

# A Simple Guide to Churn Analysis

## Introduction

Thank you for downloading A Simple Guide to Churn Analysis. The goal of this guide is to make analyzing churn easy, meaning you won't need a Ph.D. in statistics or a complex statistical program. Instead, all you'll need is a program like excel, the ability to perform some simple math, and this guide.

After reading our guide you'll know how to:

If you would like to read more about churn, such as tips and strategies to reducing churn, please check out our blog: <http://www.Evergage.com/blog>

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Over the past 5 years Brian spent a majority of his time working in customer success where he helped develop HubSpot's customer engagement score, analyze customer behavior, and scale the department to handle thousands of customers.

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## Understanding and Calculating Churn

Before we dig into how to analyze churn, it's critical to understand it; from a high level all the way down to how to calculate it and it's impact on the bottom line. Once you have an intuitive understanding of churn it will be a lot easier to analyze and develop strategies to reduce it.

From a high level, churn is the measure of how many customers leave over a set time period. It's used to measure how much revenue you lose through customer cancellations. It's also used to measure the number of users or accounts that cease using your products or services. In either case, churn represents the attrition rate of your customer base.

For subscription based businesses churn is a critical metric as every customer you lose is lost re-occurring revenue.

### **EXAMPLE**

Company ADG has 1000 customers paying \$1,000/month, giving them a monthly reoccurring revenue (MRR) of \$1,000,000 and annual revenues of \$12,000,000. If they have a churn rate of 10%, that means they lose 100 customers, or \$100,000 MRR which is a loss of \$1,200,000 for the year.

As the example illustrates, a lost customer can have a huge impact on your bottom line. This is why many businesses have account managers and customer success managers whose job is to do everything they can to reduce churn. To fully understand the impact a customer success team has, you need to calculate lifetime value (LTV).

### **EXAMPLE**

Company ADG sells a product that costs \$1,000/month and has a monthly churn rate of 5%. The LTV of this product is:  
 $\$1,000 / 0.05 = \$20,000$

Company ADG then hires a customer success manager who reduces churn to 4%, increasing the LTV to:  
 $\$1,000 / 0.04 = \$25,000$

If they have an install base of 1,000 customers, the reduction in churn would equal  $\$5,000 * 1,000 = \$5,000,000$  in increased LTV from their customers.

Please note the above example is a simplified LTV calculation. Feel free to Google "calculate lifetime value" and you'll learn how to include things like Cost of Customer Acquisition (COCA) and Cost of Goods Sold (COGS) as well as find some very complicated ways to calculate LTV. That being said, no matter how you calculate it, a reduction in churn will still equate to massive increases in LTV.

Now that you understand what churn is and how it can impact your bottom line, let's look at how to calculate churn. There are two common methods.

### 1. Customer Churn

Take all the customers you lose during a time frame, such as a month, and divide it by the total number of customers you had at the beginning of the month. You do not include any new sales from that month.

#### **EXAMPLE**

Company ADG had 500 customers at the beginning of the month and only 450 customers at the end of the month. Their churn rate would be:

$$(500-450)/500 = 50/500 = 10\%$$

If your organization prefers, you can use that same method on a different time frame such as quarterly or annually.

### 2. Revenue Churn

Take all your monthly reoccurring revenue (MRR) at the beginning of the month and divide it by the monthly reoccurring revenue you lost that month minus any upgrades or additional revenue from existing customer (net new sales in the month don't count). The reason you subtract additional revenue from existing customers is because you want to know how much total revenue you lost and additional revenue is actually revenue you gained.

#### **EXAMPLE**

Company ADG had \$500,000 MRR at the beginning of the month and only \$450,000 MRR at the end. They also had \$65,000 MRR in upgrades that month from existing customers. Their churn rate would be:

$$(\$500,000 - \$450,000 - \$65,000)/\$500,000 = (-\$15,000)/\$500,000 = -3\%$$

Note the negative revenue churn rate means you actually gained revenue that month!

As before you can choose a different time frame, such as quarterly or annual. Just remember that if you do, you'll need to look at quarterly or annual reoccurring revenue, not monthly.

It's important to note that customer churn and revenue churn aren't always the

#### **EXAMPLE**

Company ADG has 2 product lines:

**Basic:** 5000 customers, \$500/month per customer = \$2,500,000 MRR

**Premium:** 1000 customers, \$1250/month per customer = \$1,250,000 MRR

This gives them a total of 6,000 customers and \$3,750,000 MRR

In a month, 180 Basic customers and 20 premium customers churn

#### **Customer Churn**

$$(180 + 20)/6,000 = 200/6,000 = 3.33\%$$

#### **Revenue Churn**

$$((180 * \$500) + (20 * \$1250))/\$3,750,000 =$$

$$(\$90,000 + \$25,000)/\$3,750,000 = \$115,000/\$3,750,000 = 3.07\%$$

same.

The problem will only get worse if you have more product lines or the price difference between product lines is greater. To prevent internal confusion, it's very important to clearly communicate which method you'll use.

It's also important to note that you may need to use both calculations as you manage your customer success team. Revenue churn is a great way to report on performance as well as understand the financial health of your customer base. Customer churn is important for staffing reasons as an employee can only manage so many accounts at one time.

In the examples above we mention that you can calculate churn over a monthly, quarterly, or annual time frame. However, before you start using the formulas over different time frames, there is a critical caveat you need to understand.

In the monthly calculation, there is an underlying assumption that no customer can churn in the first month. The reason is that you pay for the month upfront. So when you take a snapshot at the beginning of the month and then divide that by the total number of churned customers from that month, you don't have to worry about any new sales churning in that time period.

Assuming the same model, if we calculate churn over a quarter we could run into a problem. The reason is that there will be some new sales from the first month in the quarter that could churn in the second or third month of the quarter. If those churns are accidentally included in the calculation, then we'll overstate churn.

**EXAMPLE**

Company ADG wants to calculate quarterly churn.

**Month 1:**

1000 customers at the beginning of the month and 50 churn, leaving 950 customers at the end (refer to this as Cohort A); 100 new sales (refer to this as Cohort B).

**Month 2:**

Of the 950 customers in Cohort A, another 50 churn, leaving 900; of the 100 in Cohort B, 5 churn, leaving 95; another 100 new sales this month (call this Cohort C)

**Month 3:**

Of the 900 customers still in Cohort A, another 50 churn, leaving 850; of the 95 customers in Cohort B, 5 more churn, leaving 90; of the 100 customers in Cohort C, 5 churn, leaving 95.

The summary is:

Cohort A – begins Month 1 with 1000 customers; ends Month 3 with 150

Cohort B – Begins Month 2 with 100 customers; ends Month 3 with 90 customers

Cohort C – Begins Month 3 with 100 customers; ends Month 3 with 95 customers

If we look over the quarter, our initial cohort of 1000 customers only has 850 customers remaining, giving a customer churn rate of  $150/1000 = 15\%$

During that same time frame, there were 300 new sales, of which 15 churn. If you included those 15 churns in your calculation, you'd have  $165/1000 = 16.5\%$

To get around this problem, you have to exclude all churns from new sales. If you do that, you get the churn rate of Cohort A, which was our install base at the beginning of the quarter. This method gives you the true churn rate, without replacement, of your customer base over a quarter.

The one issue with that solution is that some of you may want to include the churn rate of Cohorts B and C. If that is the case then you'll want to use the weighted average.

**EXAMPLE**

Cohort A – 1000 customers; churn rate of 15%

Cohort B – 100 customers; churn rate of 10%

Cohort C – 100 customers; churn rate or 5%

$$[(1000 * .15) + (100 * .1) + (100 * .05)] / (1000+100+100) = [150 + 10 + 5] / 1200 = 165 / 1200 = 13.75\%$$

As you can see, it's still relatively simple to include new sales and their churns during the quarter too. Just make sure you explain this to your operations team, or whoever does reporting for you, so they know exactly what you want and how to report it!

One last fundamental aspect of churn is that it will vary depending on customer stage in their lifecycle. It's very typical to find customers will churn at a higher rate during the beginning of their subscription compared to a few months in. This can happen for a variety of reasons such as poor expectation setting during sales, sudden shift in priorities, poor onboarding program, poor support, etc. As customers mature, their churn rate will stabilize. Because of this, it can be important to calculate churn for newer customers separate from older customers, so you don't overestimate the steady churn rate and underestimate early stage churn rates.

## Analyzing Churn

Now that you have a solid understanding of churn, the next step is to learn how to analyze it. There are 2 reasons:

1. Before you try to improve your churn rate, you need to identify problem areas so you can focus and prioritize
2. Once you implement programs, you need to know if they're working

While there are many ways to track and analyze churn, we are going to focus on the three most common methods, cohort reports, churn by customer age, and churn by customer behavior.

### Cohort Reports

A cohort report analyzes various cohorts of your customer base and their churn rate over time. A cohort of customers is the segment of customers who purchased in a certain time frame. A common cohort used would be customers who purchased in a specific month, for example your January 2012 cohort would be all the customers who closed that month.

There are two major benefits to using cohort reports. The first is that it produces a clean number, not influenced by new customer acquisition. For example:

#### **EXAMPLE**

Company ADG calculates their churn rate over 3 months.

##### **Month 1**

1000 existing customers; 50 churn; 100 new customers

$50/1000 = 5\%$  churn

##### **Month 2**

1050 customers (1000 from month 1 – 50 churned + 100 new); 40 churn; 100 new

$40/1050 = 3.8\%$  churn

##### **Month 3**

1110 customers (1050 – 40 + 100); 40 churn; 100 new customers

$40/1110 = 3.6\%$  churn

In the example churn fell from 5% to 3.6%. Why did this happen though? Is it because newly acquired customers are churning at lower rates? Is it because the older customers have matured and stopped churning? Is it something else? With cohort reporting, it's much easier to understand where the change is coming from.

The second benefit to cohort reporting is that it enables you to identify patterns in your customer base.



Cohort	Month Since Purchase							
	0	1	2	3	4	5	6	7
1-Jan-2012	100%	81%	75%	71%	66%	65%	65%	63%
1-Feb-2012	100%	84%	79%	74%	68%	66%	65%	
1-Mar-2012	100%	86%	80%	73%	69%	67%		
1-Apr-2012	100%	85%	79%	75%	70%			
1-May-2012	100%	94%	90%	88%				
1-Jun-2012	100%	93%	90%					
1-Jul-2012	100%	95%						
1-Aug-2012	100%							

The chart above is a sample cohort report. The way to read it is that customers who bought in a cohort, like January 2012, had a 100% renewal rate in month 0 (which is the month they bought, so it's impossible to churn), 81% of them were retained in month 1, 75% of the original number from month 0 were retained in month 2, 71% of the original number from month 0 were retained in month 3, and so on.

We then layered a heat map on top of this, which creates the color. The way that works is the closer you are to 100%, the greener the box. The further away you get from 100%, the yellower the box. As 63% is the lowest number in the chart, that box is completely yellow.

With just a glance an obvious pattern emerges with the May cohort as there is a clear difference in the color. The way to interpret that is that customers who bought in May, and later, have higher retention rates, or lower churn rates, compared to earlier customers. Now you can dig into what happened in May to understand why. Did you create a new documentation site; improve your onboarding process; release a new version of the product? Once you figure out what lead to the increased retention try to improve on it!

You don't always have to be reactionary like in the example above. You can also keep an ongoing cohort chart that you annotate with major events and strategies. Over time, you can then use this to measure if they had any impact on your retention or churn rates. For example, if you have an annotation that says you released a major update in May, the chart above is pretty solid evidence your update is improving retention or decreasing churn.

It's also important to note you can find other patterns this way. For example maybe one or two cohorts are performing well above or below the average:

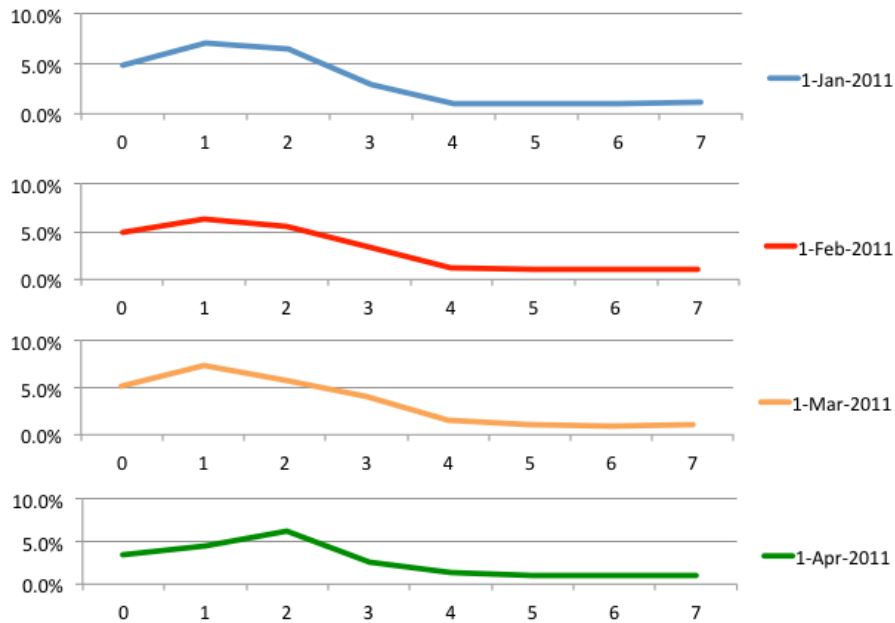
Cohort	Month Since Purchase							
	0	1	2	3	4	5	6	7
1-Jan-2012	100%	81%	75%	71%	66%	65%	65%	63%
1-Feb-2012	100%	93%	92%	89%	81%	78%	76%	
1-Mar-2012	100%	86%	80%	73%	69%	67%		
1-Apr-2012	100%	95%	90%	90%	85%			
1-May-2012	100%	83%	77%	70%				
1-Jun-2012	100%	81%	75%					
1-Jul-2012	100%	84%						
1-Aug-2012	100%							

This could indicate that your marketing team did a great job getting higher quality leads, or maybe your sales team did a better job setting expectations, or your customer team gave those customers more attention, etc. While this report can't tell you exactly why those cohorts did better, through investing what is common across those two cohorts, you might learn something surprising that will help reduce churn for the entire customer base.

Another possible pattern you might see is that after a certain time frame retention rates flatten out for everyone. This is a pretty clear indicator that your customers who make it past that time frame are mature and tend not to churn:

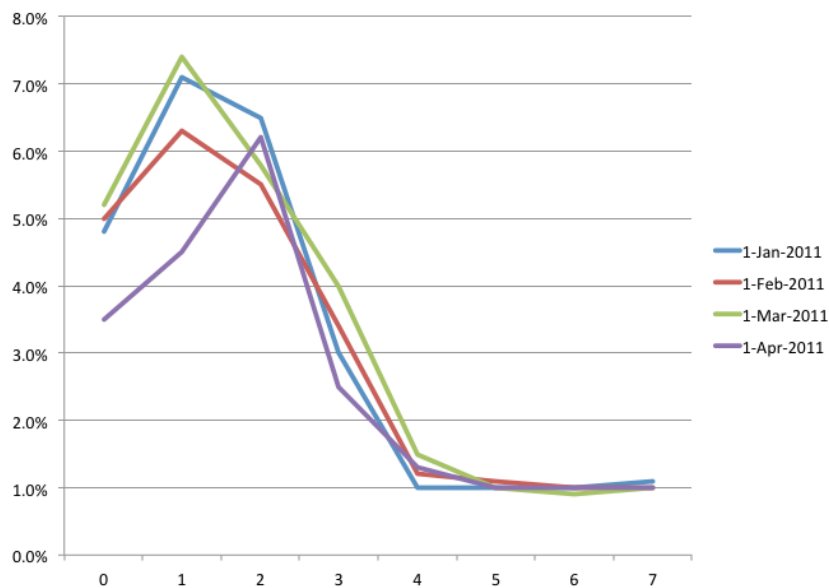
Cohort	Month Since Purchase							
	0	1	2	3	4	5	6	7
1-Jan-2012	100%	81%	75%	73%	66%	65%	65%	63%
1-Feb-2012	100%	82%	77%	74%	65%	64%	64%	
1-Mar-2012	100%	86%	80%	73%	67%	67%		
1-Apr-2012	100%	88%	82%	77%	66%			
1-May-2012	100%	83%	77%	70%				
1-Jun-2012	100%	81%	75%					
1-Jul-2012	100%	84%						
1-Aug-2012	100%							

As you can see, both in looking at the numbers and through the heatmap, churn after month 4 is pretty low. This type of cohort reporting is very effective. However, if you prefer to look at graphs as opposed to charts of numbers, you can easily do so. For example:



In the above chart we're comparing 4 cohorts between January and April. The y-axis is the churn rate and the x-axis is age in months. In this graph, you can easily see that at month 4, churn falls to ~1% for each of the cohorts. As you probably noticed, this pattern is much easier to see in a graph as opposed to the charts presented above. Viewing the data this way also makes it easy to see other the other patterns we discussed above.

Stacking charts like that is very effective, but it can be difficult to analyze a bunch of cohorts as you'll have a running report that wont fit on a single page. Therefore, you can also stack the lines:

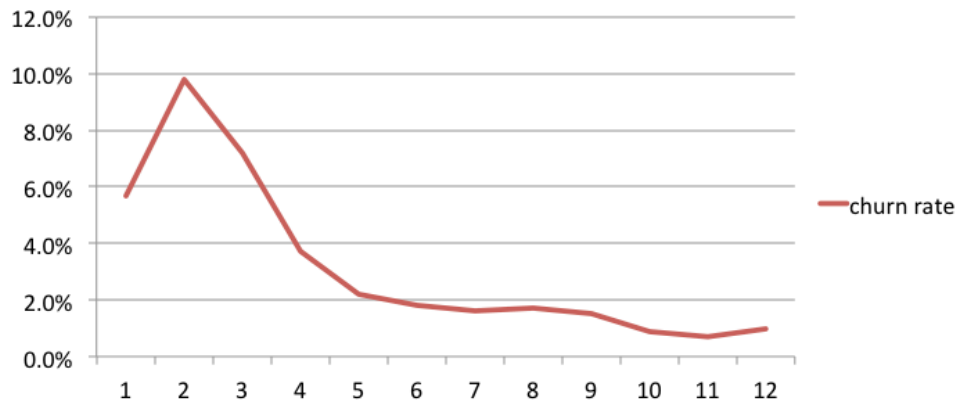


No matter which method you use to display a cohort report, it is a very powerful way to analyze your customer base. It not only makes it very easy to interpret the

data, but it also gives you very clear and accurate insight into the performance of your customer base.

### Churn by Customer Age

Another popular way to analyze churn is through grouping your customers together by age. For example, you could measure the churn rate of all customers during their first month of service, second month, and so on. It would look like:



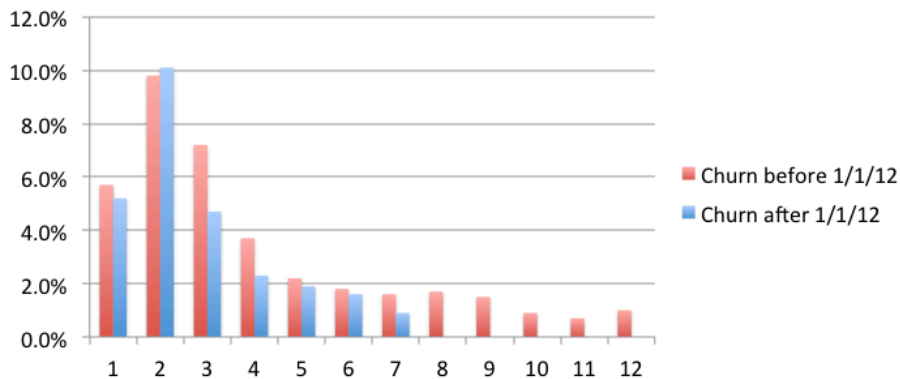
The way to read this chart is that across all your customers, you have a churn rate of ~6% during their first month of service, approximately 10% in their second, and by the 5<sup>th</sup> month churn stabilizes at around 2% or lower.

One of the major reasons for analyzing churn this way is to identify patterns across all customers, by age, regardless of cohorts. The benefit to doing this is that in a cohort report, the more cohorts you track, the harder it is to analyze. If you've been in business for years, you could have 100's of cohorts, so imagine stacking that many lines or charts! When you group customers together in this way, you can analyze all your customers in a single chart.

When you look at churn this way, it helps you understand the churn rate as your customers age. You can then use this data to try and resolve the problem. For example, in the chart above, churn is high for the first 120 days, so you can try to focus on improving your onboarding process, or cleaning up documentation, or training your onboarding experts more, and so on. If you track the reason why someone churns, you can also look at that data just for customers that churned in the first few months to try and understand why.

You may also notice bumps in churn several months in, say 6 and 12 months. This primarily happens if you have semi-annual and annual contracts that are up for renewal. You may also notice churn spiking at other time frames, in which case you'll need to investigate further. But at least you discovered there was a problem so now you can address it.

Another benefit to creating charts like this is you can easily measure the impact of your churn reduction strategies. All you need to do is compare all customers before a cut-off date to all customers post a cut-off date, and see which performs better. To illustrate this, let's continue pulling the thread in the example chart above, where churn is high in the first 4 months. Let's see what the data could look like if you improved your help and documentation site for new customers on 1/1/2012:



We went with a bar chart over a line graph this time so it's much easier to compare numbers. The red bar is the churn rate for all customers that closed before 1/1/2012 (which is the date the new documentation site went live). The blue bar is the churn rate of all customers who bought after 1/1/2012 and used the new document site. As you can see, months 1 and 2 were largely unaffected, however in months 3 and 4, churn dropped a fair amount. This shows that your improved documentation has helped prevent some churn in the first few months, but not all. Seeing data like this would make me think that the documentation site improvements are good, but there is something else going on in months 1 and 2, such as difficulty during set-up, that is causing churn. You can then dig deeper and investigate further.

Another thing of note on the chart is that the blue bars stop after 7 months. The reason is we're only tracking customers that purchased in January, so none of them are older than 7 months! Another important implication of this is that your sample sizes for the blue lines, especially in months 6 and 7, are going to be very small, as you're basically looking at a single month or two worth of sales, compared to the red bar which has your entire history of customer until 1/1/2012. So, you might want to include the sample sizes for each bar in the chart so people reading it are made aware of that fact.

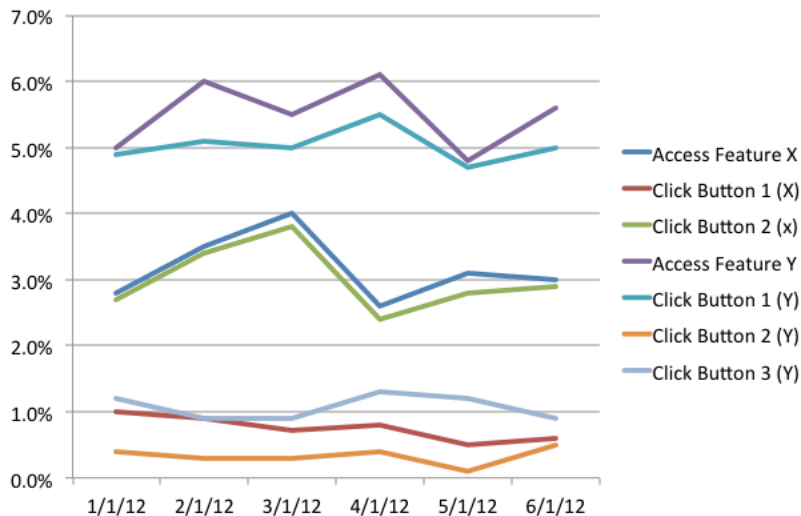
### Churn by Customer Behavior

In addition to analyzing churn by different cohorts or customer age, you also need to analyze churn by customer behavior. What this means is you need to look at customers who use a certain feature or complete a certain action and determine it's impact on churn. There are many benefits to performing this kind of analysis:

- Product may decide to focus on developing and improving features that retain customers
- Alternatively, your product team may dig into why certain features have a high churn rate to determine if they can fix the issue
- Your customer team could work on promoting features that retain customers
- You can use this data to develop a customer engagement score

The reports you need to create are simple. The time consuming part is dependent on how granular you get. For example, if you track just accessing an app and it's impact on churn, you would only need to build a single report for each app you have. On the flip side, accessing an app doesn't tell you much (for example did they really do anything with the app or get value from it?). So, you could choose to get more granular and track various button clicks in an app, or combinations of button clicks, and so on. Talk with your engineering team to see if they are able to get this data for you or if you need to use software designed to track user behavior. If you are able to get that granular, it is well worth the time as you'll have a true understanding of what behaviors lead to retention and churn.

Once you decide what you want to test, the next thing is building your reports to see what impacts churn. For example:



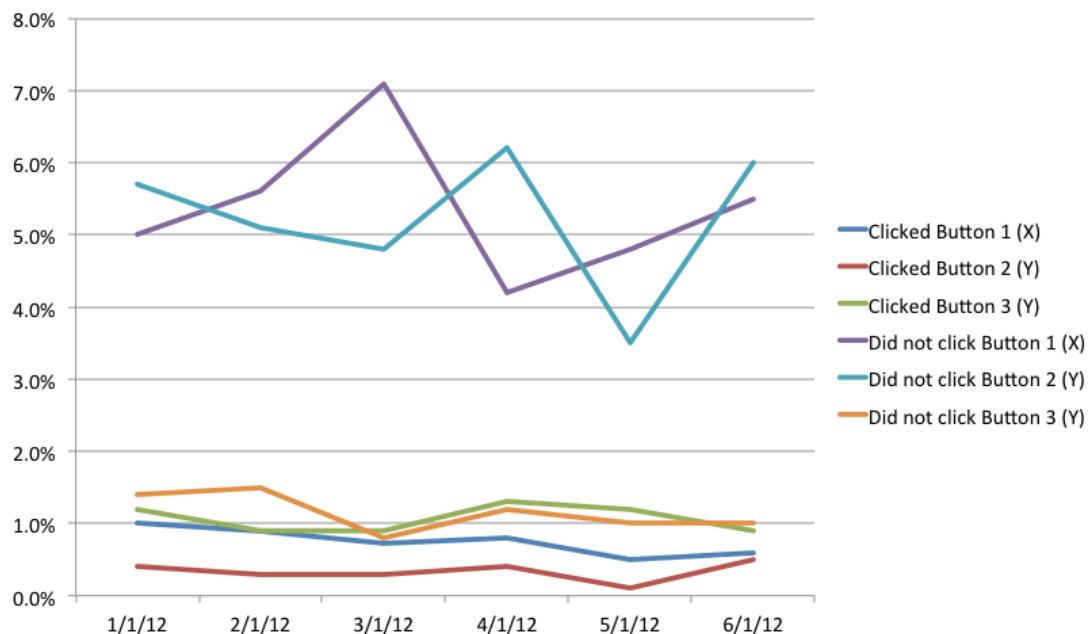
The way to read this chart is each line represents customers who accessed a feature (X or Y in this case) or completed some action in the feature (for example clicking a button) during the month in question, and what their churn rate was in that month. For example, you would say of the customers who accessed Feature X in March of 2012, their churn rate that month was 4%. To create a chart like this, I recommend you use excel as it's easy to segment your customers into segments based on their behavior and then using the customer churn formula presented earlier in this guide, you can calculate the churn rate for those segments over time.

When you look at the chart above, 3 activities jump out as having consistently low churn – if you click button 2 or 3 on feature Y and if you click button 1 on feature X. While this is great evidence that customers who use those features won't churn, we need to dig deeper. The reason is that correlation doesn't always relate to causation:

#### EXAMPLE

There were studies done that found women who were taking hormone replacement therapy (HRT) also had lower-than-average incidents of coronary heart disease (CHD). This lead doctors to believe that HRT protected against CHD. Later research found this wasn't the case at all because women on HRT tended to come from better socio-economic groups and therefore had better diets and exercise habits, which is what really impacted CHD (find the study here: [http://en.wikipedia.org/wiki/Correlation\\_does\\_not\\_imply\\_causation](http://en.wikipedia.org/wiki/Correlation_does_not_imply_causation)).

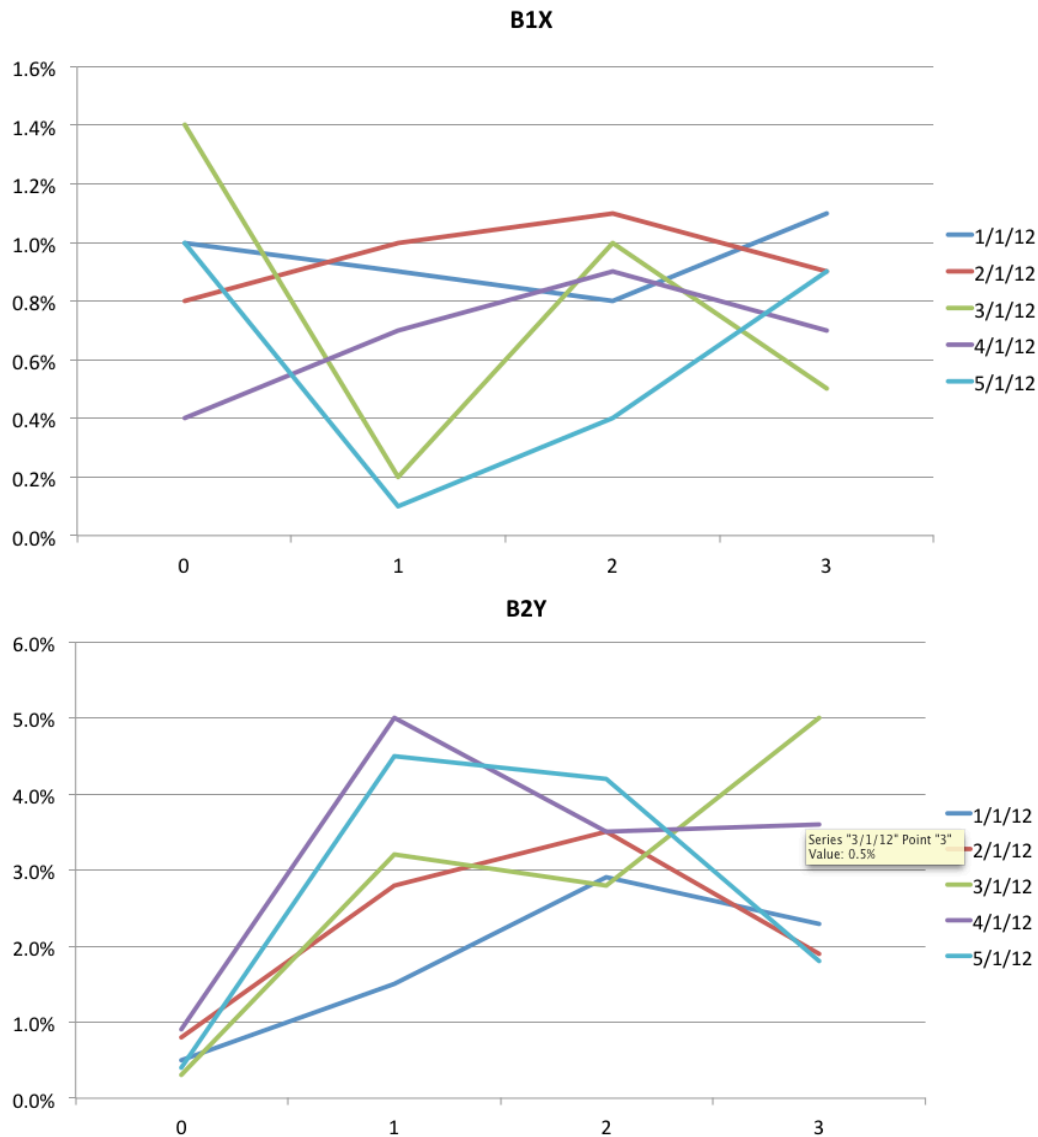
To make sure you don't fall into the same trap as the doctors in the example above, we need to dig a little deeper to determine if those actions truly cause a reduction in churn or not. The first step to doing so is comparing the churn rates above with customers who don't use those features, and what their churn rate is:



In the chart above, you can easily see that customers who used button 1 on feature X (B1X) and button 2 on feature Y (B2Y) had very low churn rates, while those customers that didn't had very high churn rates. At the same time, customers who use button 3 on feature Y had a low churn rate and customers who didn't use that button also had a low churn rate. This means button 3 on feature Y doesn't really impact churn, however the other two buttons have a much clearer impact on churn. I wouldn't declare victory just yet though.

Now we need to dig a little further into B1X and B2Y as the charts above do not answer the question of whether or not using those buttons in a month will reduce

churn over the next few months, or just in the month the button was used. For example, maybe those buttons are set-up related and customers who are actively getting set-up don't churn, but once set up is complete their churn rate goes up over the next few months. Or maybe these buttons are rarely used, so while a customer might not churn in a month they use them, in subsequent months their churn risk goes up. To address these concerns we need to move back to cohort reporting:



If you look at the B1X chart, you can see that churn for customers who use Button 1 in Feature X have a very low churn rate in the month they use the feature (month 0), and they continue to have a low churn rate over the next 3 months. Whereas customers who use Button 2 in Feature Y have a low churn rate in month 0, but it shoots up after that. These are pretty good indicators that getting customers to use B1X should decrease churn, whereas getting customers to use B2Y will help reduce churn in the short term, but the effects won't last. To wrap up the analysis, you should complete a cohort report for customers that don't use B1X, just to make sure there is true causation, and not just correlation.



Using the reports and processes above should allow you to determine, with confidence, what user behavior leads to a reduction in churn. In addition to looking at simple user behavior, like clicking a button or accessing a feature, you should consider analyzing:

- **KPIs** – What kind of key performance indicators can you use? For example, if you're a recruiting platform, you should figure out if having 10 open requisitions in the system means lower churn than 5 requisitions; if you're a blogging platform you should look analyze frequency of blog posts or total blog posts for the life of a customer; and so on.
- **Patterns** – what patterns of usage can reduce churn? For example, do people who use Feature 1 and Feature 2 have a low churn rate? What about customers who completed at least 50 actions in a month or access 4+ features in a month? What about customers who call support more than once in the 1<sup>st</sup> month? Or more than 10 times total?
- **Employee Behavior** – if you have a high touch sales and/or onboarding process, you should determine churn by employee. You should also discover the impact on churn by various behaviors, such as time between closing the sale and first point of contact with the customer, or length of time between touch points, or subject matter covered on calls, etc.

While those are examples, now that you know how to slice and dice churn data, just start exploring and see what you can do to reduce churn.

## Final Thoughts

After completing your analysis, hopefully you'll know what you can do to reduce churn. Now it's time to start promoting the user behavior and employee behavior that will impact churn. Maybe you can use in-context messaging to better promote customer behavior that reduces churn. Maybe you can incent your customer team to promote certain features and applications that will reduce churn. Your product team could start making your top apps more visible and easier to use. Your marketing team could create collateral to promote those features, and so on. Now that you know what impacts churn you've opened the door to numerous possibilities to reducing it.

No matter what strategies you choose, it's important to measure their impact. So, as you roll out your plan, make sure you have reports ready to go that will help you track your customer base, such as % of new customers or total customers that use a certain feature and how it grows over time. Another option, and our favorite at Evergage, is to develop a customer engagement score that rolls up all the features and behavior you want to track into a single number. This will make it a lot easier to monitor and measure your customer base.

Good luck with your churn analysis! Check [Evergage.com](https://Evergage.com) again soon as we'll be releasing more e-books on churn, customer engagement, and data analysis.