

# FAST RECON GG

[from global to granular]

[and how I got a P1 in Google VRP]

by `omespino@google` `ESCAL8:~/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

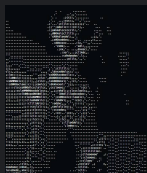
night:

- 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.

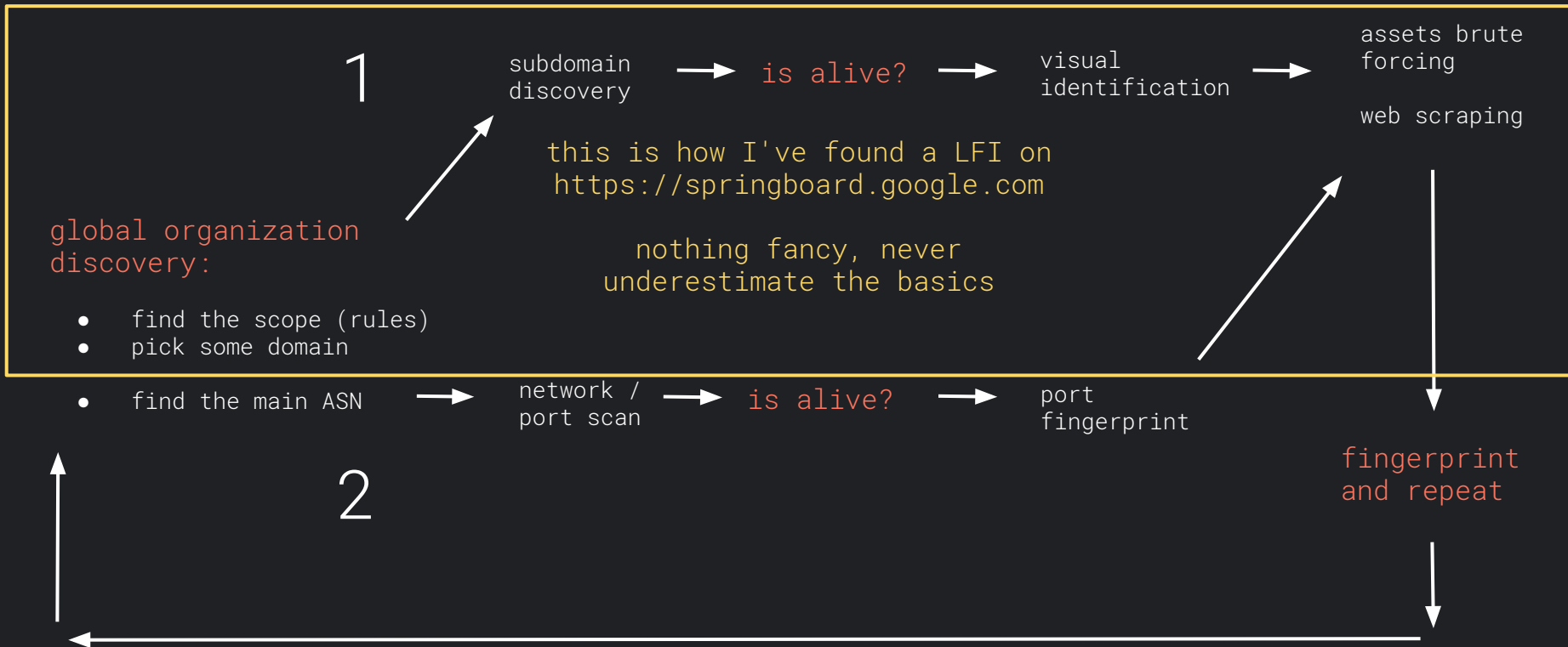


# introduction

*[ motivation: challenge, fun and profit ]*



# main bug bounty recon flow - keep it simple





## global organization discovery

Google Vulnerability Reward Program scope  
\$100 - \$31,337 [ [g.co/vrp](https://www.google.com/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	another tools like
Realtime: - 2m48s !!!	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

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## 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



# 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)

httprobe

EyeWitness - screenshots / headers

subdomain  
discovery



are this  
hosts alive?



visual  
identification

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

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

screenshots, headers and html  
source from 1023 alive hosts

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# visual identification - Eyewitness

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


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

Report Generated on XX/XX/2019 at 19:40:39  
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<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\_q0ygMBfTm7ldvn4sEMiEfUz79H1RGiOs2Xlk1-mkPtXumfACoUc1XrSOp21MSMlyB765zQgilnBK6m8oQOhHxm7mchCglcFk2PPhP1uZSYs; 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



Work accounts only

Google Cloud Search is only available for work accounts.

Have another work account?

SWITCH ACCOUNT

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`

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# 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://springboard.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"`

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# 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.*

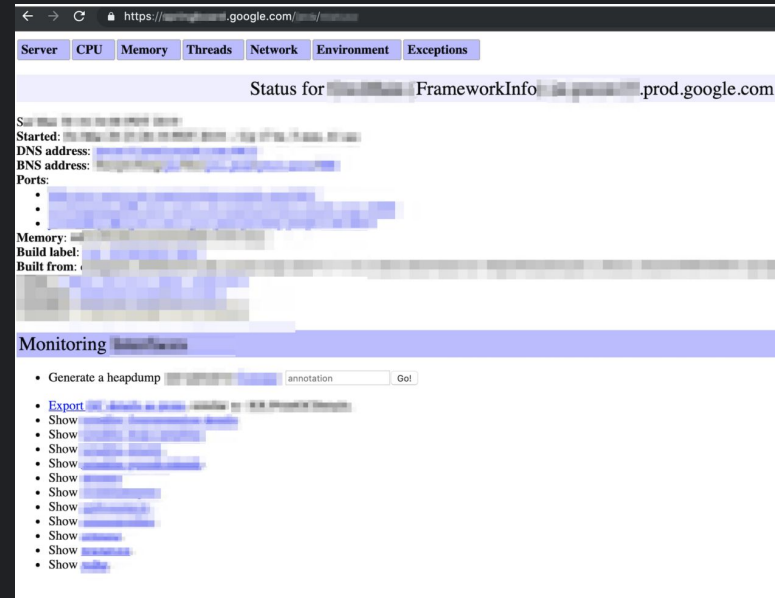
```
#first downloaded the whole framework page
httrack https://springboard.google.com/java/ -O
./springboard.google.com -v
```

```
#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/envron <---- w00000000t!!!!!!**

```
[ - - - - - REDACTED - - - - - ]
```



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

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

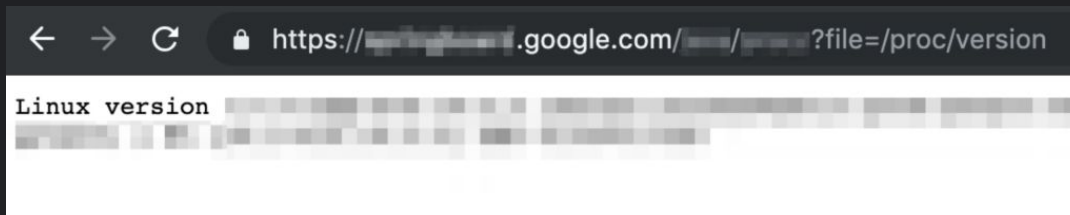


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# web scraping - LFI on https://springboard.google.com

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.

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# 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:

- find the scope (rules)
- pick some domain

environment + top level domain  
from the scope  
[corp.google.com](https://corp.google.com)

subdomain  
discovery

visual  
identification

assets brute  
forcing

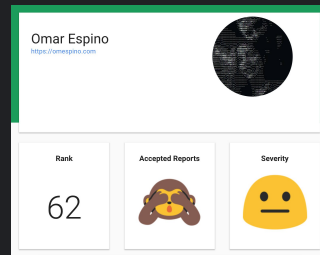
wfuzz with all.txt and  
"/java" dir found  
(google's internal  
framework)

web scraping

PROFIT

## 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

The screenshot shows the Shodan search interface. The search bar contains the query 'http.html:/java/redacted org:"Google"'. The results are categorized into 'TOTAL RESULTS' (6), 'TOP COUNTRIES' (United States), 'TOP SERVICES' (Oracle, HTTP), and 'TOP ORGANIZATIONS' (Google Cloud). On the right, there are three detailed service entries for Google Cloud, each showing HTTP status (200 OK), content type (text/html), date, server information, and various headers like X-Goog-Netnon-Label and X-Goog-Security-Sign.

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# 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

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ありがとう  
ARIGATŌ

GRAZIE

DANKE

DANKON

धन्यवाद

THANK YOU

MERCI

谢谢  
XIÈXIÈ

KIITOS

СПАСИБО

GRACIAS