What is churn?
How does it affect your business?
How do you measure it?
The most important metric for an online business is Revenue; the second most important is Churn. Your churn rate impacts your customer lifetime value, the profitability of your marketing channels and even the long-term sustainability of your entire business.

From our perspective, that’s pretty darn critical. Investors seem to agree: whether you’re looking for VC or public market funding, churn is one of the primary metrics investors look at.

In this white paper we’ll go over what exactly your churn rate is, help you understand how it impacts your business, and work through the technical details of measurement. In future white papers we’ll delve into specific tactics you can take to improve your churn rate and case studies of customers who have used churn rate to make tactical improvements in their businesses.

What is churn?

Churn is a way of expressing recurring customer attrition. If you had 100 customers at the beginning of the month and during the month 5 of them cancelled their subscriptions, that equates to a 5% customer churn rate (5/100).

In the same scenario, let’s say that you were earning $10,000 / month from those 100 customers. But the five customers you lost were actually some of your best customers and were paying more than your average customers. If those 5 customers were worth 1,000 of revenue, then your revenue churn rate is 10% ($1,000 / $10,000).

As you can see, there are multiple ways of expressing churn. How you choose to express it depending on the specific question you’re asking. Let’s take a quick look at your options.

Customer vs revenue churn

You can view churn as the number of customers churning in a period or the amount of revenue you lose from those customers in that period. Viewing churn on a customer count basis is valuable as an indication of customer satisfaction with your product or service, whereas viewing churn on a revenue basis gives a better indication of its impact on your financials.
Absolute vs percentage churn

Churn can be measured in absolute terms or as a rate. Measuring churn as a rate is valuable to benchmark your performance as your company grows, whereas measuring it in absolute terms helps to understand its impact on your business today.

If you want to calculate your churn rate, use the following formulas:

\[
\text{Churn Rate} = \frac{\text{# of customers lost in period}}{\text{# of total customers at beginning of period}}
\]

\[
\text{Churn Rate} = \frac{\text{$ of recurring revenue lost in period}}{\text{$ of total customers at beginning of period}}
\]

Using churn in different businesses

Businesses that sell products with a subscription—cable TV, a wine club, cloud software—require customers to proactively cancel their accounts. In these businesses, cancellation is referred to as a “churn event”.

In other businesses a churn event is less obvious. In traditional retail and ecommerce, companies define churn events based on the needs of their business. For example, if an active customer fails to make a purchase for a pre-defined period of time, they can be said to have churned.

If you’re a traditional or online retailer, churn is still a very powerful metric for understanding and optimizing your business. There is just some additional analysis you need to perform in order to define what a churn event looks like for you.

Choosing your measurement period

When measuring churn, there is always a temporal dimension, i.e. “3 customers churned in the past month” or “25 customers cancelled in the past quarter.” Simply stating that 25 customers cancelled is not meaningful.

When determining your measurement period, make sure to choose one large enough to minimize huge statistical variance. If you only get 10 churned customers a month, don’t attempt to measure daily churn.
Additionally, don’t choose a period that is overly long. Since the denominator is the number of customers at the beginning of the period, a large change in that metric within a measurement period can produce skewed numbers.

How does churn affect my business?

We made the ambitious claim at the beginning of this white paper that churn is the second most important metric for online businesses. Why exactly is that?

Churn acts as a speed limit on revenue growth, and the effect grows as the company gets larger. David Skok does a great job of explaining this on his blog:

As a company becomes larger, the size of the customer base becomes large enough that any kind of churn against that base becomes a large number. That loss of revenue requires more and more revenue coming from new customers just to replace the churn. As a result growth slows substantially.

Let's take a look at a simple chart that illustrates how big of a problem churn becomes as a company grows. In this scenario, the company in question starts with monthly recurring revenue of $10,000, with new monthly recurring revenue increasing by $2,000 each month. Watch as the churn begins to approach the new revenue line over time.
Another way to illustrate the importance of churn is by showing the difference in trajectory between companies with different churn rates. Take a look at the chart below. It shows the total revenue for the two businesses in the scenario above, one with 2.5% churn and one with 5% churn.
The company with 2.5% churn has 50% more recurring revenue than the company with 5% churn after 5 years. And the effect becomes even more significant as a company ages.

Many companies underestimate the problem that churn will eventually become for them as they grow. As a result, they fail to invest the time to measure and manage churn before it becomes a problem. This is a mistake. You need to be proactive about churn mitigation in all stages of your business’s growth.

If you’re interested in the data underlying these charts, we’ve published the spreadsheets used to make them in Google Docs. Please make your own copy and play with the scenarios on the assumptions tab. Put in your company’s monthly recurring revenue, growth, and churn rate and see what you come up with!

**Use churn to understand your customers**

Churn rate is one of the most useful metrics to learn more about your customers. The key here is making sure you can segment your customers by the dimensions that matter. If you’re a retailer, that will often mean demographic groups like age, gender, and geographic location. If you sell to businesses, that will typically mean industry and company size.

As long as you have the right dimensions in place, slice your churn by these dimensions and you’ll uncover incredibly valuable customer insights:

- What if you found out that your churn from customers in non-English-speaking countries was triple the churn from English-speaking countries? It might be time to open non-English customer support centers.
- What if you found out that, while 18-24 year old women converted more frequently, their churn rate was 5x their 25-34 year old counterparts? It might be time to change your Facebook campaign targeting.

Looking at churn this way can be invaluable to your sales, marketing, product, and customer support organizations.
Churn and customer lifetime value

Customer lifetime value is one of the most important metrics for your business, especially when it comes to acquiring new customers. The higher your CLV, the more your marketing team can spend to acquire new customers profitably.

It turns out there is a direct relationship between Churn and CLV. The lower your churn rate, the higher your lifetime value. Here’s the formula:

\[
\text{Lifetime Value} = \frac{\text{Average Revenue Per User}}{\text{Churn Rate}}
\]

This should make some intuitive sense—if your customers churn away more quickly, they’ll end up paying you less than if they stuck around. If you want to get technical, this formula is actually a modified version of the formula for a perpetual annuity in finance. Go ahead, geek out on it.

Let’s look at a quick example. If your average customer pays you $50 / month and your churn rate is 4%, then your customer LTV is $1,250. What happens if your churn rate goes down to 3%? Your LTV moves to $1,666, an increase of 33%. Talk about a huge improvement to your customer economics! This is a perfect illustration of how critical churn rate is to measure and manage for your business.

Combining churn with cohort analysis

Averages, as any introductory statistics teacher will tell you, are dangerous. It’s easy to average the churn rates of 100 customers and come up with a single number. Our original example had 5 customers out of 100 canceling, for a churn of 5%. But what if it turns out that 3 of those customers had just started a month ago, and the other two were still in the first 6 months of their subscriptions?

In this case, looking at a 5% average churn doesn’t help us diagnose the real problem. Let’s look at a chart that makes things much more clear.
Wow! That makes the problem blatantly obvious. This company is having huge churn problems in the initial 6-8 months of a customer’s account, but after that things are settling out to a reasonable 3.5%.

This is a very specific problem: **customer activation**. Customers are signing up and paying, but are never getting fully “activated” and dropping off, unsatisfied. Your longer-term customers, the ones who are successfully using your product, seem to be happy campers.

There are other scenarios that can crop up that are in a similar vein. Some companies find that their customers love the product initially but quickly outgrow it and move on to more sophisticated up-market competitors. Other companies find that their product is implemented on a project basis, and once the product is complete, usually in 4-12 months, churn spikes. The only way to know the answer for your business is to do the analysis.

The technical term for this is **churn cohort analysis**. It compares your entire subscription base on when they started service and shows where the major attrition events occur. Cohort analysis is an amazing tool to uncover hidden trends in your business. [Learn more here.](#)
How do I calculate churn?

Churn is actually fairly tricky to calculate on your operating data, especially if you want to be able to slice it in the ways discussed above. In large part, it will depend on exactly how your data is structured and what you define as a “churn event”. Expect to write quite a few SQL queries (or have your IT folks write them for you).

In the below scenario, we’re going to assume that you’re running an ecommerce store and that you define a churn event as a user not purchasing a product for 90 days. Additionally, we’re going to assume that you’re running on a standard shopping cart platform (like Magento) with a MySQL backend.

In order to calculate your churn rate, the SQL you need to run is actually somewhat elaborate. We’ve inserted comments inline to improve readability.

**Churned users this period**

```sql
SELECT COUNT(DISTINCT last_purchase.user_id)
FROM users
-- Find last purchase date for each user
JOIN
(SELECT MAX(created_at) as date, user_id
FROM `orders GROUP BY user_id) last_purchase
ON users.id = last_purchase.user_id
-- Find users whose last purchase date was in Jan '13
WHERE (last_purchase.date >= '2013-01-01 00:00:00'
AND last_purchase.date < '2013-02-01 00:00:00')
-- Find users whose last purchase date was over 90 days ago
AND (UNIX_TIMESTAMP(NOW()) - UNIX_TIMESTAMP(last_purchase.date)
>= 7776000);
```

**Cumulative users this period**

```sql
SELECT COUNT(`id`) FROM `users`
WHERE `created_at` < '2013-02-01 00:00:00';
```

**Cumulative churned users this period**

```sql
SELECT COUNT(DISTINCT last_purchase.user_id)
```
FROM users
-- Find last purchase date for each user
JOIN
(SELECT MAX(created_at) as date, user_id
FROM `orders GROUP BY user_id) last_purchase
ON users.id = last_purchase.user_id
-- Find total users whose last purchase date was before Feb '13
WHERE last_purchase.date < '2013-02-01 00:00:00')
-- Find users whose last purchase date was over 90 days ago
AND (UNIX_TIMESTAMP(NOW()) - UNIX_TIMESTAMP(last_purchase.date) >= 7776000);

As you can see, not for the faint of heart. And this query won’t help you perform most of the analysis we mentioned above, like segmentation and cohort analysis.

**A shameless plug**

At RJMetrics, we help hundreds of businesses understand their metrics and make data-driven decisions. Our platform imports the data from all the platforms you do business with and then outputs your critical business metrics like customer lifetime value and churn.

Calculating your churn rate is doable without RJMetrics. But calculating your churn rate, slicing it four different ways, running cohort analyses on top of it, and updating all of these reports on a monthly basis? That can be pretty tricky.

That’s where we come in. Let us know if you’d ever like to chat. And thanks for reading.