

Project3: Operation Analytics and Investigating Metric Spike

Project Description: One of the key aspects of Operational Analytics is investigating metric spikes. This involves understanding and explaining sudden changes in key metrics, such as a dip in daily user engagement or a drop in sales. My task will be to derive insights from the data provided and to answer questions posed by different departments within the company.

Approach: Tried to solve the project questions with the knowledge I got from the learning sessions of Trinity.

Tech-Stack Used: I used my SQL Workbench version 8.0.35 along with the SQL server that comes with it as I am doing MySQL training with Trinity.

Insights: On performing multiple SQL queries on the data, I was able to analyse the data well. In Case Study 1 shows the job data is being analysed for different aspects like how many jobs are reviewed per hour in a particular day, languages used by employees, etc. In Case Study 2 we have three tables that are users, events, and email_events. Multiple metrics have been analysed through the tasks given.

Case Study 1: Job Data Analysis

Tasks:

A. Jobs Reviewed Over Time:

- Objective: Calculate the number of jobs reviewed per hour for each day in November 2020.
- Your Task: Write an SQL query to calculate the number of jobs reviewed per hour for each day in November 2020.

SQL Queries and Result:

```
27
28 #Task1
29 • select avg(s) as 'average number of jobs reviewed per hour per day'
30 from
31 (select
32 ds,
33 count(job_id)*3600/sum(time_spent) as s
34 from job_data
35 where month(ds)=11
36 group by ds)aj
37
```

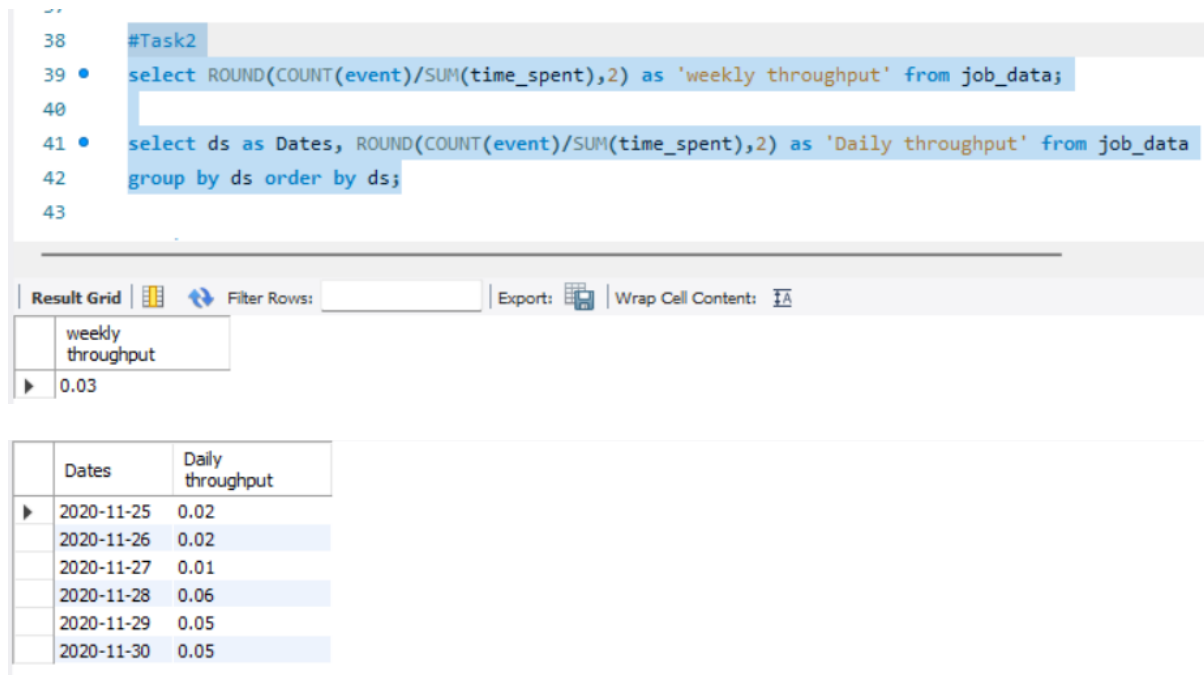
Result Grid

average number of jobs reviewed per hour per day
126.18048333

B. Throughput Analysis:

- Objective: Calculate the 7-day rolling average of throughput (number of events per second).
- Your Task: Write an SQL query to calculate the 7-day rolling average of throughput. Additionally, explain whether you prefer using the daily metric or the 7-day rolling average for throughput, and why.

SQL Queries and Result:



```
38 #Task2
39 • select ROUND(COUNT(event)/SUM(time_spent),2) as 'weekly throughput' from job_data;
40
41 • select ds as Dates, ROUND(COUNT(event)/SUM(time_spent),2) as 'Daily throughput' from job_data
42 group by ds order by ds;
43
```

Result Grid

weekly throughput
0.03

Dates	Daily throughput
2020-11-25	0.02
2020-11-26	0.02
2020-11-27	0.01
2020-11-28	0.06
2020-11-29	0.05
2020-11-30	0.05

Insight: Daily throughput gives us a more detailed metric but weekly throughput gives us one number as an average of the week, if the daily throughput was high then daily throughput would be preferred but here the throughput is very small hence we can consider weekly throughput also.

C. Language Share Analysis:

- Objective: Calculate the percentage share of each language in the last 30 days.
- Your Task: Write an SQL query to calculate the percentage share of each language over the last 30 days.

SQL Queries and Result:

```

43
44 #Task3
45 • select language as Languages, ROUND(100*COUNT(*)/total,2) AS Percentage, sub.total
46 from job_data
47 cross join (select count(*) as total from job_data) as sub
48 group by language, sub.total;

```

Languages	Percentage	total
english	12.50	8
Arabic	12.50	8
Persian	37.50	8
Hindi	12.50	8
French	12.50	8
Italian	12.50	8

Insight: Persian speaking percent shar is the highest with 37.50%.

D. Duplicate Rows Detection:

- Objective: Identify duplicate rows in the data.
- Your Task: Write an SQL query to display duplicate rows from the job_data table.

SQL Queries and Result:

```

50 #Task4
51 • select actor_id, count(*) as duplicates from job_data
52 group by actor_id having count(*)>1;
53
54
55

```

actor_id	duplicates
1003	2

Case Study 2: Investigating Metric Spike

A. Weekly User Engagement:

- Objective: Measure the activeness of users on a weekly basis.
- Your Task: Write an SQL query to calculate the weekly user engagement.

Query:

```
#task 1
select extract(week from occurred_at) as week_number,
count(distinct user_id) as active_user
from events
where event_type='engagement'
group by week_number
order by week_number;
```

Result:

week_number	active_user
17	663
18	1068
19	1113
20	1154
21	1121
22	1186
23	1232
24	1275
25	1264
26	1302
27	1372
28	1365
29	1376
30	1467
31	1299
32	1225
33	1225
34	1204
35	104

Insight: Week number 30 has the highest number of active users with number being 1467.

B. User Growth Analysis:

- Objective: Analyze the growth of users over time for a product.
- Your Task: Write an SQL query to calculate the user growth for the product.

Query:

```
#task2
select year,week_num,num_users,sum(num_users) over(order by year, week_num) as growth_user
from(
select extract(year from activated_at) as year,
extract(week from activated_at) as week_num,
count(distinct user_id) as num_users
from project3_cs2.users
where state='active'
group by year,week_num
order by year,week_num)a;
```

Result:

year	week_num	num_users	growth_user
2013	0	23	23
2013	1	30	53
2013	2	48	101
2013	3	36	137
2013	4	30	167
2013	5	48	215
2013	6	38	253
2013	7	42	295
2013	8	34	329
2013	9	43	372
2013	10	32	404
2013	11	31	435
2013	12	33	468

C. Weekly Retention Analysis:

- Objective: Analyze the retention of users on a weekly basis after signing up for a product.
- Your Task: Write an SQL query to calculate the weekly retention of users based on their sign-up cohort.

Query:

```

#task3
SELECT
    DEVICE,
    EXTRACT(YEAR FROM occurred_At) AS YEAR,
    EXTRACT(WEEK FROM occurred_At) AS WEEK_NUMBER,
    COUNT(DISTINCT USER_ID) user_retention
FROM
    events
WHERE
    EVENT_TYPE = 'ENGAGEMENT'
GROUP BY 1,2,3
ORDER BY 1,2,3;

```

Result:

DEVICE	YEAR	WEEK_NUMBER	user_retention
acer aspire desktop	2014	17	9
acer aspire desktop	2014	18	26
acer aspire desktop	2014	19	23
acer aspire desktop	2014	20	23
acer aspire desktop	2014	21	29
acer aspire desktop	2014	22	25
acer aspire desktop	2014	23	22
acer aspire desktop	2014	24	24
acer aspire desktop	2014	25	28
acer aspire desktop	2014	26	29
acer aspire desktop	2014	27	29
acer aspire desktop	2014	28	30
acer aspire desktop	2014	29	28
acer aspire desktop	2014	30	33
acer aspire desktop	2014	31	31
acer aspire desktop	2014	32	35
acer aspire desktop	2014	33	39
acer aspire desktop	2014	34	30
c	2014	35	1
acer aspire notebook	2014	17	20
acer aspire notebook	2014	18	33
acer aspire notebook	2014	19	41
acer aspire notebook	2014	20	40
acer aspire notebook	2014	21	47

acer aspire notebook	2014	22	41
acer aspire notebook	2014	23	43
acer aspire notebook	2014	24	40
acer aspire notebook	2014	25	47
acer aspire notebook	2014	26	35
acer aspire notebook	2014	27	49
acer aspire notebook	2014	28	49
acer aspire notebook	2014	29	53
acer aspire notebook	2014	30	60
acer aspire notebook	2014	31	55
acer aspire notebook	2014	32	55
acer aspire notebook	2014	33	46
acer aspire notebook	2014	34	63
acer aspire notebook	2014	35	3
amazon fire phone	2014	17	4
amazon fire phone	2014	18	9
amazon fire phone	2014	19	12
amazon fire phone	2014	20	11
amazon fire phone	2014	21	5
amazon fire phone	2014	22	5
amazon fire phone	2014	23	16
amazon fire phone	2014	24	11
amazon fire phone	2014	25	13
amazon fire phone	2014	26	13
amazon fire phone	2014	27	10
amazon fire phone	2014	28	6
amazon fire phone	2014	29	12
amazon fire phone	2014	30	12
amazon fire phone	2014	31	14
amazon fire phone	2014	32	12
amazon fire phone	2014	33	14
amazon fire phone	2014	34	11
asus chromebook	2014	17	21
asus chromebook	2014	18	42
asus chromebook	2014	19	27

asus chromebook	2014	20	41
asus chromebook	2014	21	38
asus chromebook	2014	22	52
asus chromebook	2014	23	49
asus chromebook	2014	24	43
asus chromebook	2014	25	38
asus chromebook	2014	26	49
asus chromebook	2014	27	52
asus chromebook	2014	28	50
asus chromebook	2014	29	49
asus chromebook	2014	30	56
asus chromebook	2014	31	56
asus chromebook	2014	32	62
asus chromebook	2014	33	49
asus chromebook	2014	34	47
asus chromebook	2014	35	6
dell inspiron desktop	2014	17	18
dell inspiron desktop	2014	18	58
dell inspiron desktop	2014	19	36
dell inspiron desktop	2014	20	52
dell inspiron desktop	2014	21	41
dell inspiron desktop	2014	22	52
dell inspiron desktop	2014	23	53
dell inspiron desktop	2014	24	59
dell inspiron desktop	2014	25	52
dell inspiron desktop	2014	26	60
dell inspiron desktop	2014	27	53
dell inspiron desktop	2014	28	56
dell inspiron desktop	2014	29	54
dell inspiron desktop	2014	30	54
dell inspiron desktop	2014	31	44
dell inspiron desktop	2014	32	57

dell inspiron desktop	2014	33	37
dell inspiron desktop	2014	34	49
dell inspiron desktop	2014	35	1
dell inspiron notebook	2014	17	46
dell inspiron notebook	2014	18	77
dell inspiron notebook	2014	19	83
dell inspiron notebook	2014	20	84
dell inspiron notebook	2014	21	80
dell inspiron notebook	2014	22	92
dell inspiron notebook	2014	23	103
dell inspiron notebook	2014	24	99
dell inspiron notebook	2014	25	105
dell inspiron notebook	2014	26	89
dell inspiron notebook	2014	27	89
dell inspiron notebook	2014	28	103
dell inspiron notebook	2014	29	113
dell inspiron notebook	2014	30	127
dell inspiron notebook	2014	31	113
dell inspiron notebook	2014	32	104
dell inspiron notebook	2014	33	110
dell inspiron notebook	2014	34	105
dell inspiron notebook	2014	35	9
hp pavilion desktop	2014	17	14
hp pavilion desktop	2014	18	37
hp pavilion desktop	2014	19	40
hp pavilion desktop	2014	20	30
hp pavilion desktop	2014	21	44
hp pavilion desktop	2014	22	38

hp pavilion desktop	2014	23	54
hp pavilion desktop	2014	24	56
hp pavilion desktop	2014	25	52
hp pavilion desktop	2014	26	46
hp pavilion desktop	2014	27	56
hp pavilion desktop	2014	28	56
hp pavilion desktop	2014	29	58
hp pavilion desktop	2014	30	42
hp pavilion desktop	2014	31	51
hp pavilion desktop	2014	32	51
hp pavilion desktop	2014	33	38
hp pavilion desktop	2014	34	36
hp pavilion desktop	2014	35	1
htc one	2014	17	16
htc one	2014	18	19
htc one	2014	19	30
htc one	2014	20	29
htc one	2014	21	21
htc one	2014	22	24
htc one	2014	23	20
htc one	2014	24	20
htc one	2014	25	21
htc one	2014	26	23
htc one	2014	27	27
htc one	2014	28	26
htc one	2014	29	31
htc one	2014	30	31
htc one	2014	31	13
htc one	2014	32	18
htc one	2014	33	19
htc one	2014	34	25
htc one	2014	35	2
ipad air	2014	17	27
ipad air	2014	18	52
ipad air	2014	19	55
ipad air	2014	20	59
ipad air	2014	21	51
ipad air	2014	22	58
ipad air	2014	23	41
ipad air	2014	24	57
ipad air	2014	25	57
ipad air	2014	26	56
ipad air	2014	27	55
ipad air	2014	28	54
ipad air	2014	29	52
ipad air	2014	30	70

ipad air	2014	31	55
ipad air	2014	32	48
ipad air	2014	33	40
ipad air	2014	34	39
ipad mini	2014	17	19
ipad mini	2014	18	30
ipad mini	2014	19	36
ipad mini	2014	20	32
ipad mini	2014	21	23
ipad mini	2014	22	34
ipad mini	2014	23	33
ipad mini	2014	24	39
ipad mini	2014	25	30
ipad mini	2014	26	43
ipad mini	2014	27	35
ipad mini	2014	28	35
ipad mini	2014	29	34
ipad mini	2014	30	35
ipad mini	2014	31	27
ipad mini	2014	32	30
ipad mini	2014	33	28
ipad mini	2014	34	25
ipad mini	2014	35	2
iphone 4s	2014	17	21
iphone 4s	2014	18	46
iphone 4s	2014	19	44
iphone 4s	2014	20	55
iphone 4s	2014	21	45
iphone 4s	2014	22	45
iphone 4s	2014	23	53
iphone 4s	2014	24	53
iphone 4s	2014	25	40
iphone 4s	2014	26	50
iphone 4s	2014	27	67
iphone 4s	2014	28	61
iphone 4s	2014	29	60
iphone 4s	2014	30	65
iphone 4s	2014	31	56
iphone 4s	2014	32	34
iphone 4s	2014	33	35
iphone 4s	2014	34	50
iphone 4s	2014	35	6
iphone 5	2014	17	65
iphone 5	2014	18	113
iphone 5	2014	19	115
iphone 5	2014	20	125

iphone 5	2014	21	137
iphone 5	2014	22	125
iphone 5	2014	23	152
iphone 5	2014	24	142
iphone 5	2014	25	137
iphone 5	2014	26	152
iphone 5	2014	27	163
iphone 5	2014	28	151
iphone 5	2014	29	144
iphone 5	2014	30	152
iphone 5	2014	31	135
iphone 5	2014	32	119
iphone 5	2014	33	110
iphone 5	2014	34	101
iphone 5	2014	35	2
iphone 5s	2014	17	42
iphone 5s	2014	18	73
iphone 5s	2014	19	79
iphone 5s	2014	20	79
iphone 5s	2014	21	74
iphone 5s	2014	22	71
iphone 5s	2014	23	79
iphone 5s	2014	24	79
iphone 5s	2014	25	78
iphone 5s	2014	26	94
iphone 5s	2014	27	83
iphone 5s	2014	28	93
iphone 5s	2014	29	90
iphone 5s	2014	30	103
iphone 5s	2014	31	71
iphone 5s	2014	32	67
iphone 5s	2014	33	65
iphone 5s	2014	34	70
iphone 5s	2014	35	3
kindle fire	2014	17	6
kindle fire	2014	18	27
kindle fire	2014	19	21
kindle fire	2014	20	23
kindle fire	2014	21	30
kindle fire	2014	22	21
kindle fire	2014	23	25
kindle fire	2014	24	25
kindle fire	2014	25	24
kindle fire	2014	26	26
kindle fire	2014	27	25
kindle fire	2014	28	31

kindle fire	2014	29	37
kindle fire	2014	30	25
kindle fire	2014	31	14
kindle fire	2014	32	12
kindle fire	2014	33	14
kindle fire	2014	34	13
kindle fire	2014	35	3
lenovo thinkpad	2014	17	86
lenovo thinkpad	2014	18	153
lenovo thinkpad	2014	19	178
lenovo thinkpad	2014	20	173
lenovo thinkpad	2014	21	167
lenovo thinkpad	2014	22	176
lenovo thinkpad	2014	23	176
lenovo thinkpad	2014	24	165
lenovo thinkpad	2014	25	197
lenovo thinkpad	2014	26	192
lenovo thinkpad	2014	27	202
lenovo thinkpad	2014	28	220
lenovo thinkpad	2014	29	209
lenovo thinkpad	2014	30	206
lenovo thinkpad	2014	31	207
lenovo thinkpad	2014	32	179
lenovo thinkpad	2014	33	191
lenovo thinkpad	2014	34	193
lenovo thinkpad	2014	35	16
mac mini	2014	17	6
mac mini	2014	18	13
mac mini	2014	19	18
mac mini	2014	20	26
mac mini	2014	21	18
mac mini	2014	22	25
mac mini	2014	23	18
mac mini	2014	24	29
mac mini	2014	25	21
mac mini	2014	26	11
mac mini	2014	27	15
mac mini	2014	28	28
mac mini	2014	29	31
mac mini	2014	30	23
mac mini	2014	31	24
mac mini	2014	32	20
mac mini	2014	33	32
mac mini	2014	34	30
mac mini	2014	35	2
macbook air	2014	17	54

macbook air	2014	18	121
macbook air	2014	19	112
macbook air	2014	20	119
macbook air	2014	21	110
macbook air	2014	22	145
macbook air	2014	23	124
macbook air	2014	24	152
macbook air	2014	25	121
macbook air	2014	26	134
macbook air	2014	27	142
macbook air	2014	28	148
macbook air	2014	29	148
macbook air	2014	30	159
macbook air	2014	31	147
macbook air	2014	32	125
macbook air	2014	33	133
macbook air	2014	34	136
macbook air	2014	35	10
macbook pro	2014	17	143
macbook pro	2014	18	252
macbook pro	2014	19	266
macbook pro	2014	20	256
macbook pro	2014	21	247
macbook pro	2014	22	251
macbook pro	2014	23	266
macbook pro	2014	24	255
macbook pro	2014	25	275
macbook pro	2014	26	269
macbook pro	2014	27	302
macbook pro	2014	28	295
macbook pro	2014	29	295
macbook pro	2014	30	322
macbook pro	2014	31	321
macbook pro	2014	32	307
macbook pro	2014	33	312
macbook pro	2014	34	292
macbook pro	2014	35	17
nexus 10	2014	17	16
nexus 10	2014	18	30
nexus 10	2014	19	25
nexus 10	2014	20	22
nexus 10	2014	21	25
nexus 10	2014	22	27
nexus 10	2014	23	45
nexus 10	2014	24	38
nexus 10	2014	25	29

nexus 10	2014	26	29
nexus 10	2014	27	37
nexus 10	2014	28	26
nexus 10	2014	29	25
nexus 10	2014	30	36
nexus 10	2014	31	24
nexus 10	2014	32	30
nexus 10	2014	33	23
nexus 10	2014	34	25
nexus 10	2014	35	2
nexus 5	2014	17	40
nexus 5	2014	18	73
nexus 5	2014	19	87
nexus 5	2014	20	103
nexus 5	2014	21	91
nexus 5	2014	22	96
nexus 5	2014	23	88
nexus 5	2014	24	87
nexus 5	2014	25	89
nexus 5	2014	26	87
nexus 5	2014	27	84
nexus 5	2014	28	85
nexus 5	2014	29	77
nexus 5	2014	30	84
nexus 5	2014	31	69
nexus 5	2014	32	67
nexus 5	2014	33	70
nexus 5	2014	34	70
nexus 5	2014	35	4
nexus 7	2014	17	18
nexus 7	2014	18	30
nexus 7	2014	19	41
nexus 7	2014	20	32
nexus 7	2014	21	29
nexus 7	2014	22	45
nexus 7	2014	23	36
nexus 7	2014	24	49
nexus 7	2014	25	51
nexus 7	2014	26	46
nexus 7	2014	27	40
nexus 7	2014	28	39
nexus 7	2014	29	45
nexus 7	2014	30	62
nexus 7	2014	31	38
nexus 7	2014	32	25
nexus 7	2014	33	30

nexus 7	2014	34	33
nexus 7	2014	35	2
nokia lumia 635	2014	17	17
nokia lumia 635	2014	18	33
nokia lumia 635	2014	19	23
nokia lumia 635	2014	20	22
nokia lumia 635	2014	21	25
nokia lumia 635	2014	22	25
nokia lumia 635	2014	23	31
nokia lumia 635	2014	24	35
nokia lumia 635	2014	25	37
nokia lumia 635	2014	26	42
nokia lumia 635	2014	27	31
nokia lumia 635	2014	28	35
nokia lumia 635	2014	29	43
nokia lumia 635	2014	30	34
nokia lumia 635	2014	31	28
nokia lumia 635	2014	32	28
nokia lumia 635	2014	33	27
nokia lumia 635	2014	34	17
nokia lumia 635	2014	35	2
samsung galaxy tablet	2014	17	8
samsung galaxy tablet	2014	18	11
samsung galaxy tablet	2014	19	6
samsung galaxy tablet	2014	20	9
samsung galaxy tablet	2014	21	6
samsung galaxy tablet	2014	22	10
samsung galaxy tablet	2014	23	14
samsung galaxy tablet	2014	24	11
samsung galaxy tablet	2014	25	12
samsung galaxy tablet	2014	26	12
samsung galaxy tablet	2014	27	15
samsung galaxy tablet	2014	28	9
samsung galaxy tablet	2014	29	13
samsung galaxy tablet	2014	30	9

samsung galaxy tablet	2014	31	8
samsung galaxy tablet	2014	32	6
samsung galaxy tablet	2014	33	12
samsung galaxy tablet	2014	34	14
samsung galaxy note	2014	17	7
samsung galaxy note	2014	18	15
samsung galaxy note	2014	19	11
samsung galaxy note	2014	20	18
samsung galaxy note	2014	21	20
samsung galaxy note	2014	22	19
samsung galaxy note	2014	23	14
samsung galaxy note	2014	24	20
samsung galaxy note	2014	25	14
samsung galaxy note	2014	26	9
samsung galaxy note	2014	27	15
samsung galaxy note	2014	28	10
samsung galaxy note	2014	29	16
samsung galaxy note	2014	30	15
samsung galaxy note	2014	31	14
samsung galaxy note	2014	32	12
samsung galaxy note	2014	33	13
samsung galaxy note	2014	34	13
samsung galaxy note	2014	35	1
samsung galaxy s4	2014	17	52
samsung galaxy s4	2014	18	82
samsung galaxy s4	2014	19	91
samsung galaxy s4	2014	20	93

samsung galaxy s4	2014	21	84
samsung galaxy s4	2014	22	105
samsung galaxy s4	2014	23	99
samsung galaxy s4	2014	24	101
samsung galaxy s4	2014	25	99
samsung galaxy s4	2014	26	112
samsung galaxy s4	2014	27	116
samsung galaxy s4	2014	28	122
samsung galaxy s4	2014	29	123
samsung galaxy s4	2014	30	103
samsung galaxy s4	2014	31	100
samsung galaxy s4	2014	32	82
samsung galaxy s4	2014	33	80
samsung galaxy s4	2014	34	90
samsung galaxy s4	2014	35	6
windows surface	2014	17	10
windows surface	2014	18	10
windows surface	2014	19	16
windows surface	2014	20	21
windows surface	2014	21	17
windows surface	2014	22	15
windows surface	2014	23	14
windows surface	2014	24	22
windows surface	2014	25	22
windows surface	2014	26	21
windows surface	2014	27	33
windows surface	2014	28	33
windows surface	2014	29	28
windows surface	2014	30	19
windows surface	2014	31	19
windows surface	2014	32	10
windows surface	2014	33	15
windows surface	2014	34	18
windows surface	2014	35	3

Insight: Highest user retention was in 30th week of 2014 with 322 users for macbook pro. Lowest retention was in week 35 for acer aspire desktop, dell Inspiron desktop, hp pavilion desktop and Samsung galaxy note.

D. Weekly Engagement Per Device:

- Objective: Measure the activeness of users on a weekly basis per device.
- Your Task: Write an SQL query to calculate the weekly engagement per device.

Query:

```

#task4
SELECT
    DEVICE,
    EXTRACT(WEEK FROM events.occured_At) AS WEEK_NUM,
    COUNT(DISTINCT USER_ID) AS users
FROM
    events
WHERE
    EVENT_TYPE = 'ENGAGEMENT'
GROUP BY week_num, device
order by device;

```

Result:

DEVICE	WEEK_NUM	users
acer aspire desktop	17	9
acer aspire desktop	28	30
acer aspire desktop	32	35
acer aspire desktop	20	23
acer aspire desktop	21	29
acer aspire desktop	29	28
acer aspire desktop	18	26
acer aspire desktop	35	1
acer aspire desktop	34	30
acer aspire desktop	22	25
acer aspire desktop	24	24
acer aspire desktop	30	33
acer aspire desktop	25	28
acer aspire desktop	23	22
acer aspire desktop	27	29
acer aspire desktop	26	29
acer aspire desktop	31	31
acer aspire desktop	33	39
acer aspire desktop	19	23
acer aspire notebook	17	20
acer aspire notebook	22	41
acer aspire notebook	34	63
acer aspire notebook	35	3
acer aspire notebook	32	55
acer aspire notebook	27	49
acer aspire notebook	25	47
acer aspire notebook	26	35
acer aspire notebook	18	33
acer aspire notebook	29	53
acer aspire notebook	24	40

acer aspire notebook	21	47
acer aspire notebook	20	40
acer aspire notebook	30	60
acer aspire notebook	23	43
acer aspire notebook	28	49
acer aspire notebook	33	46
acer aspire notebook	31	55
acer aspire notebook	19	41
amazon fire phone	17	4
amazon fire phone	23	16
amazon fire phone	30	12
amazon fire phone	28	6
amazon fire phone	18	9
amazon fire phone	24	11
amazon fire phone	20	11
amazon fire phone	27	10
amazon fire phone	26	13
amazon fire phone	19	12
amazon fire phone	25	13
amazon fire phone	29	12
amazon fire phone	34	11
amazon fire phone	32	12
amazon fire phone	21	5
amazon fire phone	33	14
amazon fire phone	22	5
amazon fire phone	31	14
asus chromebook	17	21
asus chromebook	19	27
asus chromebook	33	49
asus chromebook	21	38
asus chromebook	35	6
asus chromebook	31	56
asus chromebook	32	62
asus chromebook	22	52
asus chromebook	28	50
asus chromebook	25	38
asus chromebook	29	49
asus chromebook	26	49
asus chromebook	20	41
asus chromebook	24	43
asus chromebook	34	47
asus chromebook	30	56
asus chromebook	23	49
asus chromebook	27	52
asus chromebook	18	42
dell inspiron desktop	17	18

dell inspiron desktop	30	54
dell inspiron desktop	26	60
dell inspiron desktop	28	56
dell inspiron desktop	24	59
dell inspiron desktop	29	54
dell inspiron desktop	20	52
dell inspiron desktop	25	52
dell inspiron desktop	32	57
dell inspiron desktop	35	1
dell inspiron desktop	33	37
dell inspiron desktop	27	53
dell inspiron desktop	19	36
dell inspiron desktop	31	44
dell inspiron desktop	22	52
dell inspiron desktop	18	58
dell inspiron desktop	34	49
dell inspiron desktop	21	41
dell inspiron desktop	23	53
dell inspiron notebook	17	46
dell inspiron notebook	19	83
dell inspiron notebook	30	127
dell inspiron notebook	20	84
dell inspiron notebook	34	105
dell inspiron notebook	29	113
dell inspiron notebook	25	105
dell inspiron notebook	32	104
dell inspiron notebook	24	99
dell inspiron notebook	26	89
dell inspiron notebook	33	110
dell inspiron notebook	31	113
dell inspiron notebook	23	103
dell inspiron notebook	18	77
dell inspiron notebook	35	9

dell inspiron notebook	28	103
dell inspiron notebook	27	89
dell inspiron notebook	21	80
dell inspiron notebook	22	92
hp pavilion desktop	17	14
hp pavilion desktop	24	56
hp pavilion desktop	20	30
hp pavilion desktop	29	58
hp pavilion desktop	18	37
hp pavilion desktop	34	36
hp pavilion desktop	22	38
hp pavilion desktop	27	56
hp pavilion desktop	19	40
hp pavilion desktop	25	52
hp pavilion desktop	30	42
hp pavilion desktop	23	54
hp pavilion desktop	35	1
hp pavilion desktop	31	51
hp pavilion desktop	32	51
hp pavilion desktop	33	38
hp pavilion desktop	21	44
hp pavilion desktop	26	46
hp pavilion desktop	28	56
htc one	17	16
htc one	34	25
htc one	30	31
htc one	35	2
htc one	18	19
htc one	23	20
htc one	33	19
htc one	29	31
htc one	22	24
htc one	19	30
htc one	25	21
htc one	27	27
htc one	24	20
htc one	20	29
htc one	21	21
htc one	26	23
htc one	28	26
htc one	32	18
htc one	31	13
ipad air	26	56

ipad air	30	70
ipad air	20	59
ipad air	29	52
ipad air	17	27
ipad air	32	48
ipad air	22	58
ipad air	25	57
ipad air	18	52
ipad air	27	55
ipad air	24	57
ipad air	19	55
ipad air	34	39
ipad air	21	51
ipad air	28	54
ipad air	33	40
ipad air	31	55
ipad air	23	41
ipad mini	30	35
ipad mini	19	36
ipad mini	27	35
ipad mini	17	19
ipad mini	25	30
ipad mini	18	30
ipad mini	20	32
ipad mini	34	25
ipad mini	24	39
ipad mini	29	34
ipad mini	26	43
ipad mini	35	2
ipad mini	22	34
ipad mini	32	30
ipad mini	33	28
ipad mini	28	35
ipad mini	23	33
ipad mini	21	23
ipad mini	31	27
iphone 4s	21	45
iphone 4s	19	44
iphone 4s	34	50
iphone 4s	27	67
iphone 4s	18	46
iphone 4s	31	56
iphone 4s	29	60
iphone 4s	26	50
iphone 4s	30	65
iphone 4s	35	6

iphone 4s	25	40
iphone 4s	22	45
iphone 4s	28	61
iphone 4s	17	21
iphone 4s	33	35
iphone 4s	23	53
iphone 4s	20	55
iphone 4s	32	34
iphone 4s	24	53
iphone 5	17	65
iphone 5	24	142
iphone 5	25	137
iphone 5	26	152
iphone 5	27	163
iphone 5	28	151
iphone 5	29	144
iphone 5	30	152
iphone 5	31	135
iphone 5	32	119
iphone 5	33	110
iphone 5	34	101
iphone 5	19	115
iphone 5	35	2
iphone 5	20	125
iphone 5	18	113
iphone 5	21	137
iphone 5	22	125
iphone 5	23	152
iphone 5s	17	42
iphone 5s	32	67
iphone 5s	21	74
iphone 5s	35	3
iphone 5s	27	83
iphone 5s	30	103
iphone 5s	34	70
iphone 5s	20	79
iphone 5s	33	65
iphone 5s	28	93
iphone 5s	24	79
iphone 5s	23	79
iphone 5s	19	79
iphone 5s	31	71
iphone 5s	18	73
iphone 5s	25	78
iphone 5s	22	71
iphone 5s	29	90

iphone 5s	26	94
kindle fire	17	6
kindle fire	24	25
kindle fire	26	26
kindle fire	28	31
kindle fire	30	25
kindle fire	20	23
kindle fire	33	14
kindle fire	19	21
kindle fire	21	30
kindle fire	32	12
kindle fire	35	3
kindle fire	18	27
kindle fire	27	25
kindle fire	34	13
kindle fire	29	37
kindle fire	25	24
kindle fire	22	21
kindle fire	31	14
kindle fire	23	25
lenovo thinkpad	17	86
lenovo thinkpad	32	179
lenovo thinkpad	26	192
lenovo thinkpad	31	207
lenovo thinkpad	33	191
lenovo thinkpad	30	206
lenovo thinkpad	27	202
lenovo thinkpad	23	176
lenovo thinkpad	18	153
lenovo thinkpad	25	197
lenovo thinkpad	19	178
lenovo thinkpad	34	193
lenovo thinkpad	29	209
lenovo thinkpad	21	167
lenovo thinkpad	20	173
lenovo thinkpad	24	165
lenovo thinkpad	22	176
lenovo thinkpad	28	220
lenovo thinkpad	35	16
mac mini	28	28
mac mini	26	11
mac mini	21	18
mac mini	18	13
mac mini	31	24
mac mini	34	30
mac mini	32	20

mac mini	23	18
mac mini	27	15
mac mini	19	18
mac mini	22	25
mac mini	29	31
mac mini	33	32
mac mini	20	26
mac mini	30	23
mac mini	25	21
mac mini	24	29
mac mini	17	6
mac mini	35	2
macbook air	33	133
macbook air	20	119
macbook air	30	159
macbook air	29	148
macbook air	26	134
macbook air	21	110
macbook air	24	152
macbook air	32	125
macbook air	28	148
macbook air	34	136
macbook air	19	112
macbook air	25	121
macbook air	18	121
macbook air	23	124
macbook air	31	147
macbook air	17	54
macbook air	27	142
macbook air	22	145
macbook air	35	10
macbook pro	32	307
macbook pro	26	269
macbook pro	21	247
macbook pro	27	302
macbook pro	31	321
macbook pro	28	295
macbook pro	30	322
macbook pro	34	292
macbook pro	19	266
macbook pro	24	255
macbook pro	29	295
macbook pro	22	251
macbook pro	23	266
macbook pro	17	143
macbook pro	18	252

macbook pro	33	312
macbook pro	20	256
macbook pro	25	275
macbook pro	35	17
nexus 10	23	45
nexus 10	28	26
nexus 10	19	25
nexus 10	33	23
nexus 10	32	30
nexus 10	30	36
nexus 10	34	25
nexus 10	20	22
nexus 10	35	2
nexus 10	18	30
nexus 10	22	27
nexus 10	25	29
nexus 10	31	24
nexus 10	26	29
nexus 10	29	25
nexus 10	27	37
nexus 10	17	16
nexus 10	24	38
nexus 10	21	25
nexus 5	28	85
nexus 5	23	88
nexus 5	32	67
nexus 5	35	4
nexus 5	22	96
nexus 5	20	103
nexus 5	17	40
nexus 5	24	87
nexus 5	33	70
nexus 5	21	91
nexus 5	26	87
nexus 5	27	84
nexus 5	18	73
nexus 5	31	69
nexus 5	34	70
nexus 5	19	87
nexus 5	25	89
nexus 5	29	77
nexus 5	30	84
nexus 7	25	51
nexus 7	30	62
nexus 7	18	30
nexus 7	24	49

nexus 7	21	29
nexus 7	17	18
nexus 7	33	30
nexus 7	29	45
nexus 7	31	38
nexus 7	26	46
nexus 7	20	32
nexus 7	28	39
nexus 7	34	33
nexus 7	32	25
nexus 7	23	36
nexus 7	19	41
nexus 7	22	45
nexus 7	27	40
nexus 7	35	2
nokia lumia 635	32	28
nokia lumia 635	17	17
nokia lumia 635	18	33
nokia lumia 635	26	42
nokia lumia 635	25	37
nokia lumia 635	27	31
nokia lumia 635	24	35
nokia lumia 635	28	35
nokia lumia 635	23	31
nokia lumia 635	29	43
nokia lumia 635	20	22
nokia lumia 635	30	34
nokia lumia 635	22	25
nokia lumia 635	31	28
nokia lumia 635	21	25
nokia lumia 635	33	27
nokia lumia 635	34	17
nokia lumia 635	19	23
nokia lumia 635	35	2
samsung galaxy tablet	30	9
samsung galaxy tablet	24	11
samsung galaxy tablet	17	8
samsung galaxy tablet	25	12
samsung galaxy tablet	27	15
samsung galaxy tablet	32	6

samsung galaxy tablet	33	12
samsung galaxy tablet	20	9
samsung galaxy tablet	22	10
samsung galaxy tablet	21	6
samsung galaxy tablet	19	6
samsung galaxy tablet	26	12
samsung galaxy tablet	18	11
samsung galaxy tablet	34	14
samsung galaxy tablet	28	9
samsung galaxy tablet	29	13
samsung galaxy tablet	23	14
samsung galaxy tablet	31	8
samsung galaxy note	17	7
samsung galaxy note	22	19
samsung galaxy note	25	14
samsung galaxy note	31	14
samsung galaxy note	20	18
samsung galaxy note	21	20
samsung galaxy note	34	13
samsung galaxy note	27	15
samsung galaxy note	26	9
samsung galaxy note	29	16
samsung galaxy note	23	14
samsung galaxy note	18	15
samsung galaxy note	32	12
samsung galaxy note	35	1
samsung galaxy note	33	13
samsung galaxy note	28	10
samsung galaxy note	24	20
samsung galaxy note	30	15
samsung galaxy note	19	11
samsung galaxy s4	24	101
samsung galaxy s4	20	93
samsung galaxy s4	22	105
samsung galaxy s4	30	103
samsung galaxy s4	27	116

samsung galaxy s4	29	123
samsung galaxy s4	23	99
samsung galaxy s4	19	91
samsung galaxy s4	34	90
samsung galaxy s4	25	99
samsung galaxy s4	26	112
samsung galaxy s4	33	80
samsung galaxy s4	18	82
samsung galaxy s4	17	52
samsung galaxy s4	28	122
samsung galaxy s4	21	84
samsung galaxy s4	32	82
samsung galaxy s4	31	100
samsung galaxy s4	35	6
windows surface	33	15
windows surface	20	21
windows surface	25	22
windows surface	22	15
windows surface	27	33
windows surface	29	28
windows surface	18	10
windows surface	23	14
windows surface	21	17
windows surface	28	33
windows surface	17	10
windows surface	30	19
windows surface	26	21
windows surface	19	16
windows surface	31	19
windows surface	32	10
windows surface	34	18
windows surface	24	22
windows surface	35	3

Insight:

1. For acer aspire desktop max and min user engagement is 39 and 1.
2. For acer aspire notebook max and min is 63 and 3.
3. For amazon fire phone max and min is 14 and 4.
4. For asus chromebook max and min is 62 and 6.
5. For dell Inspiron desktop max and min is 60 and 1.

Similarly for others also, but max user engagement is with macbook pro with 322 users.

E. Email Engagement Analysis:

- Objective: Analyze how users are engaging with the email service.
- Your Task: Write an SQL query to calculate the email engagement metrics.

Query:

```
#task5
select * from email_events;
SELECT
    ACTION,
    EXTRACT(MONTH FROM occurred_At) AS MONTH,
    COUNT(ACTION) AS NUMBER_OF_MAILS
FROM
    email_events
GROUP BY ACTION , MONTH
ORDER BY ACTION , MONTH;
```

Result:

ACTION	MONTH	NUMBER_OF_MAILS
email_clickthrough	5	2023
email_clickthrough	6	2274
email_clickthrough	7	2721
email_clickthrough	8	1992
email_open	5	4212
email_open	6	4658
email_open	7	5611
email_open	8	5978
sent_reengagement_email	5	758
sent_reengagement_email	6	889
sent_reengagement_email	7	933
sent_reengagement_email	8	1073
sent_weekly_digest	5	11730
sent_weekly_digest	6	13155
sent_weekly_digest	7	15902
sent_weekly_digest	8	16480

Insight:

1. For email clickthrough max email enagement was in month 7.
2. For email open max email engagement was in month 8.
3. For re engaged mail max engagement was in month 8.
4. For weekly digest mail max engagement was in month 8.