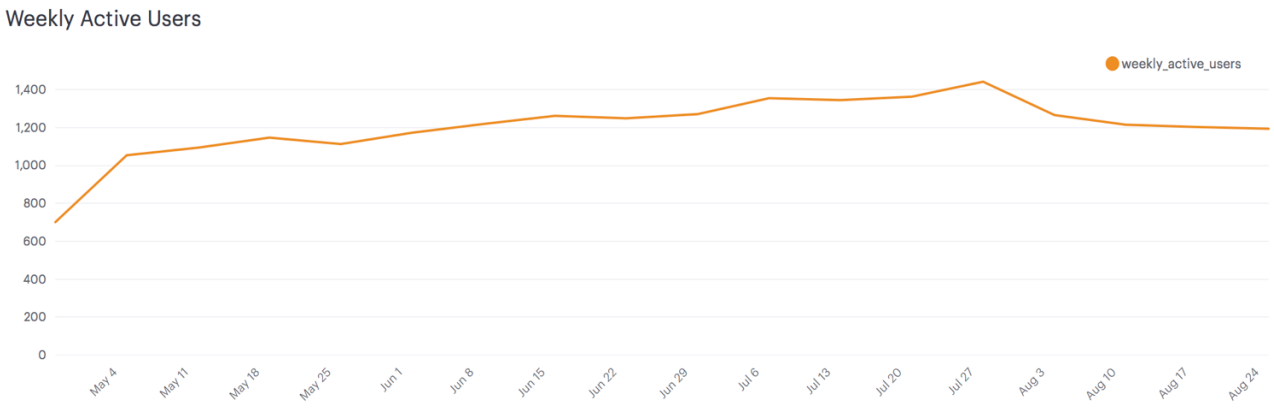
User Engagement Drop Analysis

The Problem Overview

The company faced a user engagement drop problem. The user engagement is defined as the number of users who logged at least one engagement event during the week starting on that day. The company found a constant drop in weekly-active-user after July 28, 2014. This project is going to determine what caused the dip and give recommending solutions for the problem.



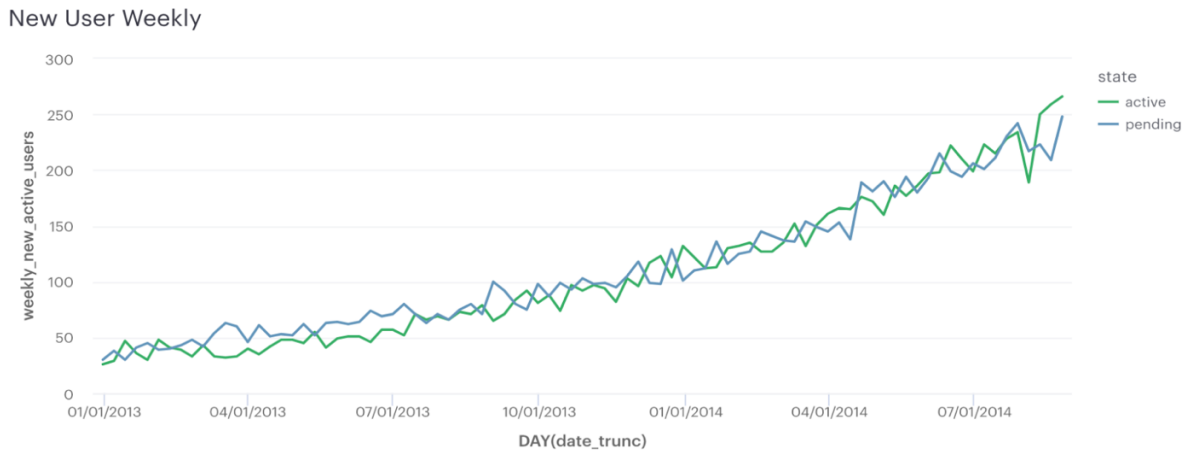
Getting Oriented

There are many possible causes for the dip in retention

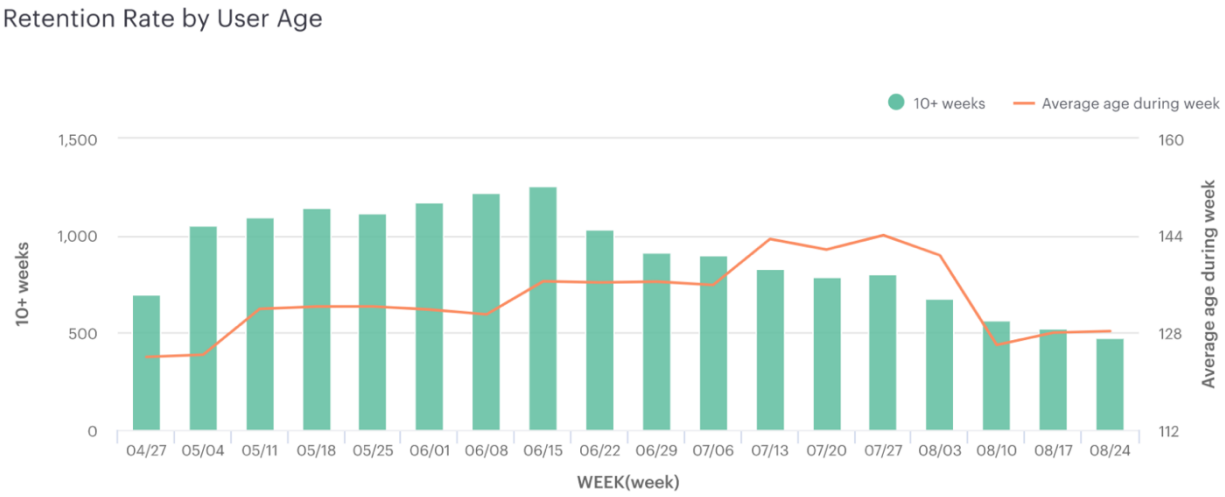
- Holidays: It is possible that users have holiday effect and during holiday time, user engagement rate will decrease. If one or a few countries have much lower engagement than others, it's possible that this is one of the causes.
- Broken feature/ broken tracking code: If the server broken down or the company system don't allow new users to sign up, then there will be a significant drop. Or if the mobile app is not stable and frequent crashed, engagement will drop for only that device type.
- Marketing event: A Super Bowl advertisement, for example, might cause a massive spike in sign-ups for the product. But users who enter through one-time marketing blitzes often retain at lower rates than users who are referred by friends.

Digging In

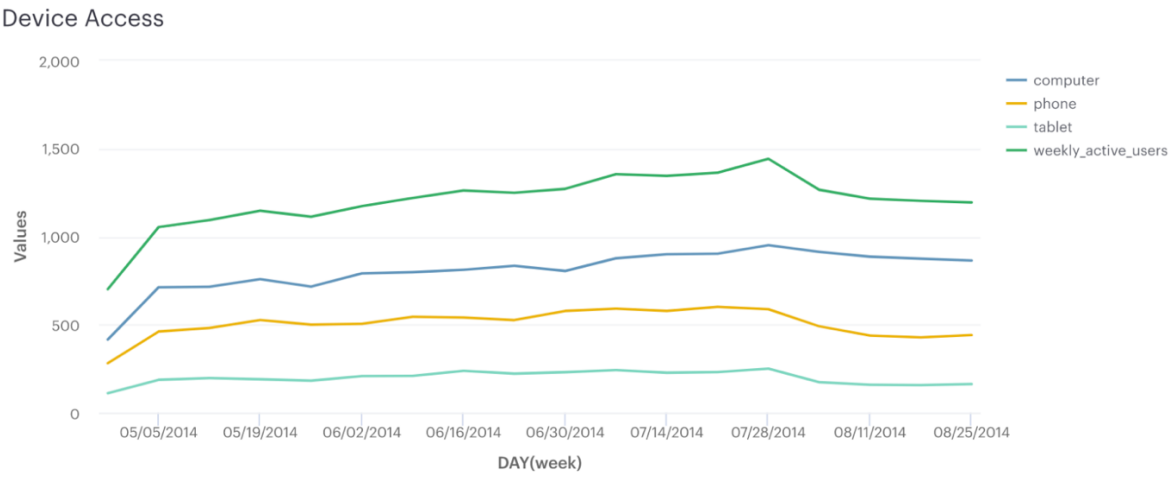
In order to solve this problem, I used three tables including users, events and email events. Firstly, I checked new user signup numbers. The company has two new user type, the active and pending. After new user signup, they need to confirm their registration in their email to get active, otherwise, the status is pending. According to the chart, the active status has a huge drop on July 28th, which is more severe than the drop in pending status. However, both numbers go up after August 11th. The trend seems normal even with minor drop.



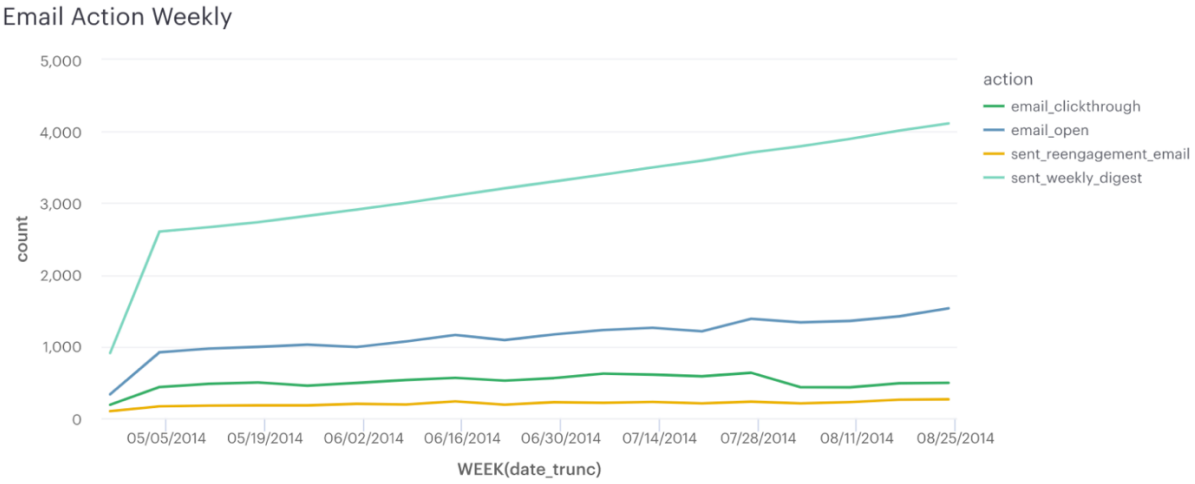
Since new user growth is normal, it's possible that the dip in engagement is coming from existing users as opposed to new ones. One way to investigate this is to cohort users based on when they signed up for the product. This chart below shows a decrease among users who signed up more than 10 weeks and it drops after the week of June 15th which is far beyond the July 28th. If we could track this metric in June or even earlier, then perhaps we could prevent the user engagement drop in July. Also, the average user engagement age shows the same concern, it drops quickly at the end of July.



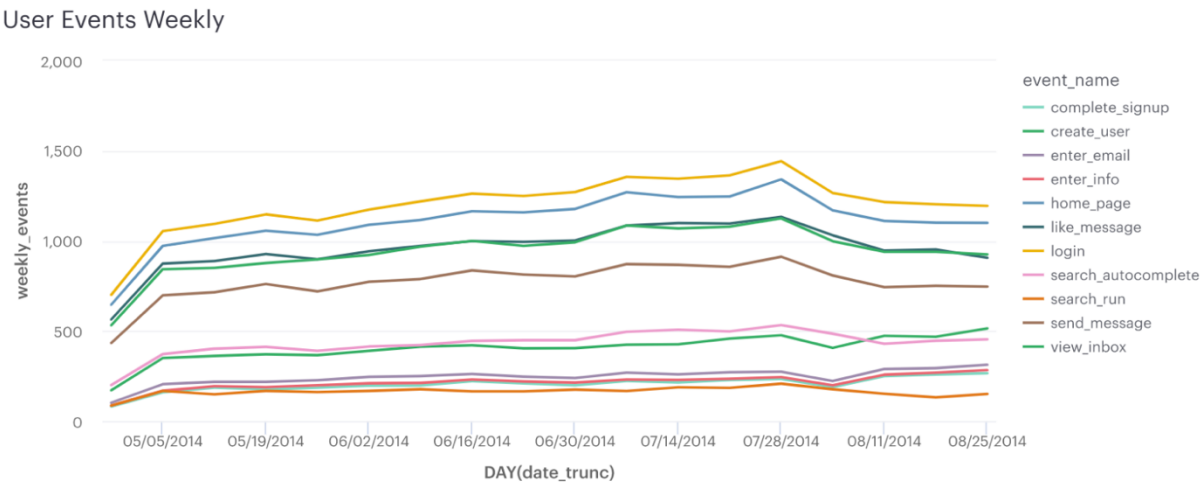
After digging in the user segmentation. I checked the access on different devices and whether there is a tracking issue on particular type. Based on the chart, it seems like the phone and tablet cause the drop in weekly active user engagement. The app in phone and tablet might be unstable or crashed frequently that severely affect the user experience. If possible, this issue could be discussed with engineer department to see if anything changed with the mobile app.



After analysis about device type, I dug into digest emails which is closely related to the retention of long-time user. One of the most frequently used metrics is click through email. From the chart below, it is clear that only the email click through rate drop during the July 28th week while other metrics keep the same. It is interesting to see that email open increases while email click through decreases. It might be a combination of fascinating email title and boring or inappropriate email content.



The Chart below verifies my assumption. Most events drop after July 28th is mainly caused by long-time users' activities, like send message, view box, and like message. However, events related with new users, like signup or create users, do not drop that much.



Result and Recommendation

After investigation, it appears that the problem has to do with long-time-users, mobile and tablet app, and digest email content. The following action will notify the head of product that the problem is localized in these areas and talk with engineer team to check if something is broken or poorly implemented. It's not clear from the data exactly what the problem is or how it should be solved, but the above work can save other teams from figuring out where to look.

For user churn problem, especially for users age longer than 10 weeks, we should analyze the product whether it could satisfy user's needs. Do the long-time users have different characteristics or change their needs with time? One of possible methods is to conduct user experience research or send survey to long-time users.