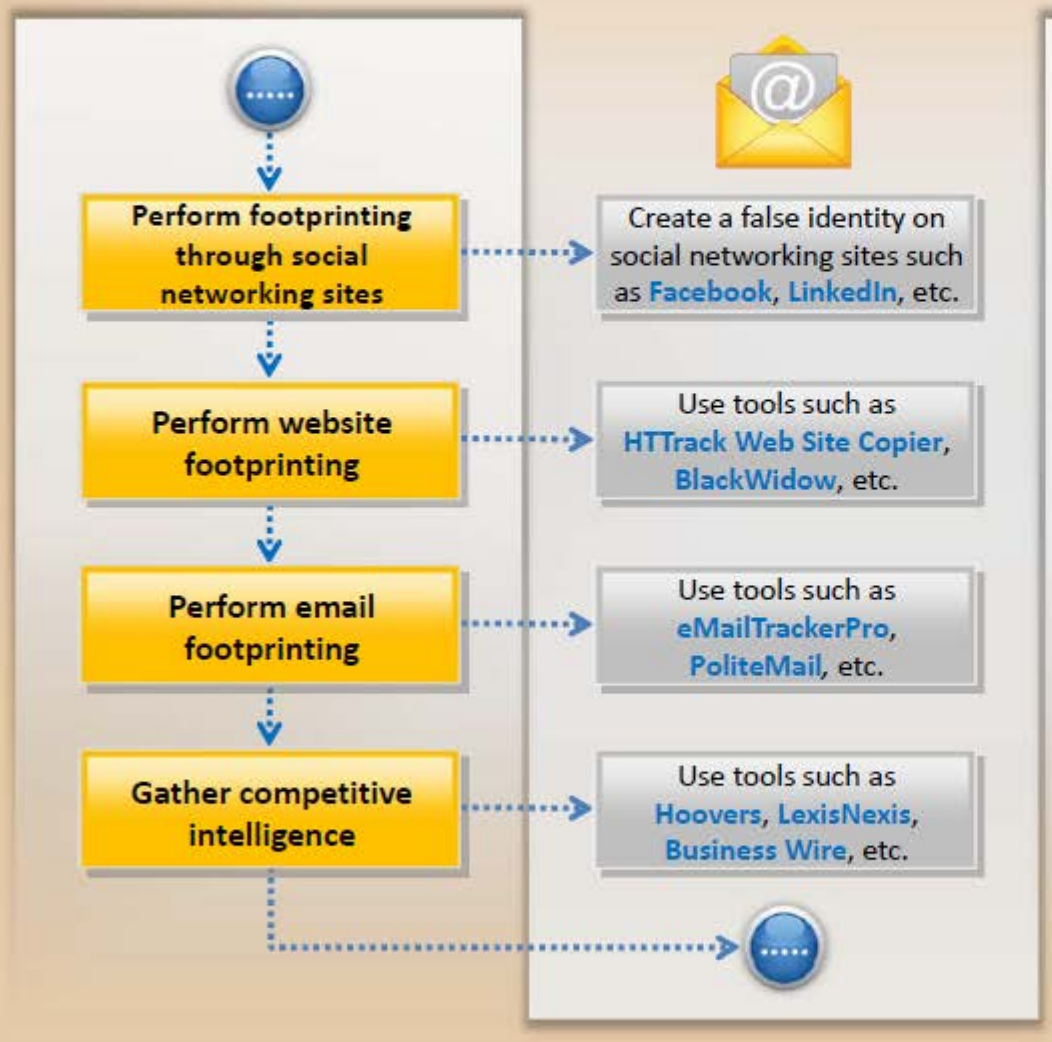
Prevent **social engineering attempts**

Footprinting Pen Testing (Cont'd)



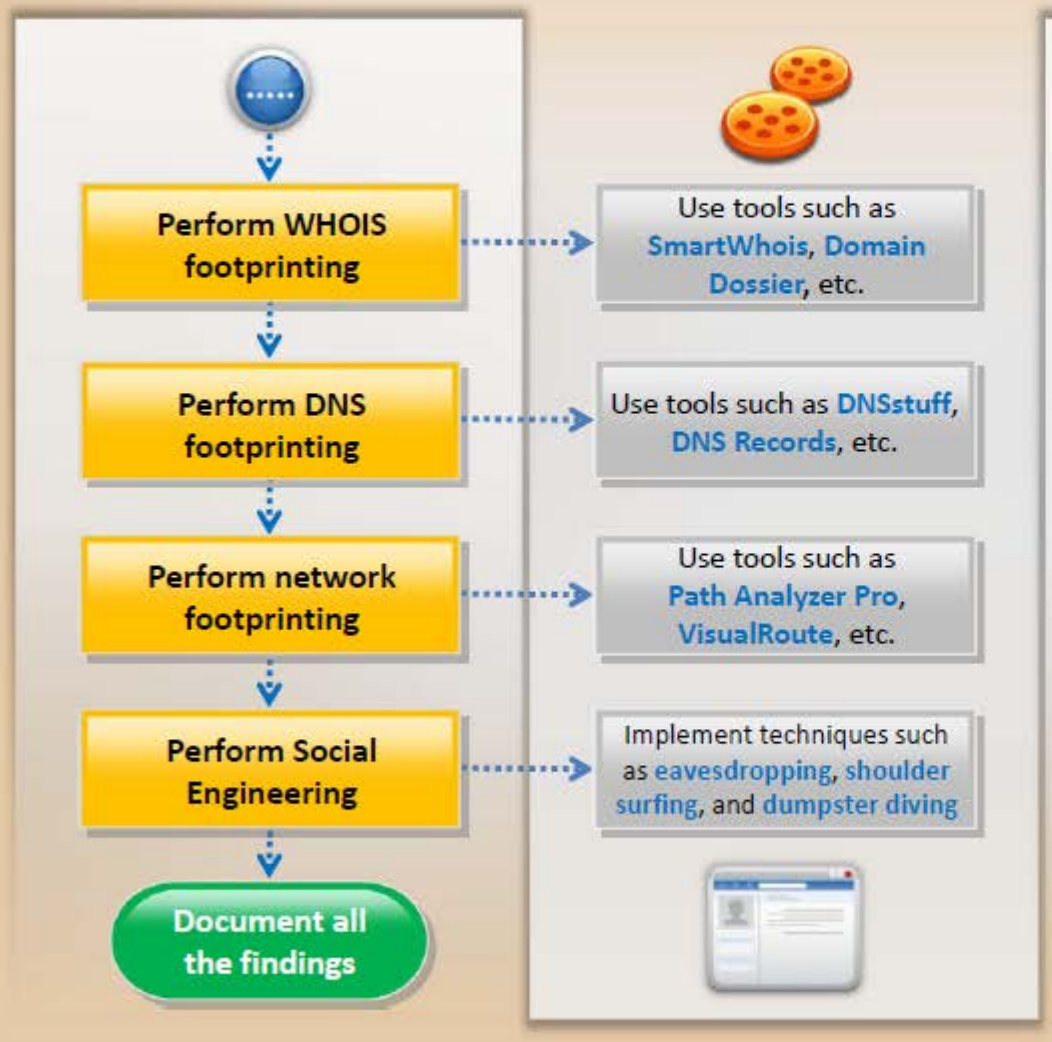
- Get proper authorization and define the scope of the assessment
- Footprint search engines such as Google, Yahoo! Search, Ask, Bing, Dogpile, etc. to gather target organization's information such as employee details, login pages, intranet portals, etc. that helps in performing social engineering and other types of advanced system attacks
- Perform Google hacking using tools such as GHDB, MetaGoofil, SiteDigger, etc.

Footprinting Pen Testing (Cont'd)



- Gather target organization employees information from their personal profiles on social networking sites such as **Facebook**, **LinkedIn**, **Twitter**, **Google+**, **Pinterest**, etc. that assist to perform social engineering
- Perform website footprinting using tools such as **HTTrack Web Site Copier**, **BlackWidow**, **Webripper**, etc. to build a detailed map of website's structure and architecture
- Perform email footprinting using tools such as **eMailTrackerPro**, **PoliteMail**, **Email Lookup – Free Email Tracker**, etc. to gather information about the physical location of an individual to perform social engineering that in turn may help in mapping target organization's network
- Gather competitive intelligence using tools such as **Hoovers**, **LexisNexis**, **Business Wire**, etc.

Footprinting Pen Testing (Cont'd)



- Perform WHOIS footprinting using tools such as **SmartWhois**, **Domain Dossier**, etc. to create detailed map of organizational network, to gather personal information that assists to perform social engineering, and to gather other internal network details, etc.
- Perform DNS footprinting using tools such as **DNSstuff**, **DNS Records**, etc. to determine key hosts in the network and perform social engineering attacks
- Perform network footprinting using tool such as **Path Analyzer Pro**, **VisualRoute**, **Network Pinger**, etc. to create a map of the target's network
- Implement social engineering techniques such as **eavesdropping**, **shoulder surfing**, and **dumpster diving** that may help to gather more critical information about the target organization
- At the end of pen testing **document all the findings**

Footprinting Pen Testing Report Templates

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Pen Testing Report

Information obtained through search engines

- Employee details:
- Login pages:
- Intranet portals:
- Technology platforms:
- Others:

Information obtained through people search

- Date of birth:
- Contact details:
- Email ID:
- Photos:
- Others:

Information obtained through Google

- Advisories and server vulnerabilities:
- Error messages that contain sensitive information:
- Files containing passwords:
- Pages containing network or vulnerability data:
- Others:

Information obtained through social networking sites

- Personal profiles:
- Work related information:
- News and potential partners of the target company:
- Educational and employment backgrounds:
- Others:

Information obtained through website footprinting

- Operating environment:
- Filesystem structure:
- Scripting platforms used:
- Contact details:
- CMS details:
- Others:

Information obtained through email footprinting

- IP address:
- GPS location:
- Authentication system used by mail server:
- Others:

Footprinting Pen Testing Report Templates (Cont'd)

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Pen Testing Report

Information obtained through competitive intelligence

- Financial details:
- Project plans:
- Others:

Information obtained through WHOIS footprinting

- Domain name details:
- Contact details of domain owner:
- Domain name servers:
- Netrange:
- When a domain has been created:
- Others:

Information obtained through DNS footprinting

- Location of DNS servers:
- Type of servers:
- Others:

Information obtained through network footprinting

- Range of IP addresses:
- Subnet mask used by the target organization:
- OS's in use:
- Firewall locations:
- Others:

Information obtained through social engineering

- Personal information:
- Financial information:
- Operating environment:
- User names and passwords:
- Network layout information:
- IP addresses and names of servers:
- Others:

Module Summary

- Footprinting is the process of collecting as much information as possible about a target network, for identifying various ways to intrude into an organization's network system
- It reduces attacker's focus area to specific range of IP address, networks, domain names, remote access, etc.
- Attackers use search engines to extract information about a target
- Attackers use social engineering tricks to gather sensitive information from social networking websites such as Facebook, MySpace, LinkedIn, Twitter, Pinterest, Google+, etc.
- Information obtained from target's website enables an attacker to build a detailed map of website's structure and architecture
- Competitive intelligence is the process of identifying, gathering, analyzing, verifying, and using information about your competitors from resources such as the Internet
- DNS records provide important information about location and type of servers
- Attackers conduct traceroute to extract information about: network topology, trusted routers, and firewall locations