RADARE2

First r2babies steps

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ABOUT ME

- 22 y/o french expat @ Luxembourg
- Food?, Food., Food! <3
- I hate Bullshit
- Malware.lu CERT team leader (2days/week) and incident response @ European Commission CSIRC (3days/week)
- User of radare2 (impossibru!)
- I’m creating tests + documentation

GENERALITY ON RADARE2 FRAMEWORK

- r1 2006, r2 2009
- Multi-(OSes|Archs|Bindings|FileFormats|...)
- 10 tools based on the framework
- Around 111 contributors
- GSOC + RSOC
- CLI/VisualMode/GUI/WebGUI
- around 350K LOC

Installation !

INSTALLATION

- Always use git version!
- Use the provided VM on SSH (radare:radare / root:root)
- git clone http://github.com/radare/radare2 && cd radare2 && ./sys/install.sh
- Use the Windows installer http://bin.rada.re/radare2.exe

UTILITIES

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- rax2
- rabin2
- rasm2
- radiff2
- rafind2
- rahash2
- radare2
- rarun2
- ragg2/ragg2-cc

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rax2 — Base converter

```
$ rax2 10
```

0xa

```
$ rax2 33 0x41 0101b
```

0x21 65 0x5

```
$ rax2 -s 4142434445
```

ABCDE

```
$ rax2 0x5*101b+5
```

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UTILITIES: RABIN2

rabin2 — Binary program info extractor

```
$ rabin2 -e
```

Entrypoints

```
$ rabin2 -i
```

Shows imports

```
$ rabin2 -zz
```

Shows strings

```
$ rabin2 -g
```

Show all possible information

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UTILITIES: RASM2

rasm2 — assembler and disassembler tool

```
$ rasm2 -a x86 -b 32 'mov eax, 33'
```

Assemble

```
$ rasm2 -d 9090
```

Disassemble

```
$ rasm2 -L
```

List supported asm plugins

```
$ rasm2 -a x86 -b 32 'mov eax, 33' -C
```

Output in C format

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UTILITIES: RADIFF2

radiff2 — unified binary diffing utility

```
$ radiff2 original patched
```

Code diffing

```
$ radiff2 -C original patched
```

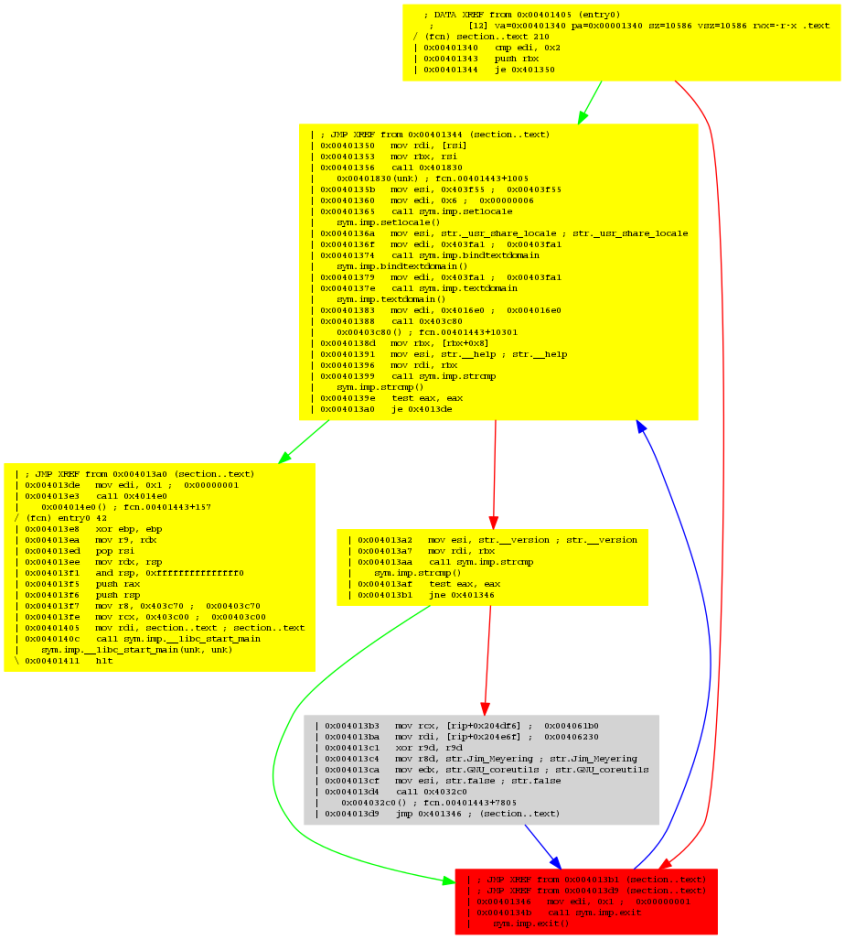
Code diffing using graphdiff algorithm

```
$ radiff2 -g main -a x86 -b32 original patched
```

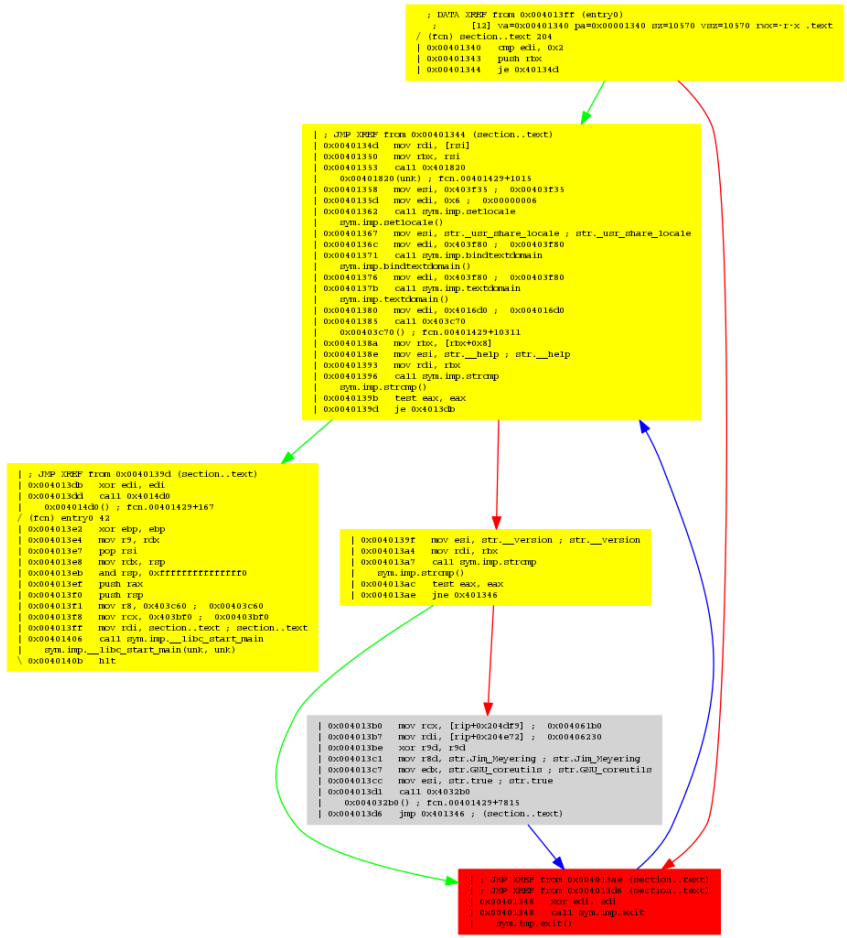
Graph diff output of given symbol, or between two functions, at given offsets: one for each binary.

UTILITIES: RADIFF2 — GRAPH EXAMPLE

/bin/true



/bin/false



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UTILITIES: RAFIND2

rafind2 — Advanced commandline hexadecimal editor

```
$ rafind2 -X -s passwd dump.bin
```

Search for the string passwd

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rahash2 — block based hashing utility

```
$ rahash2 -a all binary.exe
```

Display hashes of the whole file with all algos

```
$ rahash2 -B -b 512 -a md5
```

Compute md5 per block of 512

```
$ rahash2 -B -b 512 -a entropy
```

Compute md5 per block of 512

```
$ echo -n "admin" | rahash2 -a md5 -s "
```

Compute md5 of the string admin

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radare2 — command line

1 command <—> 1 reverse-engineering'notion

Keep in mind that:

1. Every character has a meaning i.e (w = write, p = print)
2. Every command is a succession of character i.e pdf = p <-> print d <-> disassemble f <-> function
3. Every command is documented with **cmd?**, i.e pdf?,?, ???, ???, ?$?, ?@?

THE # COMMAND — HASHING COMMAND

1. Open a file with radare2 radare2 file.exe
2. Get Usage on the command #? **Usage: #algo <size> @ addr**
3. List of all existing algorithms ##
4. SHA1 #sha1
5. Hashing from the begin #sha1 @ 0
6. with a hash block size corresponding to the size of the file #sha1 $s @ 0x0

This command is same as rahash2 -a sha1 file.exe

THE I COMMAND — INFORMATION COMMAND

1. Get Usage on the command i?
2. Same as rabin2
3. izj for displaying in json
4. internal commands: ~, ls, {}, ..

radare2 — 'major' command example: pf

Quick Demo

RADARE2 — CLI MAIN COMMANDS

1. r2 -A or r2 then aaa : Analysis
2. s : Seek
3. pdf : Print disassemble function
4. af? : Analyse function
5. ax? : Analyse XREF
6. /? : Search
7. ps? : Print strings
8. C? : Comments
9. w? : Write

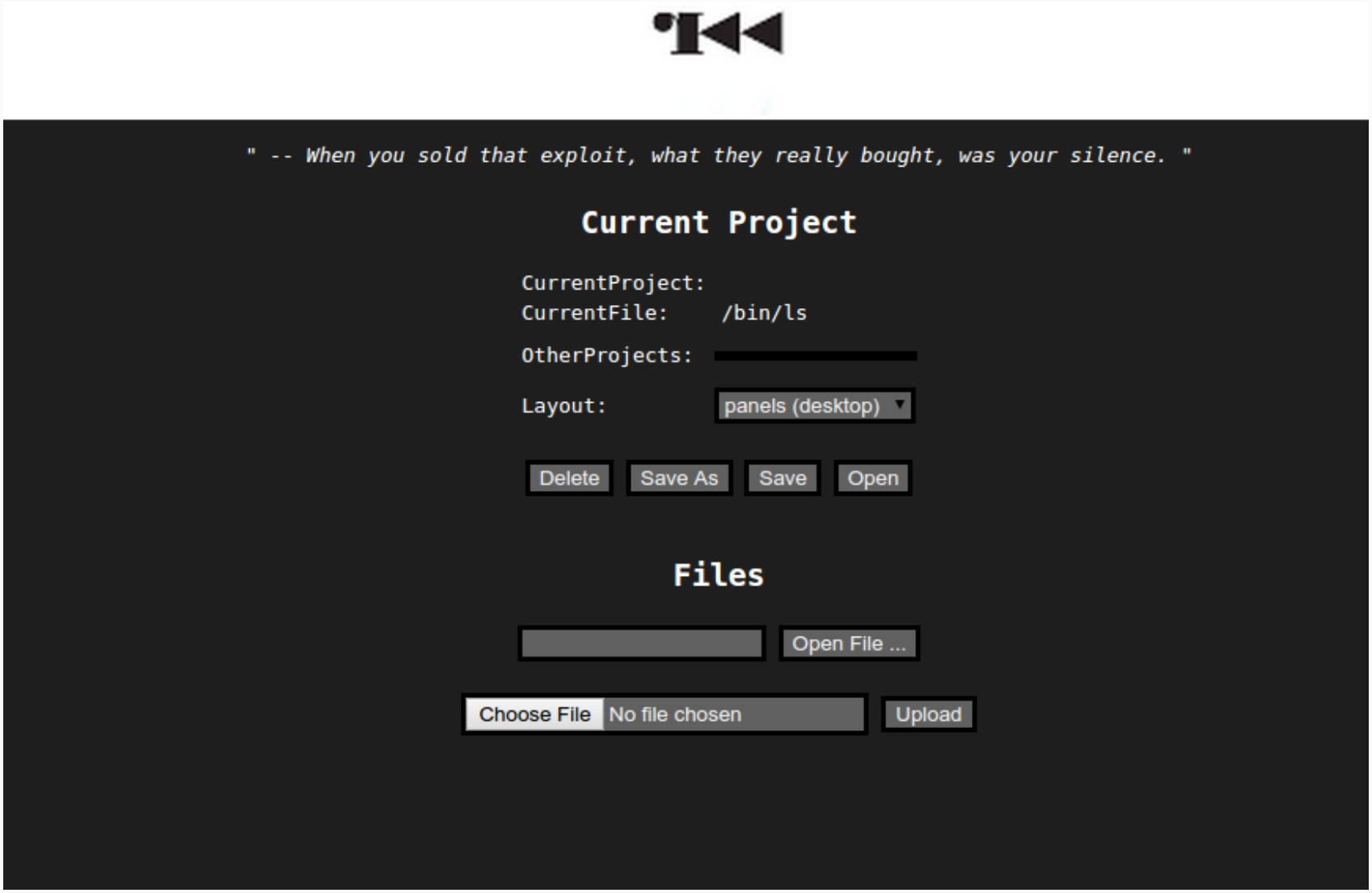
RADARE2 — VISUAL MODE

RADARE2 — VISUAL MODE MAIN COMMANDS

1. V? : Visual help
2. p/P : rotate print modes
3. move using arrows/hjkl
4. o : seek to
5. e : r2configurator
6. v : Function list
7. _ : HUD
8. V : ASCII Graph

RADARE2 — WEBUI

r2 -A -c=H filename



RADARE2 — DEBUGGER

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1. radare2 -d
2. Quickly switch to Visual debugger mode: Vpp
3. OllyDBG/IDApro shortcuts friendly

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Rarun2 — run programs in exotic environments

1. Environnment setup tools for radare2
2. most useful with debugger
3. aslr, stdout, arguments, r2preload ...

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Ragg2/Ragg2-cc — frontend for compiling shellcodes

Demo time !

DOCUMENTATION

- Website: http://rada.re/
- Blog: http://radare.today
- Book: http://maijin.gitbooks.io/radare2book/content/

Now your turn !