FAST RECON GG

[from global to granular]

[and how I got a P1 in Google VRP]

by omespino@googleESCAL8:~/london$

whoami

omespino@googleESCAL8:~/london$ id

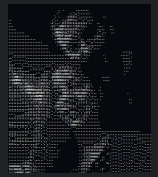
Omar Espino aka @omespino [M É X I C O]

morning:
• security & devops manager
• background: unix* lover, backend & mobile developer

night:
• independent security researcher
• bug hunter since 2017

personal blog
https://omespino.com

twitter @omespino



omespino@googleESCAL8:~/london$ cat milestones.txt

acknowledged by / security hall of fame:

agenda

omespino@googleESCAL8:~/london$ cat agenda.txt

- introduction
- main bug bounty recon flow
  - global organization discovery
  - subdomain discovery
  - visual identification
  - assets brute forcing / web scraping
- LFI on springboard.google.com recap
- what's nexts? duck test
- lessons learned
- Q&A

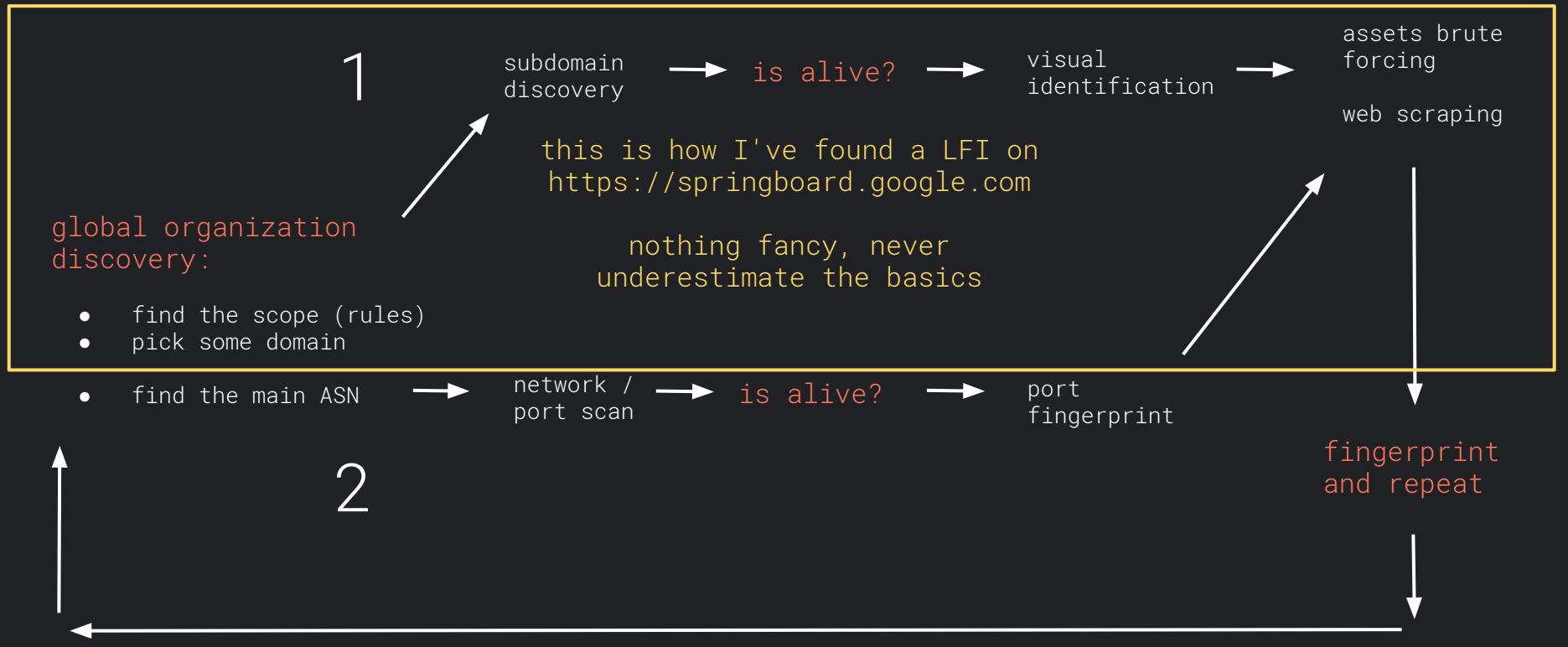
WARNING!

All information included in this medium is for educational and professional purposes, in no case GOOGLE or neither I, are responsible for any misuse of this information.

introduction

[motivation: challenge, fun and profit]

main bug bounty recon flow - keep it simple



fast recon GG (from global to granular) by omespino@googleESCAL8:~/london$

2. network / port scan - [main ASN Google LLC (AS15169)] - NOT IN THE CURRENT FLOW TO FIND THE LFI - BONUS

*extracted from https://ipinfo.io/AS15169 (9 Million hosts),there are more ASN that belong to google

aggressive

Getting corp.google.com's CIDR
whois `dig +short corp.google.com | tail -n1` | grep CIDR
64.233.160.0/19

nmap scan
time nmap -p80 -T5 -Pn --max-rate 10000 64.233.160.0/19
Hosts: - 2,591
Realtime: - 2m 8s

masscan scan
time masscan --rate 10000 -p80 64.233.160.0/19
Hosts: - 2,611
Realtime: - 0m 12s

masscan > nmap *(SPEED UP 10.6x w00t!)*
BUT, WAIT A SECOND ...

if masscan is faster and nmap is very good at fingerprinting, first filter alive host with masscan, then re-scan with nmap

masscan + nmap = FAST AND PRECISE

passive

• shodan:
"net:64.233.160.0/19"
"asn:AS15169"
"ssl:corp.google.com"

• binaryedge.io
"ip:64.233.160.0/19"
"asn:AS15169"
"ssl:corp.google.com"

• zoomeye
"cidr:64.233.160.0/19"
"asn:AS15169"
"ssl:corp.google.com"

• censys
"64.233.160.0/19"
autonomous_system.description.raw: "GOOGLE - Google LLC"

information already sorted for you

- top ports
- top services
- top OS
- CVE info
- locations

global organization discovery

Google Vulnerability Reward Program scope
$100 - $31,337 [g.co/vrp]

*.google.com
*.youtube.com
*.blogger.com
(+20,000 subdomains?)

just the main ASN Google LLC
~9 million ip addresses

where should we start?
let's pick *.google.com

1. subdomain discovery - [*.google.com]

aggressive

• to save time choose one of most common environments + tld and start doing some testing: [corp, dev, development, admin, staggin, alpha, stage, prod, beta, local, test].

environment + top level domain

corp.google.com

• then brute force with subbrute.py, massdns & all.txt - thx @jhaddix

"./subbrute.py all.txt corp.google.com | massdns -r resolvers.txt -t A -a -o -w gcorp.txt -"

Total requests - 2,286,549
Realtime: - 2m48s !!!

another tools like dns-parallel-prober or gobuster took about 30m

**all.txt is a combination of wordlists from every public dns source / enumeration tool*

passive

• shodan & zoomeye:
"ssl:corp.google.com"
"hostname:corp.google.com"

• zoomeye, binaryedge.io & github
"corp.google.com"

• censys
"443.https.tls.certificate.parsed.extensions.subject_alt_name.dns_names:corp.google.com" - thx @nahamsec

• crt.sh
"%.corp.google.com"

• lifehack - "hack" hackers hacking their hacks. TLDR; grab bug bounty scans results in github lol thx @randomrobbie

Finally combine all results in 1 file

corp.google.com-all.txt

visual identification

httprobe - @tomnomnom

Take a list of domains and probe for working http and https servers.

You can set the concurrency level with the -c flag.

```
time cat corp.google.com-all.txt | httprobe -c 1000
```

EyeWitness - @ChrisTruncer

EyeWitness is designed to take screenshots of websites provide some server header info, and identify default credentials if known.

The --timeout flag is completely optional, and lets you provide the max time to wait when trying to render and screenshot a web page, by default timeout is 7 seconds

```
python ./EyeWitness.py -f ./corp.google.com-probed.txt
--headless -d corp.google.com-output --timeout 1
```

corp.google.com-all.txt
(~12,312 hosts)

subdomain discovery

massdns brute forcing, shodan, zoomeye, censys, crt.sh, github @randomrobbie and another hackers hacks lol

→

httprobe

are this hosts alive?

corp.google.com-probed.txt
in ~12,312 hosts out 1023 hosts

→

EyeWitness - screenshots / headers

visual identification

screenshots, headers and html source from 1023 alive hosts

visual identification - Eyewitness

```
cd corp.google.com-probed; python -m SimpleHTTPServer 9090 #(9090 or any port)
```

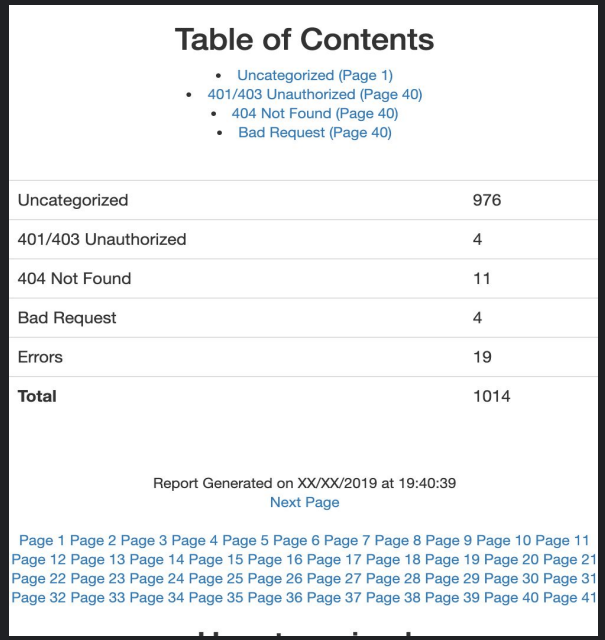


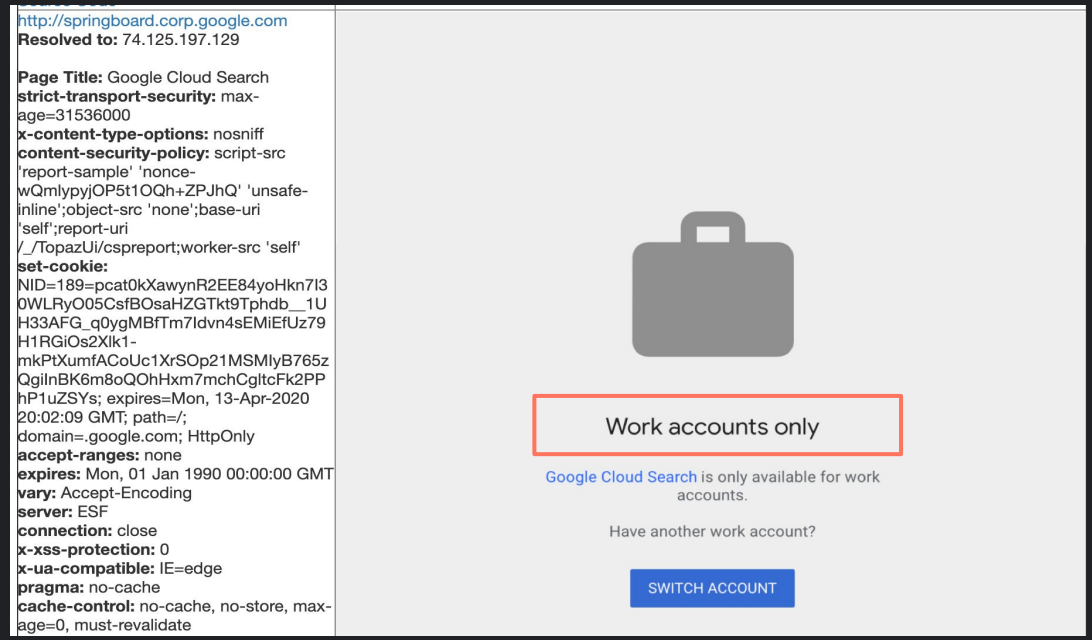
Table of Contents

- Uncategorized (Page 1)
- 401/403 Unauthorized (Page 40)
- 404 Not Found (Page 40)
- Bad Request (Page 40)

Uncategorized	976
401/403 Unauthorized	4
404 Not Found	11
Bad Request	4
Errors	19
Total	1014

Report Generated on XX/XX/2019 at 19:40:39
Next Page

Page 1 Page 2 Page 3 Page 4 Page 5 Page 6 Page 7 Page 8 Page 9 Page 10 Page 11
Page 12 Page 13 Page 14 Page 15 Page 16 Page 17 Page 18 Page 19 Page 20 Page 21
Page 22 Page 23 Page 24 Page 25 Page 26 Page 27 Page 28 Page 29 Page 30 Page 31
Page 32 Page 33 Page 34 Page 35 Page 36 Page 37 Page 38 Page 39 Page 40 Page 41



http://springboard.corp.google.com
Resolved to: 74.125.197.129

Page Title: Google Cloud Search
strict-transport-security: max-age=31536000
x-content-type-options: nosniff
content-security-policy: script-src 'report-sample' 'nonce-wQmlypyjOP5t1OQh+ZPJhQ' 'unsafe-inline';object-src 'none';base-uri 'self';report-uri /_/TopazUi/cspreport;worker-src 'self'
set-cookie: NID=189=pcat0kXawynR2EE84yoHkn7l30WLRyO05CsfBOsaHZGTkt9Tphdb__1UH33AFG_q0ygMBfTm7Idvn4sEMiEfUz79H1RGiOs2Xlk1-mkPtXumfACoUc1XrSOp21MSMlyB765zQgiInBK6m8oQOhHxm7mchCgltcFk2PPhP1uZSYs; expires=Mon, 13-Apr-2020 20:02:09 GMT; path=/; domain=.google.com; HttpOnly
accept-ranges: none
expires: Mon, 01 Jan 1990 00:00:00 GMT
vary: Accept-Encoding
server: ESF
connection: close
x-xss-protection: 0
x-ua-compatible: IE=edge
pragma: no-cache
cache-control: no-cache, no-store, max-age=0, must-revalidate

I just curl -IL https://springboard.corp.google.com
and springboard.corp.google.com redirects to springboard.google.com and then redirect to cloudsearch.google.com

asset brute forcing

Basic process, use all.txt and fuzz any web application
in this case https://springboard.google.com

wfuzz - The Web Fuzzer @xmendez

Wfuzz has been created to facilitate the task in web applications assessments and it is based on a simple concept: it replaces any reference to the FUZZ keyword by the value of a given payload.

```
time wfuzz -c -w all.txt https://springbooard.google.com/FUZZ

Total requests - 2,286,549
Requests/sec.  - 484.21
Realtime:      - 78m42s ~ 1 hour 18 minutes
```

ffuf - Fuzz Faster U Fool @joohoi

A fast web fuzzer written in Go.

heavily inspired by the great projects gobuster and wfuzz.

```
time fuff -c -w all.txt -u https://springboard.google.com/FUZZ

Total requests - 2,286,549
Requests/sec.  - 2019
Realtime:      - 18m52s !!!
```

wfuzz < fuff

SPEED UP 4.2x w00t!

after the fuzzing I found just 1 interesting directory "/java"

web scraping - "/java" = Google's internal framework

Basic process, download the whole web application html and grep for the win

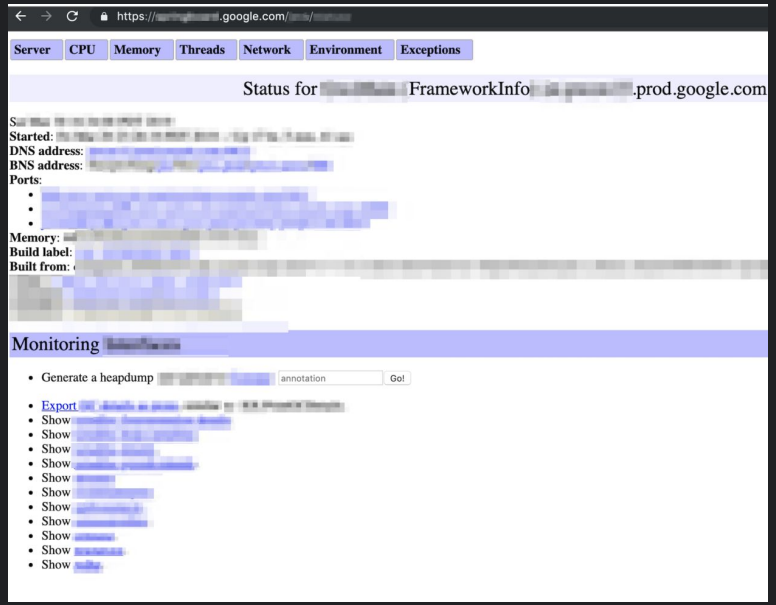
httrack - Xavier Roche

HTTrack is a free and open-source Web crawler and offline browser, developed by Xavier Roche and licensed under the GNU General Public License Version 3. HTTrack allows users to download World Wide Web sites from the Internet to a local computer.

```
#first downloaded the whole framework page
httrack https://springboard.google.com/java/ -O
./springboard.google.com -v

#then grep the whole framework page (local mirror)
grep -rih "file=" springboard.google.com/ | grep env

[ - - - - - REDACTED - - - - - -]
https://springboard.google.com//hts-cache/new.txt:18:05:27
4095/4095     ---MCZ 200     added ('OK') text/plain
date:Wed,%2016%20Oct%202019%2001:05:26%20GMT
https://springboard.google.com/java/procz?file=/proc/self/environ <---- w00000000t!!!!!!
[ - - - - - REDACTED - - - - - -]
```

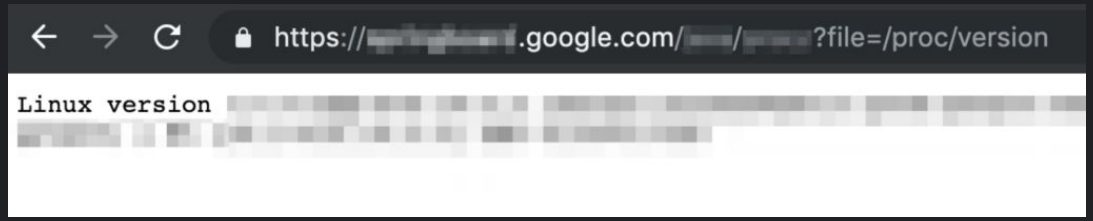


web scraping - LFI on https://springboard.google.com

after get the url https://springboard.google.com/java/procz?file=/proc/self/environ
from grep, I open that url in the browser and ...

web scraping - LFI on https://springboard.google.com

Just to be sure that was a full LFI working I tried to load another file, I checked with /proc/version and ...



To be honest I tried to escalate to RCE but I hadn't any success, since apparently it was very hardened, I wasn't able to read /proc/*/fd, ssh keys, server keys or any logs.

LFI on https://springboard.google.com recap

subdomains filtering and screenshots
https://springboard.google.com was
interesting because was a forbidden
site (works accounts only)

download the whole web app
"/java" with httrack and
grep "file=" | grep "env"

global organization discovery: → subdomain discovery → assets brute forcing → web scraping → PROFIT

- find the scope (rules)
- pick some domain

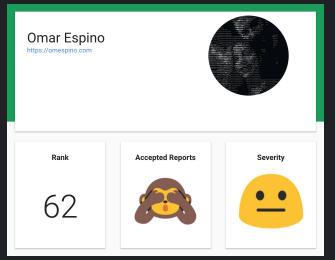
visual identification

wfuzz with all.txt and
"/java" dir found
(google's internal
framework)

environment + top level domain
from the scope
corp.google.com

RESULTS

- a lot of fun
- google's hall of fame 62th rank
- $13,337 USD bounty



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what's nexts? duck test - fingerprinting and repeat

"If it looks like a duck, swims like a duck, and quacks like a duck, then it probably is a duck."

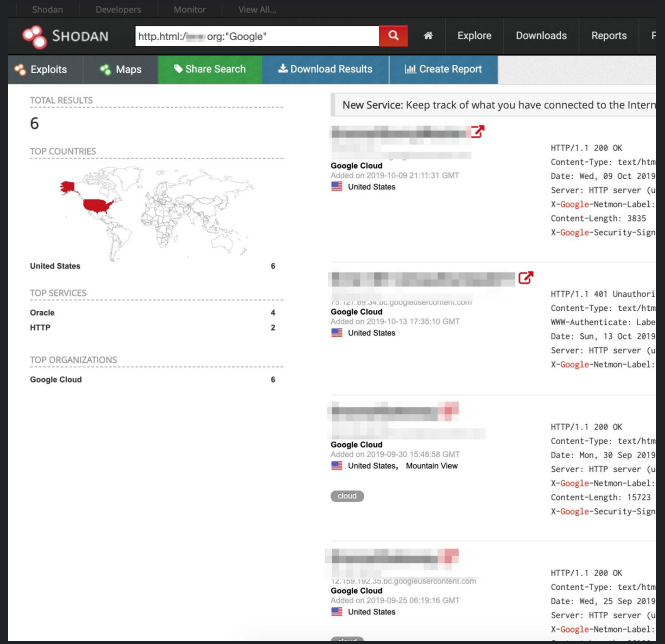
shodan, oh my dear friend ❤️

one day I was thinking, what if there are more unprotected google's internal framework instances, then I just search:

`http.html:/java/redacted org:"Google"`

RESULTS

P	TYPE	TITLE	ASSIGNEE	STATUS
P3	Bug	other in google corp prod server	wo...@google.com	Accepted
P1	Bug	other in Google Server	wo...@google.com	Accepted
P1	Bug	other in Google Server	wo...@google.com	Accepted
P4	Customer Issue	other in Google Server	--	Duplicate



lessons learned

omespino@googleESCAL8:~/london$ cat lessons_learned.txt

- keep it simple never underestimate the basics
- tweak your tools timeouts / threads
- be professional
- discipline - be constant
- do not rush - it take times
- avoid burnouts - go outside, hang up with family and friends
- learn how communicate - learn english
- read read read read read read (twitter #bugbounty #writeup)
- be patient - 16 mo wait reports o more
- repeat

Q&A

ありがとう
ARIGATŌ

GRAZIE

DANKE

DANKON

धन्यवाद

THANK YOU

MERCI

谢谢
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KIITOS

СПАСИБО

GRACIAS