

# Operation Analytics and Investigating Metric Spike

## Case Study 1: Job Data Analysis

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).

### 1. Jobs Reviewed Over Time:

- Objective: Calculate the number of jobs reviewed per hour for each day in November 2020.

```
select count(distinct job_id)/((sum(time_spent)/3600)*(count(distinct ds)))
as number_of_jobs_reviewd_per_hour_day
from job;
```

Insight: Here jobs reviewed is according to the total time spent in researching each job and the number of days in table

```
+-----+
| number_of_jobs_reviewd_per_hour_day |
+-----+
| 12.0805 |
+-----+
```

```
select count(distinct job_id)/(24*30)
as number_of_jobs_reviewd_per_hour_day
from job;
```

Insight: Here jobs reviewed is according to the total number of hours and days in the whole month of November

```

+-----+
| number_of_jobs_reviewd_per_hour_day |
+-----+
|                                     0.0083 |
+-----+

```

## 2. Throughput Analysis:

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

```

SELECT
    ds,
    daily_throughput,
    ROUND(AVG(daily_throughput) OVER (
        ORDER BY ds
        ROWS BETWEEN 6 PRECEDING AND CURRENT ROW
    ), 7) AS rolling_avg_throughput
FROM (
    SELECT
        ds,
        COUNT(*) AS daily_event_count,
        ROUND(COUNT(*) / 86400.0, 7) AS daily_throughput
    FROM
        job
    GROUP BY
        ds
    ORDER BY
        ds
) daily_stats;

```

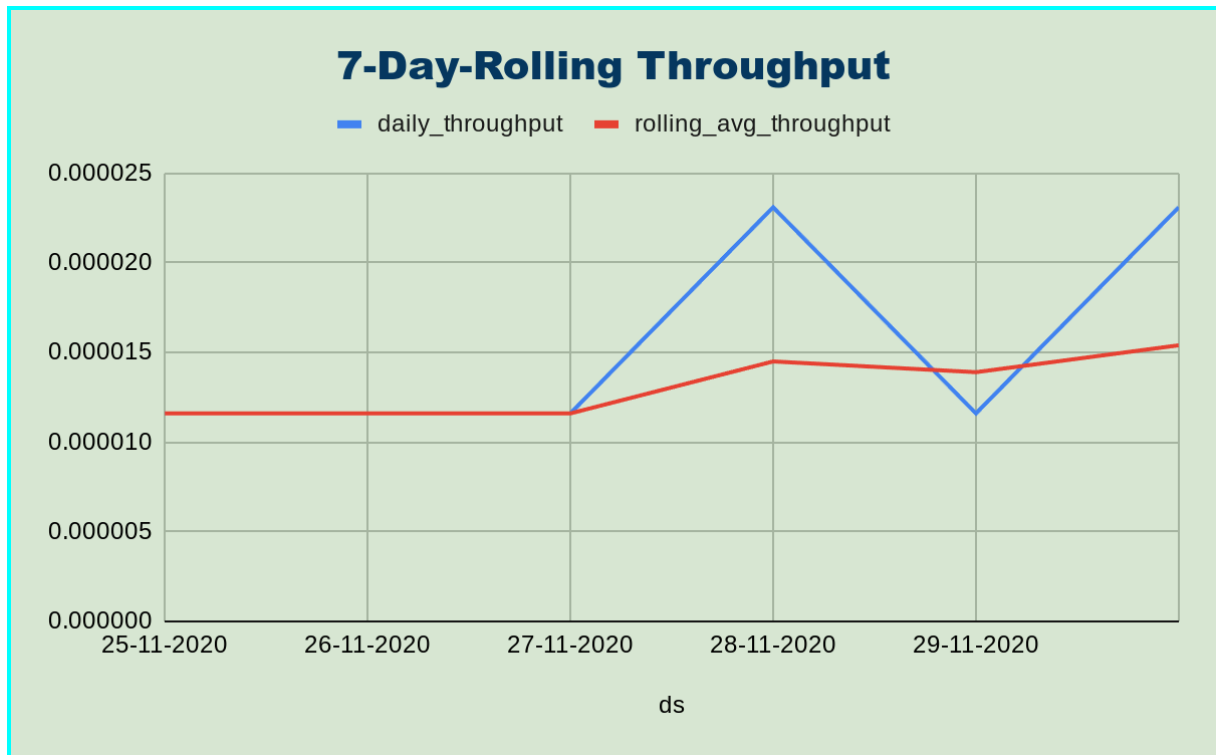
Insight: Here throughput is taken as number of events per day per second ie. number of events per day is divided by number of seconds in a day and then 7 day rolling avg throughput is calculated

Using weekly rolling average throughput is more useful as it gives a more uniform sense of metric through a specific period of time which helps analyse large quantities of data

Process: Create Window function for calculating daily throughput- counting number of events in a day

Use window table in main query for calculating 7 day rolling avg throughput using ROWS BETWEEN 6 PRECEDING AND CURRENT ROW

Order the table by date



ds	daily_throughput	rolling_avg_throughput
25-11-2020	0.0000116	0.0000116
26-11-2020	0.0000116	0.0000116
27-11-2020	0.0000116	0.0000116
28-11-2020	0.0000231	0.0000145
29-11-2020	0.0000116	0.0000139
30-11-2020	0.0000231	0.0000154

subquery:

```

MariaDB [project]> select ds, count(distinct job_id) as jobs_reviewd
-> from job
-> group by ds
-> order by ds;
+-----+-----+
| ds          | jobs_reviewd |
+-----+-----+
| 25-11-2020 |            1 |
| 26-11-2020 |            1 |
| 27-11-2020 |            1 |
| 28-11-2020 |            2 |
| 29-11-2020 |            1 |
| 30-11-2020 |            2 |
+-----+-----+

```

```

with events_rev as (select
    ds, count(*) as jobs_reviewd
from job
    group by ds
    order by ds)
select ds, avg(jobs_reviewd) over (order by ds rows between 6 preceding and current row
) as 7_day_rolling_avg_throughput
from events_rev;

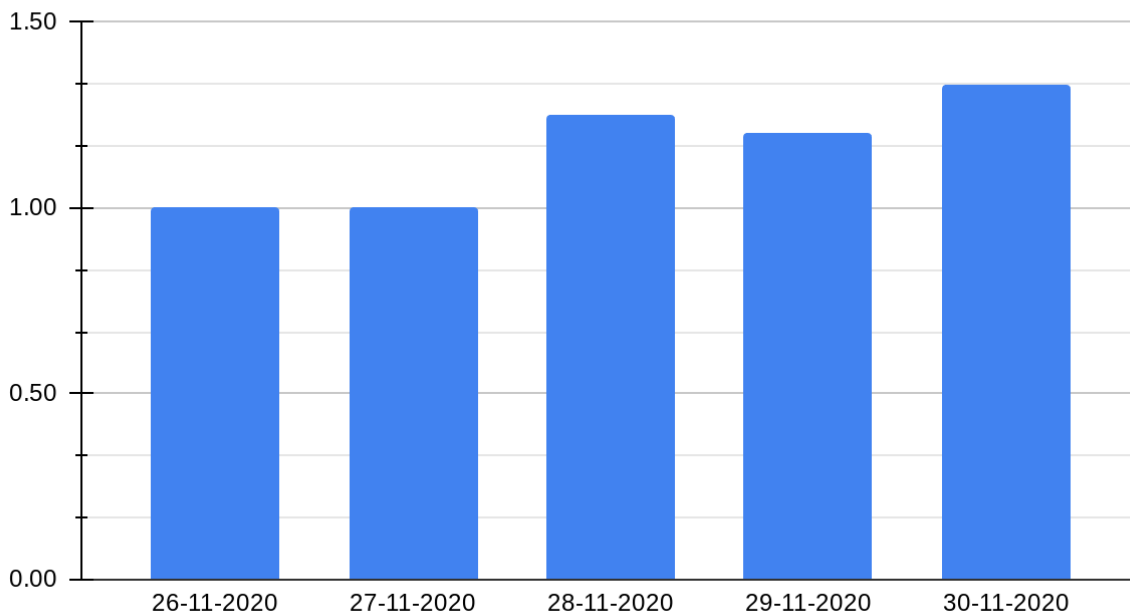
```

```

+-----+-----+
| ds          | 7_day_rolling_avg_throughput |
+-----+-----+
| 25-11-2020 |            1.0000 |
| 26-11-2020 |            1.0000 |
| 27-11-2020 |            1.0000 |
| 28-11-2020 |            1.2500 |
| 29-11-2020 |            1.2000 |
| 30-11-2020 |            1.3333 |
+-----+-----+

```

## Rolling Throughput



**Insight:** Here throughput is taken as number of events happening per day, and then rolling throughput average for the same is taken

**Process:** Create Window function for calculating daily throughput- counting number of events in a day using count function

Use window table in main query for calculating 7 day rolling avg throughput using ROWS BETWEEN 6 PRECEDING AND CURRENT ROW

Order the table by date

### 3. Language Share Analysis:

- Objective: Calculate the percentage share of each language in the last 30 days.

```
with language_number as (select
  language, count(*) as language_count
from job
group by language
order by language_count)
select language, language_count, language_count/(select count(language) from job) * 100
as language_percent_share
from language_number
```

order by language\_percent\_share;

Process: Create window language\_number to find the number of distinct languages spoken

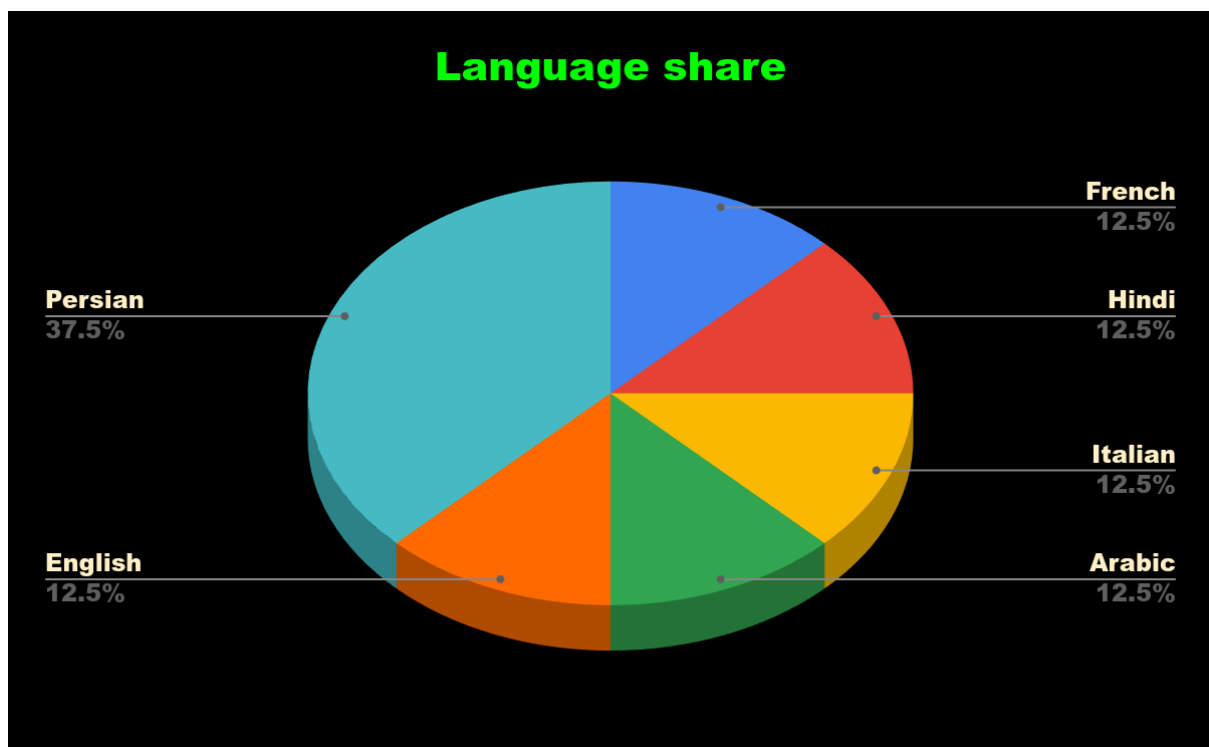
Use window table to get language, count and percentage share of each language using

formula  $\text{language\_count} / (\text{select count(language) from job}) * 100$

select count(language) from job gives total count of languages

Finally order by percentage share

language	language_count	language_percent_share
Italian	1	12.5000
Arabic	1	12.5000
English	1	12.5000
French	1	12.5000
Hindi	1	12.5000
Persian	3	37.5000



#### 4. Duplicate Rows Detection:

- Objective: Identify duplicate rows in the data.

```

with duplicates as (select
    *, row_number() over (partition by job_id,language) as row_num
    from job
    order by row_num)
select * from duplicates
where row_num>1;

```

Process: Create window duplicates and partition by job id and language to get row numbers for the similar rows

Use duplicates to get row numbered>1 which indicates duplicate rows

ds	job_id	actor_id	event	language	time_spent	org	row_num
28-11-2020	23	1005	transfer	Persian	22	D	2
26-11-2020	23	1004	skip	Persian	56	A	3

## 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.

### Weekly User Engagement:

- Objective: Measure the activeness of users on a weekly basis.

1.

```

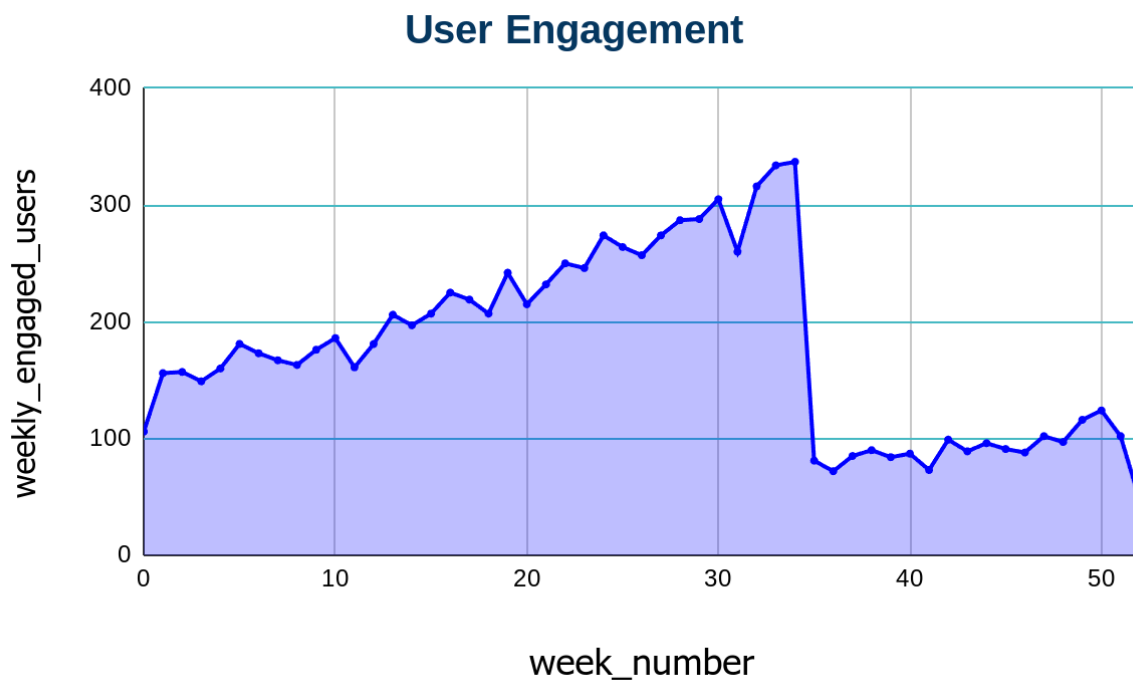
select extract(week from created_at) as week_number, count(*) as weekly_engaged_users
from users
group by week_number

```

order by week\_number;

Process: Extract week from date to know the week number and count the number of users is each week using count function and grouping the weeks

Finally order by week number





+-----+-----+	
week_number	weekly_engaged_users
+-----+-----+	
0	106
1	156
2	157
3	149
4	160
5	181
6	173
7	167
8	163
9	176
10	186
11	161
12	181
13	206
14	197
15	207
16	225
17	219
18	207
19	242
20	215
21	232
22	250
23	246
24	274
25	264
26	257
27	274
28	287
29	288
30	305
31	260

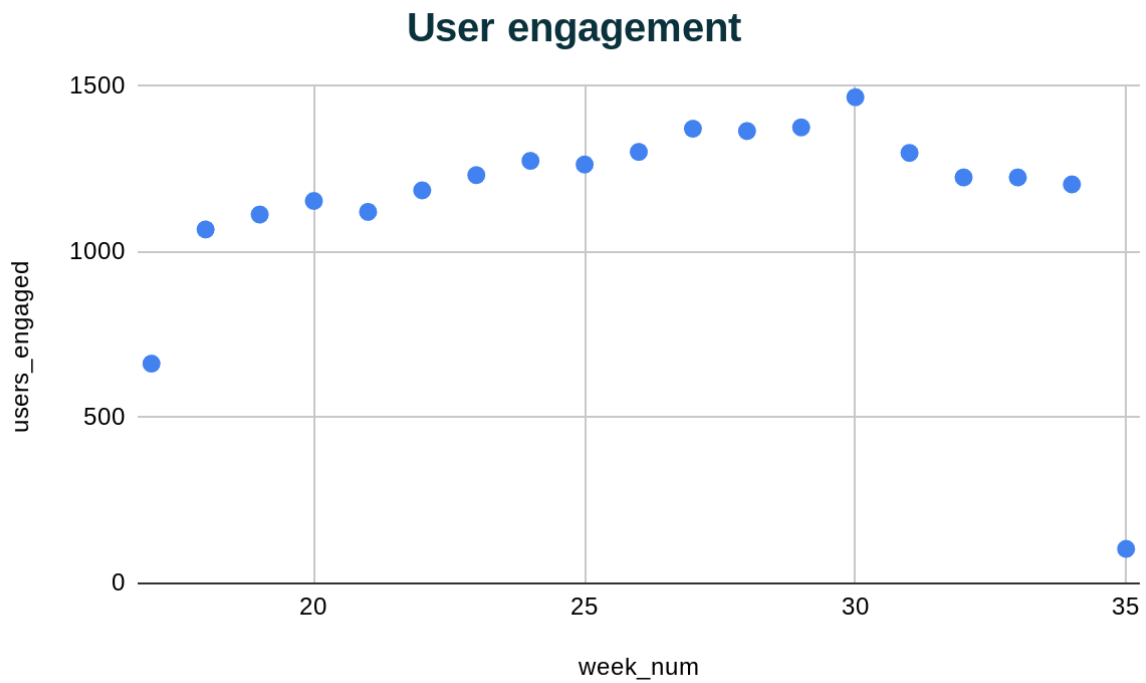
31	288
32	316
33	334
34	337
35	81
36	72
37	85
38	90
39	84
40	87
41	73
42	99
43	89
44	96
45	91
46	88
47	102
48	97
49	116
50	124
51	102
52	47

## 2. User Growth Analysis:

- Objective: Analyze the growth of users over time for a product.

```
select extract(week from event_date) as week_num,
       extract(year from event_date) as year_num,
       count(distinct user_id) as users_engaged
from events
group by week_num;
```

Process: Extract week from date to know the week number, year from date to know the year and count the number of users is each week using count function and grouping the weeks Finally order by week number



week_num	year_num	users_engaged
17	2014	663
18	2014	1068
19	2014	1113
20	2014	1154
21	2014	1121
22	2014	1186
23	2014	1232
24	2014	1275
25	2014	1264
26	2014	1302
27	2014	1372
28	2014	1365
29	2014	1376
30	2014	1467
31	2014	1299
32	2014	1225
33	2014	1225
34	2014	1204
35	2014	104

### 3. Weekly Retention Analysis:

- Objective: Analyze the retention of users on a weekly basis after signing up for a product.

```

WITH sign_up_table AS (
    SELECT DISTINCT
        user_id,
        EXTRACT(WEEK FROM event_date) AS weekly_signup_cohort,
        event_name,
        event_type
    FROM events
    WHERE event_type = 'signup_flow'
    AND event_name = 'complete_signup'
    ORDER BY user_id
),
eng_table AS (
    SELECT DISTINCT
        user_id,
        EXTRACT(WEEK FROM event_date) AS engaged_week
    FROM events
    WHERE event_type = 'engagement'
),
retention_table AS (
    SELECT DISTINCT
        eng_table.user_id,
        engaged_week,
        weekly_signup_cohort,
        engaged_week - weekly_signup_cohort AS retention_week
    FROM eng_table
    LEFT JOIN sign_up_table
    ON eng_table.user_id = sign_up_table.user_id
)
SELECT
    user_id, engaged_week, weekly_signup_cohort,
    retention_week,
    CASE
        WHEN retention_week = 1 THEN 'retention user'
        ELSE 'dont return after a week'
    
```

```

        END AS retention_users
    FROM retention_table
    Where retention_week = 1
    ORDER BY user_id;

```

**Insight:** Here, retention week is calculated as the engagement week - signup week that allows us to know how many users after engaging in an event return back to signup for it. So if retention week is 1, then they return back in a week which is true, else it is false and doesn't count those users.

**Process:**

**Sign\_up table** - select user\_id and extract week from date corresponding to events that are signup flow and complete signup (relating to sign in of a user) as weekly\_signup\_cohort

**Eng table** - select user\_id and extract week from date corresponding to events are engagement (relating to user working around their emails) as engaged\_week

**Retention table** - it's a left join table created from sign\_up and eng table on their user\_id and select user-id, and engaged\_week, weekly\_signup\_cohort

Create retention\_week column as engaged\_week-weekly\_signup\_cohort

Since retention is referred to as the number of users returning back to email after engagement within a week, if the retention\_week is 1, then they are extracted as retention users using CASE function.

+-----+-----+-----+-----+-----+				
user_id	engaged_week	weekly_signup_cohort	retention_week	retention_users
+-----+-----+-----+-----+-----+				
11775	18	17	1	retention user
11779	18	17	1	retention user
11780	18	17	1	retention user
11787	18	17	1	retention user
11791	18	17	1	retention user
11793	18	17	1	retention user
11795	18	17	1	retention user
11798	18	17	1	retention user
11799	18	17	1	retention user
11801	18	17	1	retention user
11804	18	17	1	retention user
11811	18	17	1	retention user
11818	18	17	1	retention user
11820	18	17	1	retention user
11823	18	17	1	retention user
11824	18	17	1	retention user

11825	18	17	1   retention user
11826	18	17	1   retention user
11828	18	17	1   retention user
11829	18	17	1   retention user
11832	18	17	1   retention user
11833	18	17	1   retention user
11834	18	17	1   retention user
11838	18	17	1   retention user
11840	18	17	1   retention user
11841	18	17	1   retention user
11842	18	17	1   retention user
11843	18	17	1   retention user
11844	18	17	1   retention user
11849	18	17	1   retention user
11852	18	17	1   retention user
11854	18	17	1   retention user
11858	18	17	1   retention user
11859	18	17	1   retention user
11863	18	17	1   retention user
11864	18	17	1   retention user
11865	18	17	1   retention user
11868	18	17	1   retention user
11872	18	17	1   retention user
11874	18	17	1   retention user
11875	18	17	1   retention user
11876	18	17	1   retention user
11877	18	17	1   retention user
11879	18	17	1   retention user
11881	18	17	1   retention user
11882	18	17	1   retention user
11887	18	17	1   retention user
11889	18	17	1   retention user
11893	18	17	1   retention user
11894	18	17	1   retention user
11895	18	17	1   retention user
11896	18	17	1   retention user
11899	18	17	1   retention user
11900	18	17	1   retention user
11901	18	17	1   retention user
11906	18	17	1   retention user
11908	18	17	1   retention user
11909	18	17	1   retention user
11914	18	17	1   retention user
11926	19	18	1   retention user
11931	19	18	1   retention user
11933	19	18	1   retention user
11939	19	18	1   retention user
11940	19	18	1   retention user

11942	19	18	1   retention user
11944	19	18	1   retention user
11947	19	18	1   retention user
11949	19	18	1   retention user
11953	19	18	1   retention user
11960	19	18	1   retention user
11962	19	18	1   retention user
11963	19	18	1   retention user
11975	19	18	1   retention user
11984	19	18	1   retention user
11986	19	18	1   retention user
11992	19	18	1   retention user
11999	19	18	1   retention user
12001	19	18	1   retention user
12007	19	18	1   retention user
12014	19	18	1   retention user
12023	19	18	1   retention user
12029	19	18	1   retention user
12033	19	18	1   retention user
12034	19	18	1   retention user
12042	19	18	1   retention user
12048	19	18	1   retention user
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12066	19	18	1   retention user
12072	19	18	1   retention user
12073	19	18	1   retention user
12076	19	18	1   retention user
12077	19	18	1   retention user
12079	19	18	1   retention user
12081	19	18	1   retention user
12084	19	18	1   retention user
12085	19	18	1   retention user
12087	19	18	1   retention user
12089	19	18	1   retention user
12093	19	18	1   retention user
12095	19	18	1   retention user
12097	19	18	1   retention user
12101	19	18	1   retention user
12102	19	18	1   retention user
12107	19	18	1   retention user
12111	19	18	1   retention user
12118	19	18	1   retention user

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12127	19	18	1   retention user
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12167	19	18	1   retention user
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12170	19	18	1   retention user
12173	19	18	1   retention user
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12212	19	18	1   retention user
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12214	19	18	1   retention user
12216	19	18	1   retention user
12217	19	18	1   retention user
12221	19	18	1   retention user
12225	19	18	1   retention user
12227	19	18	1   retention user
12228	19	18	1   retention user
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12251	19	18	1   retention user
12256	19	18	1   retention user
12263	19	18	1   retention user
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12290	20	19	1   retention user
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12311	20	19	1   retention user
12313	20	19	1   retention user
12315	20	19	1   retention user
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12373	20	19	1   retention user
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12397	20	19	1   retention user
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12406	20	19	1   retention user
12407	20	19	1   retention user
12411	20	19	1   retention user
12417	20	19	1   retention user
12420	20	19	1   retention user
12421	20	19	1   retention user
12425	20	19	1   retention user
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12443	20	19	1   retention user
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12451	20	19	1   retention user
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12456	20	19	1   retention user
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12462	20	19	1   retention user
12464	20	19	1   retention user
12468	20	19	1   retention user
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12472	20	19	1   retention user
12473	20	19	1   retention user
12474	20	19	1   retention user
12477	20	19	1   retention user
12478	20	19	1   retention user
12480	20	19	1   retention user
12486	20	19	1   retention user
12487	20	19	1   retention user
12490	20	19	1   retention user
12492	20	19	1   retention user
12493	20	19	1   retention user
12496	20	19	1   retention user
12497	20	19	1   retention user
12501	20	19	1   retention user
12505	20	19	1   retention user
12506	20	19	1   retention user
12509	20	19	1   retention user
12510	20	19	1   retention user
12512	20	19	1   retention user
12515	20	19	1   retention user

12517	20	19	1   retention user
12518	20	19	1   retention user
12519	20	19	1   retention user
12521	20	19	1   retention user
12522	20	19	1   retention user
12524	20	19	1   retention user
12526	20	19	1   retention user
12527	20	19	1   retention user
12529	20	19	1   retention user
12530	20	19	1   retention user
12531	20	19	1   retention user
12537	20	19	1   retention user
12539	20	19	1   retention user
12541	20	19	1   retention user
12543	20	19	1   retention user
12545	20	19	1   retention user
12547	20	19	1   retention user
12548	20	19	1   retention user
12550	20	19	1   retention user
12551	20	19	1   retention user
12553	20	19	1   retention user
12554	20	19	1   retention user
12558	20	19	1   retention user
12560	20	19	1   retention user
12562	20	19	1   retention user
12564	20	19	1   retention user
12565	20	19	1   retention user
12567	20	19	1   retention user
12569	20	19	1   retention user
12571	20	19	1   retention user
12573	20	19	1   retention user
12574	20	19	1   retention user
12576	20	19	1   retention user
12577	20	19	1   retention user
12578	20	19	1   retention user
12584	20	19	1   retention user
12585	20	19	1   retention user
12586	20	19	1   retention user
12589	20	19	1   retention user
12591	20	19	1   retention user
12593	20	19	1   retention user
12594	20	19	1   retention user
12595	20	19	1   retention user
12599	20	19	1   retention user
12600	20	19	1   retention user
12603	20	19	1   retention user
12604	20	19	1   retention user
12605	20	19	1   retention user

12607	20	19	1   retention user
12608	20	19	1   retention user
12610	20	19	1   retention user
12611	20	19	1   retention user
12613	20	19	1   retention user
12615	20	19	1   retention user
12617	20	19	1   retention user
12621	20	19	1   retention user
12627	20	19	1   retention user
12628	20	19	1   retention user
12630	20	19	1   retention user
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18809	35	34	1   retention user
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18814	35	34	1   retention user
18815	35	34	1   retention user
18864	35	34	1   retention user
18885	35	34	1   retention user
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#### 4. Weekly Engagement Per Device:

- Objective: Measure the activeness of users on a weekly basis per device.

```
select device, extract(week from event_date) as week_num, count(distinct use
r_id) as weekly_engagement_of_users
from events
where event_type="engagement"
```

```
group by device, week_num
order by device, week_num;
```

Process : select device, extract week from date as week number and count distinct users which gives the number of users used a device in a week span with a condition that event\_type is engagement

Group by device, week\_num to get the weekly engagement of users for a particular device

device	week_num	weekly_engagement_of_users
acer aspire desktop	17	9
acer aspire desktop	18	26
acer aspire desktop	19	23
acer aspire desktop	20	23
acer aspire desktop	21	29
acer aspire desktop	22	25
acer aspire desktop	23	22
acer aspire desktop	24	24
acer aspire desktop	25	28
acer aspire desktop	26	29
acer aspire desktop	27	29
acer aspire desktop	28	30
acer aspire desktop	29	28
acer aspire desktop	30	33
acer aspire desktop	31	31
acer aspire desktop	32	35
acer aspire desktop	33	39
acer aspire desktop	34	30
acer aspire desktop	35	1
acer aspire notebook	17	20
acer aspire notebook	18	33
acer aspire notebook	19	41
acer aspire notebook	20	40
acer aspire notebook	21	47
acer aspire notebook	22	41
acer aspire notebook	23	43
acer aspire notebook	24	40
acer aspire notebook	25	47
acer aspire notebook	26	35
acer aspire notebook	27	49
acer aspire notebook	28	49
acer aspire notebook	29	53
acer aspire notebook	30	60
acer aspire notebook	31	55

acer aspire notebook	32	55
acer aspire notebook	33	46
acer aspire notebook	34	63
acer aspire notebook	35	3
amazon fire phone	17	4
amazon fire phone	18	9
amazon fire phone	19	12
amazon fire phone	20	11
amazon fire phone	21	5
amazon fire phone	22	5
amazon fire phone	23	16
amazon fire phone	24	11
amazon fire phone	25	13
amazon fire phone	26	13
amazon fire phone	27	10
amazon fire phone	28	6
amazon fire phone	29	12
amazon fire phone	30	12
amazon fire phone	31	14
amazon fire phone	32	12
amazon fire phone	33	14
amazon fire phone	34	11
asus chromebook	17	21
asus chromebook	18	42
asus chromebook	19	27
asus chromebook	20	41
asus chromebook	21	38
asus chromebook	22	52
asus chromebook	23	49
asus chromebook	24	43
asus chromebook	25	38
asus chromebook	26	49
asus chromebook	27	52
asus chromebook	28	50
asus chromebook	29	49
asus chromebook	30	56
asus chromebook	31	56
asus chromebook	32	62
asus chromebook	33	49
asus chromebook	34	47
asus chromebook	35	6
dell inspiron desktop	17	18
dell inspiron desktop	18	58
dell inspiron desktop	19	36
dell inspiron desktop	20	52
dell inspiron desktop	21	41
dell inspiron desktop	22	52
dell inspiron desktop	23	53

dell inspiron desktop	24	59
dell inspiron desktop	25	52
dell inspiron desktop	26	60
dell inspiron desktop	27	53
dell inspiron desktop	28	56
dell inspiron desktop	29	54
dell inspiron desktop	30	54
dell inspiron desktop	31	44
dell inspiron desktop	32	57
dell inspiron desktop	33	37
dell inspiron desktop	34	49
dell inspiron desktop	35	1
dell inspiron notebook	17	46
dell inspiron notebook	18	77
dell inspiron notebook	19	83
dell inspiron notebook	20	84
dell inspiron notebook	21	80
dell inspiron notebook	22	92
dell inspiron notebook	23	103
dell inspiron notebook	24	99
dell inspiron notebook	25	105
dell inspiron notebook	26	89
dell inspiron notebook	27	89
dell inspiron notebook	28	103
dell inspiron notebook	29	113
dell inspiron notebook	30	127
dell inspiron notebook	31	113
dell inspiron notebook	32	104
dell inspiron notebook	33	110
dell inspiron notebook	34	105
dell inspiron notebook	35	9
hp pavilion desktop	17	14
hp pavilion desktop	18	37
hp pavilion desktop	19	40
hp pavilion desktop	20	30
hp pavilion desktop	21	44
hp pavilion desktop	22	38
hp pavilion desktop	23	54
hp pavilion desktop	24	56
hp pavilion desktop	25	52
hp pavilion desktop	26	46
hp pavilion desktop	27	56
hp pavilion desktop	28	56
hp pavilion desktop	29	58
hp pavilion desktop	30	42
hp pavilion desktop	31	51
hp pavilion desktop	32	51
hp pavilion desktop	33	38

hp pavilion desktop	34	36
hp pavilion desktop	35	1
htc one	17	16
htc one	18	19
htc one	19	30
htc one	20	29
htc one	21	21
htc one	22	24
htc one	23	20
htc one	24	20
htc one	25	21
htc one	26	23
htc one	27	27
htc one	28	26
htc one	29	31
htc one	30	31
htc one	31	13
htc one	32	18
htc one	33	19
htc one	34	25
htc one	35	2
ipad air	17	27
ipad air	18	52
ipad air	19	55
ipad air	20	59
ipad air	21	51
ipad air	22	58
ipad air	23	41
ipad air	24	57
ipad air	25	57
ipad air	26	56
ipad air	27	55
ipad air	28	54
ipad air	29	52
ipad air	30	70
ipad air	31	55
ipad air	32	48
ipad air	33	40
ipad air	34	39
ipad mini	17	19
ipad mini	18	30
ipad mini	19	36
ipad mini	20	32
ipad mini	21	23
ipad mini	22	34
ipad mini	23	33
ipad mini	24	39
ipad mini	25	30

ipad mini	26	43
ipad mini	27	35
ipad mini	28	35
ipad mini	29	34
ipad mini	30	35
ipad mini	31	27
ipad mini	32	30
ipad mini	33	28
ipad mini	34	25
ipad mini	35	2
iphone 4s	17	21
iphone 4s	18	46
iphone 4s	19	44
iphone 4s	20	55
iphone 4s	21	45
iphone 4s	22	45
iphone 4s	23	53
iphone 4s	24	53
iphone 4s	25	40
iphone 4s	26	50
iphone 4s	27	67
iphone 4s	28	61
iphone 4s	29	60
iphone 4s	30	65
iphone 4s	31	56
iphone 4s	32	34
iphone 4s	33	35
iphone 4s	34	50
iphone 4s	35	6
iphone 5	17	65
iphone 5	18	113
iphone 5	19	115
iphone 5	20	125
iphone 5	21	137
iphone 5	22	125
iphone 5	23	152
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	35	2

iphone 5s	17	42
iphone 5s	18	73
iphone 5s	19	79
iphone 5s	20	79
iphone 5s	21	74
iphone 5s	22	71
iphone 5s	23	79
iphone 5s	24	79
iphone 5s	25	78
iphone 5s	26	94
iphone 5s	27	83
iphone 5s	28	93
iphone 5s	29	90
iphone 5s	30	103
iphone 5s	31	71
iphone 5s	32	67
iphone 5s	33	65
iphone 5s	34	70
iphone 5s	35	3
kindle fire	17	6
kindle fire	18	27
kindle fire	19	21
kindle fire	20	23
kindle fire	21	30
kindle fire	22	21
kindle fire	23	25
kindle fire	24	25
kindle fire	25	24
kindle fire	26	26
kindle fire	27	25
kindle fire	28	31
kindle fire	29	37
kindle fire	30	25
kindle fire	31	14
kindle fire	32	12
kindle fire	33	14
kindle fire	34	13
kindle fire	35	3
lenovo thinkpad	17	86
lenovo thinkpad	18	153
lenovo thinkpad	19	178
lenovo thinkpad	20	173
lenovo thinkpad	21	167
lenovo thinkpad	22	176
lenovo thinkpad	23	176
lenovo thinkpad	24	165
lenovo thinkpad	25	197
lenovo thinkpad	26	192

lenovo thinkpad	27	202
lenovo thinkpad	28	220
lenovo thinkpad	29	209
lenovo thinkpad	30	206
lenovo thinkpad	31	207
lenovo thinkpad	32	179
lenovo thinkpad	33	191
lenovo thinkpad	34	193
lenovo thinkpad	35	16
mac mini	17	6
mac mini	18	13
mac mini	19	18
mac mini	20	26
mac mini	21	18
mac mini	22	25
mac mini	23	18
mac mini	24	29
mac mini	25	21
mac mini	26	11
mac mini	27	15
mac mini	28	28
mac mini	29	31
mac mini	30	23
mac mini	31	24
mac mini	32	20
mac mini	33	32
mac mini	34	30
mac mini	35	2
macbook air	17	54
macbook air	18	121
macbook air	19	112
macbook air	20	119
macbook air	21	110
macbook air	22	145
macbook air	23	124
macbook air	24	152
macbook air	25	121
macbook air	26	134
macbook air	27	142
macbook air	28	148
macbook air	29	148
macbook air	30	159
macbook air	31	147
macbook air	32	125
macbook air	33	133
macbook air	34	136
macbook air	35	10
macbook pro	17	143



macbook pro	18	252
macbook pro	19	266
macbook pro	20	256
macbook pro	21	247
macbook pro	22	251
macbook pro	23	266
macbook pro	24	255
macbook pro	25	275
macbook pro	26	269
macbook pro	27	302
macbook pro	28	295
macbook pro	29	295
macbook pro	30	322
macbook pro	31	321
macbook pro	32	307
macbook pro	33	312
macbook pro	34	292
macbook pro	35	17
nexus 10	17	16
nexus 10	18	30
nexus 10	19	25
nexus 10	20	22
nexus 10	21	25
nexus 10	22	27
nexus 10	23	45
nexus 10	24	38
nexus 10	25	29
nexus 10	26	29
nexus 10	27	37
nexus 10	28	26
nexus 10	29	25
nexus 10	30	36
nexus 10	31	24
nexus 10	32	30
nexus 10	33	23
nexus 10	34	25
nexus 10	35	2
nexus 5	17	40
nexus 5	18	73
nexus 5	19	87
nexus 5	20	103
nexus 5	21	91
nexus 5	22	96
nexus 5	23	88
nexus 5	24	87
nexus 5	25	89
nexus 5	26	87
nexus 5	27	84

nexus 5	28	85
nexus 5	29	77
nexus 5	30	84
nexus 5	31	69
nexus 5	32	67
nexus 5	33	70
nexus 5	34	70
nexus 5	35	4
nexus 7	17	18
nexus 7	18	30
nexus 7	19	41
nexus 7	20	32
nexus 7	21	29
nexus 7	22	45
nexus 7	23	36
nexus 7	24	49
nexus 7	25	51
nexus 7	26	46
nexus 7	27	40
nexus 7	28	39
nexus 7	29	45
nexus 7	30	62
nexus 7	31	38
nexus 7	32	25
nexus 7	33	30
nexus 7	34	33
nexus 7	35	2
nokia lumia 635	17	17
nokia lumia 635	18	33
nokia lumia 635	19	23
nokia lumia 635	20	22
nokia lumia 635	21	25
nokia lumia 635	22	25
nokia lumia 635	23	31
nokia lumia 635	24	35
nokia lumia 635	25	37
nokia lumia 635	26	42
nokia lumia 635	27	31
nokia lumia 635	28	35
nokia lumia 635	29	43
nokia lumia 635	30	34
nokia lumia 635	31	28
nokia lumia 635	32	28
nokia lumia 635	33	27
nokia lumia 635	34	17
nokia lumia 635	35	2
samsung galaxy tablet	17	8
samsung galaxy tablet	18	11

samsung galaxy tablet	19	6
samsung galaxy tablet	20	9
samsung galaxy tablet	21	6
samsung galaxy tablet	22	10
samsung galaxy tablet	23	14
samsung galaxy tablet	24	11
samsung galaxy tablet	25	12
samsung galaxy tablet	26	12
samsung galaxy tablet	27	15
samsung galaxy tablet	28	9
samsung galaxy tablet	29	13
samsung galaxy tablet	30	9
samsung galaxy tablet	31	8
samsung galaxy tablet	32	6
samsung galaxy tablet	33	12
samsung galaxy tablet	34	14
samsung galaxy note	17	7
samsung galaxy note	18	15
samsung galaxy note	19	11
samsung galaxy note	20	18
samsung galaxy note	21	20
samsung galaxy note	22	19
samsung galaxy note	23	14
samsung galaxy note	24	20
samsung galaxy note	25	14
samsung galaxy note	26	9
samsung galaxy note	27	15
samsung galaxy note	28	10
samsung galaxy note	29	16
samsung galaxy note	30	15
samsung galaxy note	31	14
samsung galaxy note	32	12
samsung galaxy note	33	13
samsung galaxy note	34	13
samsung galaxy note	35	1
samsung galaxy s4	17	52
samsung galaxy s4	18	82
samsung galaxy s4	19	91
samsung galaxy s4	20	93
samsung galaxy s4	21	84
samsung galaxy s4	22	105
samsung galaxy s4	23	99
samsung galaxy s4	24	101
samsung galaxy s4	25	99
samsung galaxy s4	26	112
samsung galaxy s4	27	116
samsung galaxy s4	28	122
samsung galaxy s4	29	123

samsung galaxy s4	30	103
samsung galaxy s4	31	100
samsung galaxy s4	32	82
samsung galaxy s4	33	80
samsung galaxy s4	34	90
samsung galaxy s4	35	6
windows surface	17	10
windows surface	18	10
windows surface	19	16
windows surface	20	21
windows surface	21	17
windows surface	22	15
windows surface	23	14
windows surface	24	22
windows surface	25	22
windows surface	26	21
windows surface	27	33
windows surface	28	33
windows surface	29	28
windows surface	30	19
windows surface	31	19
windows surface	32	10
windows surface	33	15
windows surface	34	18
windows surface	35	3
+-----+-----+-----+		

## 5. Email Engagement Analysis:

- Objective: Analyze how users are engaging with the email service.

Engagement over time:

### Insight:

Defined as the engagement over time refers to the number of users engaging in email by opening or clicking links per day

```
select actual_date , count(distinct user_id) as engaged_users
  from emailEvents
 where action = "email_open" or "email_clickthrough"
 group by actual_date
 order by actual_date;
```

Process: select date and count of distinct users engaging in emails in that particular date  
By appropriate engagement condition using where clause

And group by date to get engaged user number for every date

```
+-----+-----+
| actual_date | engaged_users |
+-----+-----+
| 2014-05-01 |      145 |
| 2014-05-02 |      142 |
| 2014-05-03 |       23 |
| 2014-05-04 |       22 |
| 2014-05-05 |      255 |
| 2014-05-06 |      168 |
| 2014-05-07 |      141 |
| 2014-05-08 |      156 |
| 2014-05-09 |      148 |
| 2014-05-10 |       22 |
| 2014-05-11 |       29 |
| 2014-05-12 |      258 |
| 2014-05-13 |      193 |
| 2014-05-14 |      151 |
| 2014-05-15 |      146 |
| 2014-05-16 |      162 |
| 2014-05-17 |       33 |
| 2014-05-18 |       28 |
| 2014-05-19 |      282 |
| 2014-05-20 |      204 |
| 2014-05-21 |      142 |
| 2014-05-22 |      146 |
| 2014-05-23 |      168 |
| 2014-05-24 |       34 |
| 2014-05-25 |       19 |
| 2014-05-26 |      285 |
| 2014-05-27 |      187 |
| 2014-05-28 |      145 |
| 2014-05-29 |      176 |
| 2014-05-30 |      173 |
| 2014-05-31 |       29 |
| 2014-06-01 |       31 |
| 2014-06-02 |      256 |
| 2014-06-03 |      195 |
| 2014-06-04 |      148 |
| 2014-06-05 |      158 |
| 2014-06-06 |      173 |
| 2014-06-07 |       26 |
| 2014-06-08 |       37 |
| 2014-06-09 |      264 |
| 2014-06-10 |      201 |
| 2014-06-11 |      149 |
| 2014-06-12 |      198 |
```

2014-06-13	200
2014-06-14	26
2014-06-15	32
2014-06-16	305
2014-06-17	209
2014-06-18	169
2014-06-19	189
2014-06-20	205
2014-06-21	46
2014-06-22	38
2014-06-23	280
2014-06-24	198
2014-06-25	155
2014-06-26	185
2014-06-27	223
2014-06-28	17
2014-06-29	32
2014-06-30	313
2014-07-01	223
2014-07-02	184
2014-07-03	189
2014-07-04	190
2014-07-05	34
2014-07-06	35
2014-07-07	325
2014-07-08	225
2014-07-09	170
2014-07-10	200
2014-07-11	243
2014-07-12	30
2014-07-13	37
2014-07-14	356
2014-07-15	216
2014-07-16	195
2014-07-17	187
2014-07-18	222
2014-07-19	37
2014-07-20	47
2014-07-21	316
2014-07-22	214
2014-07-23	184
2014-07-24	191
2014-07-25	235
2014-07-26	32
2014-07-27	39
2014-07-28	378
2014-07-29	241
2014-07-30	205

2014-07-31	231
2014-08-01	257
2014-08-02	32
2014-08-03	42
2014-08-04	362
2014-08-05	236
2014-08-06	210
2014-08-07	234
2014-08-08	234
2014-08-09	33
2014-08-10	27
2014-08-11	401
2014-08-12	245
2014-08-13	201
2014-08-14	217
2014-08-15	215
2014-08-16	31
2014-08-17	47
2014-08-18	392
2014-08-19	257
2014-08-20	218
2014-08-21	235
2014-08-22	245
2014-08-23	38
2014-08-24	36
2014-08-25	403
2014-08-26	299
2014-08-27	229
2014-08-28	247
2014-08-29	276
2014-08-30	38
2014-08-31	41

+-----+-----+

## 5.Email Engagement Analysis:

- Objective: Analyze how users are engaging with the email service.

WITH table1 AS (

SELECT

SUM(CASE WHEN action = 'email\_open' THEN 1 ELSE 0 END) AS open\_email,

SUM(CASE WHEN action = 'email\_clickthrough' THEN 1 ELSE 0 END) AS

click\_email,

```

SUM(CASE WHEN action = 'sent_weekly_digest' OR action =
'sent_reengagement_email' THEN 1 ELSE 0 END) AS total_emails,
SUM(CASE WHEN action = 'sent_reengagement_email' THEN 1 ELSE 0 END) AS
inactive_users
FROM emailEvents
)
SELECT
(open_email/ total_emails) * 100 AS open_rate,
(click_email / total_emails) * 100 AS clickthrough_rate,
(inactive_users / total_emails) * 100 AS reengagement_rate
FROM table1;

```

### Insight:

Total sent emails= sent\_weekly\_digest + sent\_reengagement\_email

Open\_rate is defined as the percentage of opened emails compared to the total sent emails

Clickthrough\_rate is defined as the percentage of clicked emails compared to total sent emails

Reengagement\_rate is defined as the percentage of reengagement emails sent to inactive users compared to total emails sent

Process: Using window Table1 get number of open\_email, click\_email, total\_emails, inactive\_users

as sum of case functions WHEN action = specified condition' THEN 1 ELSE 0

Use table1 in main query to calculate open\_rate, clickthrough\_rate and reengagement\_rate using the above formulas.

(open\_email/ total\_emails) \* 100 AS open\_rate,

(click\_email / total\_emails) \* 100 AS clickthrough\_rate,

(inactive\_users / total\_emails) \* 100 AS reengagement\_rate

```

+-----+-----+-----+
| open_rate | clickthrough_rate | reengagement_rate |
+-----+-----+-----+
| 33.5834 | 14.7899 | 5.9964 |
+-----+-----+-----+

```

Software Used : Maria DB, Excel

-Shivaani Dushyanth



