##### **PROJECT:** **Operation Analytics and Investigating Metric Spike**

**PROJECT DESCRIPTION:**

Operation analytics and investigation metrics are tools and methodologies used to analyze and measure the effectiveness and efficiency of operational activities and investigations within an organization. These metrics provide insights into the performance, productivity, and success of various operations and investigations, enabling organizations to identify areas for improvement and make data-driven decisions.

In this project we are dealing with operation analytics and investigation metrics like Time Cycle measurement, Throughput, Language density, and duplicate values sorting.

# APPROACH:

# To work in an organizational based Project, certain areas are need to be studied thoroughly to understand the demand of the Project. Using Mysql Workbench Database is created under name Project\_3. Case Study-1 table is created on Mysql using Workbench and all the queries are operated on Mysql 8.0 Command Line Prompt for ease of query power. For Case Study-2, tables given through the attachments in csv format are copied to VMware Ubuntu framework on Hadoop ecosystem and bulk loaded in to hive table and again migrated using Sqoop command from Local to Mysql database. (A Detailed Methodology is mentioned on page no.2)

# TECH-STACK USED:

Used Mysql Workbench v8.0.31 for creating a new Database.

Used command prompt console for computation of data and deriving meaningful results.

Used VMware Ubuntu Framework: Hadoop 2.x ecosystem, hive 2.3 database for bulk loading.

Apache sqoop for data migration.

# INSIGHTS:

In this project, these metrics is specified to the nature of the operations and investigations are being conducted in contrast to the goals of the organization. It essentially defines relevant metrics aligned with the organization's objectives and regularly monitor and analyze them to drive continuous improvement and informed decision-making.

# RESULTS:

While working on this project, I came to know that the organizational exchange is occurred mostly concentrated in contrast of French speaking human resources management in film industry. Organizational based and Job activities centered decisions are provided and could be implemented using the data obtained flexible to their terms. In investigation metric spike the Project is subject to a mail portal which need to understand the user behavioral activities and understanding the engagement or usage from users using various segments of devices. These results may help the mail portal to improve the performance of the platform for user’s dynamic experience and ease of operation.

Mentioned below are the Questions along with there Queries performed & Outputs received;

# Table-2 events.csv LOADING METHODOLOGY (BULK LOADING):

**STEP 1:**

Copying csv file from windows to Ubuntu framework.

**STEP 2: Entering into Hive console**

**hive>** create database Project\_3;

**hive>** use Project\_3;

**hive>** create table device\_usage(user\_id int, occurred\_at timestamp, event\_type string, event\_name string, location string, device string, user\_type int)

Row format delimited

Fields terminated by ‘,’

lines terminated by ‘\n’

stored as textfile;

**hive>**

**hive>** load data local inpath ‘/home/user/Table-2 events.csv’ into table device\_usage;

**STEP 3: Entering to Mysql console**

**mysql>** create database Project\_3;

**mysql>** use Project\_3;

**mysql>** create table device\_usage(user\_id int Primary Key,

occurred\_at timestamp,

event\_type varchar(255),

event\_name varchar(255),

location varchar(255),

device varchar(255),

user\_type int);

**STEP 4: Entering to hdfs console**

**user:-$** hdfs dfs -copyToLocal /user/hive/warehouse/device\_usage/

**STEP 5:Migrating of data using Sqoop command**

**user:-$** sqoop export --connect jdbc:mysql://localhost:3306 /Project\_3 –username user –password user --table device\_usage -m 4 --export-dir /home/user/device\_usage

# CASE STUDY 1: JOB DATA: -

**A**. Number of jobs reviewed: Amount of jobs reviewed over time.

**OBJECTIVE:** Calculate the number of jobs reviewed per hour per day for November 2020?

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# ANS:-

# Mysql>

select

Dates\_of\_Nov,

no\_of\_Reviewed as Jobs\_Reviewed

from (

select

ds as Dates\_of\_Nov,

round((count(job\_id)\*3600)/sum(time\_spent)) as no\_of\_Reviewed

from job\_data

where month(ds) = 11

group by ds

order by ds asc

)s;

# OUTPUT:-

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

| Dates\_of\_Nov | Jobs\_Reviewed |

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

| 2020-11-25 | 80 |

| 2020-11-26 | 64 |

| 2020-11-27 | 35 |

| 2020-11-28 | 218 |

| 2020-11-29 | 180 |

| 2020-11-30 | 180 |

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**NOTE:-**

In this query the number of Jobs reviewed per hour per day are ordered by dates mentioned in the column ds in ascending order accordingly.

Further on to obtain the data based on maximum numbers of Jobs Reviewed we can use order by clause on Jobs\_Reviewed similar to that of Dates\_of\_Nov.

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**B.** Throughput: It is the no. of events happening per second.

**OBJECTIVE:** Let’s say the above metric is called throughput. Calculate 7 day rolling average of throughput? For throughput, do you prefer daily metric or 7-day rolling and why?

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# ANS:-

# SELECT

# ds AS DATE,

# ROUND(COUNT(event)/SUM(time\_spent),3) AS Weekly\_Avg\_Throughput

# FROM job\_data

# GROUP BY ds

# ORDER BY ds;

# OUTPUT:-

# +----------------+------------------------------------+

# | DATE | Weekly\_Avg\_Throughput |

# +-----------------+-----------------------------------+

# | 2020-11-25 | 0.022 |

# | 2020-11-26 | 0.018 |

# | 2020-11-27 | 0.010 |

# | 2020-11-28 | 0.061 |

# | 2020-11-29 | 0.050 |

# | 2020-11-30 | 0.050 |

# +----------------+------------------------------------+

**NOTE:-**

7-day Rolling Average is Useful for identifying long-term trends and patterns while providing a more stable metric. It can be particularly helpful when there are significant variations in throughput on different days of the week. Whereas daily metric is useful for analyzing specific daily anomalies. In a wider range of contrast Daily metric anomalies or changes are not reflected through a fair pattern.

**C.** Percentage share of each language: Share of each language for different contents.

**OBJECTIVE:** Calculate the percentage share of each language in the last 30 days?

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# ANS:-

# select

# language,

# round((1000\* num\_jobs/total\_jobs)/0.6,2) as Percentage\_Contribution

# from

# (

# select

# language,

# count(job\_id) as num\_jobs

# from job\_data

# group by language

# )s1

# cross join

# (

# select

# sum(job\_id) as total\_jobs

# from job\_data

# )s2;

# OUTPUT:-

# +-------------+-----------------------------------+

# | language | Percentage\_Contribution |

# +-------------+-----------------------------------+

# | English | 9.92 |

# | Arabic | 9.92 |

# | Persian | 29.76 |

# | Hindi | 9.92 |

# | French | 9.92 |

# | Italian | 9.92 |

# +-------------+-----------------------------------+

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**D.** Duplicate rows: Rows that have the same value present in them.

**OBJECTIVE:**  Let’s say you see some duplicate rows in the data. How will you display duplicates from the table?

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ANS:-

select \* from

(

select \*,

row\_number() over(partition by job\_id) as Duplicate\_Records

from job\_data

)a

where Duplicate\_Records > 1;

# OUTPUT:-

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

| job\_id | actor\_id | event | language | time\_spent | org | ds | Duplicate\_Records |

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

| 23 | 1005 | transfer | Persian | 22 | D | 2020-11-28 | 2 |

| 23 | 1004 | skip | Persian | 56 | A | 2020-11-26 | 3 |

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

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# CASE STUDY 2: INVESTIGATING METRIC SPIKE: -

1. User Engagement: To measure the activeness of a user. Measuring if the user finds quality in a product/service.

**OBJECTIVE:**  Calculate the weekly user engagement?

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ANS:-

select

extract(week from occurred\_at) as Week\_No,

count(distinct user\_id) as User\_Engagement

from email

group by Week\_No;

OUTPUT:-

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

| Week\_No | User\_Engagement |

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

| 17 | 981 |

| 18 | 2714 |

| 19 | 2787 |

| 20 | 2874 |

| 21 | 2926 |

| 22 | 3029 |

| 23 | 3134 |

| 24 | 3254 |

| 25 | 3343 |

| 26 | 3439 |

| 27 | 3543 |

| 28 | 3641 |

| 29 | 3734 |

| 30 | 3866 |

| 31 | 3950 |

| 32 | 4023 |

| 33 | 4200 |

| 34 | 4294 |

| 35 | 48 |

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1. User Growth: Amount of users growing over time for a product.

**OBJECTIVE:** Calculate the user growth for product?

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ANS:-

select

MONTH,

ACTIVE\_USERS,

round(((ACTIVE\_USERS/lag(ACTIVE\_USERS, 1) over (ORDER BY MONTH) - 1)\*100), 2) as "GROWTH\_RATIO\_IN\_%"

from

(

select extract(month from created\_at) as MONTH,

count(activated\_at) as ACTIVE\_USERS

from users

where activated\_at is not null

group by 1

order by 1

)s;

OUTPUT:-

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

| MONTH | ACTIVE\_USERS | GROWTH\_RATIO\_IN\_% |

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

| 1 | 712 | NULL |

| 2 | 685 | -3.79 |

| 3 | 765 | 11.68 |

| 4 | 907 | 18.56 |

| 5 | 993 | 9.48 |

| 6 | 1086 | 9.37 |

| 7 | 1281 | 17.96 |

| 8 | 1347 | 5.15 |

| 9 | 330 | -75.50 |

| 10 | 390 | 18.18 |

| 11 | 399 | 2.31 |

| 12 | 486 | 21.80 |

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1. Weekly Retention: Users getting retained weekly after signing-up for a product.

**OBJECTIVE:** Calculate the weekly retention of users-sign up cohort?

------------------------------------------------------------------------------------------------------------------------------------------ANS:-

select

SIGN\_UP\_DURATION,

RETENTED\_COHORT,

round(((RETENTED\_COHORT / first\_value(RETENTED\_COHORT) over (order by SIGN\_UP\_DURATION))\*100),2) as RETENTION\_PERCENT

from(

select

timestampdiff(week,a.activated\_at,b.occurred\_at) as SIGN\_UP\_DURATION,

count(distinct a.user\_id) as RETENTED\_COHORT

from

(select

user\_id,

activated\_at

from users

where state='active' and activated\_at is not null

group by 1) a

inner join

(select

user\_id,

occurred\_at

from email )b

on a.user\_id=b.user\_id

group by 1) c;

OUTPUT:-

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

| SIGN\_UP\_DURATION | RETENTED\_COHORT | RETENTION\_PERCENT |

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

| 0 | 3679 | 100.00 |

| 1 | 1568 | 42.62 |

| 2 | 1518 | 41.26 |

| 3 | 1501 | 40.80 |

| 4 | 1483 | 40.31 |

| 5 | 1444 | 39.25 |

| 6 | 1409 | 38.30 |

| 7 | 1386 | 37.67 |

| 8 | 1344 | 36.53 |

| 9 | 1311 | 35.63 |

| 10 | 1264 | 34.36 |

| 11 | 1232 | 33.49 |

| 12 | 1199 | 32.59 |

| 13 | 1176 | 31.97 |

| 14 | 1141 | 31.01 |

| 15 | 1124 | 30.55 |

| 16 | 1117 | 30.36 |

| 17 | 1100 | 29.90 |

| 18 | 1074 | 29.19 |

| 19 | 1055 | 28.68 |

| 20 | 1022 | 27.78 |

| 21 | 987 | 26.83 |

| 22 | 964 | 26.20 |

| 23 | 945 | 25.69 |

| 24 | 907 | 24.65 |

| 25 | 886 | 24.08 |

| 26 | 881 | 23.95 |

| 27 | 855 | 23.24 |

| 28 | 820 | 22.29 |

| 29 | 795 | 21.61 |

| 30 | 760 | 20.66 |

| 31 | 760 | 20.66 |

| 32 | 739 | 20.09 |

| 33 | 722 | 19.62 |

| 34 | 699 | 19.00 |

| 35 | 680 | 18.48 |

| 36 | 672 | 18.27 |

| 37 | 657 | 17.86 |

| 38 | 637 | 17.31 |

| 39 | 633 | 17.21 |

| 40 | 620 | 16.85 |

| 41 | 599 | 16.28 |

| 42 | 587 | 15.96 |

| 43 | 568 | 15.44 |

| 44 | 543 | 14.76 |

| 45 | 529 | 14.38 |

| 46 | 520 | 14.13 |

| 47 | 501 | 13.62 |

| 48 | 479 | 13.02 |

| 49 | 456 | 12.39 |

| 50 | 446 | 12.12 |

| 51 | 444 | 12.07 |

| 52 | 449 | 12.20 |

| 53 | 441 | 11.99 |

| 54 | 415 | 11.28 |

| 55 | 401 | 10.90 |

| 56 | 390 | 10.60 |

| 57 | 380 | 10.33 |

| 58 | 366 | 9.95 |

| 59 | 353 | 9.59 |

| 60 | 351 | 9.54 |

| 61 | 347 | 9.43 |

| 62 | 344 | 9.35 |

| 63 | 339 | 9.21 |

| 64 | 329 | 8.94 |

| 65 | 336 | 9.13 |

| 66 | 346 | 9.40 |

| 67 | 338 | 9.19 |

| 68 | 325 | 8.83 |

| 69 | 301 | 8.18 |

| 70 | 277 | 7.53 |

| 71 | 258 | 7.01 |

| 72 | 244 | 6.63 |

| 73 | 226 | 6.14 |

| 74 | 211 | 5.74 |

| 75 | 192 | 5.22 |

| 76 | 179 | 4.87 |

| 77 | 156 | 4.24 |

| 78 | 143 | 3.89 |

| 79 | 125 | 3.40 |

| 80 | 107 | 2.91 |

| 81 | 85 | 2.31 |

| 82 | 69 | 1.88 |

| 83 | 45 | 1.22 |

| 84 | 27 | 0.73 |

| 85 | 11 | 0.30 |

| 86 | 3 | 0.08 |

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1. Weekly Engagement: To measure the activeness of a user. Measuring if the user finds quality in a product/service weekly.

**OBJECTIVE:** Calculate the weekly engagement per device?

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ANS:-

select

distinct device\_name as DEVICE,

round(avg(no\_of\_users)) as WEEKLY\_USERS,

round(avg(usage\_duration),1) as WEEKLY\_USER\_ENGAGEMENT,

event\_name as ACTIVITIES

from

(

select week(occurred\_at) as week,

device as device\_name ,

count(distinct user\_id) as no\_of\_users,

count(device) as usage\_duration,

event\_name

from device\_usage

group by 1,2,5

order by 1) a

group by 1,4

order by 2 desc,3 desc;

OUTPUT:-

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

| DEVICE | WEEKLY\_USERS | WEEKLY\_USER\_ENGAGEMENT | ACTIVITIES |

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

| macbook pro | 20 | 20.3 | complete\_signup |

| lenovo thinkpad | 14 | 13.7 | complete\_signup |

| lenovo thinkpad | 13 | 13.5 | login |

| macbook pro | 13 | 13.0 | login |

| macbook pro | 12 | 31.0 | home\_page |

| lenovo thinkpad | 12 | 30.3 | home\_page |

| macbook pro | 11 | 20.3 | like\_message |

| lenovo thinkpad | 10 | 16.3 | like\_message |

| macbook pro | 9 | 14.7 | view\_inbox |

| lenovo thinkpad | 8 | 13.8 | view\_inbox |

| lenovo thinkpad | 8 | 12.5 | send\_message |

| macbook pro | 8 | 11.5 | send\_message |

| macbook air | 8 | 8.8 | login |

| iphone 5 | 8 | 8.0 | complete\_signup |

| macbook air | 7 | 20.0 | home\_page |

| macbook pro | 7 | 15.3 | search\_autocomplete |

| macbook air | 7 | 13.8 | view\_inbox |

| macbook air | 7 | 7.3 | complete\_signup |

| iphone 5s | 7 | 7.0 | login |

| nexus 5 | 7 | 7.0 | complete\_signup |

| samsung galaxy s4 | 7 | 7.0 | complete\_signup |

| nexus 5 | 7 | 6.5 | login |

| ipad air | 6 | 14.3 | home\_page |

| iphone 5s | 6 | 13.3 | home\_page |

| nexus 5 | 6 | 13.0 | home\_page |

| macbook air | 6 | 12.8 | like\_message |

| ipad air | 6 | 12.0 | like\_message |

| macbook air | 6 | 10.7 | send\_message |

| iphone 5 | 6 | 6.6 | login |

| ipad air | 6 | 6.0 | login |

| iphone 5s | 6 | 6.0 | complete\_signup |

| samsung galaxy s4 | 6 | 6.0 | login |

| dell inspiron notebook | 6 | 5.7 | complete\_signup |

| ipad air | 6 | 5.7 | complete\_signup |

| iphone 5 | 5 | 14.0 | home\_page |

| samsung galaxy s4 | 5 | 13.8 | home\_page |

| iphone 5s | 5 | 9.3 | like\_message |

| samsung galaxy s4 | 5 | 9.0 | like\_message |

| nexus 5 | 5 | 7.5 | like\_message |

| dell inspiron notebook | 5 | 4.6 | login |

| lenovo thinkpad | 4 | 10.0 | search\_autocomplete |

| iphone 5 | 4 | 9.6 | like\_message |

| iphone 5 | 4 | 8.6 | view\_inbox |

| dell inspiron notebook | 4 | 8.4 | home\_page |

| ipad air | 4 | 7.3 | view\_inbox |

| iphone 5s | 4 | 7.3 | view\_inbox |

| nexus 5 | 4 | 6.5 | view\_inbox |

| samsung galaxy s4 | 4 | 5.4 | send\_message |

| iphone 5s | 4 | 5.0 | send\_message |

| dell inspiron notebook | 4 | 4.8 | view\_inbox |

| nexus 7 | 4 | 3.8 | login |

| acer aspire notebook | 4 | 3.7 | login |

| ipad mini | 4 | 3.7 | login |

| ipad mini | 4 | 3.5 | complete\_signup |

| kindle fire | 4 | 3.5 | login |

| ipad mini | 3 | 10.7 | home\_page |

| hp pavilion desktop | 3 | 8.7 | home\_page |

| samsung galaxy s4 | 3 | 8.0 | view\_inbox |

| nexus 5 | 3 | 8.0 | search\_run |

| nexus 7 | 3 | 7.3 | home\_page |

| ipad mini | 3 | 6.3 | view\_inbox |

| ipad mini | 3 | 6.0 | like\_message |

| kindle fire | 3 | 6.0 | home\_page |

| acer aspire notebook | 3 | 5.7 | home\_page |

| dell inspiron notebook | 3 | 5.4 | like\_message |

| nexus 7 | 3 | 5.3 | view\_inbox |

| ipad air | 3 | 5.0 | send\_message |

| iphone 5 | 3 | 5.0 | send\_message |

| nexus 7 | 3 | 5.0 | like\_message |

| acer aspire notebook | 3 | 4.7 | view\_inbox |

| ipad mini | 3 | 4.7 | send\_message |

| nexus 7 | 3 | 4.5 | search\_autocomplete |

| nexus 5 | 3 | 4.3 | send\_message |

| samsung galaxy note | 3 | 4.3 | home\_page |

| dell inspiron notebook | 3 | 4.3 | send\_message |

| hp pavilion desktop | 3 | 4.0 | send\_message |

| nexus 7 | 3 | 4.0 | send\_message |

| kindle fire | 3 | 4.0 | view\_inbox |

| kindle fire | 3 | 3.5 | like\_message |

| nexus 7 | 3 | 3.3 | complete\_signup |

| acer aspire desktop | 3 | 3.0 | complete\_signup |

| hp pavilion desktop | 3 | 3.0 | complete\_signup |

| hp pavilion desktop | 3 | 3.0 | login |

| kindle fire | 3 | 3.0 | complete\_signup |

| asus chromebook | 3 | 2.7 | complete\_signup |

| iphone 4s | 3 | 2.7 | complete\_signup |

| samsung galaxy note | 3 | 2.7 | login |

| macbook air | 2 | 7.5 | search\_run |

| iphone 5s | 2 | 6.0 | search\_run |

| dell inspiron notebook | 2 | 5.7 | search\_autocomplete |

| amazon fire phone | 2 | 5.5 | like\_message |

| mac mini | 2 | 5.5 | like\_message |

| iphone 4s | 2 | 5.4 | home\_page |

| acer aspire notebook | 2 | 5.0 | search\_autocomplete |

| ipad mini | 2 | 5.0 | search\_run |

| nokia lumia 635 | 2 | 5.0 | search\_autocomplete |

| amazon fire phone | 2 | 4.5 | view\_inbox |

| asus chromebook | 2 | 4.4 | home\_page |

| dell inspiron desktop | 2 | 4.3 | home\_page |

| hp pavilion desktop | 2 | 4.3 | view\_inbox |

| iphone 4s | 2 | 4.3 | like\_message |

| macbook air | 2 | 4.3 | search\_autocomplete |

| dell inspiron desktop | 2 | 4.0 | like\_message |

| hp pavilion desktop | 2 | 4.0 | like\_message |

| htc one | 2 | 4.0 | home\_page |

| nokia lumia 635 | 2 | 4.0 | home\_page |

| mac mini | 2 | 4.0 | send\_message |

| iphone 5 | 2 | 3.8 | search\_autocomplete |

| windows surface | 2 | 3.7 | home\_page |

| acer aspire desktop | 2 | 3.5 | like\_message |

| mac mini | 2 | 3.5 | view\_inbox |

| samsumg galaxy tablet | 2 | 3.5 | home\_page |

| iphone 4s | 2 | 3.4 | view\_inbox |

| asus chromebook | 2 | 3.3 | view\_inbox |

| dell inspiron desktop | 2 | 3.3 | view\_inbox |

| macbook pro | 2 | 3.3 | search\_run |

| acer aspire desktop | 2 | 3.0 | home\_page |

| acer aspire notebook | 2 | 3.0 | like\_message |

| asus chromebook | 2 | 3.0 | like\_message |

| ipad air | 2 | 3.0 | search\_autocomplete |

| ipad mini | 2 | 3.0 | search\_autocomplete |

| nokia lumia 635 | 2 | 3.0 | send\_message |

| samsung galaxy s4 | 2 | 3.0 | search\_autocomplete |

| acer aspire desktop | 2 | 3.0 | search\_autocomplete |

| asus chromebook | 2 | 3.0 | send\_message |

| htc one | 2 | 3.0 | search\_autocomplete |

| nexus 5 | 2 | 3.0 | search\_click\_result\_5 |

| windows surface | 2 | 3.0 | send\_message |

| iphone 5s | 2 | 2.7 | search\_autocomplete |

| nokia lumia 635 | 2 | 2.7 | view\_inbox |

| iphone 4s | 2 | 2.5 | send\_message |

| htc one | 2 | 2.5 | view\_inbox |

| asus chromebook | 2 | 2.4 | login |

| acer aspire desktop | 2 | 2.3 | login |

| acer aspire notebook | 2 | 2.3 | complete\_signup |

| htc one | 2 | 2.3 | login |

| iphone 4s | 2 | 2.3 | login |

| nokia lumia 635 | 2 | 2.3 | complete\_signup |

| samsung galaxy note | 2 | 2.3 | complete\_signup |

| samsung galaxy note | 2 | 2.3 | like\_message |

| acer aspire desktop | 2 | 2.0 | view\_inbox |

| dell inspiron desktop | 2 | 2.0 | login |

| hp pavilion desktop | 2 | 2.0 | search\_autocomplete |

| htc one | 2 | 2.0 | complete\_signup |

| nokia lumia 635 | 2 | 2.0 | login |

| samsumg galaxy tablet | 2 | 2.0 | login |

| samsung galaxy note | 2 | 2.0 | send\_message |

| samsung galaxy note | 2 | 2.0 | view\_inbox |

| asus chromebook | 2 | 2.0 | search\_autocomplete |

| nexus 10 | 2 | 2.0 | complete\_signup |

| nexus 10 | 2 | 2.0 | home\_page |

| nexus 10 | 2 | 2.0 | like\_message |

| nexus 10 | 2 | 2.0 | login |

| nexus 5 | 2 | 2.0 | search\_autocomplete |

| windows surface | 2 | 2.0 | login |

| nexus 5 | 2 | 2.0 | search\_click\_result\_4 |

| dell inspiron desktop | 2 | 1.7 | complete\_signup |

| samsumg galaxy tablet | 2 | 1.5 | view\_inbox |

| kindle fire | 2 | 1.5 | send\_message |

| windows surface | 2 | 1.5 | complete\_signup |

| samsung galaxy note | 1 | 10.0 | search\_run |

| mac mini | 1 | 5.7 | home\_page |

| iphone 5 | 1 | 5.5 | search\_run |

| amazon fire phone | 1 | 5.3 | home\_page |

| amazon fire phone | 1 | 5.0 | search\_autocomplete |

| samsumg galaxy tablet | 1 | 4.0 | search\_autocomplete |

| lenovo thinkpad | 1 | 3.5 | search\_run |

| asus chromebook | 1 | 3.5 | search\_run |

| dell inspiron notebook | 1 | 3.0 | search\_run |

| nexus 7 | 1 | 3.0 | search\_run |

| asus chromebook | 1 | 3.0 | search\_click\_result\_3 |

| windows surface | 1 | 3.0 | view\_inbox |

| mac mini | 1 | 3.0 | search\_run |

| nokia lumia 635 | 1 | 2.7 | like\_message |

| acer aspire notebook | 1 | 2.3 | send\_message |

| windows surface | 1 | 2.3 | like\_message |

| amazon fire phone | 1 | 2.0 | send\_message |

| dell inspiron desktop | 1 | 2.0 | send\_message |

| samsumg galaxy tablet | 1 | 2.0 | like\_message |

| samsumg galaxy tablet | 1 | 2.0 | send\_message |

| samsung galaxy s4 | 1 | 2.0 | search\_run |

| dell inspiron notebook | 1 | 2.0 | search\_click\_result\_3 |

| dell inspiron notebook | 1 | 2.0 | search\_click\_result\_5 |

| dell inspiron notebook | 1 | 2.0 | search\_click\_result\_8 |

| iphone 5 | 1 | 2.0 | search\_click\_result\_1 |

| iphone 5 | 1 | 2.0 | search\_click\_result\_4 |

| iphone 5 | 1 | 2.0 | search\_click\_result\_9 |

| nexus 5 | 1 | 2.0 | search\_click\_result\_6 |

| iphone 4s | 1 | 1.8 | search\_autocomplete |

| samsung galaxy note | 1 | 1.5 | search\_autocomplete |

| amazon fire phone | 1 | 1.3 | complete\_signup |

| amazon fire phone | 1 | 1.3 | login |

| dell inspiron desktop | 1 | 1.3 | search\_autocomplete |

| htc one | 1 | 1.3 | send\_message |

| mac mini | 1 | 1.3 | login |

| mac mini | 1 | 1.0 | complete\_signup |

| samsumg galaxy tablet | 1 | 1.0 | complete\_signup |

| acer aspire desktop | 1 | 1.0 | send\_message |

| asus chromebook | 1 | 1.0 | search\_click\_result\_1 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_4 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_5 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_6 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_7 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_8 |

| asus chromebook | 1 | 1.0 | search\_click\_result\_9 |

| htc one | 1 | 1.0 | like\_message |

| ipad mini | 1 | 1.0 | search\_click\_result\_1 |

| ipad mini | 1 | 1.0 | search\_click\_result\_3 |

| ipad mini | 1 | 1.0 | search\_click\_result\_7 |

| ipad mini | 1 | 1.0 | search\_click\_result\_8 |

| iphone 5s | 1 | 1.0 | search\_click\_result\_3 |

| iphone 5s | 1 | 1.0 | search\_click\_result\_6 |

| iphone 5s | 1 | 1.0 | search\_click\_result\_8 |

| iphone 5s | 1 | 1.0 | search\_click\_result\_9 |

| lenovo thinkpad | 1 | 1.0 | search\_click\_result\_1 |

| lenovo thinkpad | 1 | 1.0 | search\_click\_result\_2 |

| lenovo thinkpad | 1 | 1.0 | search\_click\_result\_3 |

| lenovo thinkpad | 1 | 1.0 | search\_click\_result\_6 |

| macbook air | 1 | 1.0 | search\_click\_result\_10 |

| nexus 10 | 1 | 1.0 | view\_inbox |

| samsung galaxy s4 | 1 | 1.0 | search\_click\_result\_2 |

| samsung galaxy s4 | 1 | 1.0 | search\_click\_result\_5 |

| samsung galaxy s4 | 1 | 1.0 | search\_click\_result\_6 |

| samsung galaxy s4 | 1 | 1.0 | search\_click\_result\_8 |

| dell inspiron notebook | 1 | 1.0 | search\_click\_result\_10 |

| dell inspiron notebook | 1 | 1.0 | search\_click\_result\_4 |

| dell inspiron notebook | 1 | 1.0 | search\_click\_result\_7 |

| dell inspiron notebook | 1 | 1.0 | search\_click\_result\_9 |

| ipad air | 1 | 1.0 | search\_run |

| iphone 5 | 1 | 1.0 | search\_click\_result\_5 |

| iphone 5 | 1 | 1.0 | search\_click\_result\_7 |

| mac mini | 1 | 1.0 | search\_autocomplete |

| mac mini | 1 | 1.0 | search\_click\_result\_10 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_1 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_2 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_3 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_7 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_8 |

| nexus 5 | 1 | 1.0 | search\_click\_result\_9 |

| windows surface | 1 | 1.0 | search\_autocomplete |

+------------------------+--------------+------------------------+------------------------+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Email Engagement: Users engaging with the email service.

**OBJECTIVE:** Calculate the email engagement metrics?

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ANS:-

SELECT

WEEK,

ROUND((weekly\_digest/total\*100)) AS "Weekly Digest Activity",

ROUND((email\_opened/total\*100)) AS "Email Open Activity",

ROUND((email\_clickthrough/total\*100)) AS "Email Clickthrough Activity",

ROUND((reengagement\_email/total\*100)) AS "Reengagement Email Activity"

FROM

(

SELECT EXTRACT(WEEK FROM occurred\_at) AS WEEK,

COUNT(CASE WHEN action = 'sent\_weekly\_digest' THEN user\_id ELSE NULL END) AS

weekly\_digest,

COUNT(CASE WHEN action = 'email\_open' THEN user\_id ELSE NULL END) AS

email\_opened,

COUNT(CASE WHEN action = 'email\_clickthrough' THEN user\_id ELSE NULL END) AS

email\_clickthrough,

COUNT(CASE WHEN action = 'sent\_reengagement\_email' THEN user\_id ELSE NULL END)

AS reengagement\_email,

COUNT(user\_id) AS total

FROM email

GROUP BY 1

) s

GROUP BY 1

ORDER BY 1;

OUTPUT:-

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

| WEEK | Weekly Digest Activity | Email Open Activity | Email Clickthrough Activity | Reengagement Email Activity |

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

| 17 | 62 | 21 | 11 | 5 |

| 18 | 63 | 22 | 10 | 4 |

| 19 | 62 | 23 | 11 | 4 |

| 20 | 62 | 23 | 11 | 4 |

| 21 | 64 | 23 | 10 | 4 |

| 22 | 64 | 22 | 11 | 4 |

| 23 | 62 | 22 | 11 | 4 |

| 24 | 62 | 23 | 11 | 4 |

| 25 | 64 | 22 | 11 | 4 |

| 26 | 63 | 22 | 11 | 4 |

| 27 | 62 | 22 | 11 | 4 |

| 28 | 63 | 22 | 11 | 4 |

| 29 | 64 | 22 | 11 | 4 |

| 30 | 62 | 23 | 11 | 4 |

| 31 | 65 | 23 | 8 | 4 |

| 32 | 67 | 23 | 7 | 3 |

| 33 | 65 | 23 | 8 | 4 |

| 34 | 64 | 24 | 8 | 4 |

| 35 | 0 | 32 | 30 | 38 |

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

-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x---END-OF-DOCUMENT---x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-x-