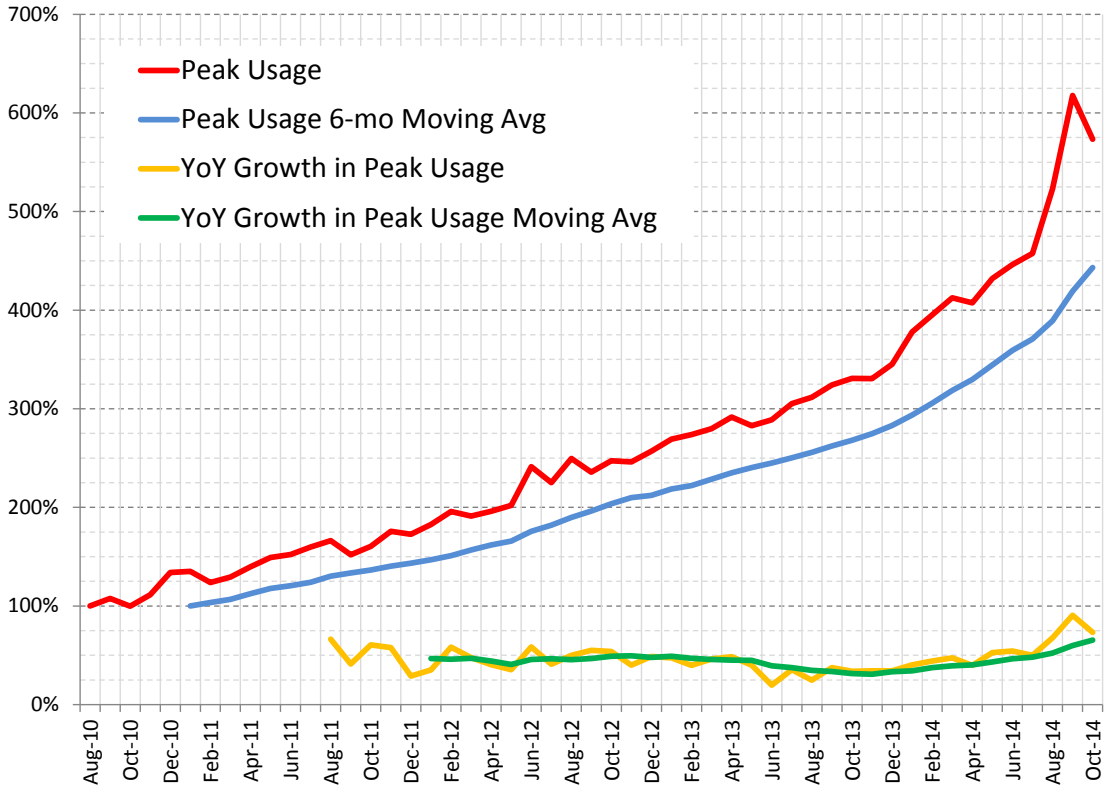
4.3 Bandwidth Consumption – Operator Data

Operator data on bandwidth consumption varies greatly from operator to operator, depending on the data collection methodology, type of examined subscribers, and observation period. The following bandwidth consumption and peak rates are intended to be an example of the trends observed for residential subscribers over the period of approximately 3.5 years. The presented data includes Internet traffic and managed unicast video, but does not include managed broadcast and multicast linear television (TV) (i.e. traditional scheduled non-time-shifted television service).



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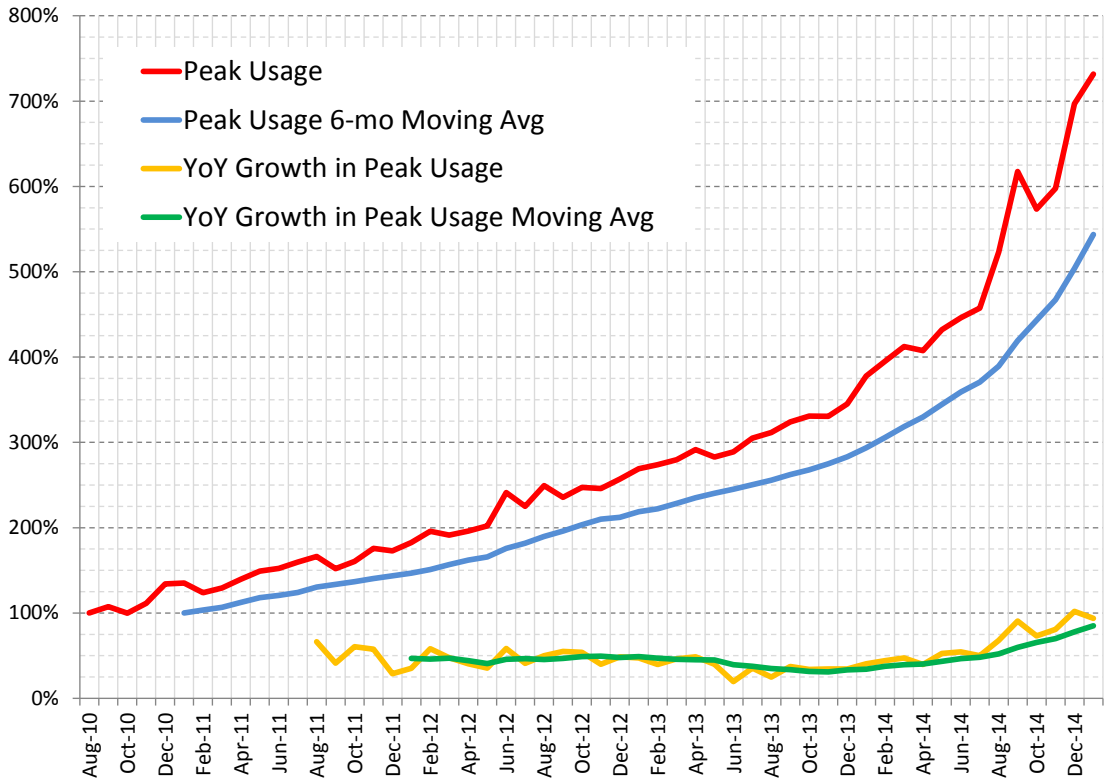

Figure 1: Peak Bandwidth Trends Over a 4-year Period

Figure 15 presents the peak data rate per connected subscriber presented on a month-to-month basis, calculated per month and as a 6 months' moving average, as well as the year-to-year peak usage and a moving average. It is important to note that over the period of 3.5 years the observed peak data rate increased ~6 times, trending very closely to ~50% compounded annual growth rate (CAGR) per year. CAGR in the last 6 months has increased and it is right now reaching almost 100%.

Trending the peak data rate into the future under the assumption of ~50% CAGR year-to-year growth, the peak rate at the year 2020 shows ~70 fold growth when compared with August 2010 peak data rate. For example, if the peak data rate per subscriber in 2010 is around 1 Mb/s, in 2020 the same subscriber would be expected to generate the peak data rate around 70 Mb/s. Note that this compound growth accounts only for a steady increase in the subscriber bandwidth, resulting from increased consumption of digital content, emergence of new subscriber applications, increase in the quality and resolution of video content, etc. Obviously, it does not account for new, revolutionary networked applications that do not exist today and their emergence is very hard to predict in any quantifiable manner.

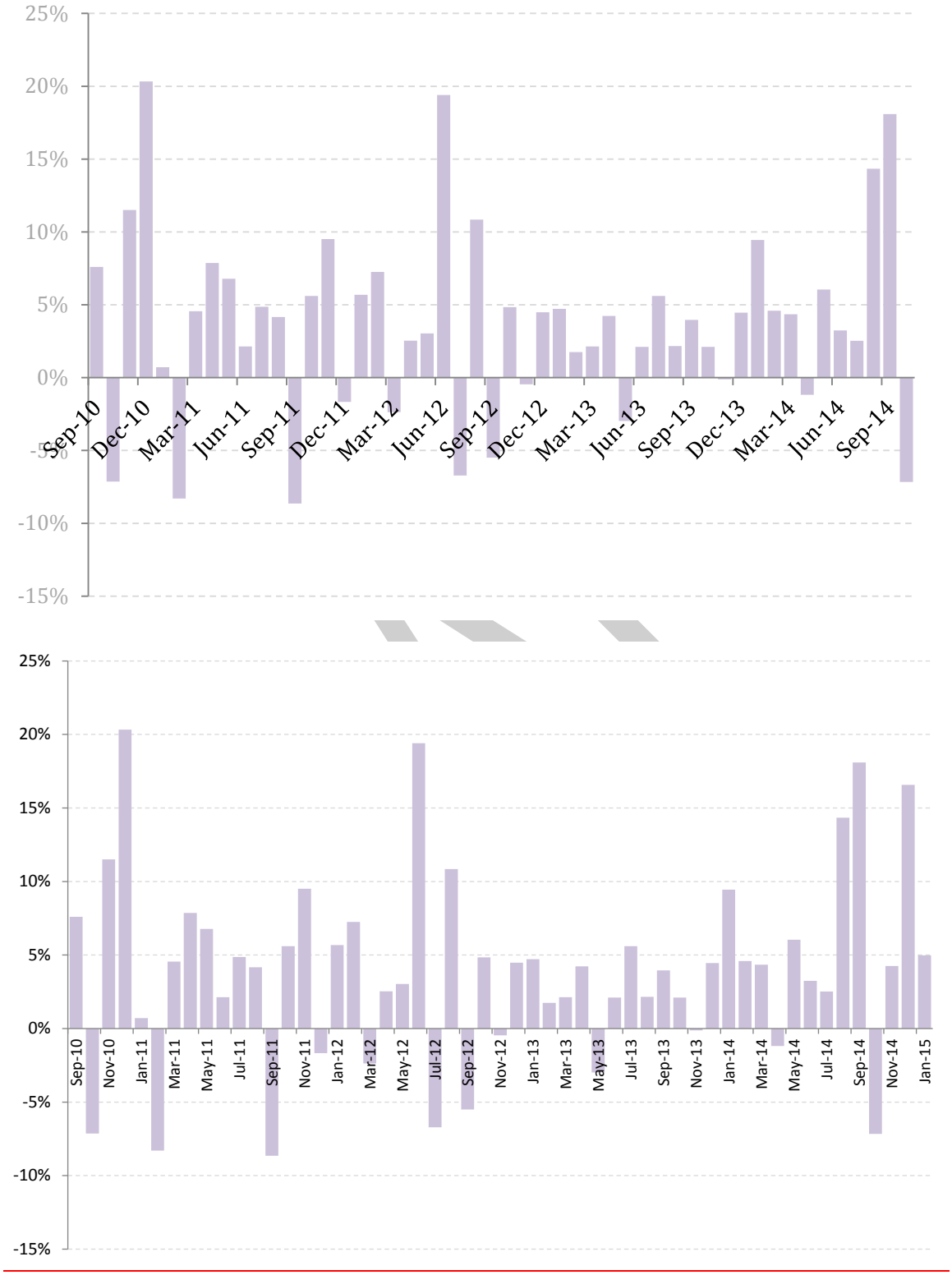

Figure 2: Average Subscriber Month-to-Month Change in Peak-Hour Data Rate

Figure 16 presents the month-to-month variations (as a percentage) of the peak-hour data rate consumed by an average subscriber in the examined network. The two major positive changes observed in December 2010 and June 2012 are the result of two events: changes in the offered subscriber data rates (increase) to a larger number of subscribers in the network footprint. The August/September 2014 change is mainly related to network architecture changes and are due to a new direct connect to Netflix Content Delivery Network (CDN), dramatically improving video quality and generating more traffic on average without increase in the number of connected subscribers or offered data rates. Overall, there is a steady trend to see month-to-month increase in peak data rate consumed per connected subscriber, mainly attributed to more diverse, video-rich content, rather than increase in the number of connected subscribers, which increased only by ~20% over the examined period of time.