

# Operation Analytics and Investigating Metric Spike

## What are Operation Analytics?

Operational Analytics is all about understanding and improving how a company runs its day-to-day activities. By analysing data from different teams—like operations, support, and marketing—a business can find ways to work more efficiently, boost productivity, and make smarter decisions.

One essential part of this process is investigating sudden changes, or "spikes," in important metrics. For example, if daily user engagement drops or sales take a sudden dip, Operational Analytics helps identify why these changes are happening and what can be done about them.

In this kind of role, a Data Analyst uses tools like SQL to dive into various datasets, answer pressing questions from different departments, and provide insights that help keep everything running smoothly. The goal is to make sure the company's operations are as effective and resilient as possible.

## Project Approach

This project is developed using PostgreSQL. First, I need to create databases by using the dataset file which was provided by the company. Next steps load the data into PostgreSQL then performed analysis and find the information that will help the **ops team**, **support team**, **marketing team**, etc. to understand questions like - Why is there a dip in daily engagement? Why have sales taken a dip? Etc. Questions like these must be answered daily and for that it's very important to investigate metric spikes.

## Tech-Stack Used :PostgreSQL

## Insights

### Case Study 1 (Job Data)

You will be working with a table named `job_data` with the following columns:

- `job_id`: Unique identifier of jobs
- `actor_id`: Unique identifier of actor
- `event`: The type of event (decision/skip/transfer).
- `language`: The Language of the content
- `time_spent`: Time spent to review the job in seconds.
- `org`: The Organization of the actor
- `ds`: The date in the format `yyyy/mm/dd` (stored as text).

Tasks:

1. Calculate the number of jobs reviewed per hour for each day in November 2020.

Solution:

```
SELECT ds AS Dates, COUNT (job_id),SUM(time_spent)/3600 AS "Jobs Reviewed per Hour per Day"
FROM job_data
WHERE ds BETWEEN '2020-11-01' AND '2020-11-30' GROUP BY ds;
```

Output:

	dates date	count bigint	Jobs Reviewed per Hour per Day numeric
1	2020-11-25	1	0.0125000000000000000000
2	2020-11-26	1	0.01555555555555555556
3	2020-11-28	2	0.00916666666666666667
4	2020-11-29	1	0.00555555555555555556
5	2020-11-30	2	0.01111111111111111111

2. Calculate the 7-day rolling average of throughput (number of events per second).

Solution:

pgAdmin 4

File Object Tools Edit View Window Help

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Query Query History

```
1 with Daily_Throughput As(
2 Select ds, count(job_id) as num_job,
3 sum(time_spent) as total_time
4 from job_data
5 where event in ('transfer','decision') and ds between '2020-11-01' and '2020-11-30'
6 group by ds
7 )
8 select ds,
9 round(1.0*sum(num_job) over (order by ds rows between 6 preceding and current row)/sum(total_time) over (order by ds rows between 6
10 from Daily_Throughput
```

Data Output Messages Notifications

	ds date	throughput_7_day_rolling numeric
1	2020-11-25	0.02
2	2020-11-28	0.04
3	2020-11-29	0.04
4	2020-11-30	0.04

Total rows: 4 of 4 Query complete 00:00:00.150 Ln 1, Col 1

3. Calculate the percentage share of each language in the last 30 days.

solution:

```
with job_description as(
select Language ,
count(job_id) as num_job
from job_data
where event in('transfer','decision') and ds between '2020-11-01' and '2020-11-30'
group by language),
total as (
select count(job_id)as total_job
from job_data
where ds between '2020-11-01' and '2020-11-30'
group by language
)
select language,round(100*num_job/total_job,2) as perecentage_job
from job_description cross join total
order by perecentage_job
```

language	perecentage_job
Arabic	33
Hindi	33
Italian	33
Persian	66
Hindi	100
Hindi	100
Hindi	100
Hindi	100
Arabic	100
Italian	100
Italian	100
Italian	100
Italian	100
Arabic	100
Arabic	100
Arabic	100
Persian	200
Persian	200
Persian	200
Persian	200

#### 4. Identify duplicate rows in the data.

The screenshot shows the pgAdmin 4 interface with a SQL query editor. The query is designed to identify duplicate rows in the `job_data` table by grouping rows based on several columns and counting the occurrences of each group. The query is as follows:

```
1 SELECT
2     ds,
3     job_id,
4     actor_id,
5     event,
6     language,
7     time_spent,
8     org,
9     COUNT(*) AS duplicate_count
10 FROM
11     job_data
12 GROUP BY
13     ds, job_id, actor_id, event, language, time_spent, org
14 HAVING
15     COUNT(*) > 1
16 ORDER BY
17     duplicate_count DESC;
```

The query is executed, and the results are displayed in the Data Output tab. The results show the columns `ds`, `job_id`, `actor_id`, `event`, `language`, `time_spent`, `org`, and `duplicate_count`. The data types for these columns are: `ds` (date), `job_id` (integer), `actor_id` (integer), `event` (character varying (50)), `language` (character varying (50)), `time_spent` (numeric), `org` (character varying (50)), and `duplicate_count` (bigint).

The status bar at the bottom indicates that the query is complete, with a total of 0 rows returned. The query execution time is 00:00:00.154, and the current line is 12, column 10.

## Case Study 2: Investigating Metric Spike

You will be working with three tables:

- users: Contains one row per user, with descriptive information about that user's account.
- events: Contains one row per event, where an event is an action that a user has taken (e.g., login, messaging, search).
- email\_events: Contains events specific to the sending of emails.

### 1. Measure the activeness of users on a weekly basis.

```
select DATE_TRUNC('week', occurred_at) as week,  
count(distinct user_id) as weekly_active_user  
from events  
where event_type='engagement' and event_name='login'  
group by 1  
order by 1
```

week	weekly_active_user
28-04-2014 00:00	701
05-05-2014 00:00	1054
12-05-2014 00:00	1094
19-05-2014 00:00	1147
26-05-2014 00:00	1113
02-06-2014 00:00	1173
09-06-2014 00:00	1219
16-06-2014 00:00	1262
23-06-2014 00:00	1249
30-06-2014 00:00	1271
07-07-2014 00:00	1355
14-07-2014 00:00	1345
21-07-2014 00:00	1363
28-07-2014 00:00	1442
04-08-2014 00:00	1266
11-08-2014 00:00	1215
18-08-2014 00:00	1203
25-08-2014 00:00	1194

### 2. Analyze the growth of users over time for a product.

```
Select date_trunc('day', created_at) as Day,  
count(*) as All_User,  
count(Case when activated_at is not null then user_id else null end) as active_users  
from users where created_at >= '2013-04-01' and created_at < '2014-09-30'  
group by 1  
order by 1
```

day	all_user	active_users
01-04-2013 00:00	7	7
02-04-2013 00:00	10	10
03-04-2013 00:00	5	5
04-04-2013 00:00	6	6
05-04-2013 00:00	6	6

06-04-2013 00:00	3	3
07-04-2013 00:00	3	3
08-04-2013 00:00	8	8
09-04-2013 00:00	4	4
10-04-2013 00:00	8	8
11-04-2013 00:00	2	2
12-04-2013 00:00	6	6
13-04-2013 00:00	4	4
14-04-2013 00:00	3	3
15-04-2013 00:00	6	6
16-04-2013 00:00	9	9
17-04-2013 00:00	7	7
18-04-2013 00:00	7	7
19-04-2013 00:00	9	9
20-04-2013 00:00	2	2
21-04-2013 00:00	2	2
22-04-2013 00:00	8	8
23-04-2013 00:00	6	6
24-04-2013 00:00	8	8
25-04-2013 00:00	10	10
26-04-2013 00:00	9	9
27-04-2013 00:00	3	3
28-04-2013 00:00	4	4
29-04-2013 00:00	9	9
30-04-2013 00:00	7	7
01-05-2013 00:00	10	10
02-05-2013 00:00	6	6
03-05-2013 00:00	12	12
04-05-2013 00:00	1	1
05-05-2013 00:00	3	3
06-05-2013 00:00	5	5
07-05-2013 00:00	8	8
08-05-2013 00:00	10	10
09-05-2013 00:00	6	6
10-05-2013 00:00	8	8
11-05-2013 00:00	4	4
12-05-2013 00:00	4	4
13-05-2013 00:00	12	12
14-05-2013 00:00	11	11
15-05-2013 00:00	10	10
16-05-2013 00:00	10	10
17-05-2013 00:00	8	8
18-05-2013 00:00	2	2
19-05-2013 00:00	2	2
20-05-2013 00:00	8	8
21-05-2013 00:00	7	7
22-05-2013 00:00	8	8
23-05-2013 00:00	7	7
24-05-2013 00:00	4	4
25-05-2013 00:00	3	3

26-05-2013 00:00	4	4
27-05-2013 00:00	7	7
28-05-2013 00:00	9	9
29-05-2013 00:00	6	6
30-05-2013 00:00	11	11
31-05-2013 00:00	8	8
01-06-2013 00:00	4	4
02-06-2013 00:00	4	4
03-06-2013 00:00	12	12
04-06-2013 00:00	16	16
05-06-2013 00:00	7	7
06-06-2013 00:00	5	5
07-06-2013 00:00	8	8
08-06-2013 00:00	2	2
09-06-2013 00:00	1	1
10-06-2013 00:00	12	12
11-06-2013 00:00	7	7
12-06-2013 00:00	9	9
13-06-2013 00:00	6	6
14-06-2013 00:00	10	10
15-06-2013 00:00	5	5
16-06-2013 00:00	2	2
17-06-2013 00:00	11	11
18-06-2013 00:00	5	5
19-06-2013 00:00	6	6
20-06-2013 00:00	9	9
21-06-2013 00:00	9	9
22-06-2013 00:00	3	3
23-06-2013 00:00	3	3
24-06-2013 00:00	12	12
25-06-2013 00:00	13	13
26-06-2013 00:00	10	10
27-06-2013 00:00	11	11
28-06-2013 00:00	7	7
29-06-2013 00:00	1	1
30-06-2013 00:00	3	3
01-07-2013 00:00	8	8
02-07-2013 00:00	10	10
03-07-2013 00:00	13	13
04-07-2013 00:00	9	9
05-07-2013 00:00	11	11
06-07-2013 00:00	2	2
07-07-2013 00:00	4	4
08-07-2013 00:00	5	5
09-07-2013 00:00	5	5
10-07-2013 00:00	10	10
11-07-2013 00:00	16	16
12-07-2013 00:00	9	9
13-07-2013 00:00	3	3
14-07-2013 00:00	4	4

15-07-2013 00:00	12	12
16-07-2013 00:00	13	13
17-07-2013 00:00	13	13
18-07-2013 00:00	12	12
19-07-2013 00:00	14	14
20-07-2013 00:00	4	4
21-07-2013 00:00	3	3
22-07-2013 00:00	14	14
23-07-2013 00:00	11	11
24-07-2013 00:00	14	14
25-07-2013 00:00	10	10
26-07-2013 00:00	10	10
27-07-2013 00:00	5	5
28-07-2013 00:00	2	2
29-07-2013 00:00	16	16
30-07-2013 00:00	11	11
31-07-2013 00:00	11	11
01-08-2013 00:00	12	12
02-08-2013 00:00	13	13
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04-08-2013 00:00	4	4
05-08-2013 00:00	9	9
06-08-2013 00:00	13	13
07-08-2013 00:00	12	12
08-08-2013 00:00	12	12
09-08-2013 00:00	13	13
10-08-2013 00:00	4	4
11-08-2013 00:00	3	3
12-08-2013 00:00	15	15
13-08-2013 00:00	10	10
14-08-2013 00:00	12	12
15-08-2013 00:00	15	15
16-08-2013 00:00	14	14
17-08-2013 00:00	2	2
18-08-2013 00:00	5	5
19-08-2013 00:00	9	9
20-08-2013 00:00	12	12
21-08-2013 00:00	14	14
22-08-2013 00:00	19	19
23-08-2013 00:00	10	10
24-08-2013 00:00	4	4
25-08-2013 00:00	3	3
26-08-2013 00:00	13	13
27-08-2013 00:00	14	14
28-08-2013 00:00	15	15
29-08-2013 00:00	14	14
30-08-2013 00:00	17	17
31-08-2013 00:00	2	2
01-09-2013 00:00	4	4
02-09-2013 00:00	12	12



03-09-2013 00:00	8	8
04-09-2013 00:00	12	12
05-09-2013 00:00	13	13
06-09-2013 00:00	12	12
07-09-2013 00:00	2	2
08-09-2013 00:00	6	6
09-09-2013 00:00	13	13
10-09-2013 00:00	10	10
11-09-2013 00:00	15	15
12-09-2013 00:00	9	9
13-09-2013 00:00	13	13
14-09-2013 00:00	6	6
15-09-2013 00:00	5	5
16-09-2013 00:00	16	16
17-09-2013 00:00	14	14
18-09-2013 00:00	15	15
19-09-2013 00:00	19	19
20-09-2013 00:00	10	10
21-09-2013 00:00	6	6
22-09-2013 00:00	4	4
23-09-2013 00:00	16	16
24-09-2013 00:00	19	19
25-09-2013 00:00	17	17
26-09-2013 00:00	12	12
27-09-2013 00:00	17	17
28-09-2013 00:00	5	5
29-09-2013 00:00	6	6
30-09-2013 00:00	14	14
01-10-2013 00:00	16	16
02-10-2013 00:00	12	12
03-10-2013 00:00	15	15
04-10-2013 00:00	16	16
05-10-2013 00:00	5	5
06-10-2013 00:00	3	3
07-10-2013 00:00	14	14
08-10-2013 00:00	18	18
09-10-2013 00:00	18	18
10-10-2013 00:00	16	16
11-10-2013 00:00	12	12
12-10-2013 00:00	6	6
13-10-2013 00:00	4	4
14-10-2013 00:00	11	11
15-10-2013 00:00	12	12
16-10-2013 00:00	13	13
17-10-2013 00:00	15	15
18-10-2013 00:00	14	14
19-10-2013 00:00	4	4
20-10-2013 00:00	5	5
21-10-2013 00:00	14	14
22-10-2013 00:00	20	20

23-10-2013 00:00	19	19
24-10-2013 00:00	19	19
25-10-2013 00:00	18	18
26-10-2013 00:00	4	4
27-10-2013 00:00	3	3
28-10-2013 00:00	15	15
29-10-2013 00:00	18	18
30-10-2013 00:00	15	15
31-10-2013 00:00	16	16
01-11-2013 00:00	17	17
02-11-2013 00:00	5	5
03-11-2013 00:00	6	6
04-11-2013 00:00	16	16
05-11-2013 00:00	19	19
06-11-2013 00:00	15	15
07-11-2013 00:00	16	16
08-11-2013 00:00	17	17
09-11-2013 00:00	7	7
10-11-2013 00:00	7	7
11-11-2013 00:00	13	13
12-11-2013 00:00	18	18
13-11-2013 00:00	18	18
14-11-2013 00:00	17	17
15-11-2013 00:00	15	15
16-11-2013 00:00	3	3
17-11-2013 00:00	10	10
18-11-2013 00:00	14	14
19-11-2013 00:00	15	15
20-11-2013 00:00	12	12
21-11-2013 00:00	19	19
22-11-2013 00:00	16	16
23-11-2013 00:00	2	2
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25-11-2013 00:00	17	17
26-11-2013 00:00	17	17
27-11-2013 00:00	20	20
28-11-2013 00:00	18	18
29-11-2013 00:00	20	20
30-11-2013 00:00	6	6
01-12-2013 00:00	5	5
02-12-2013 00:00	18	18
03-12-2013 00:00	12	12
04-12-2013 00:00	19	19
05-12-2013 00:00	18	18
06-12-2013 00:00	21	21
07-12-2013 00:00	4	4
08-12-2013 00:00	4	4
09-12-2013 00:00	23	23
10-12-2013 00:00	24	24
11-12-2013 00:00	16	16

12-12-2013 00:00	21	21
13-12-2013 00:00	21	21
14-12-2013 00:00	7	7
15-12-2013 00:00	5	5
16-12-2013 00:00	20	20
17-12-2013 00:00	18	18
18-12-2013 00:00	31	31
19-12-2013 00:00	20	20
20-12-2013 00:00	24	24
21-12-2013 00:00	6	6
22-12-2013 00:00	4	4
23-12-2013 00:00	19	19
24-12-2013 00:00	19	19
25-12-2013 00:00	16	16
26-12-2013 00:00	19	19
27-12-2013 00:00	22	22
28-12-2013 00:00	3	3
29-12-2013 00:00	6	6
30-12-2013 00:00	19	19
31-12-2013 00:00	22	22
01-01-2014 00:00	16	16
02-01-2014 00:00	35	35
03-01-2014 00:00	25	25
04-01-2014 00:00	7	7
05-01-2014 00:00	8	8
06-01-2014 00:00	20	20
07-01-2014 00:00	32	32
08-01-2014 00:00	20	20
09-01-2014 00:00	19	19
10-01-2014 00:00	19	19
11-01-2014 00:00	8	8
12-01-2014 00:00	4	4
13-01-2014 00:00	18	18
14-01-2014 00:00	14	14
15-01-2014 00:00	26	26
16-01-2014 00:00	25	25
17-01-2014 00:00	18	18
18-01-2014 00:00	4	4
19-01-2014 00:00	7	7
20-01-2014 00:00	23	23
21-01-2014 00:00	20	20
22-01-2014 00:00	21	21
23-01-2014 00:00	15	15
24-01-2014 00:00	23	23
25-01-2014 00:00	4	4
26-01-2014 00:00	7	7
27-01-2014 00:00	17	17
28-01-2014 00:00	27	27
29-01-2014 00:00	27	27
30-01-2014 00:00	20	20

31-01-2014 00:00	23	23
01-02-2014 00:00	9	9
02-02-2014 00:00	7	7
03-02-2014 00:00	29	29
04-02-2014 00:00	21	21
05-02-2014 00:00	19	19
06-02-2014 00:00	27	27
07-02-2014 00:00	23	23
08-02-2014 00:00	7	7
09-02-2014 00:00	6	6
10-02-2014 00:00	23	23
11-02-2014 00:00	30	30
12-02-2014 00:00	26	26
13-02-2014 00:00	22	22
14-02-2014 00:00	21	21
15-02-2014 00:00	7	7
16-02-2014 00:00	6	6
17-02-2014 00:00	21	21
18-02-2014 00:00	18	18
19-02-2014 00:00	22	22
20-02-2014 00:00	25	25
21-02-2014 00:00	27	27
22-02-2014 00:00	6	6
23-02-2014 00:00	8	8
24-02-2014 00:00	25	25
25-02-2014 00:00	20	20
26-02-2014 00:00	19	19
27-02-2014 00:00	26	26
28-02-2014 00:00	25	25
01-03-2014 00:00	6	6
02-03-2014 00:00	6	6
03-03-2014 00:00	23	23
04-03-2014 00:00	26	26
05-03-2014 00:00	20	20
06-03-2014 00:00	27	27
07-03-2014 00:00	23	23
08-03-2014 00:00	8	8
09-03-2014 00:00	8	8
10-03-2014 00:00	30	30
11-03-2014 00:00	27	27
12-03-2014 00:00	25	25
13-03-2014 00:00	24	24
14-03-2014 00:00	32	32
15-03-2014 00:00	8	8
16-03-2014 00:00	6	6
17-03-2014 00:00	22	22
18-03-2014 00:00	23	23
19-03-2014 00:00	22	22
20-03-2014 00:00	28	28
21-03-2014 00:00	23	23

22-03-2014 00:00	6	6
23-03-2014 00:00	8	8
24-03-2014 00:00	26	26
25-03-2014 00:00	24	24
26-03-2014 00:00	21	21
27-03-2014 00:00	28	28
28-03-2014 00:00	30	30
29-03-2014 00:00	11	11
30-03-2014 00:00	11	11
31-03-2014 00:00	33	33
01-04-2014 00:00	22	22
02-04-2014 00:00	32	32
03-04-2014 00:00	31	31
04-04-2014 00:00	34	34
05-04-2014 00:00	4	4
06-04-2014 00:00	5	5
07-04-2014 00:00	29	29
08-04-2014 00:00	34	34
09-04-2014 00:00	22	22
10-04-2014 00:00	36	36
11-04-2014 00:00	28	28
12-04-2014 00:00	8	8
13-04-2014 00:00	9	9
14-04-2014 00:00	34	34
15-04-2014 00:00	24	24
16-04-2014 00:00	29	29
17-04-2014 00:00	32	32
18-04-2014 00:00	29	29
19-04-2014 00:00	7	7
20-04-2014 00:00	10	10
21-04-2014 00:00	36	36
22-04-2014 00:00	32	32
23-04-2014 00:00	31	31
24-04-2014 00:00	32	32
25-04-2014 00:00	30	30
26-04-2014 00:00	8	8
27-04-2014 00:00	7	7
28-04-2014 00:00	39	39
29-04-2014 00:00	27	27
30-04-2014 00:00	25	25
01-05-2014 00:00	34	34
02-05-2014 00:00	30	30
03-05-2014 00:00	8	8
04-05-2014 00:00	9	9
05-05-2014 00:00	24	24
06-05-2014 00:00	27	27
07-05-2014 00:00	32	32
08-05-2014 00:00	33	33
09-05-2014 00:00	31	31
10-05-2014 00:00	7	7

11-05-2014 00:00	6	6
12-05-2014 00:00	29	29
13-05-2014 00:00	35	35
14-05-2014 00:00	34	34
15-05-2014 00:00	38	38
16-05-2014 00:00	36	36
17-05-2014 00:00	7	7
18-05-2014 00:00	7	7
19-05-2014 00:00	31	31
20-05-2014 00:00	38	38
21-05-2014 00:00	23	23
22-05-2014 00:00	34	34
23-05-2014 00:00	34	34
24-05-2014 00:00	9	9
25-05-2014 00:00	8	8
26-05-2014 00:00	24	24
27-05-2014 00:00	32	32
28-05-2014 00:00	37	37
29-05-2014 00:00	33	33
30-05-2014 00:00	39	39
31-05-2014 00:00	10	10
01-06-2014 00:00	11	11
02-06-2014 00:00	33	33
03-06-2014 00:00	29	29
04-06-2014 00:00	44	44
05-06-2014 00:00	32	32
06-06-2014 00:00	39	39
07-06-2014 00:00	8	8
08-06-2014 00:00	12	12
09-06-2014 00:00	34	34
10-06-2014 00:00	28	28
11-06-2014 00:00	37	37
12-06-2014 00:00	41	41
13-06-2014 00:00	37	37
14-06-2014 00:00	7	7
15-06-2014 00:00	14	14
16-06-2014 00:00	41	41
17-06-2014 00:00	49	49
18-06-2014 00:00	45	45
19-06-2014 00:00	32	32
20-06-2014 00:00	39	39
21-06-2014 00:00	9	9
22-06-2014 00:00	7	7
23-06-2014 00:00	43	43
24-06-2014 00:00	21	21
25-06-2014 00:00	36	36
26-06-2014 00:00	42	42
27-06-2014 00:00	46	46
28-06-2014 00:00	12	12
29-06-2014 00:00	10	10

30-06-2014 00:00	35	35
01-07-2014 00:00	38	38
02-07-2014 00:00	39	39
03-07-2014 00:00	34	34
04-07-2014 00:00	36	36
05-07-2014 00:00	9	9
06-07-2014 00:00	8	8
07-07-2014 00:00	49	49
08-07-2014 00:00	38	38
09-07-2014 00:00	40	40
10-07-2014 00:00	35	35
11-07-2014 00:00	42	42
12-07-2014 00:00	10	10
13-07-2014 00:00	9	9
14-07-2014 00:00	35	35
15-07-2014 00:00	43	43
16-07-2014 00:00	52	52
17-07-2014 00:00	27	27
18-07-2014 00:00	40	40
19-07-2014 00:00	9	9
20-07-2014 00:00	9	9
21-07-2014 00:00	37	37
22-07-2014 00:00	38	38
23-07-2014 00:00	46	46
24-07-2014 00:00	40	40
25-07-2014 00:00	39	39
26-07-2014 00:00	12	12
27-07-2014 00:00	16	16
28-07-2014 00:00	43	43
29-07-2014 00:00	35	35
30-07-2014 00:00	45	45
31-07-2014 00:00	44	44
01-08-2014 00:00	42	42
02-08-2014 00:00	13	13
03-08-2014 00:00	12	12
04-08-2014 00:00	26	26
05-08-2014 00:00	40	40
06-08-2014 00:00	29	29
07-08-2014 00:00	41	41
08-08-2014 00:00	32	32
09-08-2014 00:00	13	13
10-08-2014 00:00	8	8
11-08-2014 00:00	43	43
12-08-2014 00:00	34	34
13-08-2014 00:00	53	53
14-08-2014 00:00	45	45
15-08-2014 00:00	48	48
16-08-2014 00:00	14	14
17-08-2014 00:00	13	13
18-08-2014 00:00	48	48

19-08-2014 00:00	43	43
20-08-2014 00:00	46	46
21-08-2014 00:00	49	49
22-08-2014 00:00	50	50
23-08-2014 00:00	12	12
24-08-2014 00:00	11	11
25-08-2014 00:00	52	52
26-08-2014 00:00	41	41
27-08-2014 00:00	48	48
28-08-2014 00:00	50	50
29-08-2014 00:00	45	45
30-08-2014 00:00	12	12
31-08-2014 00:00	18	18

3. Analyze the retention of users on a weekly basis after signing up for a product.

```
SELECT DATE_TRUNC('week', occurred_at) AS week,
COUNT (CASE WHEN e.event_type = 'engagement' THEN e.user_id ELSE NULL END) AS engagement,
COUNT (CASE WHEN e.event_type = 'signup_flow' THEN e.user_id ELSE NULL END) AS signup
FROM events e
GROUP BY 1
ORDER BY 1
```

week	engagement	signup
28-04-2014 00:00	8709	81
05-05-2014 00:00	17532	160
12-05-2014 00:00	17047	186
19-05-2014 00:00	17890	177
26-05-2014 00:00	17193	186
02-06-2014 00:00	18608	197
09-06-2014 00:00	18233	198
16-06-2014 00:00	18976	222
23-06-2014 00:00	18859	210
30-06-2014 00:00	18959	199
07-07-2014 00:00	19965	223
14-07-2014 00:00	20723	215
21-07-2014 00:00	20132	228
28-07-2014 00:00	21472	234
04-08-2014 00:00	18341	189
11-08-2014 00:00	16612	250
18-08-2014 00:00	16158	259
25-08-2014 00:00	16166	266



4. Measure the activeness of users on a weekly basis per device.

```
SELECT DATE_TRUNC('week', occurred_at) AS week,  
  
COUNT (DISTINCT e.user_id) AS "weekly active users",  
  
COUNT (DISTINCT CASE WHEN e.device IN ('macbook pro', 'lenovo thinkpad', 'macbook air', 'dell inspiron  
notebook','asus chromebook', 'dell inspiron desktop','acer aspire notebook', 'hp pavilion desktop', 'acer aspire  
desktop', 'mac mini')  
  
THEN e.user_id ELSE NULL END) AS computer,  
  
COUNT (DISTINCT CASE WHEN e.device IN ('iphone 5', 'samsung galaxy s4', 'nexus 5', 'iphone 5s', 'iphone 4s',  
'nokia lumia 635', 'htc one',  
  
'samsung galaxy note', 'amazon fire phone') THEN e.user_id ELSE NULL END) AS phone,  
  
COUNT (DISTINCT CASE WHEN e.device IN ('ipad air', 'nexus 7', 'ipad mini', 'nexus 10', 'kindle fire', 'windows  
surface', 'samsung galaxy tablet')  
  
THEN e.user_id ELSE NULL END) AS tablet  
  
FROM events e  
  
WHERE e.event_type = 'engagement'  
  
AND e.event_name = 'login'  
  
GROUP BY 1  
  
ORDER BY 1  
  
LIMIT 106
```

week	weekly active users	computer	phone	tablet
28-04-2014 00:00	701	415	281	103
05-05-2014 00:00	1054	712	461	176
12-05-2014 00:00	1094	715	481	191
19-05-2014 00:00	1147	758	526	181
26-05-2014 00:00	1113	716	500	176
02-06-2014 00:00	1173	791	505	197
09-06-2014 00:00	1219	798	545	195
16-06-2014 00:00	1262	812	541	227
23-06-2014 00:00	1249	834	526	210
30-06-2014 00:00	1271	805	578	218
07-07-2014 00:00	1355	877	591	227
14-07-2014 00:00	1345	900	578	218
21-07-2014 00:00	1363	903	601	218
28-07-2014 00:00	1442	951	588	241
04-08-2014 00:00	1266	913	491	166
11-08-2014 00:00	1215	886	438	153
18-08-2014 00:00	1203	875	428	145
25-08-2014 00:00	1194	864	441	150

5. Analyze how users are engaging with the email service.

```
Select date_trunc('week',occurred_at) as week,
count(case when e.action='sent weekly digest' then e.user_id else null end) as weekly_email,
count(case when e.action='sent reengagement email' then e.user_id else null end) as reengagement_email,
count(case when e.action='email open' then e.user_id else null end) as email_opens,
count(case when e.action='email clickthrough' then e.user_id else null end) as email_clickthrough
from email_events e
group by 1
```

	A	B	C	D	E	F
1	week	weekly_active_user	weekly_email_open	weekly_email_clickthrough		
2	2014-04-28 00:00:00+05:30	529770	281485	176421		
3	2014-05-05 00:00:00+05:30	1383173	748239	416565		
4	2014-05-12 00:00:00+05:30	1459972	807252	465996		
5	2014-05-19 00:00:00+05:30	1562340	868222	508170		
6	2014-05-26 00:00:00+05:30	1528567	837872	438816		
7	2014-06-02 00:00:00+05:30	1675576	885705	514473		
8	2014-06-09 00:00:00+05:30	1773600	974845	570411		
9	2014-06-16 00:00:00+05:30	1912242	1066423	603765		
10	2014-06-23 00:00:00+05:30	1926260	1030526	585546		
11	2014-06-30 00:00:00+05:30	2001068	1080145	609933		
12	2014-07-07 00:00:00+05:30	2250837	1249579	740493		
13	2014-07-14 00:00:00+05:30	2312688	1266045	717183		
14	2014-07-21 00:00:00+05:30	2293806	1213196	689886		
15	2014-07-28 00:00:00+05:30	2590335	1453679	784635		
16	2014-08-04 00:00:00+05:30	2209513	1169269	461997		
17	2014-08-11 00:00:00+05:30	2052487	1063707	413547		
18	2014-08-18 00:00:00+05:30	2157707	1141452	475704		
19	2014-08-25 00:00:00+05:30	2193130	1203444	482742		
20						