scanning

Matsuzaki ‘maz’ Yoshinobu

<maz@iij.ad.jp>

- Stole slides from
  - Fakrul Alam and Shahadat Hossain

Basic Features of Google Search

- Automatic “AND” Queries
  - By default, Google only returns pages that include all of your search terms.
  - There is no need to include “AND” between terms.
- Automatic Exclusion of Common Words
  - Google ignores common words and characters such as and, or, in, of, be etc. as well as certain single digits and single letters, because they tend to slow down your search without improving the results. Google will indicate if a common word has been excluded by displaying details on the results page below the search box.

Basic Features of Google Search

- Capitalization
  - Google search are NOT case sensitive. For example searches for “APNIC”,
  - “Apnic” and “apnic” will all retrieve the same results.
- Spell Checker
  - Google’s spell checking software automatically looks at your query to see if you are using the most common version of a word’s spelling. If it is likely that an alternative spelling would retrieve more relevant results, it will as”Did you mean: (more common spelling)?”

Different Search Operators

- + Searches
- - Searches
- ~ Searches
- Phrase Searches
- Domain Restrict Searches
- Definition Searches
- File Type Searches
- Or Searches
- Fill in the Blank
- Currency Conversion
- Calculator Function
- Unit Conversion
- Time Check

Advanced Operators

- Google advanced operators help refine searches.
- They are included as part of a standard Google query.
- Advanced operators use a syntax such as the following:

  operator:search_term

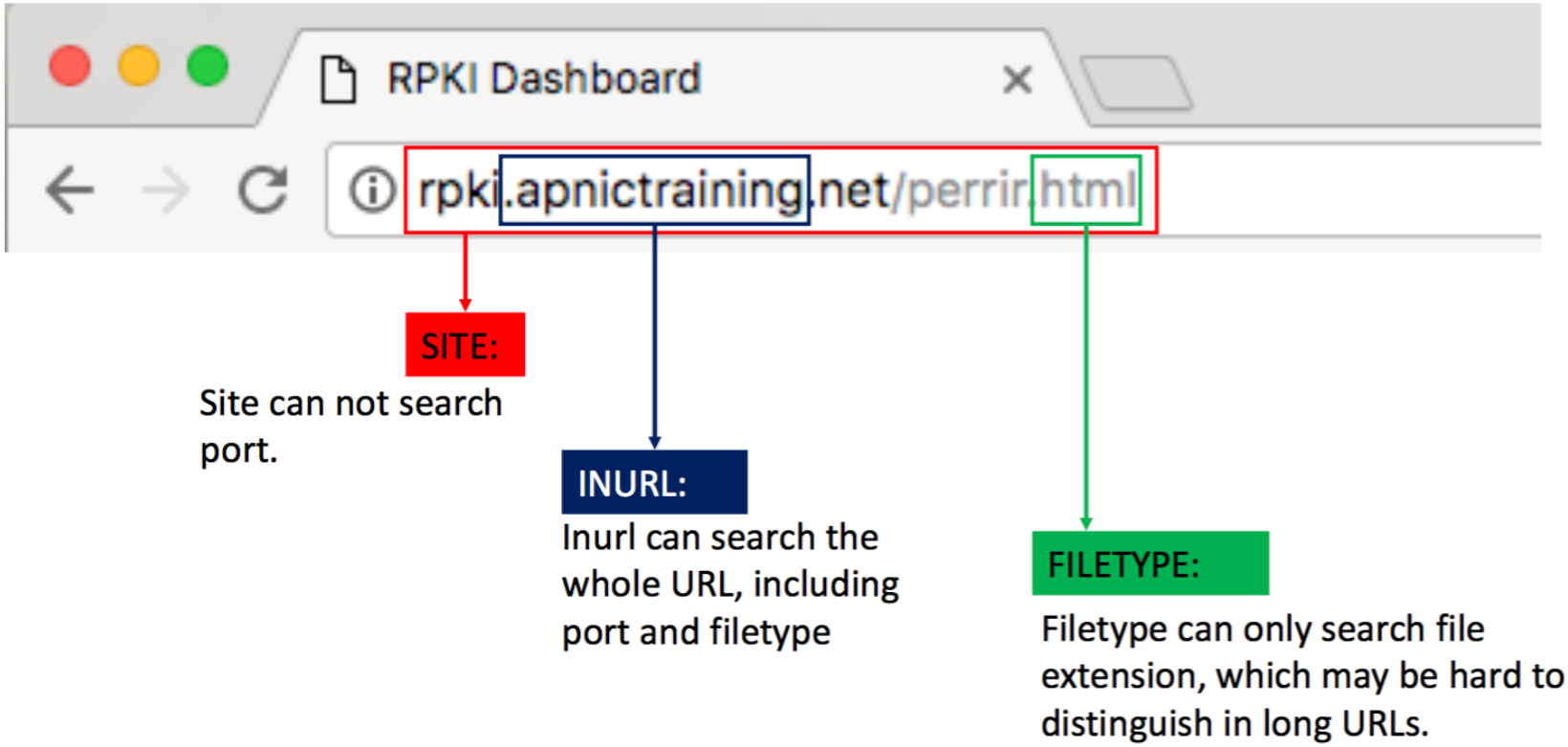
- There's no space between the operator, the colon, and the search term!

Advanced Operators at a Glance

Operators	Purpose
intitle	Search page title
allintitle	Search page title
inurl	Search URL
allinurl	Search URL
filetype	Search specific files
allintext	Search text of page only
site	Search specific site
link	Search for links to pages
inanchor	Search link anchor text

Operators	Purpose
numrange	Locate number
daterange	Search in date range
author	Group author search
group	Group name search
insubject	Group subject search
msgid	Group msgid search

Advanced Google Searching



Some operators search overlapping areas. Consider site, inurl and filetype.

Exercise:

1. Find web servers of your organization?
2. Any admin login page available?
3. Any .doc file which contains word “Confidential”?

nmap (https://nmap.org)

- Nmap is a free and open source network exploration and security auditing tool
- Nmap was created by Gordon Lyon, a.k.a. Fyodor Vaskovich, and first published in 1997.
- Working cross-platform although best working on Linux-type environments
- It uses raw IP packets to determine
  - What hosts are available on the network
  - What services (application name and version)
  - Guesses the operational system, uptime and other characteristics

Ethical Issue

- Can be used for hacking-to discover vulnerable ports
- System admins ca use it to check that systems meet security standards
- Unauthorized use of Nmap on a system could be illegal.
- Make sure you have permission before using this tool.
- There is no right way to do the wrong things

Nmap : How it works

- DNS lookup-matches name with IP
- Nmap pings the remote target with 0 (zero) byte packets to each port
- If packets are not received back, port is open
- If packets are received, port is closed
- Firewall can interfere with this process

Nmap : Scanning Techniques

- Host Discovery and Target Specification
- Port Scanning Technique, Specification and order
- OS, Service and Version Detection
- namp Scripting Engine
- Timing and Performance
- Firewall, IDS Evasion and Spoofing Technique
- Scan Report

Nmap: Scan

```
Usage: nmap [Scan Type(s)] [Options] {target specification}
TARGET SPECIFICATION:
  Can pass hostnames, IP addresses, networks, etc.
  Ex: scanme.nmap.org, microsoft.com/24, 192.168.0.1; 10.0.0-255.1-254
  -iL <inputfilename>: Input from list of hosts/networks
  -iR <num hosts>: Choose random targets
  --exclude <host1[,host2][,host3],...>: Exclude hosts/networks
  --excludefile <exclude_file>: Exclude list from file
```

OS DETECTION:

-O: Enable OS detection

--osscan-limit: Limit OS detection to promising targets

--osscan-guess: Guess OS more aggressively

Nmap: Scan

HOST DISCOVERY:

-sL: List Scan - simply list targets to scan

-sn: Ping Scan - disable port scan

-Pn: Treat all hosts as online -- skip host discovery

-PS/PA/PU/PY[portlist]: TCP SYN/ACK, UDP or SCTP discovery to given ports

-PE/PP/PM: ICMP echo, timestamp, and netmask request discovery probes

-PO[protocol list]: IP Protocol Ping

-n/-R: Never do DNS resolution/Always resolve [default: sometimes]

--dns-servers <serv1[,serv2],...>: Specify custom DNS servers

--system-dns: Use OS's DNS resolver

--traceroute: Trace hop path to each host

Nmap: Scan

```
SCAN TECHNIQUES:
  -sS/sT/sA/sW/sM: TCP SYN/Connect()/ACK/Window/Maimon scans
  -sU: UDP Scan
  -sN/sF/sX: TCP Null, FIN, and Xmas scans
  --scanflags <flags>: Customize TCP scan flags
  -sI <zombie host[:probeport]>: Idle scan
  -sY/sZ: SCTP INIT/COOKIE-ECHO scans
  -sO: IP protocol scan
  -b <FTP relay host>: FTP bounce scan
```

Exercise 1: Hostdiscovery

- ssh to workshop@10.0.0.x
  - Note: x is your group#
  - Note: password is iij/2497

- $ nmap -sP 10.0.2.0/24

Exercise 1: Hostdiscovery

- ssh to workshop@10.0.0.x
  - Note: x is your group#
  - Note: password is iij/2497

- $ nmap -sP 10.0.1.0/24

Exercise 2: Opening Ports

- Scan the host found in Exercise 1

- $ nmap <$ip>

Exercise 3: OS Fingerprint

- Guess the OS found in Exercise 1

- $ nmap -O <ip>

Exercise 4: Scan your client

- do not scan others’
- $ nmap <your IP>
- What’s kind of service running there?
- Let nmap guess your OS

Exercise 5: Version

- $ nmap -sV 10.0.2.1