

Apply filters to SQL queries

Project description

Using SQL queries and query filtering techniques, I will examine data about employees and login attempts to investigate potential security issues from different datasets.

Retrieve after hours failed login attempts

A recent potential security incident occurred after business hours.

Retrieving the failed login attempts that occurred after 6pm:

```
MariaDB [organization]> |SELECT *
-> FROM log_in_attempts
-> WHERE login_time > '18:00' AND success = 0;
+-----+-----+-----+-----+-----+-----+-----+
| event_id | username | login_date | login_time | country | ip_address | success |
+-----+-----+-----+-----+-----+-----+-----+
| 2 | apatel | 2022-05-10 | 20:27:27 | CAN | 192.168.205.12 | 0 |
| 18 | pwashing | 2022-05-11 | 19:28:50 | US | 192.168.66.142 | 0 |
| 20 | tshah | 2022-05-12 | 18:56:36 | MEXICO | 192.168.109.50 | 0 |
| 28 | aestrada | 2022-05-09 | 19:28:12 | MEXICO | 192.168.27.57 | 0 |
| 34 | drosas | 2022-05-11 | 21:02:04 | US | 192.168.45.93 | 0 |
| 42 | cgriffin | 2022-05-09 | 23:04:05 | US | 192.168.4.157 | 0 |
| 52 | cjackson | 2022-05-10 | 22:07:07 | CAN | 192.168.58.57 | 0 |
| 69 | wjaffrey | 2022-05-11 | 19:55:15 | USA | 192.168.100.17 | 0 |
| 82 | abernard | 2022-05-12 | 23:38:46 | MEX | 192.168.234.49 | 0 |
| 87 | apatel | 2022-05-08 | 22:38:31 | CANADA | 192.168.132.153 | 0 |
| 96 | ivelasco | 2022-05-09 | 22:36:36 | CAN | 192.168.84.194 | 0 |
| 104 | asundara | 2022-05-11 | 18:38:07 | US | 192.168.96.200 | 0 |
| 107 | bisles | 2022-05-12 | 20:25:57 | USA | 192.168.116.187 | 0 |
| 111 | aestrada | 2022-05-10 | 22:00:26 | MEXICO | 192.168.76.27 | 0 |
| 127 | abellmas | 2022-05-09 | 21:20:51 | CANADA | 192.168.70.122 | 0 |
| 131 | bisles | 2022-05-09 | 20:03:55 | US | 192.168.113.171 | 0 |
| 155 | cgriffin | 2022-05-12 | 22:18:42 | USA | 192.168.236.176 | 0 |
| 160 | jclark | 2022-05-10 | 20:49:00 | CANADA | 192.168.214.49 | 0 |
| 199 | yappiah | 2022-05-11 | 19:34:48 | MEXICO | 192.168.44.232 | 0 |
+-----+-----+-----+-----+-----+-----+-----+
19 rows in set (0.004 sec)
```

Retrieve login attempts on specific dates

A suspicious event occurred on 5/9/22. We'll examine more closely the login attempts on the day before (5/8/22) and the day of (5/9/22) using the **OR** keyword:

```
MariaDB [organization]> SELECT *
-> FROM log_in_attempts
-> WHERE login_date = '2022-05-08' OR login_date = '2022-05-09';
```

event_id	username	login_date	login_time	country	ip_address	success
1	jrafael	2022-05-09	04:56:27	CAN	192.168.243.140	1
3	dkot	2022-05-09	06:47:41	USA	192.168.151.162	1
4	dkot	2022-05-08	02:00:39	USA	192.168.178.71	0
8	bisles	2022-05-08	01:30:17	US	192.168.119.173	0
12	dkot	2022-05-08	09:11:34	USA	192.168.100.158	1
15	lyamamot	2022-05-09	17:17:26	USA	192.168.183.51	0
24	arusso	2022-05-09	06:49:39	MEXICO	192.168.171.192	1
25	sbaelish	2022-05-09	07:04:02	US	192.168.33.137	1
26	apatel	2022-05-08	17:27:00	CANADA	192.168.123.105	1
28	aestrada	2022-05-09	19:28:12	MEXICO	192.168.27.57	0
30	yappiah	2022-05-09	03:22:22	MEX	192.168.124.48	1
32	acook	2022-05-09	02:52:02	CANADA	192.168.142.239	0
36	asundara	2022-05-08	09:00:42	US	192.168.78.151	1
38	sbaelish	2022-05-09	14:40:01	USA	192.168.60.42	1
39	yappiah	2022-05-09	07:56:40	MEXICO	192.168.57.115	1
42	cgriffin	2022-05-09	23:04:05	US	192.168.4.157	0
43	mcouliba	2022-05-08	02:35:34	CANADA	192.168.16.208	0
44	daquino	2022-05-08	07:02:35	CANADA	192.168.168.144	0
47	dkot	2022-05-08	05:06:45	US	192.168.233.24	1
49	asundara	2022-05-08	14:00:01	US	192.168.173.213	0
53	nmason	2022-05-08	11:51:38	CAN	192.168.133.188	1

Retrieve login attempts outside of Mexico

The team has determined that the suspicious login attempts have occurred outside of Mexico. We can use the **NOT** and **LIKE** keywords to search for login attempts that did not occur in Mexico (matched by the "MEX%" pattern):

```
MariaDB [organization]> SELECT *
-> FROM log_in_attempts
-> WHERE NOT country LIKE 'MEX%';
```

event_id	username	login_date	login_time	country	ip_address	success
1	jrafael	2022-05-09	04:56:27	CAN	192.168.243.140	1
2	apatel	2022-05-10	20:27:27	CAN	192.168.205.12	0
3	dkot	2022-05-09	06:47:41	USA	192.168.151.162	1
4	dkot	2022-05-08	02:00:39	USA	192.168.178.71	0
5	jrafael	2022-05-11	03:05:59	CANADA	192.168.86.232	0
7	eraab	2022-05-11	01:45:14	CAN	192.168.170.243	1
8	bisles	2022-05-08	01:30:17	US	192.168.119.173	0
10	jrafael	2022-05-12	09:33:19	CANADA	192.168.228.221	0
11	sgilmore	2022-05-11	10:16:29	CANADA	192.168.140.81	0

Retrieve employees in Marketing

The team wants to perform security updates on the machines used by the Marketing department.

We can use the **LIKE** filter to search for offices that start with the keyword “East” using the % operator:

```
MariaDB [organization]> SELECT * FROM employees WHERE department='Marketing' AND office LIKE 'East%';
```

employee_id	device_id	username	department	office
1000	a320b137c219	elarson	Marketing	East-170
1052	a192b174c940	jdarosa	Marketing	East-195
1075	x573y883z772	fbautist	Marketing	East-267
1088	k865l965m233	rgosh	Marketing	East-157
1103	NULL	randerss	Marketing	East-460
1156	a184b775c707	dellery	Marketing	East-417
1163	h679i515j339	cwilliam	Marketing	East-216

```
7 rows in set (0.001 sec)
```

Retrieve employees in Finance or Sales

The team wants to perform a different security update on the machines for the Finance and Sales departments.

We can use the **OR** keyword to match the department to either Finance or Sales:

```
MariaDB [organization]> SELECT * FROM employees WHERE department='Finance' OR department='Sales';
```

employee_id	device_id	username	department	office
1003	d394e816f943	sgilmore	Finance	South-153
1007	h174i497j413	wjaffrey	Finance	North-406
1008	i858j583k571	abernard	Finance	South-170
1009	NULL	lrodriqu	Sales	South-134
1010	k242l212m542	jlansky	Finance	South-109
1011	l748m120n401	drozas	Sales	South-292
1015	p611q262r945	jsoto	Finance	North-271
1017	r550s824t230	jclark	Finance	North-188
1018	s310t540u653	abellmas	Finance	North-403

Retrieve all employees not in IT

The machines in the IT department already have a specific security update, so to find all of the machines that don't have this update we'll use the **NOT** keyword to find all of the machines not in the IT department:

```
MariaDB [organization]> SELECT * FROM employees WHERE NOT department = 'Information Technology';
```

employee_id	device_id	username	department	office
1000	a320b137c219	elarson	Marketing	East-170
1001	b239c825d303	bmoreno	Marketing	Central-276
1002	c116d593e558	tshah	Human Resources	North-434
1003	d394e816f943	sgilmore	Finance	South-153
1004	e218f877g788	eraab	Human Resources	South-127
1005	f551g340h864	gesparza	Human Resources	South-366
1007	h174i497j413	wjaffrey	Finance	North-406
1008	i858j583k571	abernard	Finance	South-170
1009	NULL	lrodriqu	Sales	South-134

Summary

This document shows how SQL queries and query filtering can be used to analyze data from different datasets to perform critical security tasks.