

# Operation Analytics and Investigating Metric Spike

## Project Description:

In this project, we are supposed to provide a detailed report for the ops team, support team and marketing team, etc and help them get insight from the data they have collected to make some important decisions.

## JOB DATA

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

```
select count(distinct job_id)/(30*24) as jobs_reviewed
from job_data
where ds between '2020-11-01' and '2020-11-30'
```

jobs_reviewed
0.0083

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?

```
select ds,
avg(jobs_reviewed) over (order by 1 rows between 6 preceding and current row) as
throughput_7_days
from
(select ds,count(distinct job_id)as jobs_reviewed
from job_data
where ds between '2020-11-01' and '2020-11-30'
group by 1
order by 1) as s
```

ds	throughput_7_days
2020-11-25T00:00:00.000Z	1.00000000000000000000
2020-11-26T00:00:00.000Z	1.00000000000000000000
2020-11-27T00:00:00.000Z	1.00000000000000000000
2020-11-28T00:00:00.000Z	1.25000000000000000000
2020-11-29T00:00:00.000Z	1.20000000000000000000
2020-11-30T00:00:00.000Z	1.3333333333333333

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

```
select language, (100*(count(language)/(select count(language) from job_data))) as
each_lang_share from job_data
group by 1
```

language	each_lang_share
Arabic	12.5000
English	12.5000

<b>French</b>	<b>12.5000</b>
<b>Hindi</b>	<b>12.5000</b>
<b>Italian</b>	<b>12.5000</b>
<b>Persian</b>	<b>37.5000</b>

Let's say you see some duplicate rows in the data. How will you display duplicates from the table?

```
select ds, job_id, actors_id, event, language, time_spent, org
from job_data
group by 1,2,3,4,5,6,7
having count(*)>1
```

There are no results to be displayed.

## INVESTIGATING METRIC SPIKE

Calculate the weekly user engagement?

```
select extract(year from occurred_at) as year, extract(week from occurred_at) as week_num,
count(distinct user_id) as total_engagement
from tutorial.yammer_events
group by 1,2
order by 1,2
```

year	week_num	total_engagement
2014	18	791
2014	19	1244
2014	20	1270
2014	21	1341
2014	22	1293
2014	23	1366

2014	24	1434
2014	25	1462
2014	26	1443
2014	27	1477
2014	28	1556
2014	29	1556
2014	30	1593
2014	31	1685
2014	32	1483
2014	33	1438
2014	34	1412
2014	35	1442

Calculate the user growth for product?

```

select a.year, a.week_num, a.user_count, sum(a.user_count) over (order by a.year, a.week_num
rows between unbounded preceding and current row) as cumm_user_count
from
(select extract(year from created_at) as year, extract(week from created_at) as week_num,
count(user_id) as user_count
from tutorial.yammer_users
where state= 'active'
group by 1,2
order by 1,2) as a

```

year	week_num	user_count	cumm_user_count
2013	1	67	67
2013	2	29	96
2013	3	47	143
2013	4	36	179
2013	5	30	209
2013	6	48	257
2013	7	41	298

2013	8	39	337
2013	9	33	370
2013	10	43	413
2013	11	33	446
2013	12	32	478
2013	13	33	511
2013	14	40	551
2013	15	35	586
2013	16	42	628
2013	17	48	676
2013	18	48	724
2013	19	45	769
2013	20	55	824
2013	21	41	865
2013	22	49	914
2013	23	51	965
2013	24	51	1016
2013	25	46	1062
2013	26	57	1119
2013	27	57	1176
2013	28	52	1228
2013	29	71	1299
2013	30	66	1365
2013	31	69	1434
2013	32	66	1500
2013	33	73	1573
2013	34	71	1644
2013	35	79	1723
2013	36	65	1788
2013	37	71	1859
2013	38	84	1943

2013	39	92	2035
2013	40	81	2116
2013	41	88	2204
2013	42	74	2278
2013	43	97	2375
2013	44	92	2467
2013	45	97	2564
2013	46	94	2658
2013	47	82	2740
2013	48	103	2843
2013	49	96	2939
2013	50	117	3056
2013	51	123	3179
2013	52	104	3283
2014	1	91	3374
2014	2	122	3496
2014	3	112	3608
2014	4	113	3721
2014	5	130	3851
2014	6	132	3983
2014	7	135	4118
2014	8	127	4245
2014	9	127	4372
2014	10	135	4507
2014	11	152	4659
2014	12	132	4791
2014	13	151	4942
2014	14	161	5103
2014	15	166	5269
2014	16	165	5434
2014	17	176	5610

2014	18	172	5782
2014	19	160	5942
2014	20	186	6128
2014	21	177	6305
2014	22	186	6491
2014	23	197	6688
2014	24	198	6886
2014	25	222	7108
2014	26	210	7318
2014	27	199	7517
2014	28	223	7740
2014	29	215	7955
2014	30	228	8183
2014	31	234	8417
2014	32	189	8606
2014	33	250	8856
2014	34	259	9115
2014	35	266	9381

Calculate the weekly retention of users-sign up cohort?

```

select count( distinct ss.user_id)as total_user_retained from(
select s.user_id,(s.engg_week-s.signup_week) as retention_week from(
select a.user_id,a.signup_week,b.engg_week from
(SELECT user_id,extract(week from occurred_at) as signup_week from tutorial.yammer_events
where event_type='signup_flow' AND
event_name='complete_signup'
and extract(week from occurred_at)=18) as a left join
(select distinct user_id,extract(week from occurred_at) as engg_week from
tutorial.yammer_events
where event_type='engagement') as b
on a.user_id=b.user_id

```

```
order by a.user_id) as s) as ss
where ss.retention_week>=1
```

total_user_retained
70

Calculate the weekly engagement per device?

year	week_num	device	total_engagement
2014	18	acer aspire desktop	10
2014	18	acer aspire notebook	21
2014	18	amazon fire phone	4
2014	18	asus chromebook	23
2014	18	dell inspiron desktop	21
2014	18	dell inspiron notebook	49
2014	18	hp pavilion desktop	15
2014	18	htc one	16
2014	18	ipad air	30
2014	18	ipad mini	21
2014	18	iphone 4s	21
2014	18	iphone 5	70
2014	18	iphone 5s	45
2014	18	kindle fire	6
2014	18	lenovo thinkpad	90
2014	18	macbook air	57



2014	18	macbook pro	154
2014	18	mac mini	8
2014	18	nexus 10	16
2014	18	nexus 5	43
2014	18	nexus 7	20
2014	18	nokia lumia 635	19
2014	18	samsung galaxy tablet	8
2014	18	samsung galaxy note	7
2014	18	samsung galaxy s4	56
2014	18	windows surface	10
2014	19	acer aspire desktop	26
2014	19	acer aspire notebook	34
2014	19	amazon fire phone	9
2014	19	asus chromebook	42
2014	19	dell inspiron desktop	58
2014	19	dell inspiron notebook	78
2014	19	hp pavilion desktop	37
2014	19	htc one	19
2014	19	ipad air	52
2014	19	ipad mini	29
2014	19	iphone 4s	47
2014	19	iphone 5	114
2014	19	iphone 5s	70
2014	19	kindle fire	26

2014	19	lenovo thinkpad	155
2014	19	macbook air	119
2014	19	macbook pro	248
2014	19	mac mini	12
2014	19	nexus 10	30
2014	19	nexus 5	73
2014	19	nexus 7	29
2014	19	nokia lumia 635	34
2014	19	samsung galaxy tablet	11
2014	19	samsung galaxy note	15
2014	19	samsung galaxy s4	80
2014	19	windows surface	10
2014	20	acer aspire desktop	22
2014	20	acer aspire notebook	40
2014	20	amazon fire phone	12
2014	20	asus chromebook	26
2014	20	dell inspiron desktop	36
2014	20	dell inspiron notebook	82
2014	20	hp pavilion desktop	40
2014	20	htc one	32
2014	20	ipad air	53
2014	20	ipad mini	37
2014	20	iphone 4s	40
2014	20	iphone 5	113

2014	20	iphone 5s	77
2014	20	kindle fire	20
2014	20	lenovo thinkpad	176
2014	20	macbook air	110
2014	20	macbook pro	261
2014	20	mac mini	19
2014	20	nexus 10	25
2014	20	nexus 5	84
2014	20	nexus 7	41
2014	20	nokia lumia 635	22
2014	20	samsung galaxy tablet	6
2014	20	samsung galaxy note	11
2014	20	samsung galaxy s4	90
2014	20	windows surface	15
2014	21	acer aspire desktop	23
2014	21	acer aspire notebook	40
2014	21	amazon fire phone	10
2014	21	asus chromebook	39
2014	21	dell inspiron desktop	52
2014	21	dell inspiron notebook	84
2014	21	hp pavilion desktop	31
2014	21	htc one	27
2014	21	ipad air	54
2014	21	ipad mini	32

2014	21	iphone 4s	56
2014	21	iphone 5	128
2014	21	iphone 5s	75
2014	21	kindle fire	22
2014	21	lenovo thinkpad	177
2014	21	macbook air	119
2014	21	macbook pro	256
2014	21	mac mini	25
2014	21	nexus 10	23
2014	21	nexus 5	99
2014	21	nexus 7	31
2014	21	nokia lumia 635	21
2014	21	samsung galaxy tablet	9
2014	21	samsung galaxy note	18
2014	21	samsung galaxy s4	92
2014	21	windows surface	19
2014	22	acer aspire desktop	28
2014	22	acer aspire notebook	47
2014	22	amazon fire phone	4
2014	22	asus chromebook	38
2014	22	dell inspiron desktop	41
2014	22	dell inspiron notebook	81
2014	22	hp pavilion desktop	42
2014	22	htc one	20

2014	22	ipad air	51
2014	22	ipad mini	25
2014	22	iphone 4s	46
2014	22	iphone 5	136
2014	22	iphone 5s	71
2014	22	kindle fire	30
2014	22	lenovo thinkpad	164
2014	22	macbook air	107
2014	22	macbook pro	244
2014	22	mac mini	18
2014	22	nexus 10	24
2014	22	nexus 5	94
2014	22	nexus 7	29
2014	22	nokia lumia 635	25
2014	22	samsung galaxy tablet	6
2014	22	samsung galaxy note	20
2014	22	samsung galaxy s4	84
2014	22	windows surface	17
2014	23	acer aspire desktop	25
2014	23	acer aspire notebook	39
2014	23	amazon fire phone	5
2014	23	asus chromebook	51
2014	23	dell inspiron desktop	53
2014	23	dell inspiron notebook	91

2014	23	hp pavilion desktop	38
2014	23	htc one	24
2014	23	ipad air	57
2014	23	ipad mini	32
2014	23	iphone 4s	41
2014	23	iphone 5	122
2014	23	iphone 5s	71
2014	23	kindle fire	21
2014	23	lenovo thinkpad	170
2014	23	macbook air	145
2014	23	macbook pro	254
2014	23	mac mini	24
2014	23	nexus 10	28
2014	23	nexus 5	95
2014	23	nexus 7	44
2014	23	nokia lumia 635	25
2014	23	samsung galaxy tablet	11
2014	23	samsung galaxy note	19
2014	23	samsung galaxy s4	103
2014	23	windows surface	15
2014	24	acer aspire desktop	21
2014	24	acer aspire notebook	43
2014	24	amazon fire phone	16
2014	24	asus chromebook	48

2014	24	dell inspiron desktop	53
2014	24	dell inspiron notebook	100
2014	24	hp pavilion desktop	55
2014	24	htc one	21
2014	24	ipad air	42
2014	24	ipad mini	32
2014	24	iphone 4s	52
2014	24	iphone 5	151
2014	24	iphone 5s	80
2014	24	kindle fire	25
2014	24	lenovo thinkpad	176
2014	24	macbook air	122
2014	24	macbook pro	259
2014	24	mac mini	17
2014	24	nexus 10	43
2014	24	nexus 5	87
2014	24	nexus 7	37
2014	24	nokia lumia 635	31
2014	24	samsung galaxy tablet	14
2014	24	samsung galaxy note	12
2014	24	samsung galaxy s4	95
2014	24	windows surface	16
2014	25	acer aspire desktop	23
2014	25	acer aspire notebook	42

2014	25	amazon fire phone	11
2014	25	asus chromebook	41
2014	25	dell inspiron desktop	57
2014	25	dell inspiron notebook	102
2014	25	hp pavilion desktop	56
2014	25	htc one	19
2014	25	ipad air	58
2014	25	ipad mini	38
2014	25	iphone 4s	52
2014	25	iphone 5	143
2014	25	iphone 5s	78
2014	25	kindle fire	25
2014	25	lenovo thinkpad	164
2014	25	macbook air	149
2014	25	macbook pro	251
2014	25	mac mini	29
2014	25	nexus 10	38
2014	25	nexus 5	85
2014	25	nexus 7	47
2014	25	nokia lumia 635	32
2014	25	samsung galaxy tablet	11
2014	25	samsung galaxy note	19
2014	25	samsung galaxy s4	102
2014	25	windows surface	21



2014	26	acer aspire desktop	29
2014	26	acer aspire notebook	44
2014	26	amazon fire phone	12
2014	26	asus chromebook	40
2014	26	dell inspiron desktop	53
2014	26	dell inspiron notebook	108
2014	26	hp pavilion desktop	50
2014	26	htc one	20
2014	26	ipad air	57
2014	26	ipad mini	31
2014	26	iphone 4s	39
2014	26	iphone 5	134
2014	26	iphone 5s	80
2014	26	kindle fire	24
2014	26	lenovo thinkpad	196
2014	26	macbook air	119
2014	26	macbook pro	276
2014	26	mac mini	22
2014	26	nexus 10	30
2014	26	nexus 5	90
2014	26	nexus 7	49
2014	26	nokia lumia 635	37
2014	26	samsung galaxy tablet	12
2014	26	samsung galaxy note	14

2014	26	samsung galaxy s4	100
2014	26	windows surface	19
2014	27	acer aspire desktop	28
2014	27	acer aspire notebook	35
2014	27	amazon fire phone	13
2014	27	asus chromebook	47
2014	27	dell inspiron desktop	59
2014	27	dell inspiron notebook	90
2014	27	hp pavilion desktop	47
2014	27	htc one	23
2014	27	ipad air	55
2014	27	ipad mini	41
2014	27	iphone 4s	49
2014	27	iphone 5	150
2014	27	iphone 5s	92
2014	27	kindle fire	26
2014	27	lenovo thinkpad	188
2014	27	macbook air	134
2014	27	macbook pro	259
2014	27	mac mini	11
2014	27	nexus 10	29
2014	27	nexus 5	86
2014	27	nexus 7	45
2014	27	nokia lumia 635	41

2014	27	samsung galaxy tablet	12
2014	27	samsung galaxy note	10
2014	27	samsung galaxy s4	114
2014	27	windows surface	22
2014	28	acer aspire desktop	29
2014	28	acer aspire notebook	47
2014	28	amazon fire phone	10
2014	28	asus chromebook	52
2014	28	dell inspiron desktop	52
2014	28	dell inspiron notebook	91
2014	28	hp pavilion desktop	56
2014	28	htc one	28
2014	28	ipad air	57
2014	28	ipad mini	35
2014	28	iphone 4s	68
2014	28	iphone 5	159
2014	28	iphone 5s	79
2014	28	kindle fire	25
2014	28	lenovo thinkpad	195
2014	28	macbook air	140
2014	28	macbook pro	301
2014	28	mac mini	15
2014	28	nexus 10	38
2014	28	nexus 5	83

2014	28	nexus 7	41
2014	28	nokia lumia 635	31
2014	28	samsung galaxy tablet	15
2014	28	samsung galaxy note	14
2014	28	samsung galaxy s4	119
2014	28	windows surface	31
2014	29	acer aspire desktop	27
2014	29	acer aspire notebook	50
2014	29	amazon fire phone	6
2014	29	asus chromebook	51
2014	29	dell inspiron desktop	55
2014	29	dell inspiron notebook	100
2014	29	hp pavilion desktop	55
2014	29	htc one	26
2014	29	ipad air	55
2014	29	ipad mini	34
2014	29	iphone 4s	58
2014	29	iphone 5	148
2014	29	iphone 5s	93
2014	29	kindle fire	29
2014	29	lenovo thinkpad	220
2014	29	macbook air	145
2014	29	macbook pro	295
2014	29	mac mini	28

2014	29	nexus 10	28
2014	29	nexus 5	83
2014	29	nexus 7	39
2014	29	nokia lumia 635	34
2014	29	samsung galaxy tablet	9
2014	29	samsung galaxy note	10
2014	29	samsung galaxy s4	120
2014	29	windows surface	33
2014	30	acer aspire desktop	29
2014	30	acer aspire notebook	52
2014	30	amazon fire phone	12
2014	30	asus chromebook	47
2014	30	dell inspiron desktop	52
2014	30	dell inspiron notebook	114
2014	30	hp pavilion desktop	57
2014	30	htc one	32
2014	30	ipad air	50
2014	30	ipad mini	36
2014	30	iphone 4s	61
2014	30	iphone 5	147
2014	30	iphone 5s	92
2014	30	kindle fire	36
2014	30	lenovo thinkpad	209
2014	30	macbook air	146

2014	30	macbook pro	291
2014	30	mac mini	28
2014	30	nexus 10	25
2014	30	nexus 5	81
2014	30	nexus 7	43
2014	30	nokia lumia 635	42
2014	30	samsung galaxy tablet	13
2014	30	samsung galaxy note	17
2014	30	samsung galaxy s4	117
2014	30	windows surface	28
2014	31	acer aspire desktop	32
2014	31	acer aspire notebook	62
2014	31	amazon fire phone	12
2014	31	asus chromebook	56
2014	31	dell inspiron desktop	53
2014	31	dell inspiron notebook	125
2014	31	hp pavilion desktop	39
2014	31	htc one	30
2014	31	ipad air	70
2014	31	ipad mini	34
2014	31	iphone 4s	63
2014	31	iphone 5	151
2014	31	iphone 5s	100
2014	31	kindle fire	24

2014	31	lenovo thinkpad	208
2014	31	macbook air	156
2014	31	macbook pro	317
2014	31	mac mini	23
2014	31	nexus 10	35
2014	31	nexus 5	81
2014	31	nexus 7	60
2014	31	nokia lumia 635	33
2014	31	samsung galaxy tablet	9
2014	31	samsung galaxy note	15
2014	31	samsung galaxy s4	104
2014	31	windows surface	18
2014	32	acer aspire desktop	31
2014	32	acer aspire notebook	56
2014	32	amazon fire phone	14
2014	32	asus chromebook	59
2014	32	dell inspiron desktop	42
2014	32	dell inspiron notebook	111
2014	32	hp pavilion desktop	52
2014	32	htc one	13
2014	32	ipad air	53
2014	32	ipad mini	23
2014	32	iphone 4s	52
2014	32	iphone 5	133

2014	32	iphone 5s	71
2014	32	kindle fire	14
2014	32	lenovo thinkpad	196
2014	32	macbook air	143
2014	32	macbook pro	317
2014	32	mac mini	24
2014	32	nexus 10	19
2014	32	nexus 5	65
2014	32	nexus 7	39
2014	32	nokia lumia 635	30
2014	32	samsung galaxy tablet	7
2014	32	samsung galaxy note	14
2014	32	samsung galaxy s4	99
2014	32	windows surface	18
2014	33	acer aspire desktop	37
2014	33	acer aspire notebook	56
2014	33	amazon fire phone	12
2014	33	asus chromebook	61
2014	33	dell inspiron desktop	57
2014	33	dell inspiron notebook	101
2014	33	hp pavilion desktop	51
2014	33	htc one	18
2014	33	ipad air	45
2014	33	ipad mini	31



2014	33	iphone 4s	35
2014	33	iphone 5	119
2014	33	iphone 5s	65
2014	33	kindle fire	12
2014	33	lenovo thinkpad	177
2014	33	macbook air	124
2014	33	macbook pro	307
2014	33	mac mini	21
2014	33	nexus 10	31
2014	33	nexus 5	66
2014	33	nexus 7	24
2014	33	nokia lumia 635	26
2014	33	samsung galaxy tablet	6
2014	33	samsung galaxy note	12
2014	33	samsung galaxy s4	85
2014	33	windows surface	10
2014	34	acer aspire desktop	36
2014	34	acer aspire notebook	45
2014	34	amazon fire phone	14
2014	34	asus chromebook	48
2014	34	dell inspiron desktop	35
2014	34	dell inspiron notebook	111
2014	34	hp pavilion desktop	34
2014	34	htc one	19

2014	34	ipad air	39
2014	34	ipad mini	27
2014	34	iphone 4s	34
2014	34	iphone 5	105
2014	34	iphone 5s	69
2014	34	kindle fire	14
2014	34	lenovo thinkpad	190
2014	34	macbook air	134
2014	34	macbook pro	308
2014	34	mac mini	32
2014	34	nexus 10	22
2014	34	nexus 5	71
2014	34	nexus 7	29
2014	34	nokia lumia 635	27
2014	34	samsung galaxy tablet	12
2014	34	samsung galaxy note	13
2014	34	samsung galaxy s4	76
2014	34	windows surface	14
2014	35	acer aspire desktop	30
2014	35	acer aspire notebook	63
2014	35	amazon fire phone	11
2014	35	asus chromebook	48
2014	35	dell inspiron desktop	48
2014	35	dell inspiron notebook	104

2014	35	hp pavilion desktop	37
2014	35	htc one	26
2014	35	ipad air	36
2014	35	ipad mini	25
2014	35	iphone 4s	50
2014	35	iphone 5	100
2014	35	iphone 5s	68
2014	35	kindle fire	15
2014	35	lenovo thinkpad	186
2014	35	macbook air	135
2014	35	macbook pro	290
2014	35	mac mini	29
2014	35	nexus 10	23
2014	35	nexus 5	67
2014	35	nexus 7	31
2014	35	nokia lumia 635	17
2014	35	samsung galaxy tablet	13
2014	35	samsung galaxy note	13
2014	35	samsung galaxy s4	89
2014	35	windows surface	20

Calculate the email engagement metrics?

SELECT

100.0\*sum(case when email\_category='email\_open' then 1 else 0 end)/sum(case when email\_category='email\_sent' then 1 else 0 end) as email\_open,

```

100.0*sum(case when email_category='email_clicked' then 1 else 0 end)/sum(case when
email_category='email_sent' then 1 else 0 end) as email_clicked
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_category
from tutorial.yammer_emails) as a

```

email_open	email_clicked
33.58338805	14.78988838

### Approach:

For this project, I have used My SQL to extract the required data from the given database using the Join function, subqueries, Aggregation, where condition, Group by, Distinct and other functions required.

keeping the Primary key and foreign key in consideration provided all the reports asked by the ops, support and marketing team.

### Tech-Stack Used:

I have used the DB-FIDDLE website for 'JOB DATA' analysis and MODE.COM for 'Investigation Metric Spike' analysis. I have used MS Word to make the project more attractive and easy to understand.

### Insights and Results:

While doing this project I have learnt how a company works on real time data to derive insights to make important decisions.

While working on this project I have learnt how to deal with a large amount of data as there were a huge number of rows in the data. But still it was a great experience working on big data with complex problems.

It helped me to understand how the data analysis works on a company level to derive insights for the various teams to make fruitful decisions.