

Drop in the User Engagement

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 that. The company found a constant drop in the last month weekly-active-user. This project is going to determine what caused the dip and give recommending solutions for the problem.

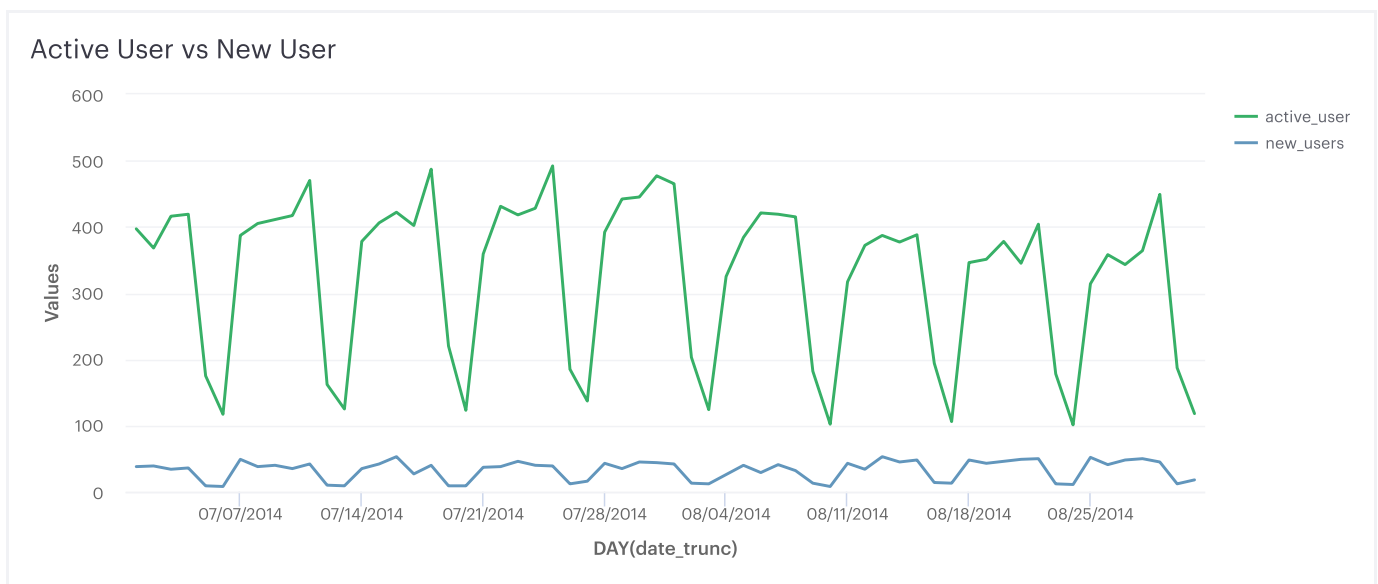
Getting Oriented

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 country has 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 signup, 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.
- Special events: Because the drop was given in a rolling 7-day period, anything causes an increase in user signup will certainly look like a big drop in engagement for the following week, and vice versa. There are many possible special events, like war, macro economy fluctuation, weather disaster, famous sport event.

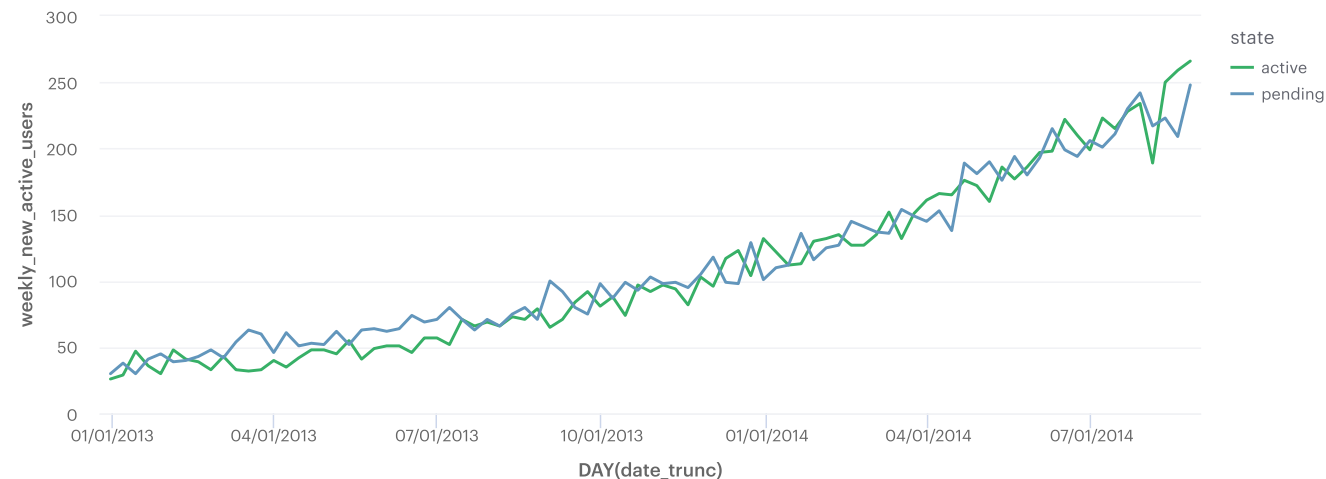
Digging In

In order to solve this problem, I used four tables including users, events, and email events. Firstly, I check the growth rate. Nothing has really changed about the growth rate. It keeps the trend that high during the week, low on weekends.



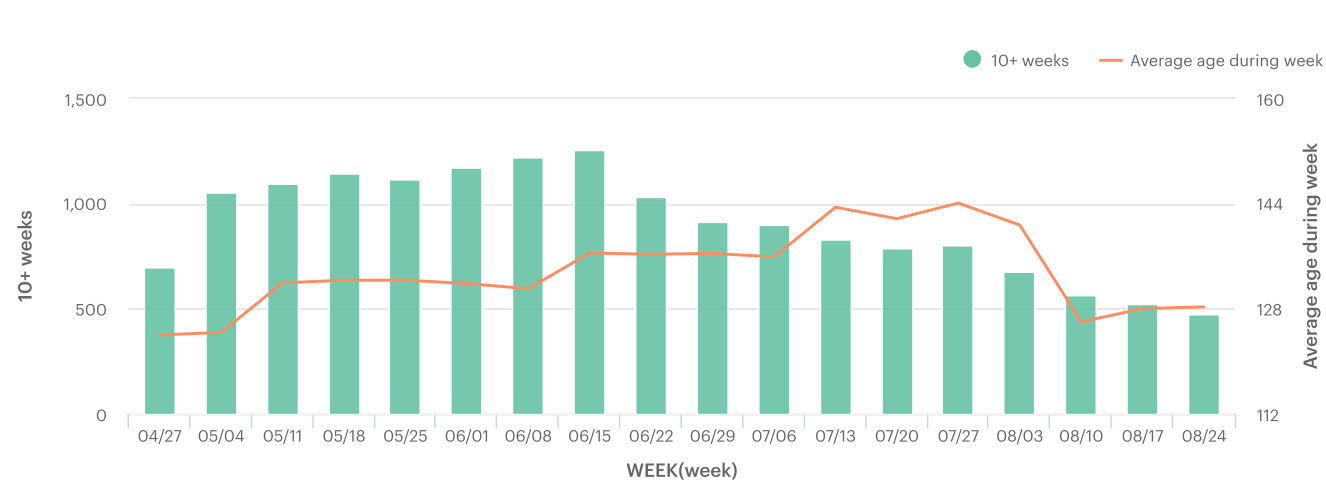
Next, I checked new users signup numbers. The company has two new user type, the active and pending. After new user signup, they need to confirm their registration in their email to get active, otherwise, the status is pending. According to the chart, the active status has a huge drop on July 28th, which is more severe than the drop in pending status. However, both number go up after August 11th. The trend seems normal even with minor drop. There might be a tracking error or some special events happened during these two weeks. What needs to be noticed is the weekly user engagement keeps drop for the rest of times, so there might be two or more reasons caused this problem.

New User Weekly

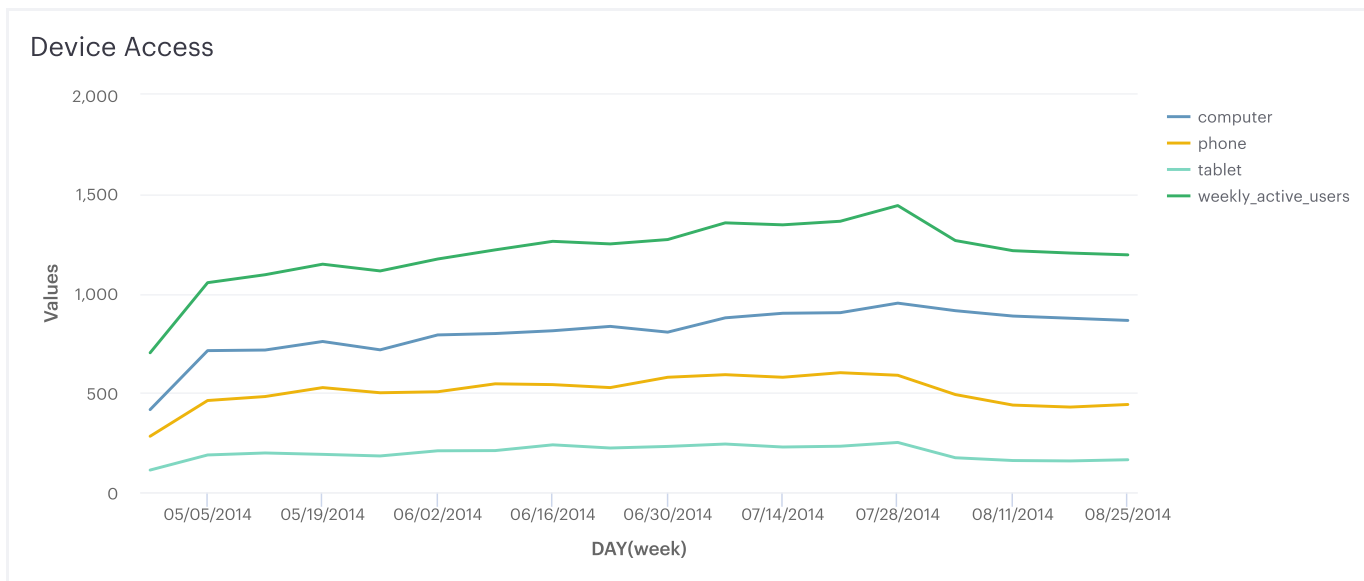


Since growth rate is normal, it's possible that the dip comes existing users as opposed to new users. One way to investigate this is to cohort users based on the time they signed up for the product. The chart below shows a decrease among users who signed up more than 10 weeks and it drops after the week 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. Even with the increase trend of new users signup, it still drops quickly at the end of July.

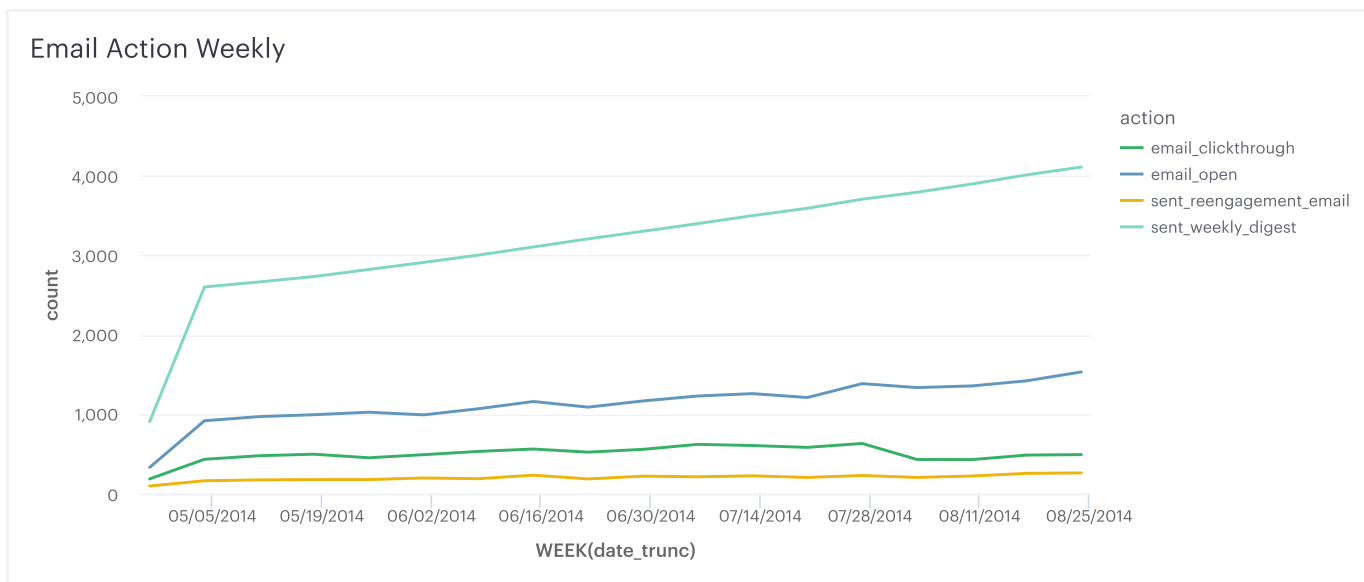
Retention Rate by User Age



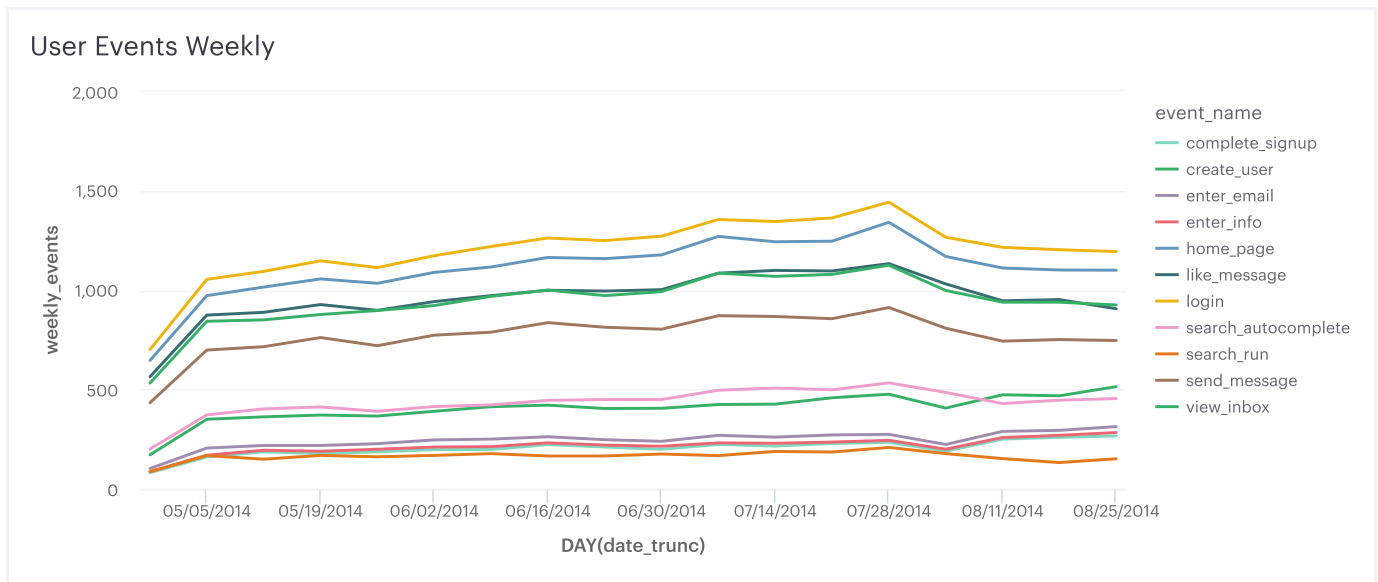
After digging the user segmentation, I check the access on different devices and whether there is a tracking issue on particular device type. Based on the chart, it seems like the phone and tablet causes the drop in weekly active user engagement. The app on phone and tablet might be unstable or crashed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



After analysis about device type, I dig into the what causes people to engage with product and bring users back into the product. One of the most frequent used metric is click through email. It relates to the retention of long-time user. From the chart, it is clearly to see that only the email click through rate drops 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 mainly comprised by long-time users, 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

So far, after investigation, it appears that the problem has to do with long-time-users, mobile and tablet app, and digest emails content. The following action will be notify the head of product that the problem is localized in these areas and talk with engineer team to check to make sure something isn't 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 a lot of time in figuring out where to look.

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