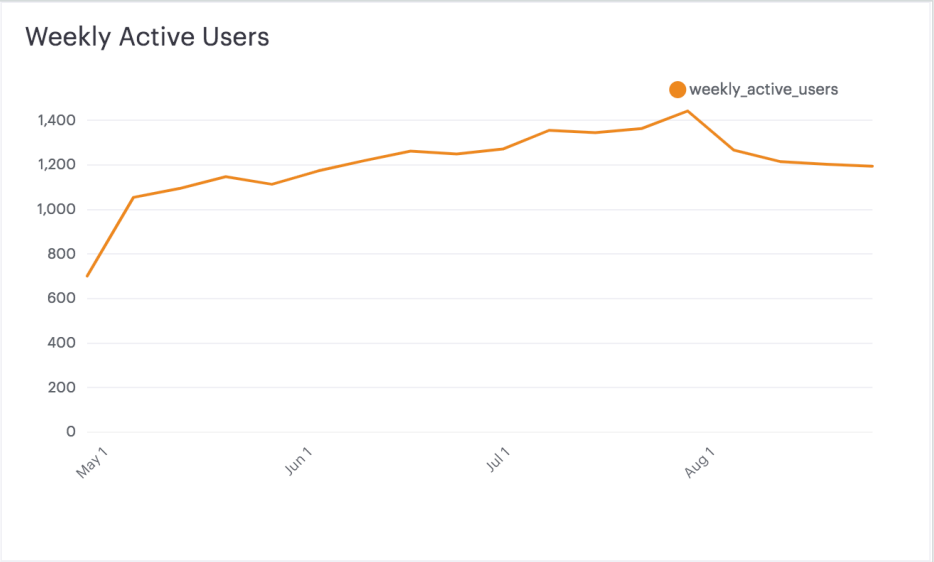
SQL - Investigating a Drop in User Engagement (Reference: Mode Analytics)

Yammer's Analysts are responsible for triaging product and business problems as they come up. In many cases, these problems surface through key metric dashboards that execs and managers check daily.

Tables Information can be seen from the link below:
https://community.modeanalytics.com/sql/tutorial/a-drop-in-user-engagement/

The problem

You show up to work Tuesday morning, September 2, 2014. The head of the Product team walks over to your desk and asks you what you think about the latest activity on the user engagement dashboards. You fire them up, and something immediately jumps out:



The above chart shows the number of engaged users each week. Yammer defines engagement as having made some type of server call by interacting with the product (shown in the data as events of type "engagement"). Any point in this chart can be interpreted as "the number of users who logged at least one engagement event during the week starting on that date."

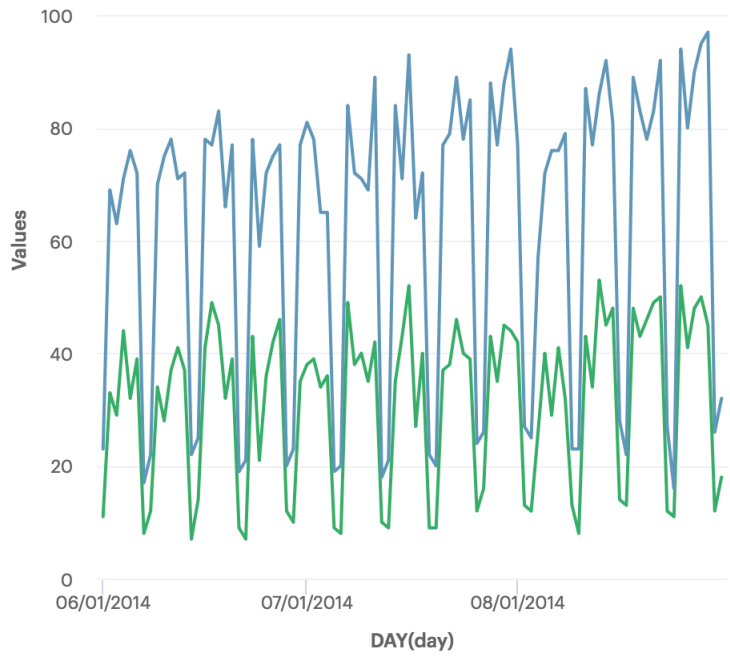
You are responsible for determining what caused the dip at the end of the chart shown above and, if appropriate, recommending solutions for the problem.

Solution:

There are many factors that could influence the result, for example, holiday seasons, technical issues (broken feature, broken tracking code..), marketing strategy, or change of search crawlers. He following will rule out some features:

1. Decline in New users? (checking daily sign up)

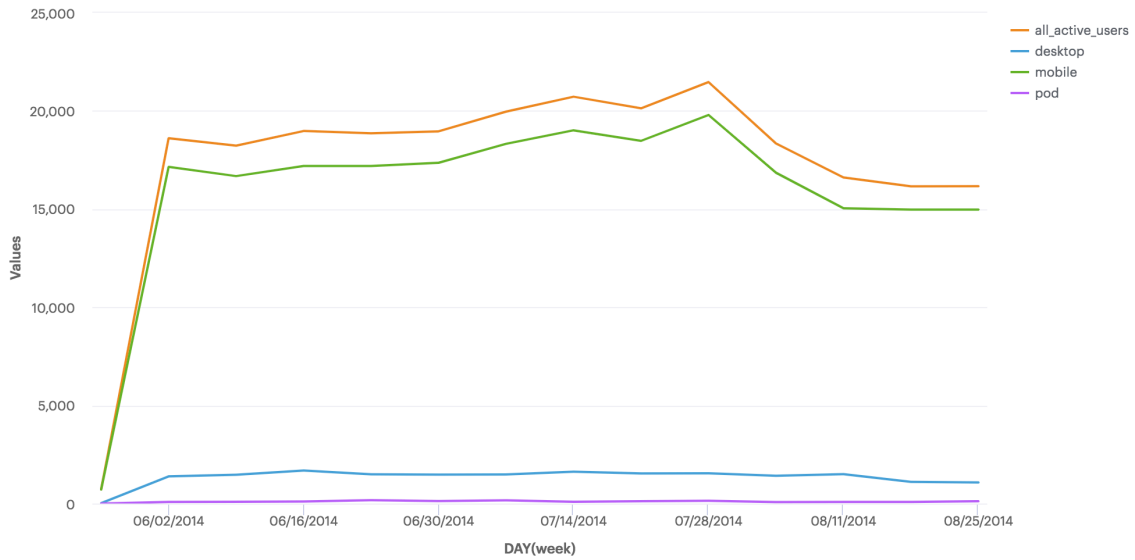
```
SELECT Date_trunc('day', created_at) as day,
       COUNT(user_id) as all_users,
       COUNT(CASE WHEN activated_at is NOT NULL THEN user_id ELSE NULL END) as activated_users
FROM tutorial.yammer_users
WHERE created_at >= '2014-06-01' AND created_at < '2014-09-01'
GROUP BY 1
ORDER BY 1
```



The result showed that the rhythm of signing up did not change much. Therefore the drop is lease likely caused by new users.

2. Type of Devices? (Check weekly engagement in device categories)

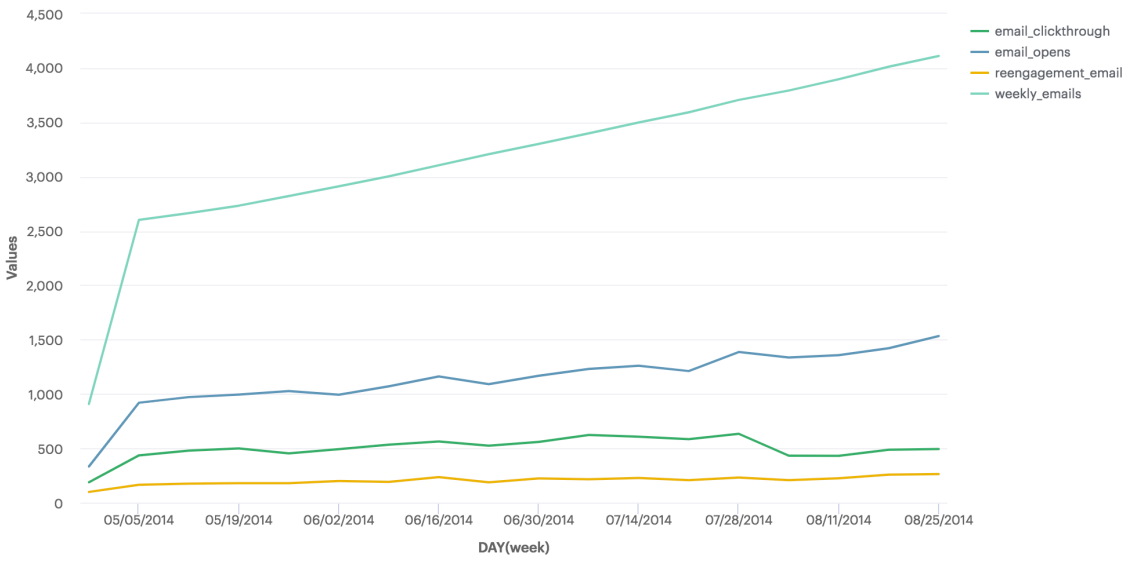
```sql
SELECT Date_trunc('week', events.occurred_at) as week,
      COUNT(users.user_id) as all_active_users,
      COUNT(CASE WHEN events.device ILIKE '%desktop%' THEN 1 ELSE NULL END) as desktop,
      COUNT(CASE WHEN events.device ILIKE '%tablet%' or events.device ILIKE '%pod%'THEN 1 ELSE NULL END) as pod,
      COUNT(CASE WHEN events.device NOT ILIKE '%desktop%' and events.device NOT ILIKE '%tablet%'
        and events.device NOT ILIKE '%pod%'THEN 1 ELSE NULL END) as mobile
FROM tutorial.yammer_users users
JOIN tutorial.yammer_events events
ON users.user_id = events.user_id
WHERE events.occurred_at >= '2014-06-01'
AND events.occurred_at < '2014-09-01'
AND events.event_type = 'engagement'
AND users.activated_at IS NOT NULL
GROUP BY 1
ORDER BY 1
```



There are drop in mobile engagement without other two devices have significant drop. Therefore we can infer that there might be issue with mobile app.

3. What functions in mobile app possibly cracked?

```sql
SELECT Date_trunc('week', emails.occurred_at) as week,
      COUNT(CASE WHEN emails.action = 'email_clickthrough' THEN 1 ELSE NULL END) as email_clickthrough,
      COUNT(CASE WHEN emails.action = 'sent_reengagement_email' THEN 1 ELSE NULL END) as reengagement_email,
      COUNT(CASE WHEN emails.action = 'email_open' THEN 1 ELSE NULL END) as email_opens,
      COUNT(CASE WHEN emails.action = 'sent_weekly_digest' THEN 1 ELSE NULL END) as weekly_emails
FROM tutorial.yammer_users users
JOIN tutorial.yammer_emails emails
ON users.user_id = emails.user_id
WHERE emails.occurred_at >= '2014-05-01'
AND emails.occurred_at < '2014-09-01'
AND users.activated_at IS NOT NULL
GROUP BY 1
ORDER BY 1
```



We can see that email click through has a dip, therefore the drop in the user engagement is very likely to do with issue in in weekly digest. To solve this issue, more data or information should be collected and make sure something isn't broken or poorly implemented.