Cutter

A graphical user interface for radare2

@xarkes_

# whoami

Antide Petit
Twitter: @xarkes_
GitHub: @xarkes

Grenoble INP
Ensimag

GreHack
New is not always better

# history

* project named iaito

* developed for long by Hugo Theso alone

* was less and less maintained

* cross platform GUI (Windows, Linux, OS X)

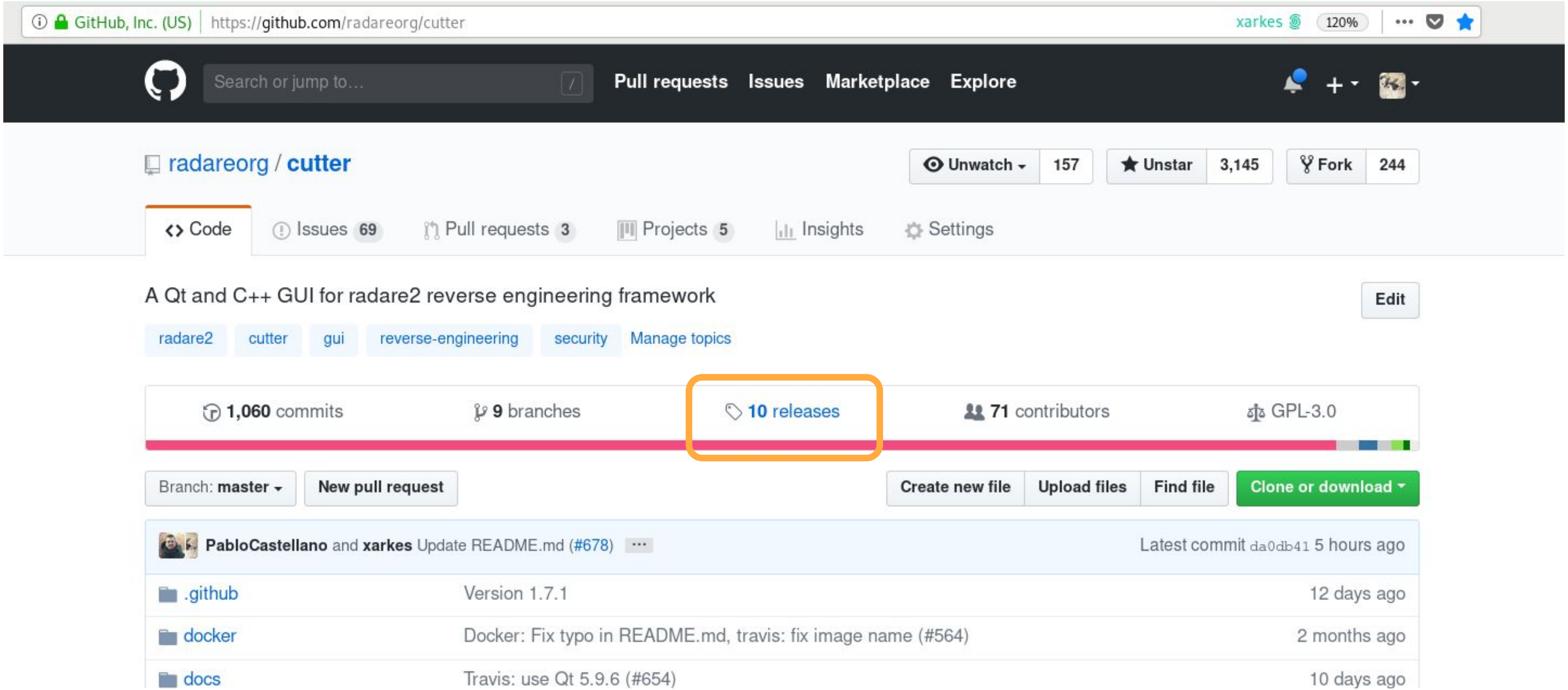
“Cutter is not aimed at existing radare2 users. It instead focuses on those who are not yet radare2 users because of the learning curve, because they don't like CLI applications or because of the difficulty/instability of radare2.”

# how to use cutter

* compile from source (cmake, qmake, meson)

* download binaries on the GitHub releases page

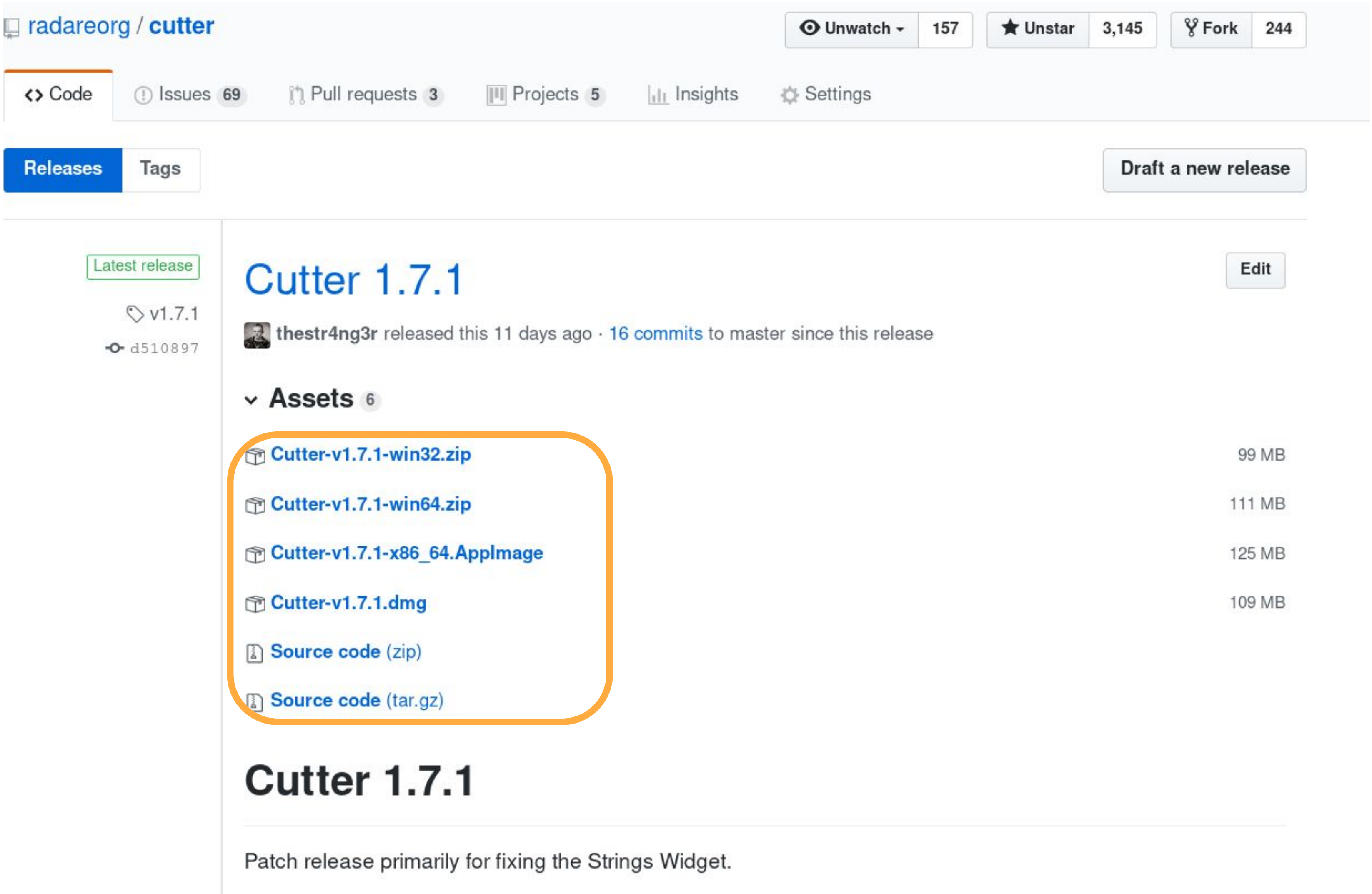
https://github.com/radareorg/cutter/releases



A Qt and C++ GUI for radare2 reverse engineering framework

PabloCastellano and xarkes Update README.md (#678) … Latest commit da0db41 5 hours ago

.github	Version 1.7.1	12 days ago
docker	Docker: Fix typo in README.md, travis: fix image name (#564)	2 months ago
docs	Travis: use Qt 5.9.6 (#654)	10 days ago



Cutter 1.7.1

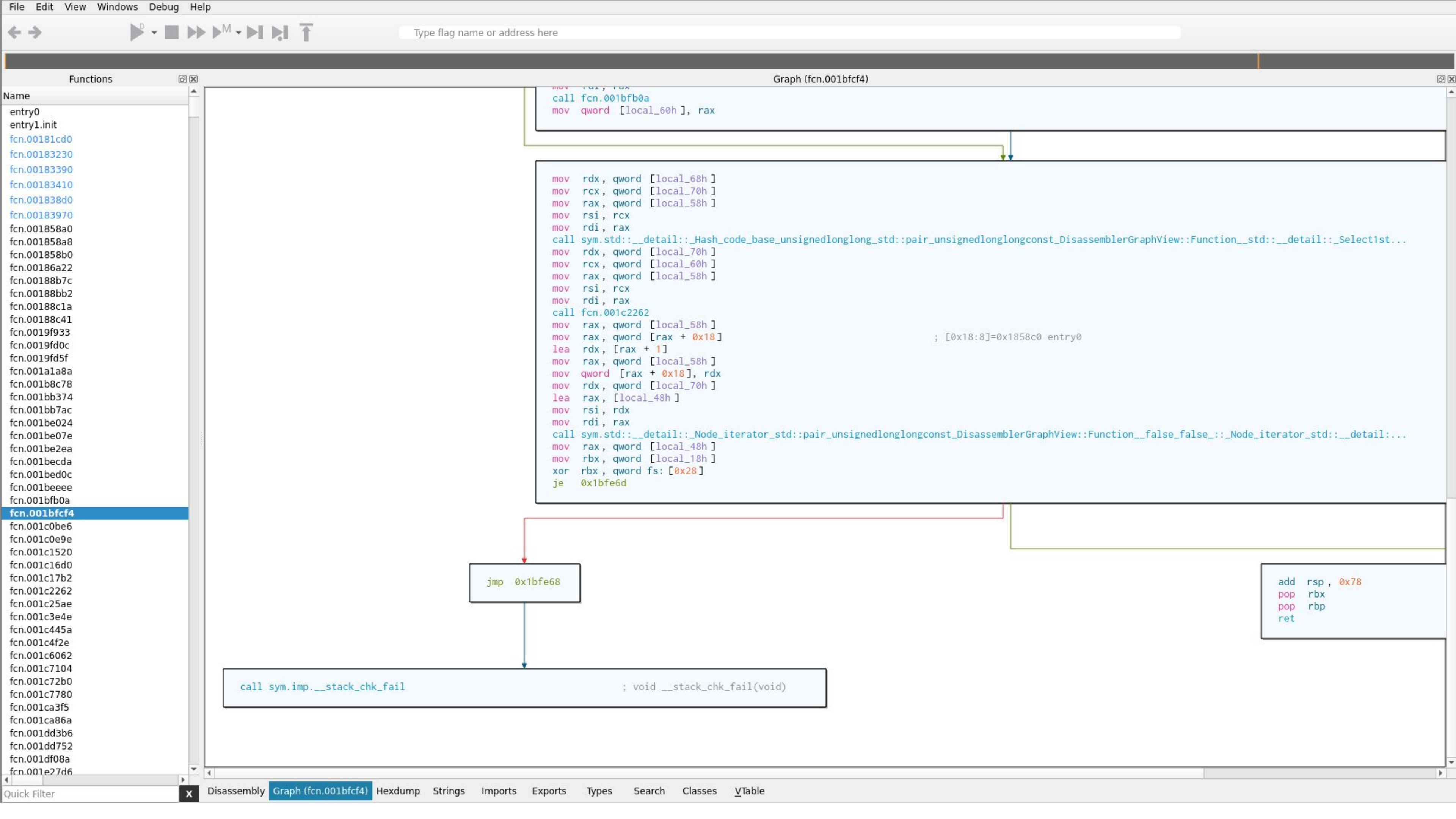
thestr4ng3r released this 11 days ago · 16 commits to master since this release

Assets 6

Cutter-v1.7.1-win32.zip	99 MB
Cutter-v1.7.1-win64.zip	111 MB
Cutter-v1.7.1-x86_64.AppImage	125 MB
Cutter-v1.7.1.dmg	109 MB
Source code (zip)	
Source code (tar.gz)	

Cutter 1.7.1

Patch release primarily for fixing the Strings Widget.



```
mov  rdi, rax
call fcn.001bfb0a
mov  qword [local_60h ], rax
```

```
mov  rdx, qword [local_68h ]
mov  rcx, qword [local_70h ]
mov  rax, qword [local_58h ]
mov  rsi, rcx
mov  rdi, rax
call sym.std::__detail::_Hash_code_base_unsignedlonglong_std::pair_unsignedlonglongconst_DisassemblerGraphView::Function__std::__detail::_Select1st...
mov  rdx, qword [local_70h ]
mov  rcx, qword [local_60h ]
mov  rax, qword [local_58h ]
mov  rsi, rcx
mov  rdi, rax
call fcn.001c2262
mov  rax, qword [local_58h ]
mov  rax, qword [rax + 0x18]                          ; [0x18:8]=0x1858c0 entry0
lea  rdx, [rax + 1]
mov  rax, qword [local_58h ]
mov  qword [rax + 0x18], rdx
mov  rdx, qword [local_70h ]
lea  rax, [local_48h ]
mov  rsi, rdx
mov  rdi, rax
call sym.std::__detail::_Node_iterator_std::pair_unsignedlonglongconst_DisassemblerGraphView::Function__false_false_::_Node_iterator_std::__detail:...
mov  rax, qword [local_48h ]
mov  rbx, qword [local_18h ]
xor  rbx, qword fs:[0x28]
je   0x1bfe6d
```

```
jmp  0x1bfe68
```

```
add  rsp, 0x78
pop  rbx
pop  rbp
ret
```

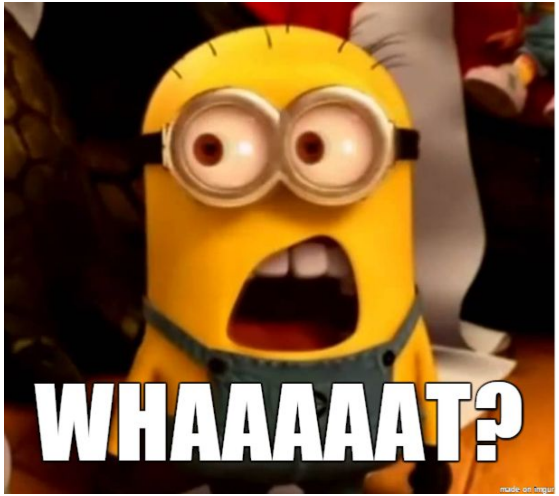
```
call sym.imp.__stack_chk_fail                  ; void __stack_chk_fail(void)
```

# a year before

* many “useless” features (from a reverse engineer PoV)

* the interface printed pseudo graphs in HTML

(qt webengine)

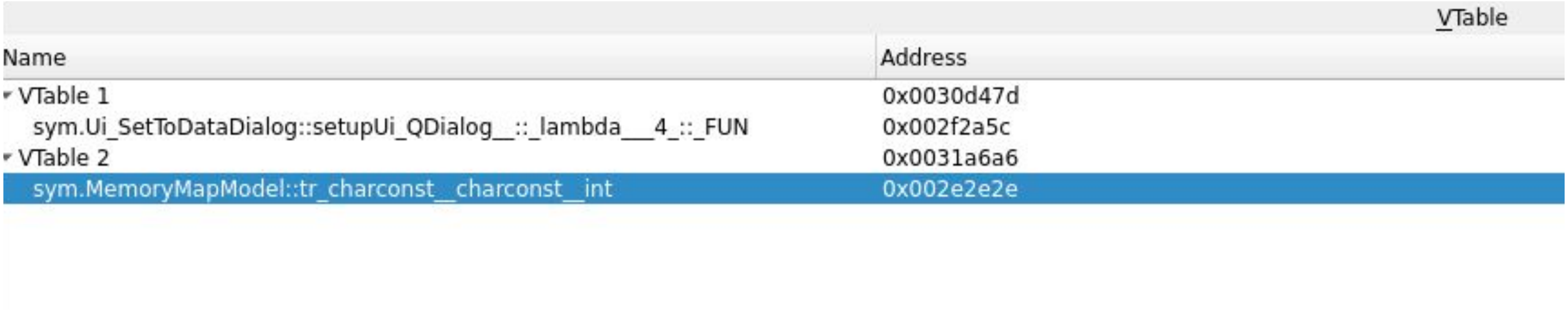


# a year after

* reworked almost 100% of the codebase

* added features

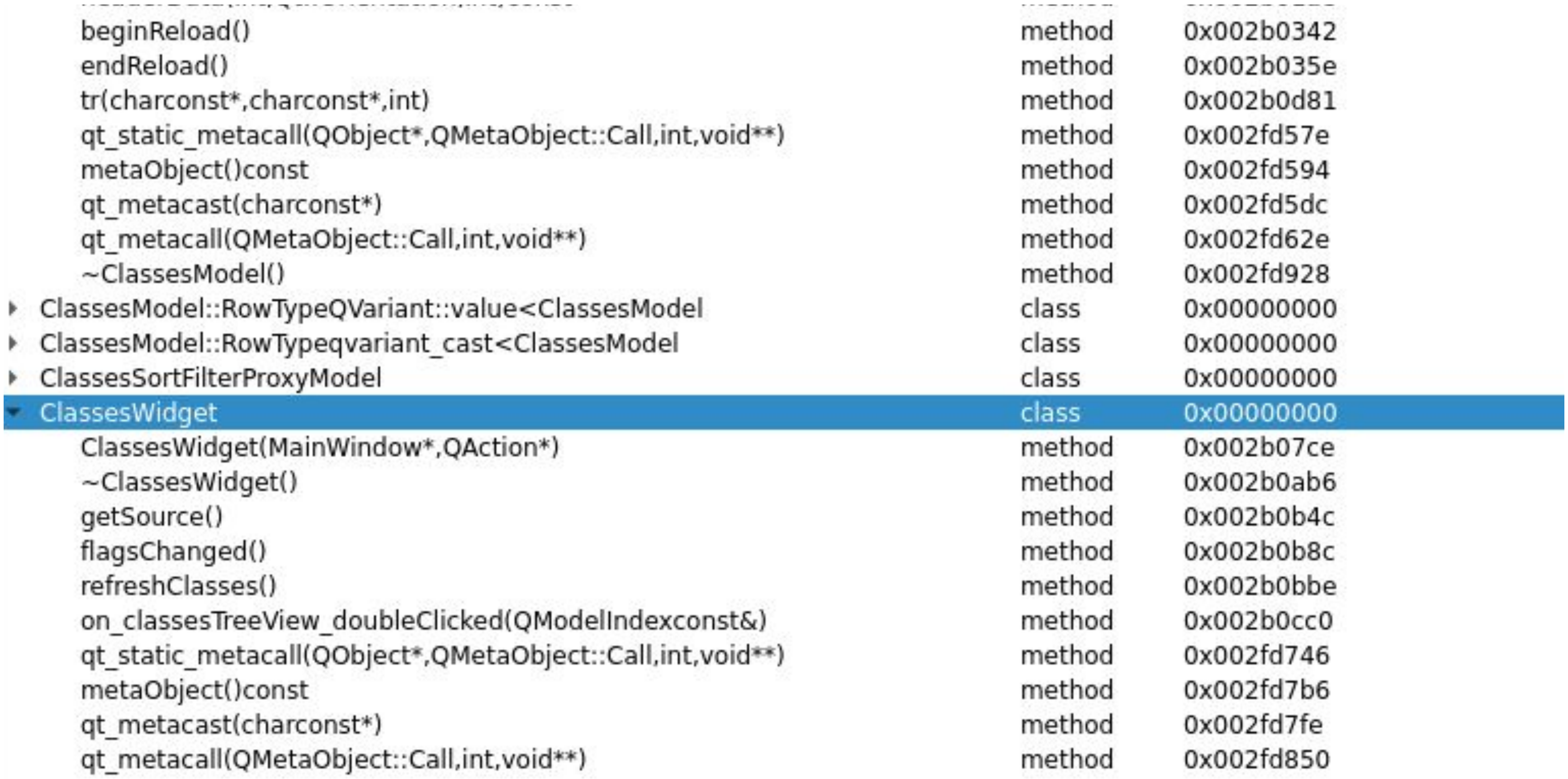
# vtables



VTable

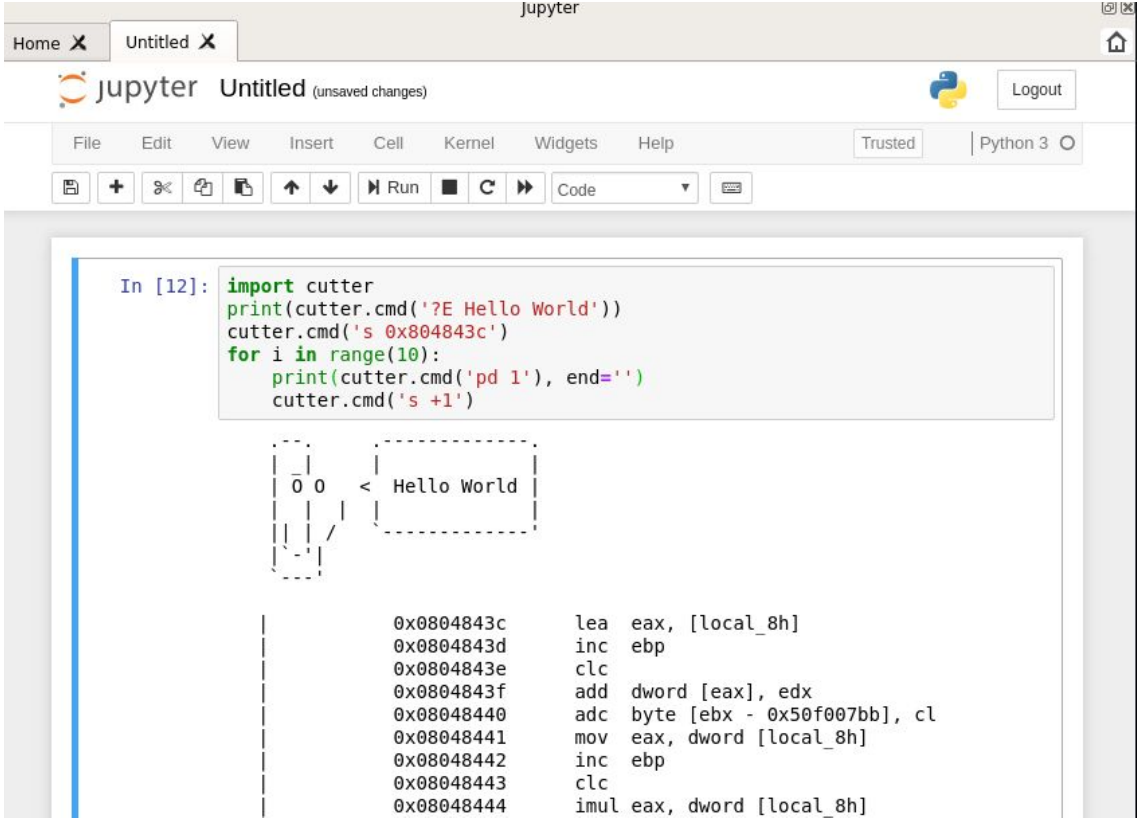
Name	Address
VTable 1	0x0030d47d
sym.Ui_SetToDataDialog::setupUi_QDialog__::_lambda___4_::_FUN	0x002f2a5c
VTable 2	0x0031a6a6
sym.MemoryMapModel::tr_charconst__charconst__int	0x002e2e2e

# classes



beginReload()	method	0x002b0342
endReload()	method	0x002b035e
tr(charconst*,charconst*,int)	method	0x002b0d81
qt_static_metacall(QObject*,QMetaObject::Call,int,void**)	method	0x002fd57e
metaObject()const	method	0x002fd594
qt_metacast(charconst*)	method	0x002fd5dc
qt_metacall(QMetaObject::Call,int,void**)	method	0x002fd62e
~ClassesModel()	method	0x002fd928
▸ ClassesModel::RowTypeQVariant::value<ClassesModel	class	0x00000000
▸ ClassesModel::RowTypeqvariant_cast<ClassesModel	class	0x00000000
▸ ClassesSortFilterProxyModel	class	0x00000000
▾ ClassesWidget	class	0x00000000
ClassesWidget(MainWindow*,QAction*)	method	0x002b07ce
~ClassesWidget()	method	0x002b0ab6
getSource()	method	0x002b0b4c
flagsChanged()	method	0x002b0b8c
refreshClasses()	method	0x002b0bbe
on_classesTreeView_doubleClicked(QModelIndexconst&)	method	0x002b0cc0
qt_static_metacall(QObject*,QMetaObject::Call,int,void**)	method	0x002fd746
metaObject()const	method	0x002fd7b6
qt_metacast(charconst*)	method	0x002fd7fe
qt_metacall(QMetaObject::Call,int,void**)	method	0x002fd850

# jupyter scripting



```
In [12]: import cutter
         print(cutter.cmd('?E Hello World'))
         cutter.cmd('s 0x804843c')
         for i in range(10):
             print(cutter.cmd('pd 1'), end='')
             cutter.cmd('s +1')
```

```
 .--.     .-------------.
 | _|     |             |
 | O O   <  Hello World |
 |  |  |  |             |
 || | /   `-------------'
 |`-'|
 `---'

|            0x0804843c      lea  eax, [local_8h]
|            0x0804843d      inc  ebp
|            0x0804843e      clc
|            0x0804843f      add  dword [eax], edx
|            0x08048440      adc  byte [ebx - 0x50f007bb], cl
|            0x08048441      mov  eax, dword [local_8h]
|            0x08048442      inc  ebp
|            0x08048443      clc
|            0x08048444      imul eax, dword [local_8h]
```

# demo

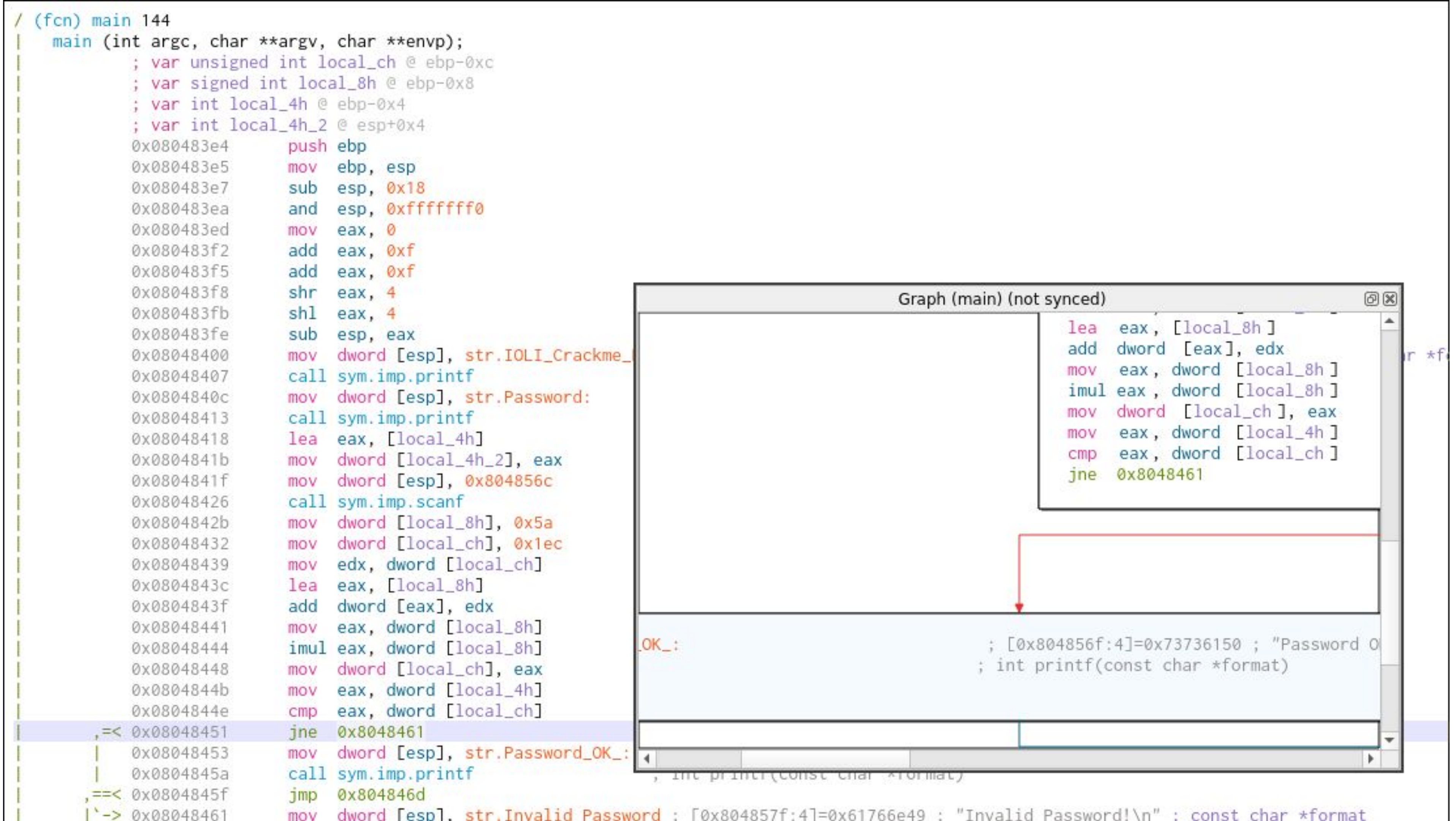
# internal structure

* QDockWidget

** can be moved around

** can be docked

** can be windowed



```
/ (fcn) main 144
|   main (int argc, char **argv, char **envp);
|           ; var unsigned int local_ch @ ebp-0xc
|           ; var signed int local_8h @ ebp-0x8
|           ; var int local_4h @ ebp-0x4
|           ; var int local_4h_2 @ esp+0x4
|           0x080483e4      push ebp
|           0x080483e5      mov ebp, esp
|           0x080483e7      sub esp, 0x18
|           0x080483ea      and esp, 0xfffffff0
|           0x080483ed      mov eax, 0
|           0x080483f2      add eax, 0xf
|           0x080483f5      add eax, 0xf
|           0x080483f8      shr eax, 4
|           0x080483fb      shl eax, 4
|           0x080483fe      sub esp, eax
|           0x08048400      mov dword [esp], str.IOLI_Crackme_                                    r *f
|           0x08048407      call sym.imp.printf
|           0x0804840c      mov dword [esp], str.Password:
|           0x08048413      call sym.imp.printf
|           0x08048418      lea eax, [local_4h]
|           0x0804841b      mov dword [local_4h_2], eax
|           0x0804841f      mov dword [esp], 0x804856c
|           0x08048426      call sym.imp.scanf
|           0x0804842b      mov dword [local_8h], 0x5a
|           0x08048432      mov dword [local_ch], 0x1ec
|           0x08048439      mov edx, dword [local_ch]
|           0x0804843c      lea eax, [local_8h]
|           0x0804843f      add dword [eax], edx
|           0x08048441      mov eax, dword [local_8h]
|           0x08048444      imul eax, dword [local_8h]
|           0x08048448      mov dword [local_ch], eax
|           0x0804844b      mov eax, dword [local_4h]
|           0x0804844e      cmp eax, dword [local_ch]
|       ,=< 0x08048451      jne 0x8048461
|       |   0x08048453      mov dword [esp], str.Password_OK_:
|       |   0x0804845a      call sym.imp.printf               ; int printf(const char *format)
|      ,==< 0x0804845f      jmp 0x804846d
|      |`-> 0x08048461      mov dword [esp], str.Invalid_Password ; [0x804857f:4]=0x61766e49 ; "Invalid Password!\n" ; const char *format
```

Graph (main) (not synced)

```
lea  eax, [local_8h]
add  dword [eax], edx
mov  eax, dword [local_8h]
imul eax, dword [local_8h]
mov  dword [local_ch], eax
mov  eax, dword [local_4h]
cmp  eax, dword [local_ch]
jne  0x8048461
```

```
OK_:                 ; [0x804856f:4]=0x73736150 ; "Password O
                    ; int printf(const char *format)
```

# internal structure (dos)

* every widget uses radare2 JSON output

** commands are more stable than the API

** json is relatively easy to parse

# contributing

* open issues

* make a PR

** .ui files

** .cpp

# projects (work in progress)

* move main widgets into an external library

** help maintenance with other projects (e.g. x64dbg)

** give the possibility to other people to use those

# projects (work in progress)

* C++ and Python plugins

* plugin manager (r2pm-go)

* debugger support

# google summer of code

* @filipe_casal (mandlebro)

* debugging platform

* some stuff require a lot of rework in r2 codebase

# documentation?

* contribution guidelines are available in the repository

* no complete documentation (the software is still young)

* feel free to ask any question on **IRC** or **Telegram** or **GitHub**

https://github.com/radareorg/cutter/blob/master/README.md

# efficiency

* more and more people use it in real world challenges
(still not enough)

* we can still add widgets and features that are available
in radare2

# conclusion

* a lot of changes and refinements in a year

* need to focus on useful features

# special thanks

* thestr4ng3r

* maijin

* pelijah

* mandlebro

* megabeets

https://github.com/radareorg/cutter/

@r2gui
@xarkes_