

Writing YARA rules

An introduction to YARA for AIL usage



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Links

- AIL project: <https://github.com/ail-project>
- AIL framework:
<https://github.com/ail-project/ail-framework>
- Training materials:
<https://github.com/ail-project/ail-training>
- YARA doc: <https://yara.readthedocs.io/en/stable/>
- YARA download: <http://virustotal.github.io/yara/>

What's YARA?

- *The pattern matching swiss knife for malware researchers (and everyone else);*
- It's an improved **grep** to create pattern matching rule to search for **strings, binary patterns, regular expressions**;
- A YARA rule can be contextualised with metadata and tags describing a specific set of pattern matching rules.
- Easier definition of conditions compared to regex.

A sample rule - disneyplus.yara

```
1 rule disney_plus : credential_leak
2 {
3     meta:
4         description = "Finding list of credentials for
5         Disney Plus"
6         leak = 1
7     strings:
8         $a = "gmail.com:"
9         $b = "DISNEY_PLUS"
10        $c = "Disney Plus"
11    condition:
12        $a and ($b or $c)
13 }
```

Calling yara from command line

- Searching a single file

```
1 yara disneyplus.yara /home/adulau/dataset/2021/09/01/  
   nv6RsKFm
```

```
2
```

- Searching a directory

```
1 yara disneyplus.yara -r /home/adulau/dataset  
   /2021/09/01/
```

```
2
```

Regular Expressions

- Regular Expressions (Regex) are extremely useful in extracting information from text
- A regex is a sequence of characters that specifies a search pattern
- They can be used to match, locate extract and replace text

Regular Expressions

You can search for simple letters and specify repetition or existence

```
1 String: 'Cookie'
2
3 // '.' Any single character
4 $re1: /Co.kie/
5
6 // '*' Zero or more for the previous sequence
7 $re2: /Co*kie/
8
9 // '+' One or more for the previous sequence
10 $re3: /Co+kie/
```

Regular Expressions

```
1 // '{2,3}' Between 2 and 3
2 $re4: /Co{2,3}kie/
3
4 // '[a-zA-Z]' Any letter between 'a' and 'Z'
5 $re5: /Co[a-zA-Z]kie/
```


Regular Expressions

Usecase: Email addresses

```
1 $re1: /.+@.+\....+/
2 // The address '1@.' is valid
3
4
5 $re2: /.+@.+\. [a-zA-Z]{2,4}/
6 // We enforce a correct TLD (i.e. '.com')
```

Regular Expressions

Usecase: Email addresses

```
1 $re2: /.+@[a-zA-Z0-9_.-]+\.[a-zA-Z]{2,4}/
2 // We enforce a correct domain (i.e. 'gmail' or 'hotmail'
  // ')
3
4 $re3: /[a-zA-Z0-9_%.+~]+@[a-zA-Z0-9_.-]+\.[a-zA-Z]{2,4}/
5 // We enforce a correct email format
6 // '!john@doe~@gmail.com' is not valid anymore
```

REGULAR EXPRESSION

1 match (20 steps, 0.0ms)

`/ ([\w_%.+~]+)@([\w.-]+\.[a-zA-Z]{2,4}) /m`

TEST STRING

`john.doe@gmail.com`

EXPLANATION

MATCH INFORMATION

Match 1	0-18	john.doe@gmail.com
Group 1	0-8	john.doe
Group 2	9-14	gmail
Group 3	15-18	com

Fun with Regular Expressions

<https://regexcrossword.com/>

	(FY F RG)+	[NODE]+	(.) [IF]+	(YE OT)K	(FI A)+
(Y F)(.)\2[DAF]\1					
(U O I)*T[FRO]+					
[KANE]*[GIN]*					

Searching in binaries

Binaries packed with UPX but made unusable by UPX -d by modifying the magic UPX string:

```

00000000: 7f45 4c46 0201 0100 0000 0000 0000 0000 .ELF.....00000000: 7f45 4c46 0201 0100 0000 0000 0000 0000 .ELF.....
00000010: 0200 3e00 0100 0000 2872 4c00 0000 0000 .>.....Hj@....00000010: 0200 3e00 0100 0000 486a 4000 0000 0000 .>.....Hj@....
00000020: 4000 0000 0000 0000 0000 0000 0000 0000 @.....00000020: 4000 0000 0000 0000 0000 0000 0000 0000 @.....
00000030: 0000 0000 4000 3800 0300 4000 0000 0000 ....@.8...@....00000030: 0000 0000 4000 3800 0300 4000 0000 0000 ....@.8...@....
00000040: 0100 0000 0500 0000 0000 0000 0000 0000 00000040: 0100 0000 0500 0000 0000 0000 0000 0000 0000
00000050: 0000 4000 0000 0000 0000 4000 0000 0000 ....@.....@....00000050: 0000 4000 0000 0000 0000 4000 0000 0000 ....@.....@....
00000060: 4284 0c00 0000 0000 4284 0c00 0000 0000 B.....B.....00000060: 427c 0000 0000 0000 2d7c 0000 0000 0000 .-|.....|.....
00000070: 0000 2000 0000 0000 0100 0000 0000 0000 ..00000070: 0000 2000 0000 0000 0100 0000 0000 0000 ..
00000080: 0000 0000 0000 0000 0090 4c00 0000 0000 xE.....L.....00000080: 0000 0000 0000 0000 0080 4000 0000 0000 xE.....L.....
00000090: 0090 4c00 0000 0000 0000 0000 0000 0000 ..L.....00000090: 0080 4000 0000 0000 0000 0000 0000 0000 ..@.....
000000a0: 7845 4500 0000 0000 0010 0000 0000 0000 xEE.....000000a0: 7893 2000 0000 0000 0010 0000 0000 0000 x.....
000000b0: 51e5 7464 0600 0000 0000 0000 0000 0000 Q.td.....000000b0: 51e5 7464 0600 0000 0000 0000 0000 0000 Q.td.....
000000c0: 0000 0000 0000 0000 0000 0000 0000 0000 .....000000c0: 0000 0000 0000 0000 0000 0000 0000 0000 .....
000000d0: 0000 0000 0000 0000 0000 0000 0000 0000 .....000000d0: 0000 0000 0000 0000 0000 0000 0000 0000 .....
000000e0: 1000 0000 0000 0000 deda 8b5f 00ff 9941 ....._..A.000000e0: 1000 0000 0000 0000 18b9 39c1 dfdd 3033 ....._..9...03
#l/usr/bin/env python                               #l/usr/bin/env python
import sys                                           import sys

def main(srcFilename):                             def main(srcFilename):
    f = open(srcFilename, 'rb')                     f = open(srcFilename, 'rb')
    s = open(srcFilename+'_00ff9941', 'wb+')        s = open(srcFilename+'_dfdd3033', 'wb+')
    header = f.read(0xea)                           header = f.read(0xea)
    s.write(header)                                  s.write(header)
    bindata = f.read()                               bindata = f.read()
    f.close()                                         f.close()
    bindata = bindata.replace(b'\x00\xff\x99\x41', 'UPXI') bindata = bindata.replace(b'\xdf\xdd\x30\x33', 'UPXI')
    s.write(bindata)                                  s.write(bindata)
    f.close()                                         f.close()

if __name__ == '__main__':                          if __name__ == '__main__':
    main(sys.argv[1])                                main(sys.argv[1])

```

Searching in binaries

```
1 rule torcryptomining
2 {
3     strings:
4         $upx_erase = {(00 FF 99 41|DF DD 30 33)}
5     condition:
6         $upx_erase at 236
7 }
8
```