Metric Analysis

Sql File Link :

https://drive.google.com/file/d/15G-aXqCKovpYa4LzktjNOfEnY-eswVYp/view?usp=drive_link

Project Description:

The project deals with investigating metrics of a product through the analysis of user engagement, growth, retention, etc. We have been provided with data regarding the sign up, logins, and other engagement of users with the product as well as relevant details regarding users.

Data 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.

Approach: The data given was imported into MySql workbench using infile command because of the data size. It was then analysed using MySql queries. MySql Workbench was used to run various queries and observe the outputs.

Tech-Stack Used: MySQL Workbench 8.0.33 : To Execute the Sql queries.

Result: This project has been rather difficult for me. Initially, it was difficult to load the data. Some of the questions required a lot more search and study than previous projects. However, I finally have an understanding regarding various metric analysis that can be applied to track the growth of a service product.

SQL Queries

```
use metric_spike;
select * from users;

alter table users
modify created_at datetime Not Null;

CREATE TABLE IF NOT EXISTS `events` (
  `user_id` bigint(20) NOT NULL,
  `occured_at` datetime NOT NULL,
  `event_type` varchar(60) NOT NULL,
  `event_name` varchar(60) NOT NULL,
  `location` varchar(60) NOT NULL,
  `device` varchar(60) NOT NULL,
  `user_type` bigint(20) NOT NULL
);


CREATE TABLE IF NOT EXISTS `email_events` (
  `user_id` bigint(20) NOT NULL,
  `occured_at` datetime NOT NULL,
  `action` varchar(60) NOT NULL,
  `user_type` bigint(20) NOT NULL
);
```

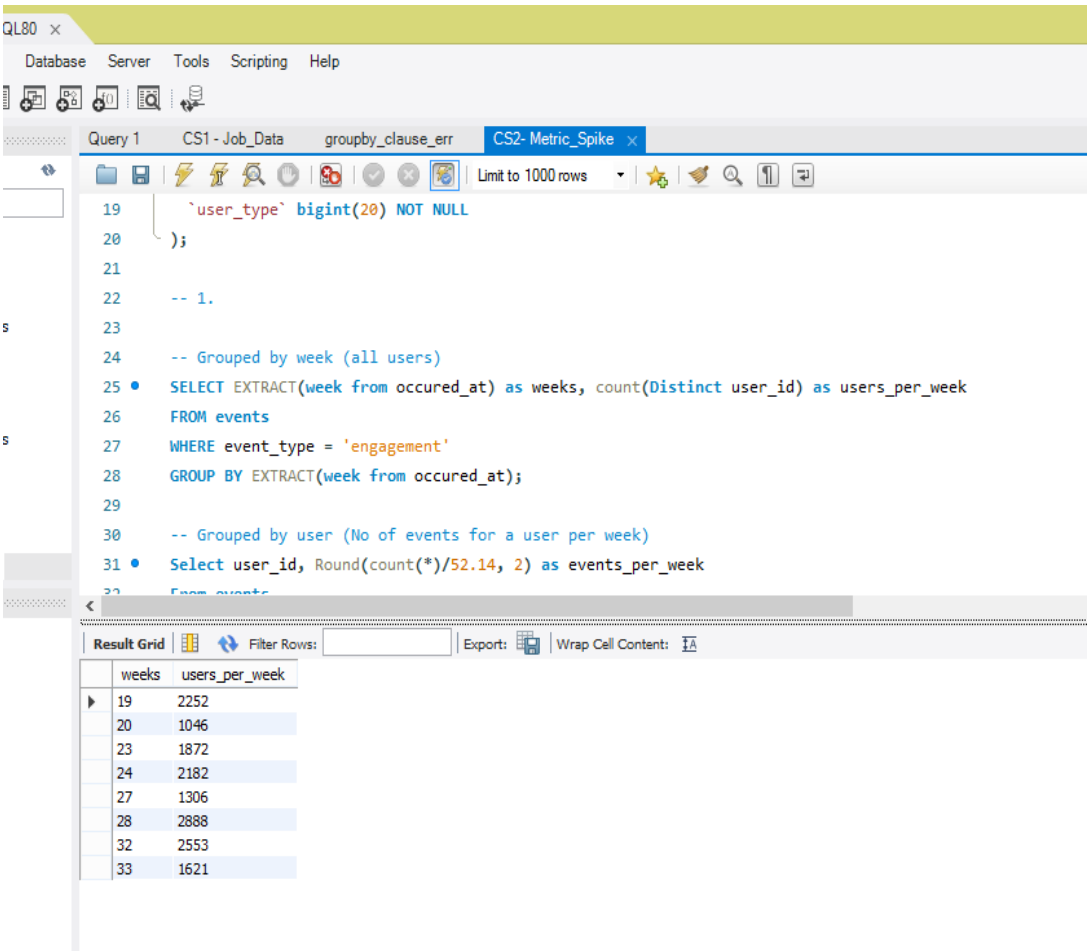
-- A. User Engagement

Measuring the activeness of users on a weekly basis.

-- Grouped by week (all users)

```
SELECT EXTRACT(week from occured_at) as weeks, count(Distinct user_id) as users_per_week
FROM events
WHERE event_type = 'engagement'
GROUP BY EXTRACT(week from occured_at);
```

Filters engagement data based on week.

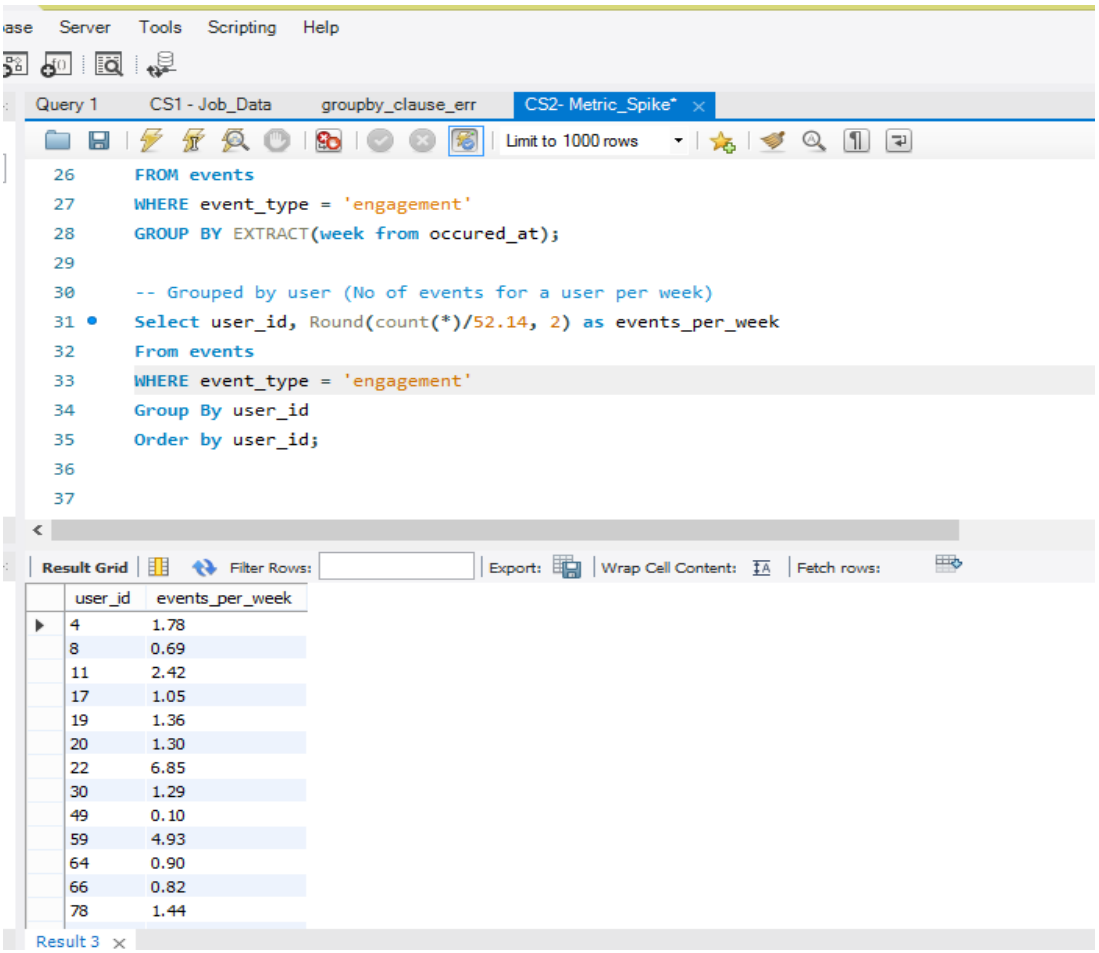


weeks	users_per_week
19	2252
20	1046
23	1872
24	2182
27	1306
28	2888
32	2553
33	1621

-- Grouped by user (No of events for a user per week)

Select user_id, Round(count(*)/52.14, 2) as events_per_week
From events
WHERE event_type = 'engagement'
Group By user_id
Order by user_id;

Filters engagement data based on user.



user_id	events_per_week
4	1.78
8	0.69
11	2.42
17	1.05
19	1.36
20	1.30
22	6.85
30	1.29
49	0.10
59	4.93
64	0.90
66	0.82
78	1.44

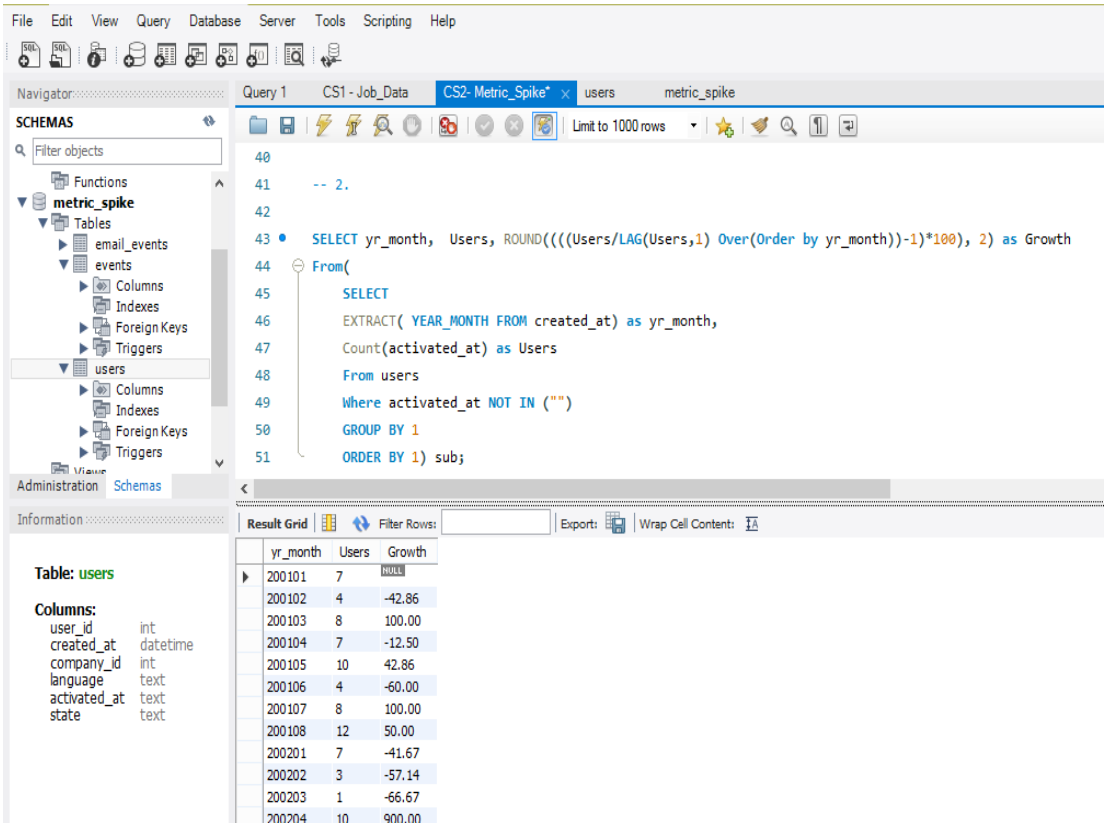
-- 2. User Growth

Analyzing the growth of users over time for product.

```
SELECT yr_month,  Users, ROUND((((Users/LAG(Users,1) Over(Order by yr_month))-1)*100), 2) as Growth
From(
        SELECT
   EXTRACT( YEAR_MONTH FROM created_at) as yr_month,
   Count(activated_at) as Users
        From users
        Where activated_at NOT IN ("")
        GROUP BY 1
        ORDER BY 1) sub;
```

Uses Year_Month to group users by year-month. Uses Window function lag to compare current months's user count to previous month's.

Formula : ((current_month_users/previous month users) -1)*100



-- 3. Yearly Retention

Analyzing the retention of users on a yearly basis after signing up for a product.

-- 31 possible first login years

```
 SELECT first_year AS "Year_No",
SUM(CASE WHEN year_number = 0 THEN 1 ELSE 0 END) AS "Year 0",
SUM(CASE WHEN year_number = 1 THEN 1 ELSE 0 END) AS "Year 1",
SUM(CASE WHEN year_number = 2 THEN 1 ELSE 0 END) AS "Year 2",
SUM(CASE WHEN year_number = 3 THEN 1 ELSE 0 END) AS "Year 3",
SUM(CASE WHEN year_number = 4 THEN 1 ELSE 0 END) AS "Year 4",
SUM(CASE WHEN year_number = 5 THEN 1 ELSE 0 END) AS "Year 5",
SUM(CASE WHEN year_number = 6 THEN 1 ELSE 0 END) AS "Year 6",
SUM(CASE WHEN year_number = 7 THEN 1 ELSE 0 END) AS "Year 7",
SUM(CASE WHEN year_number = 8 THEN 1 ELSE 0 END) AS "Year 8",
SUM(CASE WHEN year_number = 9 THEN 1 ELSE 0 END) AS "Year 9",
SUM(CASE WHEN year_number = 10 THEN 1 ELSE 0 END) AS "Year 10",
SUM(CASE WHEN year_number = 11 THEN 1 ELSE 0 END) AS "Year 11",
SUM(CASE WHEN year_number = 12 THEN 1 ELSE 0 END) AS "Year 12",
SUM(CASE WHEN year_number = 13 THEN 1 ELSE 0 END) AS "Year 13",
SUM(CASE WHEN year_number = 14 THEN 1 ELSE 0 END) AS "Year 14",
SUM(CASE WHEN year_number = 15 THEN 1 ELSE 0 END) AS "Year 15",
SUM(CASE WHEN year_number = 16 THEN 1 ELSE 0 END) AS "Year 16",
SUM(CASE WHEN year_number = 17 THEN 1 ELSE 0 END) AS "Year 17",
SUM(CASE WHEN year_number = 18 THEN 1 ELSE 0 END) AS "Year 18",
SUM(CASE WHEN year_number = 19 THEN 1 ELSE 0 END) AS "Year 19",
SUM(CASE WHEN year_number = 20 THEN 1 ELSE 0 END) AS "Year 20",
SUM(CASE WHEN year_number = 21 THEN 1 ELSE 0 END) AS "Year 21",
SUM(CASE WHEN year_number = 22 THEN 1 ELSE 0 END) AS "Year 22",
SUM(CASE WHEN year_number = 23 THEN 1 ELSE 0 END) AS "Year 23",
SUM(CASE WHEN year_number = 24 THEN 1 ELSE 0 END) AS "Year 24",
SUM(CASE WHEN year_number = 25 THEN 1 ELSE 0 END) AS "Year 25",
SUM(CASE WHEN year_number = 26 THEN 1 ELSE 0 END) AS "Year 26",
SUM(CASE WHEN year_number = 27 THEN 1 ELSE 0 END) AS "Year 27",
SUM(CASE WHEN year_number = 28 THEN 1 ELSE 0 END) AS "Year 28",
SUM(CASE WHEN year_number = 29 THEN 1 ELSE 0 END) AS "Year 29",
SUM(CASE WHEN year_number = 30 THEN 1 ELSE 0 END) AS "Year 30",
```

```
SUM(CASE WHEN year_number = 31 THEN 1 ELSE 0 END) AS "Year 31"
FROM (
SELECT logins.user_id, logins.login_year, login1.first_year, (logins.login_year -
login1.first_year) AS year_number
FROM
        (SELECT  user_id, EXTRACT(Year FROM occured_at) AS login_year
        From events
        GROUP BY 1, 2
    ) logins,
        (SELECT  user_id,  MIN(EXTRACT(Year FROM occured_at)) AS
first_year
        From events
        GROUP BY 1
    ) login1
        WHERE logins.user_id = login1.user_id
) sub
GROUP BY first_year
ORDER BY first_year;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

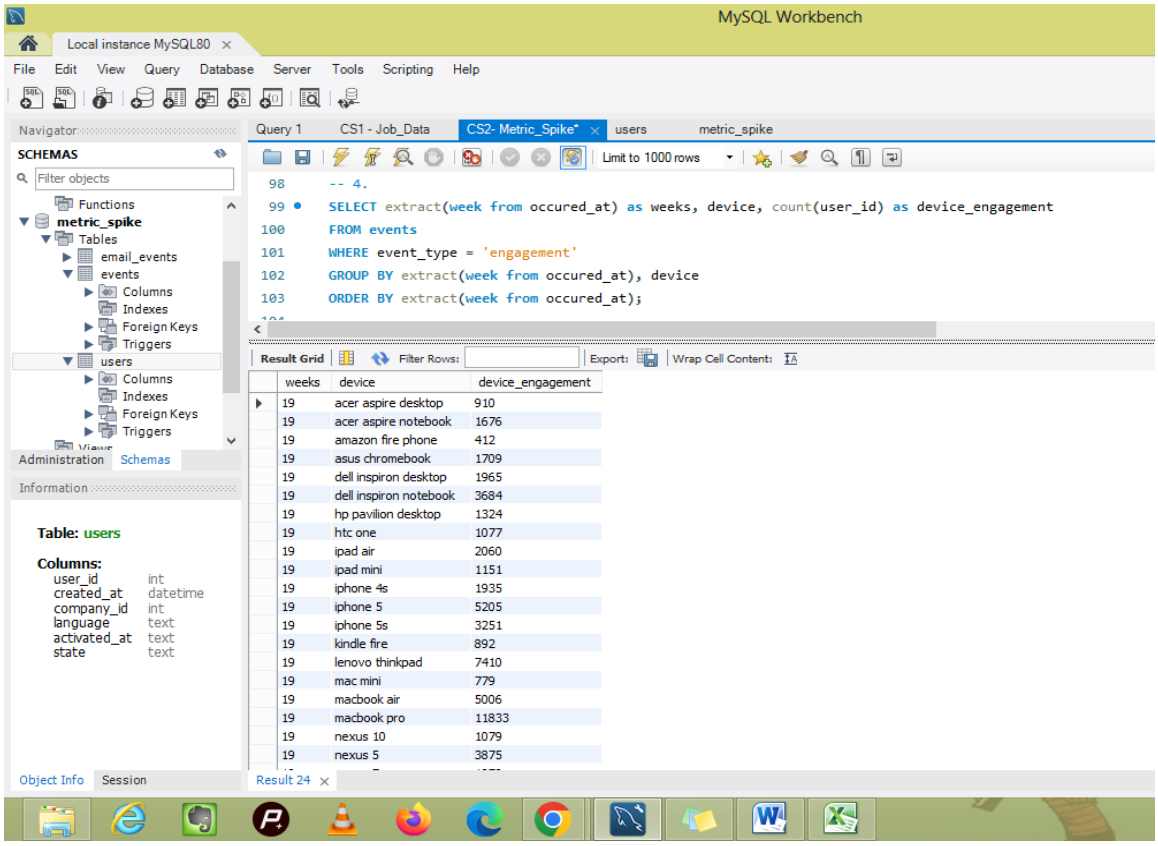
Year_No	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19
2001	1210	299	285	270	357	299	308	320	293	233	251	257	270	260	272	264	233	233	264	268
2002	883	150	202	178	253	208	178	201	160	183	159	176	136	151	191	129	156	152	180	162
2003	575	116	107	112	140	103	90	103	96	111	109	90	98	92	92	87	88	100	76	96
2004	556	85	97	87	140	99	78	90	75	77	87	68	92	58	99	75	58	84	74	92
2005	422	63	61	64	119	41	53	75	59	56	60	64	41	52	62	58	51	61	66	56
2006	363	37	37	35	90	48	44	51	49	43	41	35	41	38	53	44	39	43	33	33
2007	381	36	48	25	117	50	44	50	49	49	34	51	46	41	42	41	38	35	35	27
2008	310	28	24	17	82	29	30	38	34	30	23	26	23	17	24	18	22	19	20	18
2009	298	15	20	21	95	29	23	41	24	26	26	28	27	20	21	20	18	25	23	24
2010	211	15	17	8	53	12	21	11	14	14	10	11	16	10	12	5	15	6	7	13
2011	313	11	17	17	83	33	15	30	19	24	22	26	21	10	18	18	9	17	12	20
2012	250	16	10	13	82	20	16	26	25	21	14	12	12	14	16	19	20	17	10	8
2013	250	8	6	9	77	21	16	21	12	18	10	7	10	14	18	9	10	4	2	0
2014	287	12	11	6	83	23	18	21	19	18	14	11	16	14	10	19	14	6	0	0
2015	242	11	6	9	102	11	19	23	11	18	11	9	12	13	23	11	7	0	0	0
2016	246	2	11	13	75	21	15	23	12	10	11	15	8	10	8	5	0	0	0	0
2017	163	6	2	4	54	12	10	6	8	7	4	4	8	9	5	0	0	0	0	0
2018	260	14	12	11	86	19	12	20	14	10	17	15	19	7	0	0	0	0	0	0

The table logins collect the logins of users and record the year of login. The table login1 collects the first login of a user. The case-else is used to group users as per their first login year to create a cohort.

-- 4. Weekly Engagement per device

Measuring the activeness of users on a weekly basis per device.

```
SELECT extract(week from occured_at) as weeks, device, count(user_id) as device_engagement
FROM events
WHERE event_type = 'engagement'
GROUP BY extract(week from occured_at), device
ORDER BY extract(week from occured_at);
```



The data is filtered on the basis of week and device. The results can be made more presentable using case-else statements.

-- 5. Email Engagement

Analyzing how users are engaging with the email service.

```
Select week,
Round((weekly_digests/total*100),2) AS "Weekly Digest Rate",
Round((email_opens/total*100),2) AS "Weekly Digest Rate",
Round((email_clickthroughs/total*100),2) AS "Weekly Digest Rate",
Round((reengagement_emails/total*100),2) AS "Weekly Digest Rate"
FROM (
SELECT EXTRACT(WEEK FROM occured_at) as week,
COUNT(CASE  WHEN action  = 'sent_weekly_digest' THEN  user_id ELSE
NULL  END) as weekly_digests,
COUNT(CASE  WHEN action  = 'email_open' THEN  user_id ELSE  NULL
END) as email_opens,
COUNT(CASE  WHEN action  = 'email_clickthrough' THEN  user_id ELSE
NULL  END) as email_clickthroughs,
COUNT(CASE WHEN action = 'sent_reengagement_email' THEN  user_id ELSE
NULL  END) as reengagement_emails,
COUNT(user_id) AS total
FROM email_events
GROUP BY 1 ) sub
GROUP BY 1
ORDER BY 1;
```

Inline query is used to fetch the counts of each email event.

MySQL Workbench

Local instance MySQL80

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Navigator

SCHEMAS

Filter objects

- Functions
- metric_spike
  - Tables
    - email_events
    - events
      - Columns
      - Indexes
      - Foreign Keys
      - Triggers
    - users
      - Columns
      - Indexes
      - Foreign Keys
      - Triggers

Administration Schemas

Information

Table: users

Columns:

user_id	int
created_at	datetime
company_id	int
language	text
activated_at	text
state	text

Object Info Session

Query 1 | CS1 - Job_Data | CS2- Metric_Spike* | users | metric_spike

Limit to 1000 rows

```
Select week,
Round((weekly_digests/total*100),2) AS "Weekly Digest Rate",
Round((email_opens/total*100),2) AS "Email Open Rate",
Round((email_clickthroughs/total*100),2) AS "Email Clickthrough Rate",
Round((reengagement_emails/total*100),2) AS "Email Reengagement Rate"
FROM (
SELECT EXTRACT(WEEK FROM occured_at) as week,
COUNT(CASE  WHEN action  = 'sent_weekly_digest' THEN  user_id ELSE  NULL  END) as weekly_digests,
COUNT(CASE  WHEN action  = 'email_open' THEN  user_id ELSE  NULL  END) as email_opens,
COUNT(CASE  WHEN action  = 'email_clickthrough' THEN  user_id ELSE  NULL  END) as email_clickthroughs,
COUNT(CASE WHEN action = 'sent_reengagement_email' THEN  user_id ELSE  NULL  END) as reengagement_emails,
COUNT(user_id) AS total
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

week	Weekly Digest Rate	Email Open Rate	Email Clickthrough Rate	Email Reengagement Rate
17	62.32	21.28	11.39	5.01
18	63.45	22.24	10.49	3.83
19	62.16	22.67	11.13	4.04
20	61.62	22.64	11.43	4.31
21	63.52	22.82	9.97	3.69
22	63.59	21.56	10.66	4.19
23	62.39	22.34	11.18	4.09
24	61.61	22.92	10.99	4.48
25	63.77	21.79	10.54	3.90
26	62.99	22.22	10.61	4.18
27	62.24	22.49	11.37	3.90
28	62.92	22.48	10.77	3.83

Result 26