# Operation Analytics and Investigating Metric Spike

## Project Description:

This project involves using advanced SQL to analyze various datasets and investigate sudden metric spikes within a company's operations. As a Lead Data Analyst, you will derive insights to explain changes in key performance metrics and provide actionable recommendations to improve efficiency. The analysis will cover user engagement, sales, support tickets, and marketing data. Deliverables include SQL scripts, detailed reports, and visualizations to aid decision-making for different departments.

## Approach:

- Engage with stakeholders to understand data needs and define key metrics.
- Import, clean, and organize data into structured tables for analysis.
- Use advanced SQL to analyze data, identify trends, and investigate metric spikes.

## Case Study 1: Job Data Analysis:

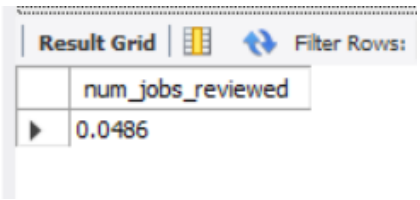
### 1) Jobs Reviewed Over Time:

This SQL query calculates the average number of distinct jobs reviewed per hour. It does this by counting the unique job_id in the job_data table and dividing that count by the total number of hours in 30 days (30 * 24).

**SQL Query:**

```
select count(distinct job_id)/(30*24) as num_jobs_reviewed
from job_data;
```

**Result:**



## 2) Throughput Analysis:

This SQL query calculates the number of distinct jobs reviewed per day (job_review) and the 7-day rolling average of jobs reviewed (throughput_rolling). It groups the data by date (ds), and for each day, it averages the job reviews over the current day and the previous six days. The results are then ordered by date (ds).

### SQL Query:

```
select ds, count(distinct job_id) as job_review,
avg(count(distinct job_id)) over(order by ds rows between 6 preceding and current row)
as throughput_rolling
from job_data
group by ds
order by ds;
```

### Result:

Result Grid | Filter Rows:

| ds | job_review | throughput_rolling |
|---|---|---|
| 10/01/2020 | 1 | 1.0000 |
| 10/08/2020 | 1 | 1.0000 |
| 10/09/2020 | 1 | 1.0000 |
| 10/10/2020 | 1 | 1.0000 |
| 10/20/2020 | 1 | 1.0000 |
| 10/26/2020 | 1 | 1.0000 |
| 10/27/2020 | 1 | 1.0000 |
| 10/28/2020 | 2 | 1.1429 |
| 10/30/2020 | 1 | 1.1429 |
| 10/31/2020 | 3 | 1.4286 |
| 11/01/2020 | 2 | 1.5714 |
| 11/08/2020 | 2 | 1.7143 |
| 11/09/2020 | 1 | 1.7143 |
| 11/10/2020 | 2 | 1.8571 |
| 11/18/2020 | 2 | 1.8571 |
| 11/19/2020 | 1 | 1.8571 |
| 11/20/2020 | 2 | 1.7143 |
| 11/25/2020 | 1 | 1.5714 |

Result Grid | Filter Rows:

| ds | job_review | throughput_rolling |
|---|---|---|
| 11/25/2020 | 1 | 1.5714 |
| 11/26/2020 | 1 | 1.4286 |
| 11/27/2020 | 1 | 1.4286 |
| 11/28/2020 | 2 | 1.4286 |
| 11/29/2020 | 1 | 1.2857 |
| 11/30/2020 | 2 | 1.4286 |
| 12/01/2020 | 1 | 1.2857 |
| 12/08/2020 | 1 | 1.2857 |
| 12/10/2020 | 1 | 1.2857 |
| 12/18/2020 | 2 | 1.4286 |
| 12/19/2020 | 1 | 1.2857 |
| 12/20/2020 | 2 | 1.4286 |
| 12/25/2020 | 1 | 1.2857 |
| 12/26/2020 | 1 | 1.2857 |
| 12/27/2020 | 1 | 1.2857 |
| 12/30/2020 | 1 | 1.2857 |
| 12/31/2020 | 1 | 1.1429 |

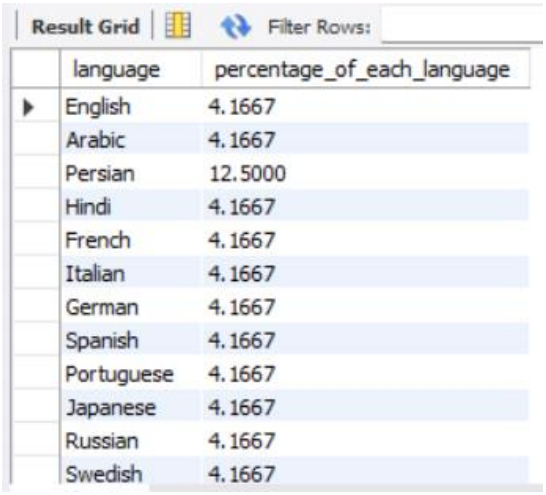
## 3) Language Share Analysis:

This SQL query calculates the percentage representation of each language within the job_data table. It groups the data by language, counts the occurrences of each language, and then divides this count by the total number of entries in the table. The result is multiplied by 100 to express the proportion as a percentage.

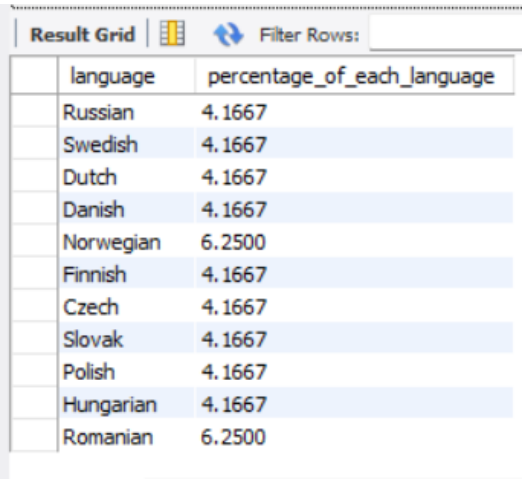
**SQL Query:**

```
select language, (count(language)/sum(count(*)) over()) * 100
as percentage_of_each_language
from job_data
group by language;
```

**Result:**



| language | percentage_of_each_language |
|---|---|
| English | 4.1667 |
| Arabic | 4.1667 |
| Persian | 12.5000 |
| Hindi | 4.1667 |
| French | 4.1667 |
| Italian | 4.1667 |
| German | 4.1667 |
| Spanish | 4.1667 |
| Portuguese | 4.1667 |
| Japanese | 4.1667 |
| Russian | 4.1667 |
| Swedish | 4.1667 |



| language | percentage_of_each_language |
|---|---|
| Russian | 4.1667 |
| Swedish | 4.1667 |
| Dutch | 4.1667 |
| Danish | 4.1667 |
| Norwegian | 6.2500 |
| Finnish | 4.1667 |
| Czech | 4.1667 |
| Slovak | 4.1667 |
| Polish | 4.1667 |
| Hungarian | 4.1667 |
| Romanian | 6.2500 |

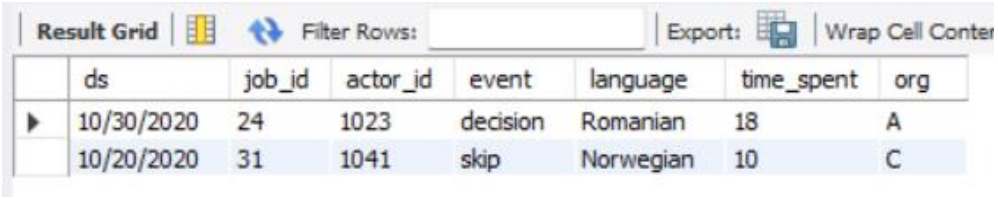
**4) Duplicate Rows Detection:**

This SQL query identifies and selects records from the job_data table that have duplicate entries based on the specified columns (DS, job_id, actor_id, event, language, time_spent, org). The having count(*) > 1 clause filters out groups that appear more than once.

**SQL Query:**

```
select *
from job_data
group by DS, job_id, actor_id, event, language, time_spent, org
having count(*) > 1;
```

**Result:**



| ds | job_id | actor_id | event | language | time_spent | org |
|---|---|---|---|---|---|---|
| 10/30/2020 | 24 | 1023 | decision | Romanian | 18 | A |
| 10/20/2020 | 31 | 1041 | skip | Norwegian | 10 | C |

## Case Study 2: Investigating Metric Spike

1. **Weekly User Engagement:**

   This SQL query calculates the number of distinct active users per week based on engagement events. It extracts the week number from the occurred_at timestamp, counts the distinct user_ids where event_type is 'engagement', groups the results by week number, and orders them by week number.

   **SQL Query:**

```sql
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:**

Result Grid | Filter Rows:

| week_number | active_user |
|---|---|
| 17 | 663 |
| 18 | 1068 |
| 19 | 1113 |
| 20 | 1154 |
| 21 | 1121 |
| 22 | 1186 |
| 23 | 1232 |
| 24 | 1275 |
| 25 | 1264 |

Result Grid | Filter Rows:

| week_number | active_user |
|---|---|
| 27 | 1372 |
| 28 | 1365 |
| 29 | 1376 |
| 30 | 1467 |
| 31 | 1299 |
| 32 | 1225 |
| 33 | 1225 |
| 34 | 1204 |
| 35 | 104 |

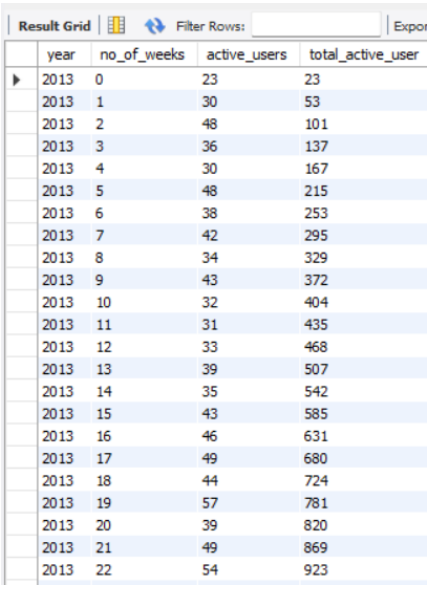
2. **User Growth Analysis:**

   This SQL query calculates the cumulative total of active users by week and year. The inner query extracts the year and week number from the created_at timestamp, counts the distinct user_ids per week, and groups the results accordingly. The outer query then computes the running total of active users using the SUM() window function, ordered by year and week number. The final result shows the year, week number, weekly active users, and the cumulative total of active users up to that week.

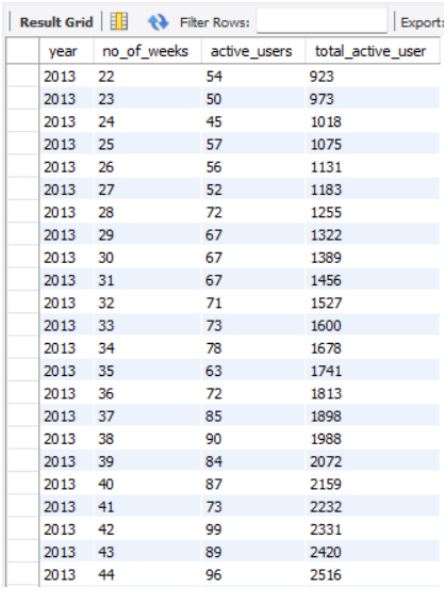
**SQL Query:**

```
select year, no_of_weeks, active_users, sum(active_users) over(order by year,
no_of_weeks rows between unbounded preceding and current row) as total_active_user
from (select extract(year from created_at) as year,
extract(week from created_at) as no_of_weeks,
count(distinct user_id) as active_users
from users
group by year, no_of_weeks
order by year, no_of_weeks)a;
```

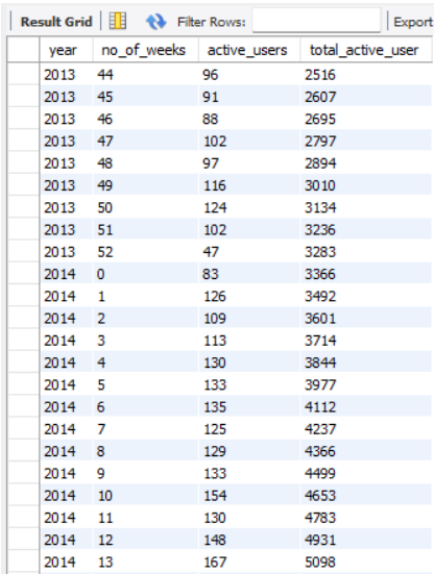
**Result:**



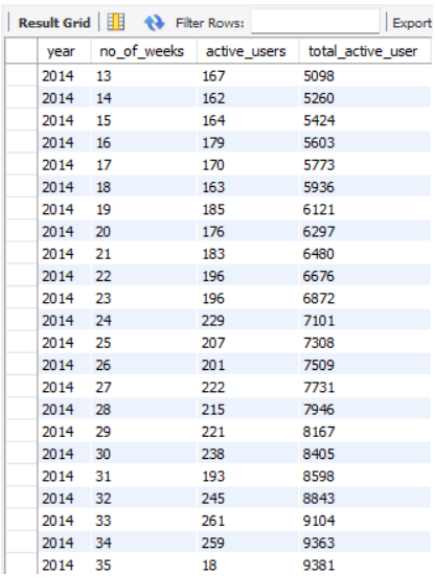
| year | no_of_weeks | active_users | total_active_user |
|---|---|---|---|
| 2013 | 0 | 23 | 23 |
| 2013 | 1 | 30 | 53 |
| 2013 | 2 | 48 | 101 |
| 2013 | 3 | 36 | 137 |
| 2013 | 4 | 30 | 167 |
| 2013 | 5 | 48 | 215 |
| 2013 | 6 | 38 | 253 |
| 2013 | 7 | 42 | 295 |
| 2013 | 8 | 34 | 329 |
| 2013 | 9 | 43 | 372 |
| 2013 | 10 | 32 | 404 |
| 2013 | 11 | 31 | 435 |
| 2013 | 12 | 33 | 468 |
| 2013 | 13 | 39 | 507 |
| 2013 | 14 | 35 | 542 |
| 2013 | 15 | 43 | 585 |
| 2013 | 16 | 46 | 631 |
| 2013 | 17 | 49 | 680 |
| 2013 | 18 | 44 | 724 |
| 2013 | 19 | 57 | 781 |
| 2013 | 20 | 39 | 820 |
| 2013 | 21 | 49 | 869 |
| 2013 | 22 | 54 | 923 |



| year | no_of_weeks | active_users | total_active_user |
|---|---|---|---|
| 2013 | 22 | 54 | 923 |
| 2013 | 23 | 50 | 973 |
| 2013 | 24 | 45 | 1018 |
| 2013 | 25 | 57 | 1075 |
| 2013 | 26 | 56 | 1131 |
| 2013 | 27 | 52 | 1183 |
| 2013 | 28 | 72 | 1255 |
| 2013 | 29 | 67 | 1322 |
| 2013 | 30 | 67 | 1389 |
| 2013 | 31 | 67 | 1456 |
| 2013 | 32 | 71 | 1527 |
| 2013 | 33 | 73 | 1600 |
| 2013 | 34 | 78 | 1678 |
| 2013 | 35 | 63 | 1741 |
| 2013 | 36 | 72 | 1813 |
| 2013 | 37 | 85 | 1898 |
| 2013 | 38 | 90 | 1988 |
| 2013 | 39 | 84 | 2072 |
| 2013 | 40 | 87 | 2159 |
| 2013 | 41 | 73 | 2232 |
| 2013 | 42 | 99 | 2331 |
| 2013 | 43 | 89 | 2420 |
| 2013 | 44 | 96 | 2516 |



| year | no_of_weeks | active_users | total_active_user |
|---|---|---|---|
| 2013 | 44 | 96 | 2516 |
| 2013 | 45 | 91 | 2607 |
| 2013 | 46 | 88 | 2695 |
| 2013 | 47 | 102 | 2797 |
| 2013 | 48 | 97 | 2894 |
| 2013 | 49 | 116 | 3010 |
| 2013 | 50 | 124 | 3134 |
| 2013 | 51 | 102 | 3236 |
| 2013 | 52 | 47 | 3283 |
| 2014 | 0 | 83 | 3366 |
| 2014 | 1 | 126 | 3492 |
| 2014 | 2 | 109 | 3601 |
| 2014 | 3 | 113 | 3714 |
| 2014 | 4 | 130 | 3844 |
| 2014 | 5 | 133 | 3977 |
| 2014 | 6 | 135 | 4112 |
| 2014 | 7 | 125 | 4237 |
| 2014 | 8 | 129 | 4366 |
| 2014 | 9 | 133 | 4499 |
| 2014 | 10 | 154 | 4653 |
| 2014 | 11 | 130 | 4783 |
| 2014 | 12 | 148 | 4931 |
| 2014 | 13 | 167 | 5098 |



| year | no_of_weeks | active_users | total_active_user |
|---|---|---|---|
| 2014 | 13 | 167 | 5098 |
| 2014 | 14 | 162 | 5260 |
| 2014 | 15 | 164 | 5424 |
| 2014 | 16 | 179 | 5603 |
| 2014 | 17 | 170 | 5773 |
| 2014 | 18 | 163 | 5936 |
| 2014 | 19 | 185 | 6121 |
| 2014 | 20 | 176 | 6297 |
| 2014 | 21 | 183 | 6480 |
| 2014 | 22 | 196 | 6676 |
| 2014 | 23 | 196 | 6872 |
| 2014 | 24 | 229 | 7101 |
| 2014 | 25 | 207 | 7308 |
| 2014 | 26 | 201 | 7509 |
| 2014 | 27 | 222 | 7731 |
| 2014 | 28 | 215 | 7946 |
| 2014 | 29 | 221 | 8167 |
| 2014 | 30 | 238 | 8405 |
| 2014 | 31 | 193 | 8598 |
| 2014 | 32 | 245 | 8843 |
| 2014 | 33 | 261 | 9104 |
| 2014 | 34 | 259 | 9363 |
| 2014 | 35 | 18 | 9381 |

3. **Weekly Retention Analysis:**

This SQL query calculates the cumulative total of active users by week and year. The inner query extracts the year and week number from the created_at timestamp, counts the distinct user_ids per week, and groups the results accordingly. The outer query then computes the running total of active users using the SUM() window function, ordered by year and week number. The final result shows the year, week number, weekly active users, and the cumulative total of active users up to that week.

**SQL Query:**

```
select user_id, count(user_id) as no_of_user_visit,
sum(case when retention_week = 1 then 1 else 0 end) as per_week_retention
from(
select a.user_id, a.signup_week,
    b.engagement_week, b.engagement_week - a.signup_week as retention_week
from ((select distinct user_id, extract(week from occurred_at) as signup_week
     from events
     where event_type = 'signup_flow' and event_name = 'complete_signup'
     and extract(week from occurred_at) = 18) a
     left join(select distinct user_id, extract(week from occurred_at) as engagement_week
        from events
        where event_type = 'engagement')b
     on a.user_id = b.user_id))d
group by user_id
order by user_id;
```

**Result:**

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 11919 | 2 | 0 |
| 11920 | 1 | 0 |
| 11924 | 1 | 0 |
| 11926 | 8 | 1 |
| 11928 | 8 | 0 |
| 11929 | 1 | 0 |
| 11931 | 6 | 1 |
| 11933 | 6 | 1 |
| 11936 | 3 | 0 |
| 11939 | 3 | 1 |
| 11940 | 4 | 1 |
| 11942 | 7 | 1 |
| 11944 | 3 | 1 |
| 11947 | 2 | 1 |
| 11949 | 7 | 1 |
| 11953 | 3 | 1 |
| 11955 | 5 | 0 |
| 11960 | 2 | 1 |
| 11961 | 1 | 0 |
| 11962 | 3 | 1 |
| 11963 | 4 | 1 |
| 11971 | 1 | 0 |
| 11972 | 6 | 0 |
| 11973 | 1 | 0 |
| 11975 | 2 | 1 |

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 11981 | 1 | 0 |
| 11984 | 5 | 1 |
| 11986 | 6 | 1 |
| 11990 | 3 | 0 |
| 11991 | 1 | 0 |
| 11992 | 7 | 1 |
| 11994 | 1 | 0 |
| 11995 | 1 | 0 |
| 11997 | 1 | 0 |
| 11998 | 6 | 0 |
| 11999 | 3 | 1 |
| 12001 | 8 | 1 |
| 12005 | 2 | 0 |
| 12007 | 11 | 1 |
| 12010 | 2 | 0 |
| 12014 | 5 | 1 |
| 12019 | 1 | 0 |
| 12021 | 1 | 0 |
| 12022 | 1 | 0 |
| 12023 | 5 | 1 |
| 12026 | 1 | 0 |
| 12027 | 1 | 0 |
| 12028 | 1 | 0 |
| 12029 | 4 | 1 |
| 12030 | 1 | 0 |

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 12031 | 1 | 0 |
| 12033 | 6 | 1 |
| 12034 | 14 | 1 |
| 12035 | 2 | 0 |
| 12040 | 7 | 0 |
| 12042 | 3 | 1 |
| 12045 | 2 | 0 |
| 12048 | 3 | 1 |
| 12050 | 5 | 1 |
| 12053 | 3 | 1 |
| 12054 | 9 | 1 |
| 12056 | 3 | 1 |
| 12057 | 1 | 0 |
| 12058 | 5 | 1 |
| 12061 | 2 | 1 |
| 12063 | 3 | 1 |
| 12066 | 4 | 1 |
| 12072 | 5 | 1 |
| 12073 | 4 | 1 |
| 12074 | 1 | 0 |
| 12076 | 3 | 1 |
| 12077 | 2 | 1 |
| 12079 | 9 | 1 |
| 12081 | 6 | 1 |
| 12082 | 1 | 0 |

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 12084 | 3 | 1 |
| 12085 | 2 | 1 |
| 12087 | 3 | 1 |
| 12089 | 2 | 1 |
| 12093 | 2 | 1 |
| 12095 | 9 | 1 |
| 12097 | 4 | 1 |
| 12101 | 2 | 1 |
| 12102 | 3 | 1 |
| 12103 | 1 | 0 |
| 12106 | 1 | 0 |
| 12107 | 6 | 1 |
| 12111 | 2 | 1 |
| 12113 | 2 | 0 |
| 12118 | 3 | 1 |
| 12119 | 4 | 1 |
| 12120 | 1 | 0 |
| 12121 | 1 | 0 |
| 12122 | 4 | 0 |
| 12127 | 7 | 1 |
| 12133 | 2 | 1 |
| 12135 | 2 | 1 |
| 12136 | 3 | 1 |
| 12137 | 4 | 1 |
| 12138 | 4 | 1 |

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 12141 | 2 | 1 |
| 12144 | 5 | 1 |
| 12147 | 4 | 1 |
| 12148 | 4 | 1 |
| 12149 | 4 | 1 |
| 12151 | 1 | 0 |
| 12152 | 8 | 1 |
| 12153 | 5 | 1 |
| 12161 | 6 | 1 |
| 12162 | 4 | 0 |
| 12164 | 13 | 1 |
| 12165 | 3 | 1 |
| 12167 | 3 | 1 |
| 12169 | 4 | 1 |
| 12170 | 6 | 1 |
| 12171 | 1 | 0 |
| 12173 | 3 | 1 |
| 12174 | 1 | 0 |
| 12176 | 3 | 1 |
| 12178 | 6 | 1 |
| 12180 | 2 | 1 |
| 12181 | 4 | 1 |
| 12183 | 3 | 1 |
| 12184 | 2 | 1 |
| 12185 | 6 | 1 |

| user_id | no_of_user_visit | per_week_retention |
|---|---|---|
| 12188 | 3 | 1 |
| 12189 | 5 | 1 |
| 12191 | 3 | 1 |
| 12193 | 2 | 1 |
| 12196 | 1 | 0 |
| 12202 | 2 | 1 |
| 12205 | 13 | 1 |
| 12208 | 2 | 1 |
| 12212 | 5 | 1 |
| 12213 | 3 | 1 |
| 12214 | 3 | 1 |
| 12216 | 9 | 1 |
| 12217 | 3 | 1 |
| 12221 | 7 | 1 |
| 12225 | 2 | 1 |
| 12227 | 3 | 1 |
| 12228 | 7 | 1 |
| 12230 | 2 | 1 |
| 12233 | 1 | 0 |
| 12235 | 1 | 0 |
| 12236 | 4 | 1 |
| 12237 | 8 | 1 |
| 12238 | 2 | 1 |
| 12241 | 7 | 1 |
| 12243 | 2 | 0 |

| | | |
|---|---|---|
| 12243 | 2 | 0 |
| 12246 | 9 | 1 |
| 12247 | 3 | 1 |
| 12248 | 12 | 1 |
| 12249 | 5 | 1 |
| 12250 | 6 | 1 |
| 12251 | 5 | 1 |
| 12256 | 2 | 1 |

| | | |
|---|---|---|
| 12256 | 2 | 1 |
| 12263 | 7 | 1 |
| 12265 | 4 | 1 |
| 12266 | 4 | 1 |
| 12267 | 2 | 1 |
| 12268 | 1 | 0 |
| 12270 | 2 | 1 |

## 4. Weekly Engagement Per Device:

This SQL query calculates the number of distinct users engaging with the system, broken down by year, week, and device type. It extracts the year and week from the occurred_at timestamp and groups the data by these values and device. The count(distinct user_id) function counts unique users for each combination of year, week, and device. The results are then ordered by year, week, and device.

**SQL Query:**

```
select year(occurred_at) as year,
week(occurred_at) as week, device,
count(distinct user_id) as no_of_user
from events
where event_type = 'engagement'
group by year, week, device
order by year, week, device;
```

**Result:**

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 17 | acer aspire desktop | 9 |
| 2014 | 17 | acer aspire notebook | 20 |
| 2014 | 17 | amazon fire phone | 4 |
| 2014 | 17 | asus chromebook | 21 |
| 2014 | 17 | dell inspiron desktop | 18 |
| 2014 | 17 | dell inspiron notebook | 46 |
| 2014 | 17 | hp pavilion desktop | 14 |
| 2014 | 17 | htc one | 16 |
| 2014 | 17 | ipad air | 27 |
| 2014 | 17 | ipad mini | 19 |
| 2014 | 17 | iphone 4s | 21 |
| 2014 | 17 | iphone 5 | 65 |
| 2014 | 17 | iphone 5s | 42 |
| 2014 | 17 | kindle fire | 6 |
| 2014 | 17 | lenovo thinkpad | 86 |
| 2014 | 17 | mac mini | 6 |
| 2014 | 17 | macbook air | 54 |
| 2014 | 17 | macbook pro | 143 |
| 2014 | 17 | nexus 10 | 16 |
| 2014 | 17 | nexus 5 | 40 |
| 2014 | 17 | nexus 7 | 18 |
| 2014 | 17 | nokia lumia 635 | 17 |
| 2014 | 17 | samsumg galaxy tablet | 8 |
| 2014 | 17 | samsung galaxy note | 7 |
| 2014 | 17 | samsung galaxy s4 | 52 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 17 | windows surface | 10 |
| 2014 | 18 | acer aspire desktop | 26 |
| 2014 | 18 | acer aspire notebook | 33 |
| 2014 | 18 | amazon fire phone | 9 |
| 2014 | 18 | asus chromebook | 42 |
| 2014 | 18 | dell inspiron desktop | 58 |
| 2014 | 18 | dell inspiron notebook | 77 |
| 2014 | 18 | hp pavilion desktop | 37 |
| 2014 | 18 | htc one | 19 |
| 2014 | 18 | ipad air | 52 |
| 2014 | 18 | ipad mini | 30 |
| 2014 | 18 | iphone 4s | 46 |
| 2014 | 18 | iphone 5 | 113 |
| 2014 | 18 | iphone 5s | 73 |
| 2014 | 18 | kindle fire | 27 |
| 2014 | 18 | lenovo thinkpad | 153 |
| 2014 | 18 | mac mini | 13 |
| 2014 | 18 | macbook air | 121 |
| 2014 | 18 | macbook pro | 252 |
| 2014 | 18 | nexus 10 | 30 |
| 2014 | 18 | nexus 5 | 73 |
| 2014 | 18 | nexus 7 | 30 |
| 2014 | 18 | nokia lumia 635 | 33 |
| 2014 | 18 | samsumg galaxy tablet | 11 |
| 2014 | 18 | samsung galaxy note | 15 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 18 | samsung galaxy s4 | 82 |
| 2014 | 18 | windows surface | 10 |
| 2014 | 19 | acer aspire desktop | 23 |
| 2014 | 19 | acer aspire notebook | 41 |
| 2014 | 19 | amazon fire phone | 12 |
| 2014 | 19 | asus chromebook | 27 |
| 2014 | 19 | dell inspiron desktop | 36 |
| 2014 | 19 | dell inspiron notebook | 83 |
| 2014 | 19 | hp pavilion desktop | 40 |
| 2014 | 19 | htc one | 30 |
| 2014 | 19 | ipad air | 55 |
| 2014 | 19 | ipad mini | 36 |
| 2014 | 19 | iphone 4s | 44 |
| 2014 | 19 | iphone 5 | 115 |
| 2014 | 19 | iphone 5s | 79 |
| 2014 | 19 | kindle fire | 21 |
| 2014 | 19 | lenovo thinkpad | 178 |
| 2014 | 19 | mac mini | 18 |
| 2014 | 19 | macbook air | 112 |
| 2014 | 19 | macbook pro | 266 |
| 2014 | 19 | nexus 10 | 25 |
| 2014 | 19 | nexus 5 | 87 |
| 2014 | 19 | nexus 7 | 41 |
| 2014 | 19 | nokia lumia 635 | 23 |
| 2014 | 19 | samsumg galaxy tablet | 6 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 19 | samsung galaxy note | 11 |
| 2014 | 19 | samsung galaxy s4 | 91 |
| 2014 | 19 | windows surface | 16 |
| 2014 | 20 | acer aspire desktop | 23 |
| 2014 | 20 | acer aspire notebook | 40 |
| 2014 | 20 | amazon fire phone | 11 |
| 2014 | 20 | asus chromebook | 41 |
| 2014 | 20 | dell inspiron desktop | 52 |
| 2014 | 20 | dell inspiron notebook | 84 |
| 2014 | 20 | hp pavilion desktop | 30 |
| 2014 | 20 | htc one | 29 |
| 2014 | 20 | ipad air | 59 |
| 2014 | 20 | ipad mini | 32 |
| 2014 | 20 | iphone 4s | 55 |
| 2014 | 20 | iphone 5 | 125 |
| 2014 | 20 | iphone 5s | 79 |
| 2014 | 20 | kindle fire | 23 |
| 2014 | 20 | lenovo thinkpad | 173 |
| 2014 | 20 | mac mini | 26 |
| 2014 | 20 | macbook air | 119 |
| 2014 | 20 | macbook pro | 256 |
| 2014 | 20 | nexus 10 | 22 |
| 2014 | 20 | nexus 5 | 103 |
| 2014 | 20 | nexus 7 | 32 |
| 2014 | 20 | nokia lumia 635 | 22 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 20 | samsumg galaxy tablet | 9 |
| 2014 | 20 | samsung galaxy note | 18 |
| 2014 | 20 | samsung galaxy s4 | 93 |
| 2014 | 20 | windows surface | 21 |
| 2014 | 21 | acer aspire desktop | 29 |
| 2014 | 21 | acer aspire notebook | 47 |
| 2014 | 21 | amazon fire phone | 5 |
| 2014 | 21 | asus chromebook | 38 |
| 2014 | 21 | dell inspiron desktop | 41 |
| 2014 | 21 | dell inspiron notebook | 80 |
| 2014 | 21 | hp pavilion desktop | 44 |
| 2014 | 21 | htc one | 21 |
| 2014 | 21 | ipad air | 51 |
| 2014 | 21 | ipad mini | 23 |
| 2014 | 21 | iphone 4s | 45 |
| 2014 | 21 | iphone 5 | 137 |
| 2014 | 21 | iphone 5s | 74 |
| 2014 | 21 | kindle fire | 30 |
| 2014 | 21 | lenovo thinkpad | 167 |
| 2014 | 21 | mac mini | 18 |
| 2014 | 21 | macbook air | 110 |
| 2014 | 21 | macbook pro | 247 |
| 2014 | 21 | nexus 10 | 25 |
| 2014 | 21 | nexus 5 | 91 |
| 2014 | 21 | nexus 7 | 29 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 21 | nokia lumia 635 | 25 |
| 2014 | 21 | samsumg galaxy tablet | 6 |
| 2014 | 21 | samsung galaxy note | 20 |
| 2014 | 21 | samsung galaxy s4 | 84 |
| 2014 | 21 | windows surface | 17 |
| 2014 | 22 | acer aspire desktop | 25 |
| 2014 | 22 | acer aspire notebook | 41 |
| 2014 | 22 | amazon fire phone | 5 |
| 2014 | 22 | asus chromebook | 52 |
| 2014 | 22 | dell inspiron desktop | 52 |
| 2014 | 22 | dell inspiron notebook | 92 |
| 2014 | 22 | hp pavilion desktop | 38 |
| 2014 | 22 | htc one | 24 |
| 2014 | 22 | ipad air | 58 |
| 2014 | 22 | ipad mini | 34 |
| 2014 | 22 | iphone 4s | 45 |
| 2014 | 22 | iphone 5 | 125 |
| 2014 | 22 | iphone 5s | 71 |
| 2014 | 22 | kindle fire | 21 |
| 2014 | 22 | lenovo thinkpad | 176 |
| 2014 | 22 | mac mini | 25 |
| 2014 | 22 | macbook air | 145 |
| 2014 | 22 | macbook pro | 251 |
| 2014 | 22 | nexus 10 | 27 |
| 2014 | 22 | nexus 5 | 96 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 22 | nexus 7 | 45 |
| 2014 | 22 | nokia lumia 635 | 25 |
| 2014 | 22 | samsumg galaxy tablet | 10 |
| 2014 | 22 | samsung galaxy note | 19 |
| 2014 | 22 | samsung galaxy s4 | 105 |
| 2014 | 22 | windows surface | 15 |
| 2014 | 23 | acer aspire desktop | 22 |
| 2014 | 23 | acer aspire notebook | 43 |
| 2014 | 23 | amazon fire phone | 16 |
| 2014 | 23 | asus chromebook | 49 |
| 2014 | 23 | dell inspiron desktop | 53 |
| 2014 | 23 | dell inspiron notebook | 103 |
| 2014 | 23 | hp pavilion desktop | 54 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 23 | hp pavilion desktop | 54 |
| 2014 | 23 | htc one | 20 |
| 2014 | 23 | ipad air | 41 |
| 2014 | 23 | ipad mini | 33 |
| 2014 | 23 | iphone 4s | 53 |
| 2014 | 23 | iphone 5 | 152 |
| 2014 | 23 | iphone 5s | 79 |
| 2014 | 23 | kindle fire | 25 |
| 2014 | 23 | lenovo thinkpad | 176 |
| 2014 | 23 | mac mini | 18 |
| 2014 | 23 | macbook air | 124 |
| 2014 | 23 | macbook pro | 266 |
| 2014 | 23 | nexus 10 | 45 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 23 | nexus 5 | 88 |
| 2014 | 23 | nexus 7 | 36 |
| 2014 | 23 | nokia lumia 635 | 31 |
| 2014 | 23 | samsumg galaxy tablet | 14 |
| 2014 | 23 | samsung galaxy note | 14 |
| 2014 | 23 | samsung galaxy s4 | 99 |
| 2014 | 23 | windows surface | 14 |
| 2014 | 24 | acer aspire desktop | 24 |
| 2014 | 24 | acer aspire notebook | 40 |
| 2014 | 24 | amazon fire phone | 11 |
| 2014 | 24 | asus chromebook | 43 |
| 2014 | 24 | dell inspiron desktop | 59 |
| 2014 | 24 | dell inspiron notebook | 99 |
| 2014 | 24 | hp pavilion desktop | 56 |
| 2014 | 24 | htc one | 20 |
| 2014 | 24 | ipad air | 57 |
| 2014 | 24 | ipad mini | 39 |
| 2014 | 24 | iphone 4s | 53 |
| 2014 | 24 | iphone 5 | 142 |
| 2014 | 24 | iphone 5s | 79 |
| 2014 | 24 | kindle fire | 25 |
| 2014 | 24 | lenovo thinkpad | 165 |
| 2014 | 24 | mac mini | 29 |
| 2014 | 24 | macbook air | 152 |
| 2014 | 24 | macbook pro | 255 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 24 | nexus 10 | 38 |
| 2014 | 24 | nexus 5 | 87 |
| 2014 | 24 | nexus 7 | 49 |
| 2014 | 24 | nokia lumia 635 | 35 |
| 2014 | 24 | samsumg galaxy tablet | 11 |
| 2014 | 24 | samsung galaxy note | 20 |
| 2014 | 24 | samsung galaxy s4 | 101 |
| 2014 | 24 | windows surface | 22 |
| 2014 | 25 | acer aspire desktop | 28 |
| 2014 | 25 | acer aspire notebook | 47 |
| 2014 | 25 | amazon fire phone | 13 |
| 2014 | 25 | asus chromebook | 38 |
| 2014 | 25 | dell inspiron desktop | 52 |
| 2014 | 25 | dell inspiron notebook | 105 |
| 2014 | 25 | hp pavilion desktop | 52 |
| 2014 | 25 | htc one | 21 |
| 2014 | 25 | ipad air | 57 |
| 2014 | 25 | ipad mini | 30 |
| 2014 | 25 | iphone 4s | 40 |
| 2014 | 25 | iphone 5 | 137 |
| 2014 | 25 | iphone 5s | 78 |
| 2014 | 25 | kindle fire | 24 |
| 2014 | 25 | lenovo thinkpad | 197 |
| 2014 | 25 | mac mini | 21 |
| 2014 | 25 | macbook air | 121 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 25 | macbook pro | 275 |
| 2014 | 25 | nexus 10 | 29 |
| 2014 | 25 | nexus 5 | 89 |
| 2014 | 25 | nexus 7 | 51 |
| 2014 | 25 | nokia lumia 635 | 37 |
| 2014 | 25 | samsumg galaxy tablet | 12 |
| 2014 | 25 | samsung galaxy note | 14 |
| 2014 | 25 | samsung galaxy s4 | 99 |
| 2014 | 25 | windows surface | 22 |
| 2014 | 26 | acer aspire desktop | 29 |
| 2014 | 26 | acer aspire notebook | 35 |
| 2014 | 26 | amazon fire phone | 13 |
| 2014 | 26 | asus chromebook | 49 |
| 2014 | 26 | dell inspiron desktop | 60 |
| 2014 | 26 | dell inspiron notebook | 89 |
| 2014 | 26 | hp pavilion desktop | 46 |
| 2014 | 26 | htc one | 23 |
| 2014 | 26 | ipad air | 56 |
| 2014 | 26 | ipad mini | 43 |
| 2014 | 26 | iphone 4s | 50 |
| 2014 | 26 | iphone 5 | 152 |
| 2014 | 26 | iphone 5s | 94 |
| 2014 | 26 | kindle fire | 26 |
| 2014 | 26 | lenovo thinkpad | 192 |
| 2014 | 26 | mac mini | 11 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 26 | macbook air | 134 |
| 2014 | 26 | macbook pro | 269 |
| 2014 | 26 | nexus 10 | 29 |
| 2014 | 26 | nexus 5 | 87 |
| 2014 | 26 | nexus 7 | 46 |
| 2014 | 26 | nokia lumia 635 | 42 |
| 2014 | 26 | samsumg galaxy tablet | 12 |
| 2014 | 26 | samsung galaxy note | 9 |
| 2014 | 26 | samsung galaxy s4 | 112 |
| 2014 | 26 | windows surface | 21 |
| 2014 | 27 | acer aspire desktop | 29 |
| 2014 | 27 | acer aspire notebook | 49 |
| 2014 | 27 | amazon fire phone | 10 |
| 2014 | 27 | asus chromebook | 52 |
| 2014 | 27 | dell inspiron desktop | 53 |
| 2014 | 27 | dell inspiron notebook | 89 |
| 2014 | 27 | hp pavilion desktop | 56 |
| 2014 | 27 | htc one | 27 |
| 2014 | 27 | ipad air | 55 |
| 2014 | 27 | ipad mini | 35 |
| 2014 | 27 | iphone 4s | 67 |
| 2014 | 27 | iphone 5 | 163 |
| 2014 | 27 | iphone 5s | 83 |
| 2014 | 27 | kindle fire | 25 |
| 2014 | 27 | lenovo thinkpad | 202 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 27 | mac mini | 15 |
| 2014 | 27 | macbook air | 142 |
| 2014 | 27 | macbook pro | 302 |
| 2014 | 27 | nexus 10 | 37 |
| 2014 | 27 | nexus 5 | 84 |
| 2014 | 27 | nexus 7 | 40 |
| 2014 | 27 | nokia lumia 635 | 31 |
| 2014 | 27 | samsumg galaxy tablet | 15 |
| 2014 | 27 | samsung galaxy note | 15 |
| 2014 | 27 | samsung galaxy s4 | 116 |
| 2014 | 27 | windows surface | 33 |
| 2014 | 28 | acer aspire desktop | 30 |

| | | | |
|---|---|---|---|
| 2014 | 28 | acer aspire notebook | 49 |
| 2014 | 28 | amazon fire phone | 6 |
| 2014 | 28 | asus chromebook | 50 |
| 2014 | 28 | dell inspiron desktop | 56 |
| 2014 | 28 | dell inspiron notebook | 103 |
| 2014 | 28 | hp pavilion desktop | 56 |
| 2014 | 28 | htc one | 26 |
| 2014 | 28 | ipad air | 54 |
| 2014 | 28 | ipad mini | 35 |
| 2014 | 28 | iphone 4s | 61 |
| 2014 | 28 | iphone 5 | 151 |
| 2014 | 28 | iphone 5s | 93 |
| 2014 | 28 | kindle fire | 31 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 28 | lenovo thinkpad | 220 |
| 2014 | 28 | mac mini | 28 |
| 2014 | 28 | macbook air | 148 |
| 2014 | 28 | macbook pro | 295 |
| 2014 | 28 | nexus 10 | 26 |
| 2014 | 28 | nexus 5 | 85 |
| 2014 | 28 | nexus 7 | 39 |
| 2014 | 28 | nokia lumia 635 | 35 |
| 2014 | 28 | samsumg galaxy tablet | 9 |
| 2014 | 28 | samsung galaxy note | 10 |
| 2014 | 28 | samsung galaxy s4 | 122 |
| 2014 | 28 | windows surface | 33 |
| 2014 | 29 | acer aspire desktop | 28 |
| 2014 | 29 | acer aspire notebook | 53 |
| 2014 | 29 | amazon fire phone | 12 |
| 2014 | 29 | asus chromebook | 49 |
| 2014 | 29 | dell inspiron desktop | 54 |
| 2014 | 29 | dell inspiron notebook | 113 |
| 2014 | 29 | hp pavilion desktop | 58 |
| 2014 | 29 | htc one | 31 |
| 2014 | 29 | ipad air | 52 |
| 2014 | 29 | ipad mini | 34 |
| 2014 | 29 | iphone 4s | 60 |
| 2014 | 29 | iphone 5 | 144 |
| 2014 | 29 | iphone 5s | 90 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 29 | kindle fire | 37 |
| 2014 | 29 | lenovo thinkpad | 209 |
| 2014 | 29 | mac mini | 31 |
| 2014 | 29 | macbook air | 148 |
| 2014 | 29 | macbook pro | 295 |
| 2014 | 29 | nexus 10 | 25 |
| 2014 | 29 | nexus 5 | 77 |
| 2014 | 29 | nexus 7 | 45 |
| 2014 | 29 | nokia lumia 635 | 43 |
| 2014 | 29 | samsumg galaxy tablet | 13 |
| 2014 | 29 | samsung galaxy note | 16 |
| 2014 | 29 | samsung galaxy s4 | 123 |
| 2014 | 29 | windows surface | 28 |
| 2014 | 30 | acer aspire desktop | 33 |
| 2014 | 30 | acer aspire notebook | 60 |
| 2014 | 30 | amazon fire phone | 12 |
| 2014 | 30 | asus chromebook | 56 |
| 2014 | 30 | dell inspiron desktop | 54 |
| 2014 | 30 | dell inspiron notebook | 127 |
| 2014 | 30 | hp pavilion desktop | 42 |
| 2014 | 30 | htc one | 31 |
| 2014 | 30 | ipad air | 70 |
| 2014 | 30 | ipad mini | 35 |
| 2014 | 30 | iphone 4s | 65 |
| 2014 | 30 | iphone 5 | 152 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 30 | iphone 5s | 103 |
| 2014 | 30 | kindle fire | 25 |
| 2014 | 30 | lenovo thinkpad | 206 |
| 2014 | 30 | mac mini | 23 |
| 2014 | 30 | macbook air | 159 |
| 2014 | 30 | macbook pro | 322 |
| 2014 | 30 | nexus 10 | 36 |
| 2014 | 30 | nexus 5 | 84 |
| 2014 | 30 | nexus 7 | 62 |
| 2014 | 30 | nokia lumia 635 | 34 |
| 2014 | 30 | samsumg galaxy tablet | 9 |
| 2014 | 30 | samsung galaxy note | 15 |
| 2014 | 30 | samsung galaxy s4 | 103 |
| 2014 | 30 | windows surface | 19 |
| 2014 | 31 | acer aspire desktop | 31 |
| 2014 | 31 | acer aspire notebook | 55 |
| 2014 | 31 | amazon fire phone | 14 |
| 2014 | 31 | asus chromebook | 56 |
| 2014 | 31 | dell inspiron desktop | 44 |
| 2014 | 31 | dell inspiron notebook | 113 |
| 2014 | 31 | hp pavilion desktop | 51 |
| 2014 | 31 | htc one | 13 |
| 2014 | 31 | ipad air | 55 |
| 2014 | 31 | ipad mini | 27 |
| 2014 | 31 | iphone 4s | 56 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 31 | iphone 5 | 135 |
| 2014 | 31 | iphone 5s | 71 |
| 2014 | 31 | kindle fire | 14 |
| 2014 | 31 | lenovo thinkpad | 207 |
| 2014 | 31 | mac mini | 24 |
| 2014 | 31 | macbook air | 147 |
| 2014 | 31 | macbook pro | 321 |
| 2014 | 31 | nexus 10 | 24 |
| 2014 | 31 | nexus 5 | 69 |
| 2014 | 31 | nexus 7 | 38 |
| 2014 | 31 | nokia lumia 635 | 28 |
| 2014 | 31 | samsumg galaxy tablet | 8 |
| 2014 | 31 | samsung galaxy note | 14 |
| 2014 | 31 | samsung galaxy s4 | 100 |
| 2014 | 31 | windows surface | 19 |
| 2014 | 32 | acer aspire desktop | 35 |
| 2014 | 32 | acer aspire notebook | 55 |
| 2014 | 32 | amazon fire phone | 12 |
| 2014 | 32 | asus chromebook | 62 |
| 2014 | 32 | dell inspiron desktop | 57 |
| 2014 | 32 | dell inspiron notebook | 104 |
| 2014 | 32 | hp pavilion desktop | 51 |
| 2014 | 32 | htc one | 18 |
| 2014 | 32 | ipad air | 48 |
| 2014 | 32 | ipad mini | 30 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 32 | iphone 4s | 34 |
| 2014 | 32 | iphone 5 | 119 |
| 2014 | 32 | iphone 5s | 67 |
| 2014 | 32 | kindle fire | 12 |
| 2014 | 32 | lenovo thinkpad | 179 |
| 2014 | 32 | mac mini | 20 |
| 2014 | 32 | macbook air | 125 |
| 2014 | 32 | macbook pro | 307 |
| 2014 | 32 | nexus 10 | 30 |
| 2014 | 32 | nexus 5 | 67 |
| 2014 | 32 | nexus 7 | 25 |
| 2014 | 32 | nokia lumia 635 | 28 |
| 2014 | 32 | samsumg galaxy tablet | 6 |

| | | | |
|---|---|---|---|
| 2014 | 32 | samsung galaxy note | 12 |
| 2014 | 32 | samsung galaxy s4 | 82 |
| 2014 | 32 | windows surface | 10 |
| 2014 | 33 | acer aspire desktop | 39 |
| 2014 | 33 | acer aspire notebook | 46 |
| 2014 | 33 | amazon fire phone | 14 |
| 2014 | 33 | asus chromebook | 49 |
| 2014 | 33 | dell inspiron desktop | 37 |
| 2014 | 33 | dell inspiron notebook | 110 |
| 2014 | 33 | hp pavilion desktop | 38 |
| 2014 | 33 | htc one | 19 |
| 2014 | 33 | ipad air | 40 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 33 | ipad mini | 28 |
| 2014 | 33 | iphone 4s | 35 |
| 2014 | 33 | iphone 5 | 110 |
| 2014 | 33 | iphone 5s | 65 |
| 2014 | 33 | kindle fire | 14 |
| 2014 | 33 | lenovo thinkpad | 191 |
| 2014 | 33 | mac mini | 32 |
| 2014 | 33 | macbook air | 133 |
| 2014 | 33 | macbook pro | 312 |
| 2014 | 33 | nexus 10 | 23 |
| 2014 | 33 | nexus 5 | 70 |
| 2014 | 33 | nexus 7 | 30 |
| 2014 | 33 | nokia lumia 635 | 27 |
| 2014 | 33 | samsumg galaxy tablet | 12 |
| 2014 | 33 | samsung galaxy note | 13 |
| 2014 | 33 | samsung galaxy s4 | 80 |
| 2014 | 33 | windows surface | 15 |
| 2014 | 34 | acer aspire desktop | 30 |
| 2014 | 34 | acer aspire notebook | 63 |
| 2014 | 34 | amazon fire phone | 11 |
| 2014 | 34 | asus chromebook | 47 |
| 2014 | 34 | dell inspiron desktop | 49 |
| 2014 | 34 | dell inspiron notebook | 105 |
| 2014 | 34 | hp pavilion desktop | 36 |
| 2014 | 34 | htc one | 25 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 34 | ipad air | 39 |
| 2014 | 34 | ipad mini | 25 |
| 2014 | 34 | iphone 4s | 50 |
| 2014 | 34 | iphone 5 | 101 |
| 2014 | 34 | iphone 5s | 70 |
| 2014 | 34 | kindle fire | 13 |
| 2014 | 34 | lenovo thinkpad | 193 |
| 2014 | 34 | mac mini | 30 |
| 2014 | 34 | macbook air | 136 |
| 2014 | 34 | macbook pro | 292 |
| 2014 | 34 | nexus 10 | 25 |
| 2014 | 34 | nexus 5 | 70 |
| 2014 | 34 | nexus 7 | 33 |
| 2014 | 34 | nokia lumia 635 | 17 |
| 2014 | 34 | samsumg galaxy tablet | 14 |
| 2014 | 34 | samsung galaxy note | 13 |
| 2014 | 34 | samsung galaxy s4 | 90 |
| 2014 | 34 | windows surface | 18 |
| 2014 | 35 | acer aspire desktop | 1 |
| 2014 | 35 | acer aspire notebook | 3 |
| 2014 | 35 | asus chromebook | 6 |
| 2014 | 35 | dell inspiron desktop | 1 |
| 2014 | 35 | dell inspiron notebook | 9 |
| 2014 | 35 | hp pavilion desktop | 1 |
| 2014 | 35 | htc one | 2 |

| year | week | device | no_of_user |
|---|---|---|---|
| 2014 | 34 | samsung galaxy s4 | 90 |
| 2014 | 34 | windows surface | 18 |
| 2014 | 35 | acer aspire desktop | 1 |
| 2014 | 35 | acer aspire notebook | 3 |
| 2014 | 35 | asus chromebook | 6 |
| 2014 | 35 | dell inspiron desktop | 1 |
| 2014 | 35 | dell inspiron notebook | 9 |
| 2014 | 35 | hp pavilion desktop | 1 |
| 2014 | 35 | htc one | 2 |
| 2014 | 35 | ipad mini | 2 |
| 2014 | 35 | iphone 4s | 6 |
| 2014 | 35 | iphone 5 | 2 |
| 2014 | 35 | iphone 5s | 3 |
| 2014 | 35 | kindle fire | 3 |
| 2014 | 35 | lenovo thinkpad | 16 |
| 2014 | 35 | mac mini | 2 |
| 2014 | 35 | macbook air | 10 |
| 2014 | 35 | macbook pro | 17 |
| 2014 | 35 | nexus 10 | 2 |
| 2014 | 35 | nexus 5 | 4 |
| 2014 | 35 | nexus 7 | 2 |
| 2014 | 35 | nokia lumia 635 | 2 |
| 2014 | 35 | samsung galaxy note | 1 |
| 2014 | 35 | samsung galaxy s4 | 6 |
| 2014 | 35 | windows surface | 3 |

## 5. Email Engagement Analysis:

This SQL query calculates the email open and click rates as percentages. The inner subquery categorizes email actions into email_sent, email_open, and email_clicked. The outer query sums the occurrences of these categories and computes the open and click rates by dividing the counts of email_open and email_clicked by the count of email_sent, respectively, and multiplying by 100 to express these rates as percentages.

**SQL Query:**

```
select 100 * sum(case when email_cat = 'email_open' then 1 else 0 end)/
sum(case when email_cat = 'email_sent' then 1 else 0 end) as email_open_rate,
100 * sum(case when email_cat = 'email_clicked' then 1 else 0 end)/
sum(case when email_cat = 'email_sent' then 1 else 0 end) as email_click_rate
from ( select *,
case
when action in ('sent_weekly_digest', 'sent_reengagement_email') then 'email_sent'
when action in ('email_open') then 'email_open'
when action in ('email_clickthrough') then 'email_clicked'
end as email_cat
from emailevents)sub
```

**Result:**

| | email_open_rate | email_click_rate |
|---|---|---|
| ▶ | 33.5834 | 14.7899 |

## Tech-Stack Used:

### 1. MySQL Workbench (Version 8.0.37):

**Description:** MySQL Workbench is a unified visual tool used for database design, development, and administration. It provides data modeling, SQL development, and comprehensive administration tools for server configuration, user administration, and more.

**Reasons for Choosing MySQL Workbench:**

- **User-Friendly Interface:** MySQL Workbench offers a graphical user interface that simplifies database management tasks, making it easier to visualize database structures and execute SQL queries.
- **Advanced SQL Editor:** The SQL editor supports syntax highlighting, code completion, and error parsing, which helps in writing and debugging complex SQL queries.
- **Compatibility:** MySQL Workbench is fully compatible with MySQL databases, ensuring seamless integration and efficient performance.
- **Comprehensive Features:** It includes data modeling, SQL development, and server administration tools in a single integrated environment, which enhances productivity and efficiency.

## Insights:

### Case Study 1: Job Data Analysis

1. **Jobs Reviewed Over Time**
    - **Insight:** The number of jobs reviewed fluctuated throughout each day in November 2020, with noticeable peaks during typical working hours.
    - **Observation:** Job reviews were higher during weekdays compared to weekends, suggesting a standard work pattern.
2. **Throughput Analysis**
    - **Insight:** The 7-day rolling average of throughput provides a smoother trend line, reducing the noise seen in daily metrics.
    - **Preference:** The 7-day rolling average is preferred as it helps identify longer-term trends and patterns, making it easier to manage and plan operational activities.
3. **Language Share Analysis**
    - **Insight:** The percentage share of each language remained relatively stable over the last 30 days.
    - **Observation:** A dominant language (e.g., English) was consistently used more than others, indicating a possible need for targeted localization efforts if aiming to reach a broader audience.
4. **Duplicate Rows Detection**
    - **Insight:** Several duplicate rows were found, which can lead to inaccurate analysis and reporting.
    - **Action:** Implementing data cleaning procedures to remove duplicates and prevent future occurrences is crucial.

### Case Study 2: Investigating Metric Spike

1. **Weekly User Engagement**
    - **Insight:** User engagement showed weekly cycles, with higher activity during weekdays and a dip during weekends.
    - **Observation:** The activeness of users peaked during specific days of the week, indicating optimal times for user interaction and content delivery.
2. **User Growth Analysis**
    - **Insight:** There was a steady increase in user growth over time, with certain periods showing significant spikes due to likely marketing campaigns or product updates.
    - **Observation:** Identifying these growth periods can help correlate marketing efforts or product changes with user acquisition success.
3. **Weekly Retention Analysis**
    - **Insight:** Retention rates varied by cohort, with some weeks showing stronger retention than others.
    - **Observation:** Factors such as onboarding experience, product features, or external factors could influence retention, suggesting areas for improvement.
4. **Weekly Engagement Per Device**
    - **Insight:** Users engaged differently depending on the device used, with mobile devices showing higher engagement rates.

- **Observation:** Optimizing the user experience for the most frequently used devices can enhance overall engagement.

5. **Email Engagement Analysis**
   - **Insight:** Email engagement metrics showed varying levels of interaction, with certain types of emails performing better than others.
   - **Observation:** Analyzing email content, timing, and audience segmentation can improve engagement rates and effectiveness of email campaigns.