



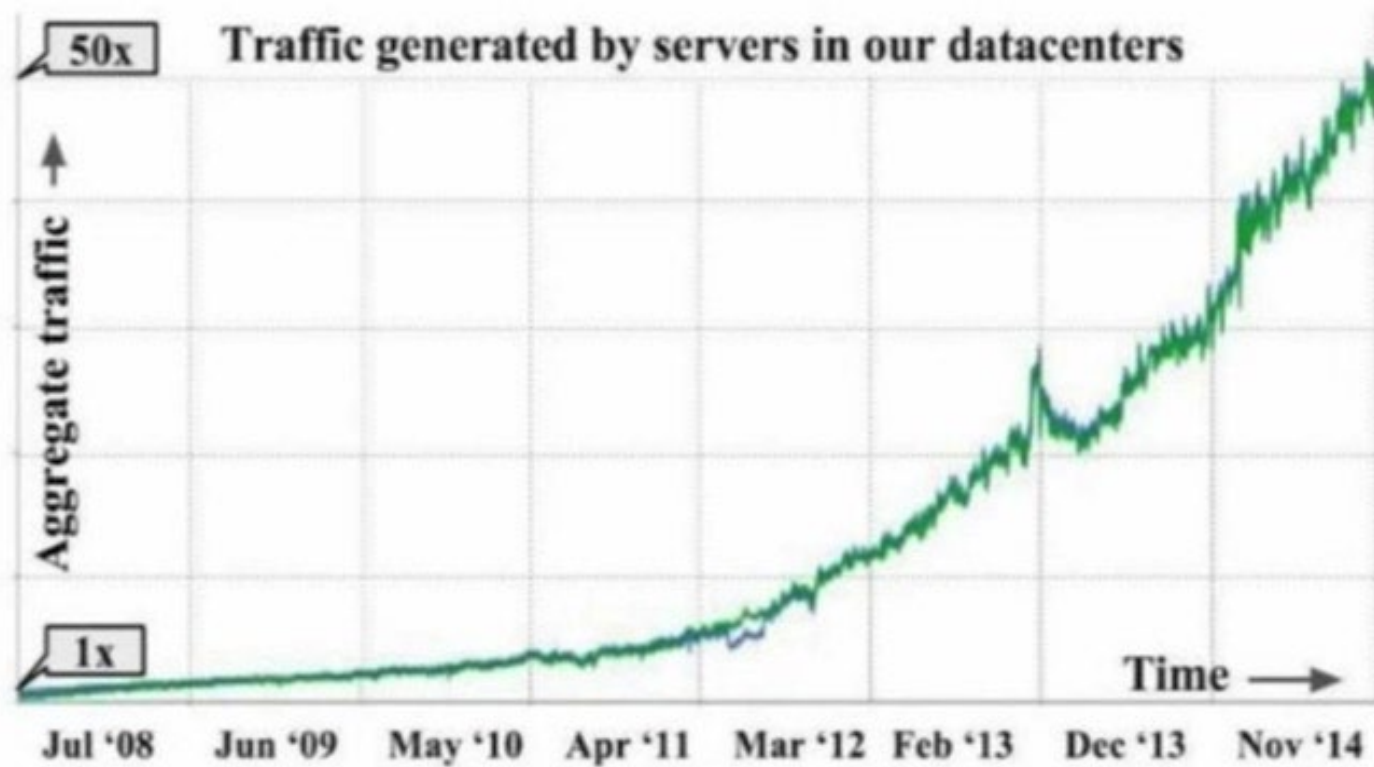
Traffic Growth in Telecom Networks and Mega Datacenters

Analysis of available data, estimates and assumptions

Vladimir Kozlov | April 9, 2019

Example of data on traffic growth: Google

Good data is hard to find. This is the best chart for traffic inside mega datacenters so far.



50x in 6 years

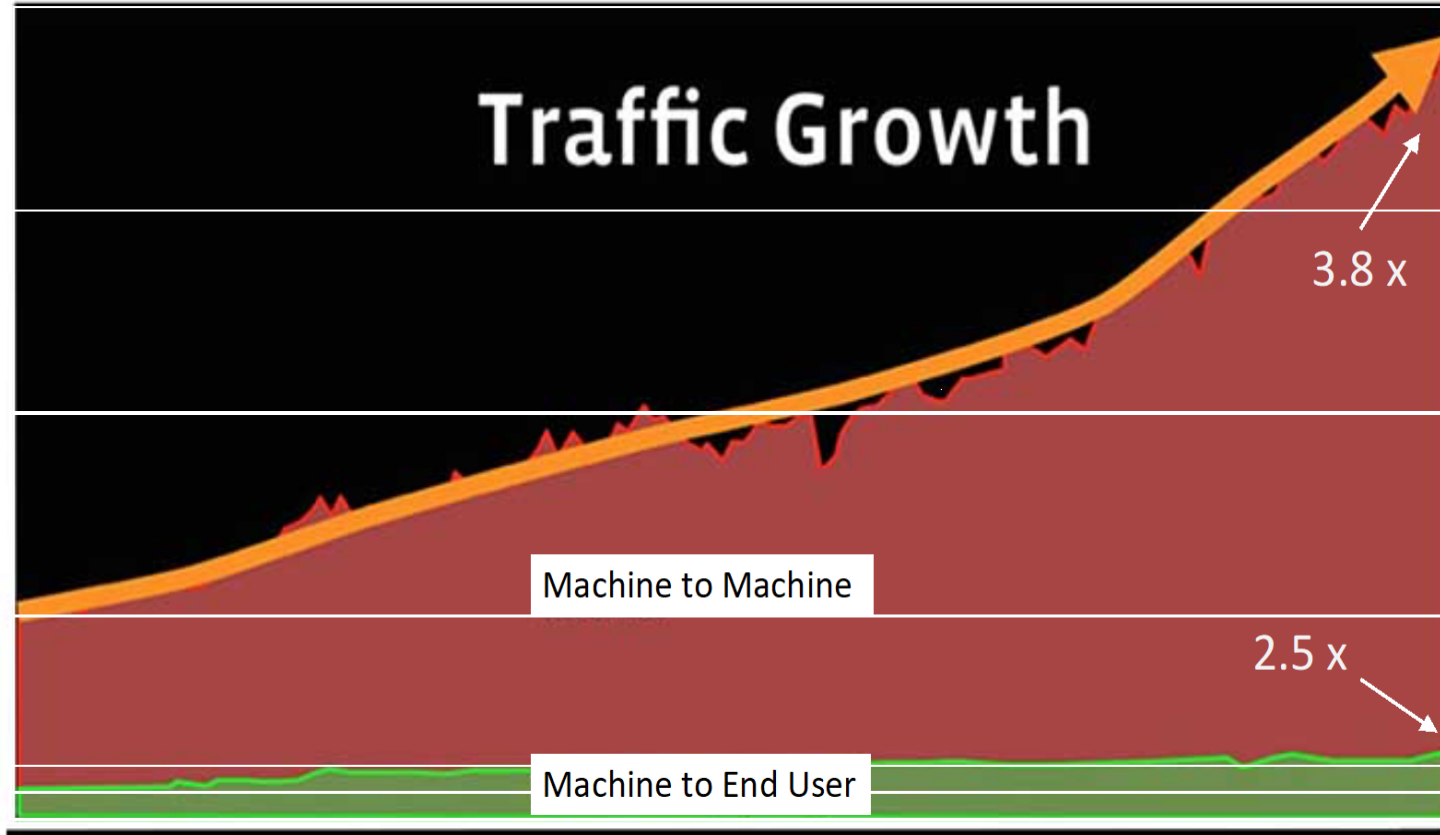
Data is released to impress the public, giving away as little information as possible



Source: Google

Example of data on traffic growth: Facebook

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No time scale

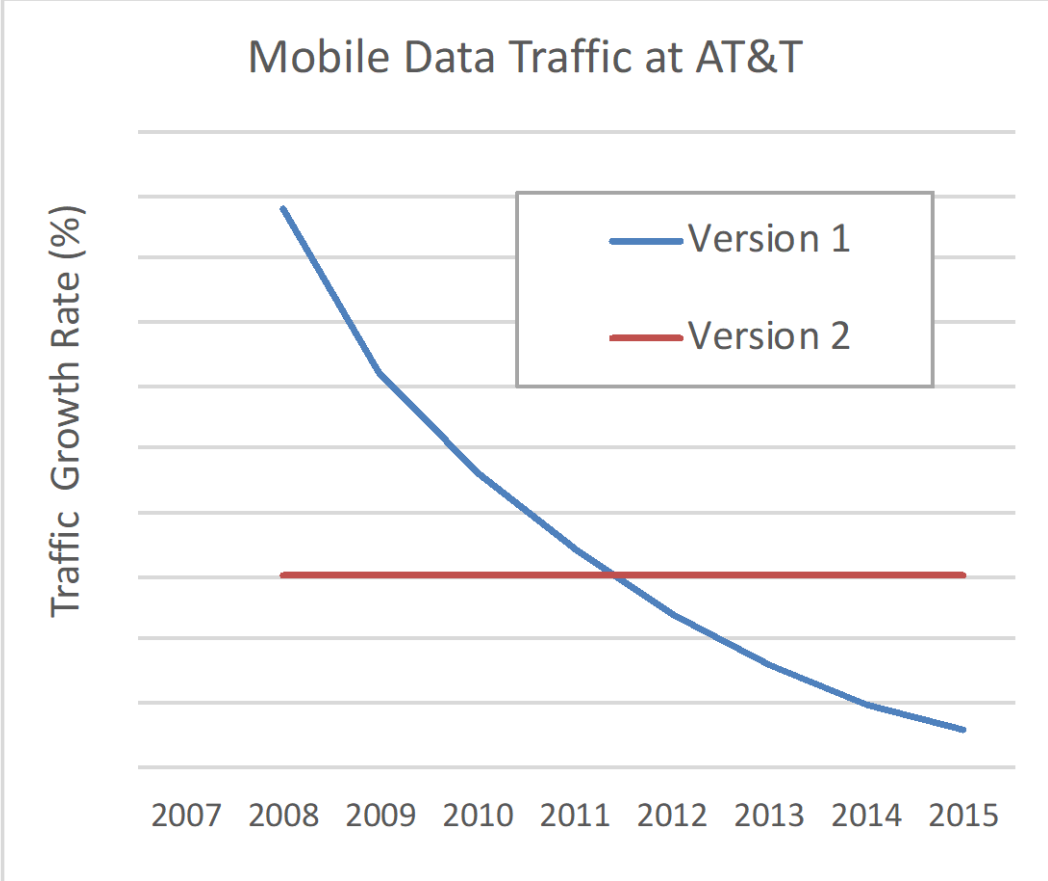
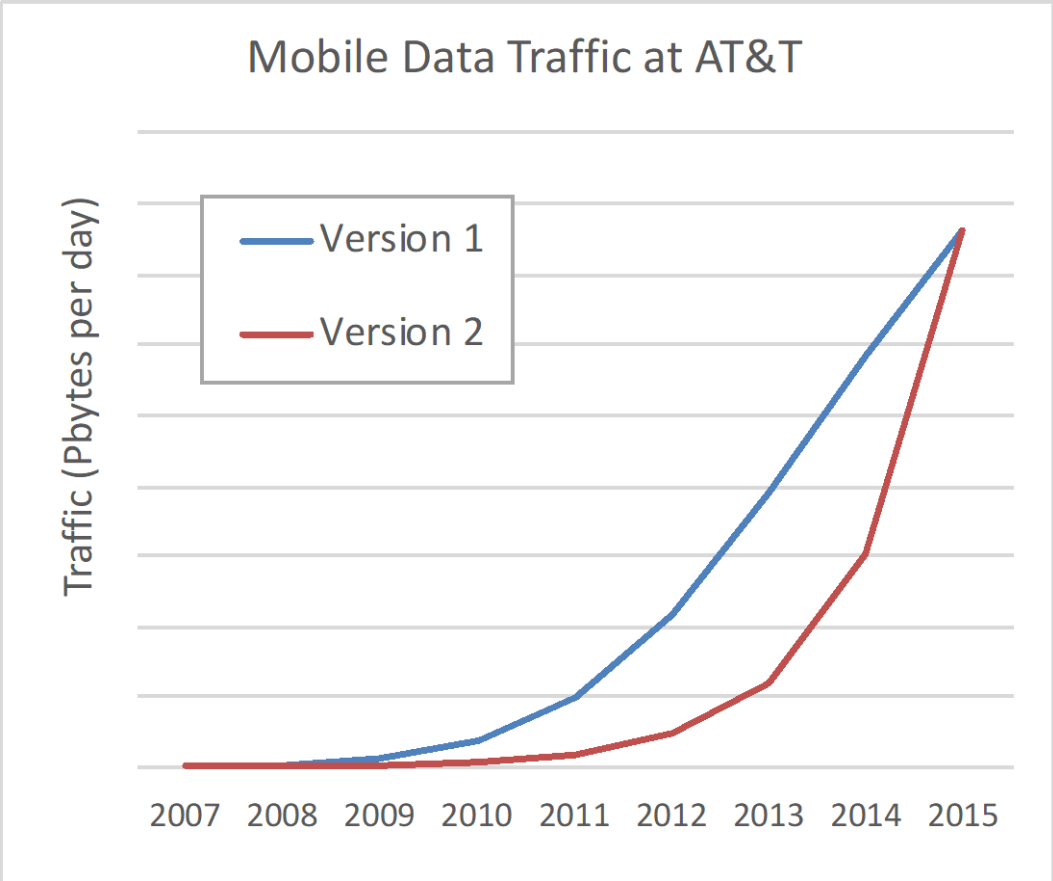
Focus on Machine to Machine Traffic

Source: Facebook with Calculations by LightCounting

Traffic curves are always impressive, but

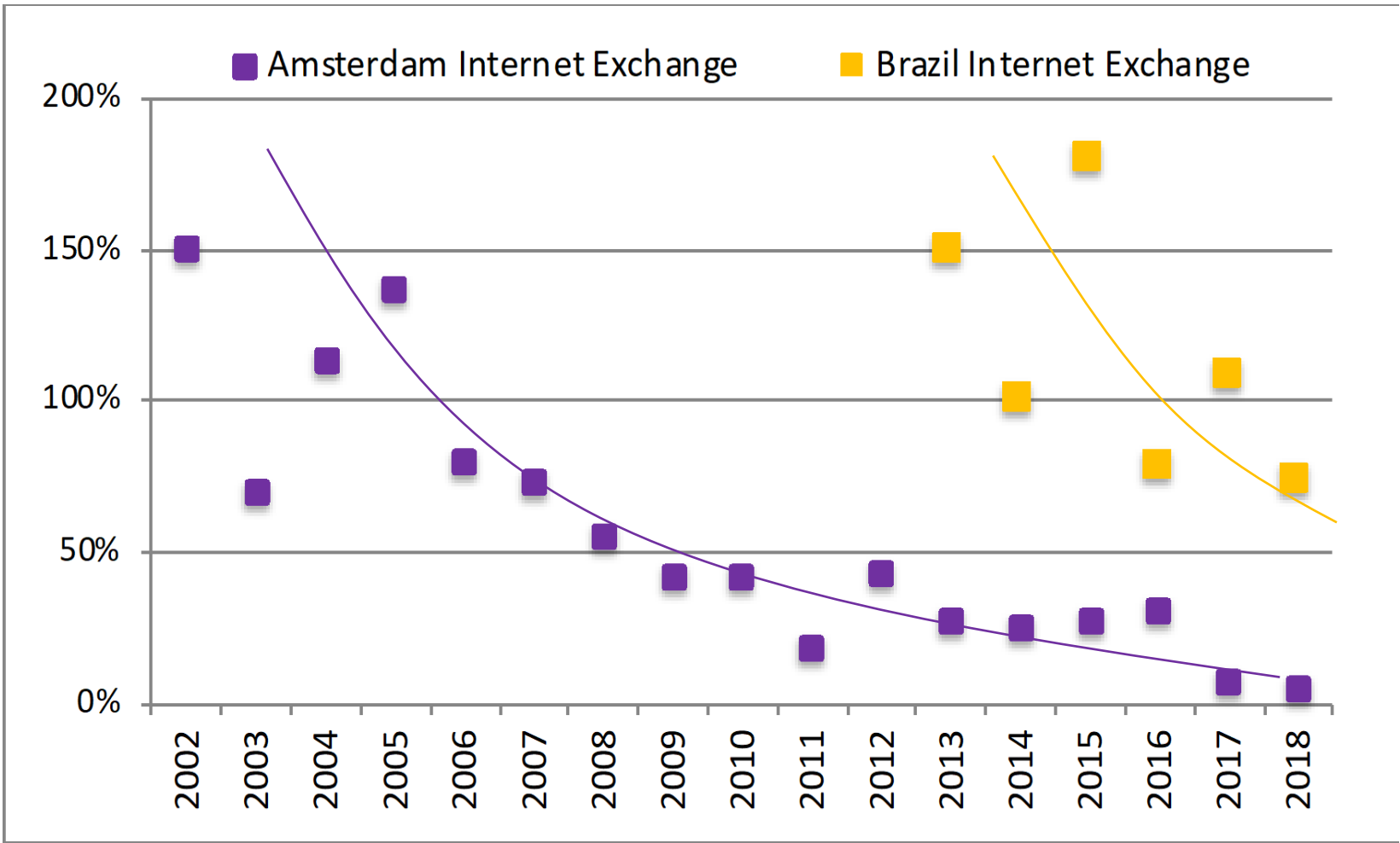
It is the growth rate that is really important.

“Mobile data traffic at AT&T increased by 150,000% from 2007 to 2015”



Source: Modeling by LightCounting

Internet Exchanges offer the best data on traffic growth

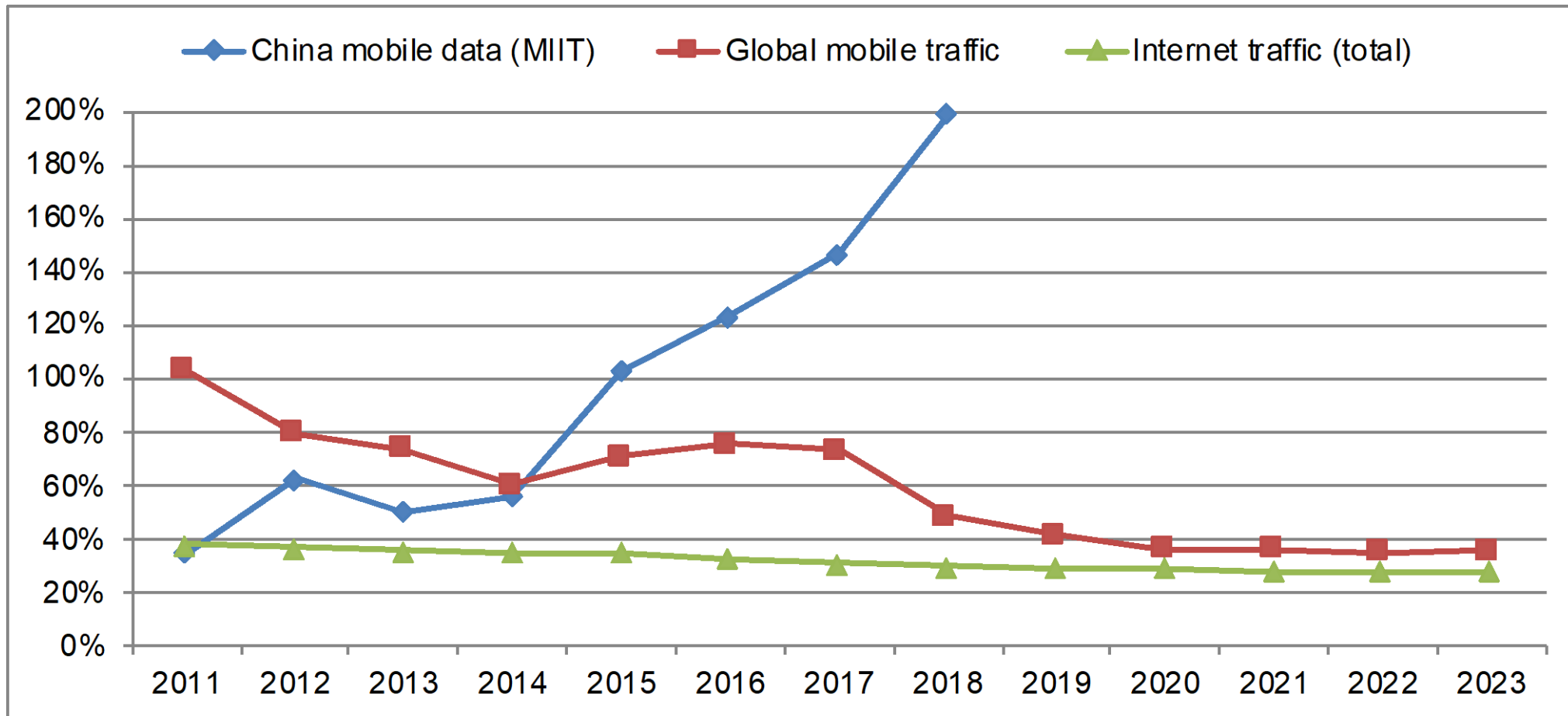


The growth rate is declining as networks mature

Several other examples confirm this trend

Source: AMX and BX

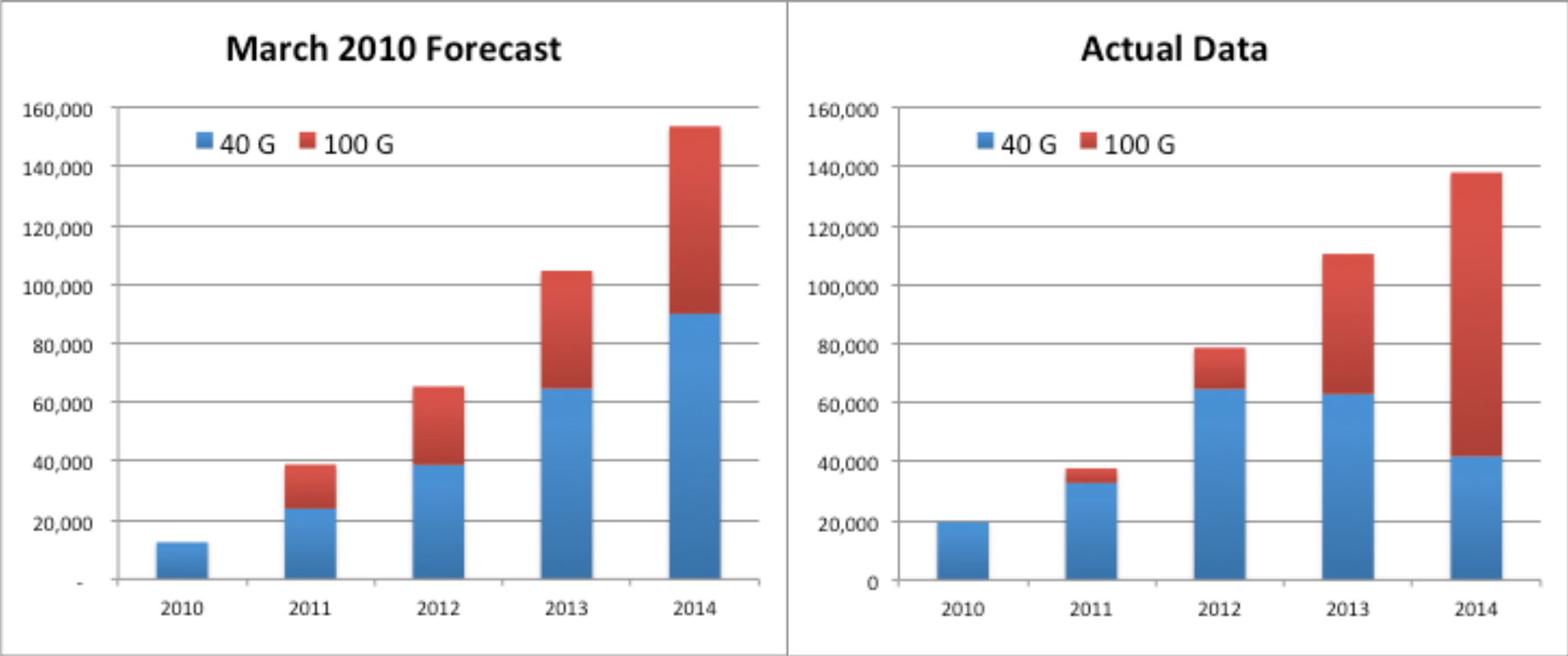
Exceptions to declining growth rates are rare



Source: MIIT, Ericson, LightCounting

Why traffic growth rates are important?

It helps to predict the future or at least future demand for optics in networks. Forecast for DWDM ports:

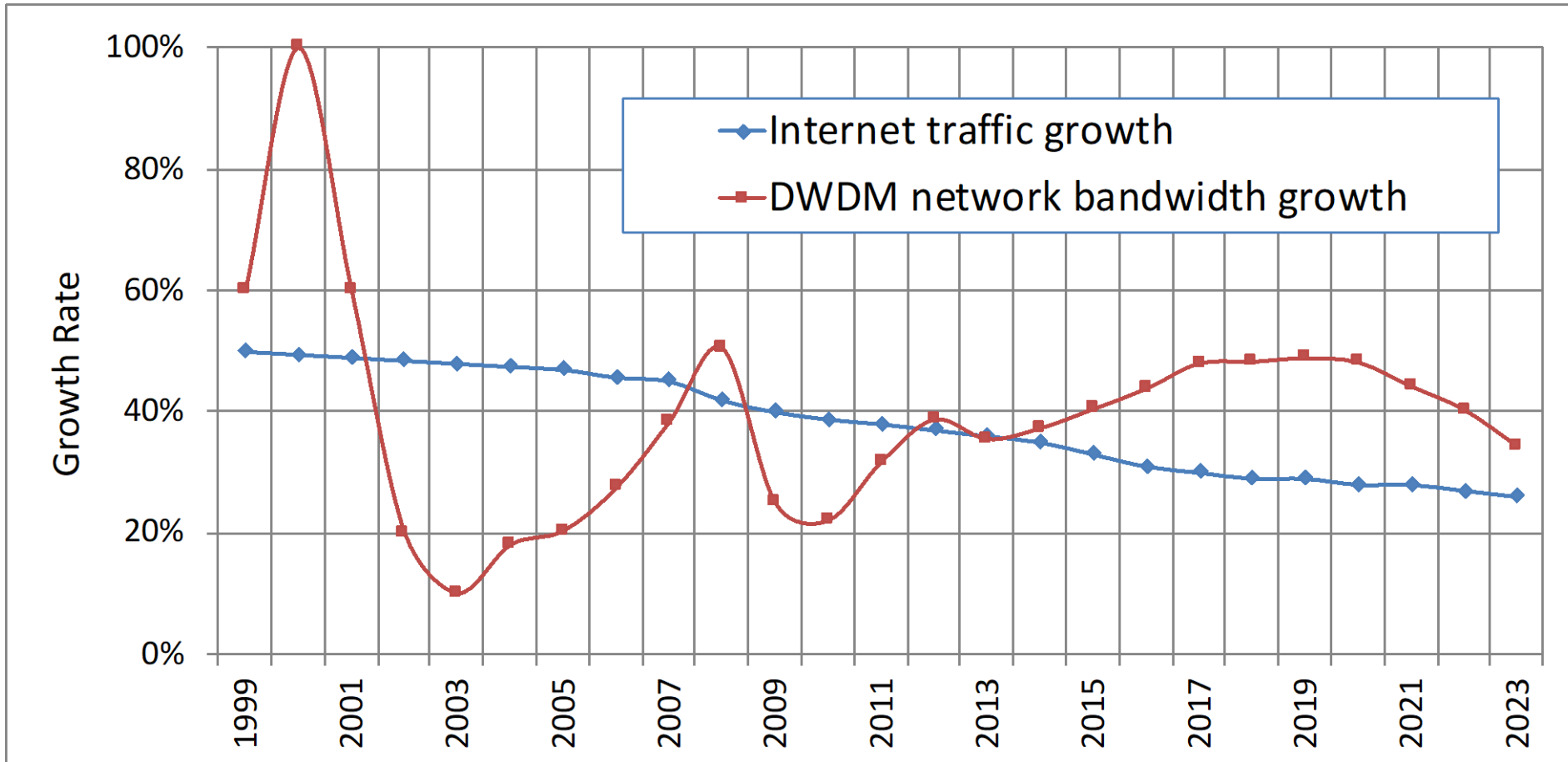


Source: LightCounting

The charts are on the same scale. Introduction of new products takes longer than expected, but their success is often underestimated

Growth in Network Bandwidth vs. Growth in Traffic

The two curves rarely overlapped in the past. Will this change in the future?



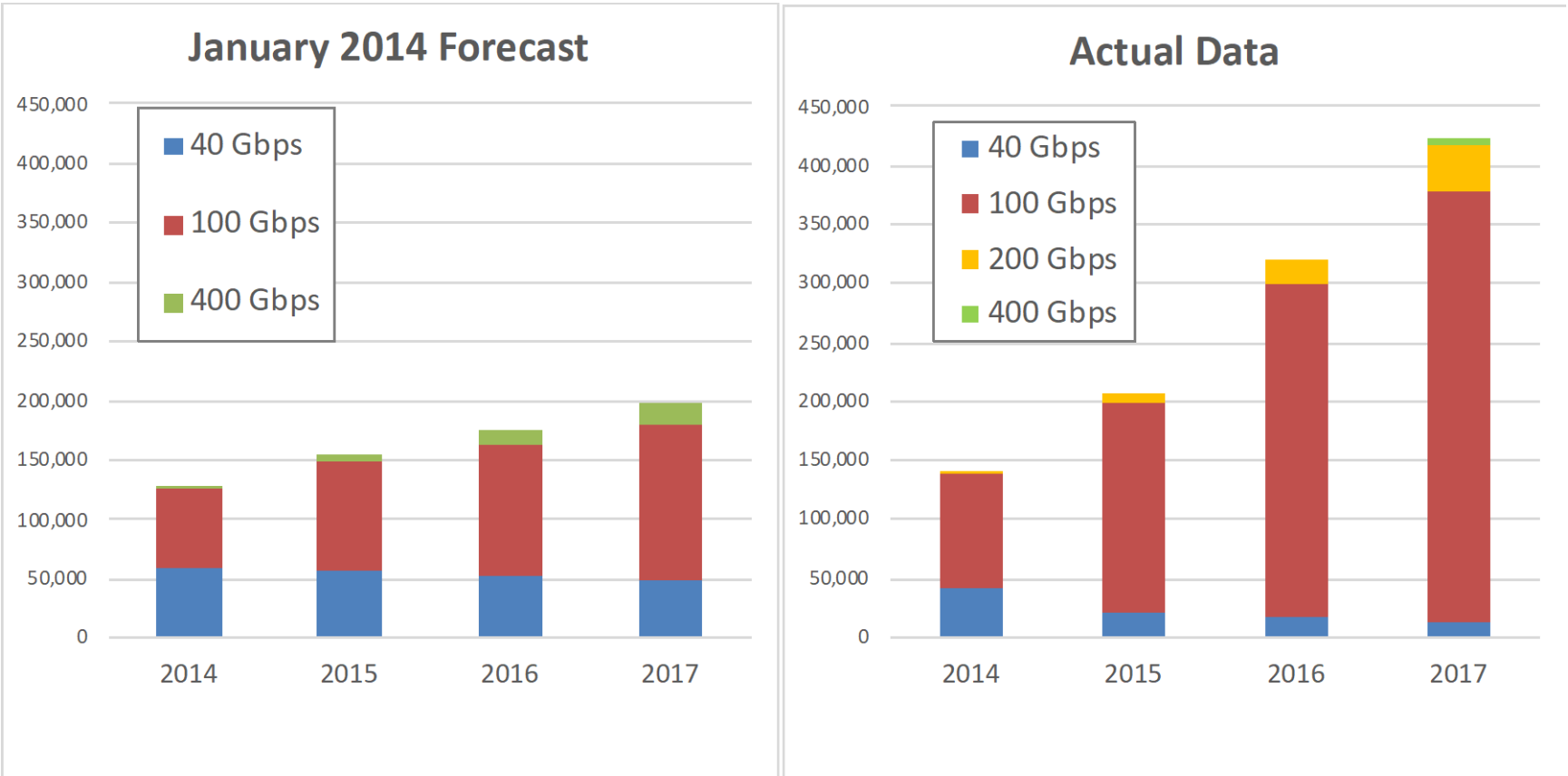
Source: LightCounting

Network upgrades are cyclical.

Internet traffic continues to grow steadily during downturns.

The Forecast Model did not work well in 2014-2017

Demand for DWDM optics for Datacenter Interconnects (DCI) emerged as a new market.



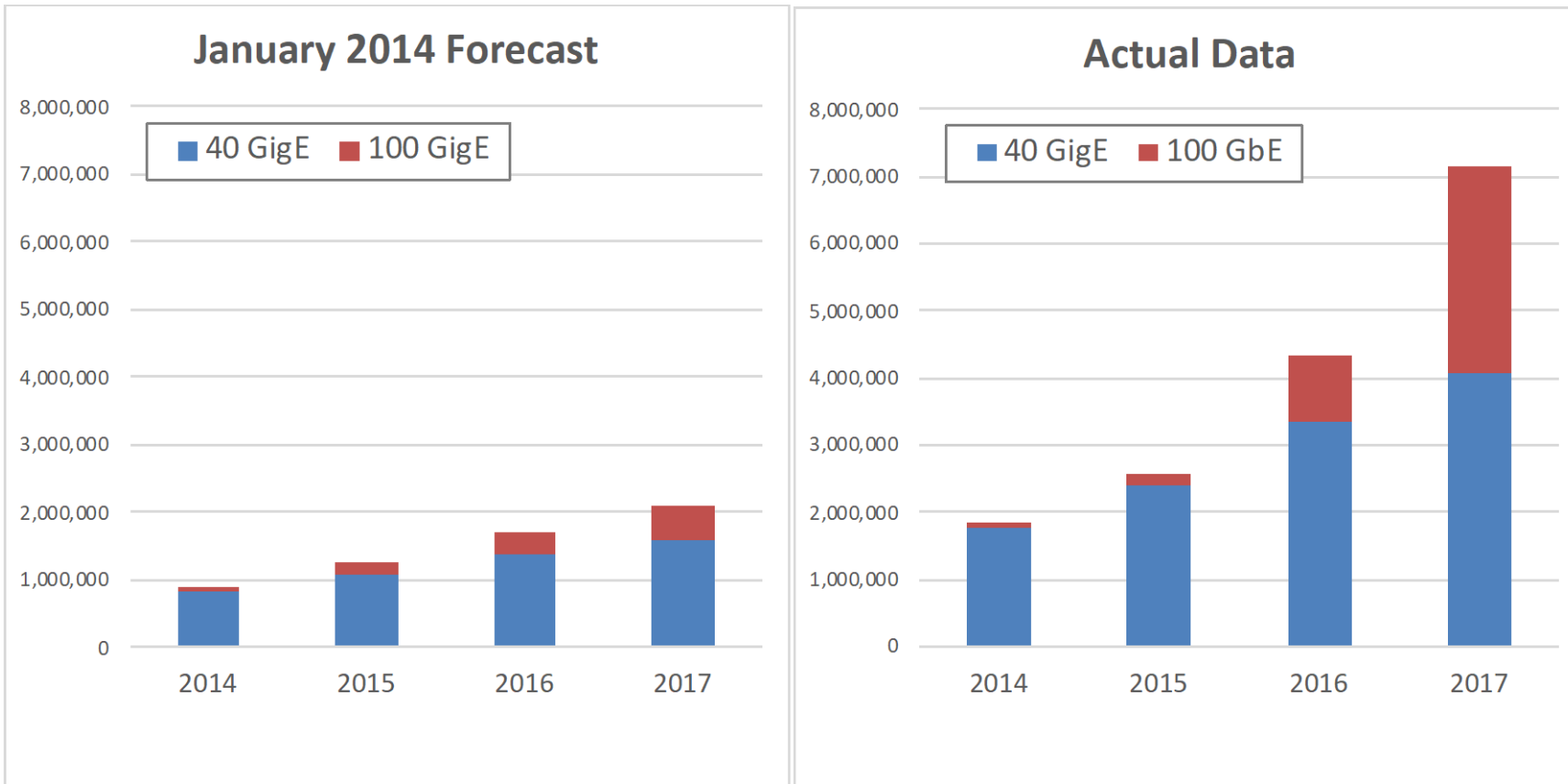
DCI accounted for 20-25% of DWDM ports shipped in 2017-2018.

Enterprise market also started to use more DWDM connections.

New Forecast Model considers DCI and Enterprise markets as separate segments with higher traffic growth rates

Source: LightCounting

Demand for Ethernet connectivity in Mega Datacenters exceeded all expectations.



90% of 100GbE transceivers shipped in 2017 were used in Mega Datacenters.

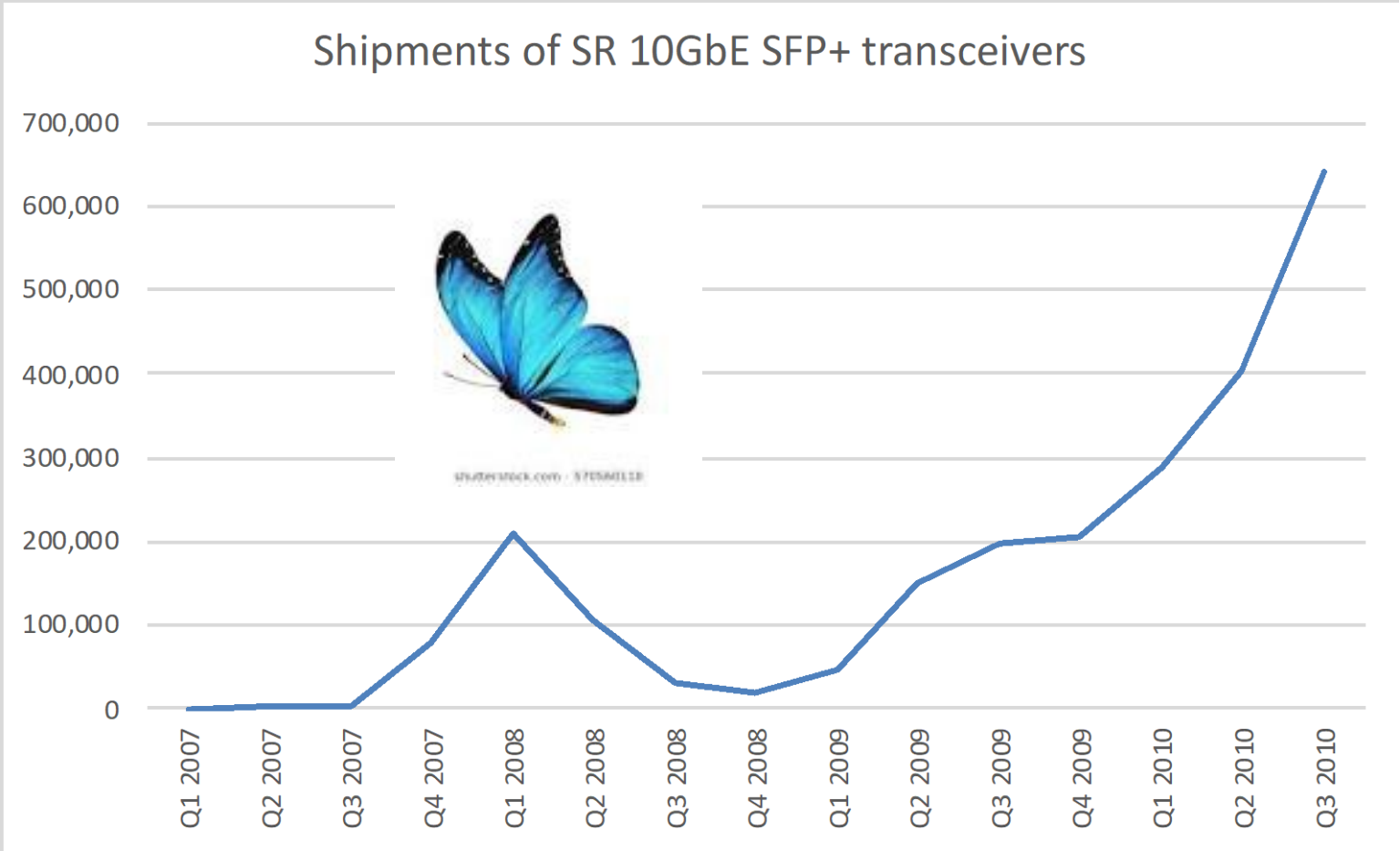
Source: LightCounting

This is how it all started

The initial projects at Google were interrupted by the financial crisis of 2008-2009.

Back in 2007 it was really hard to imagine what the future demand will be.

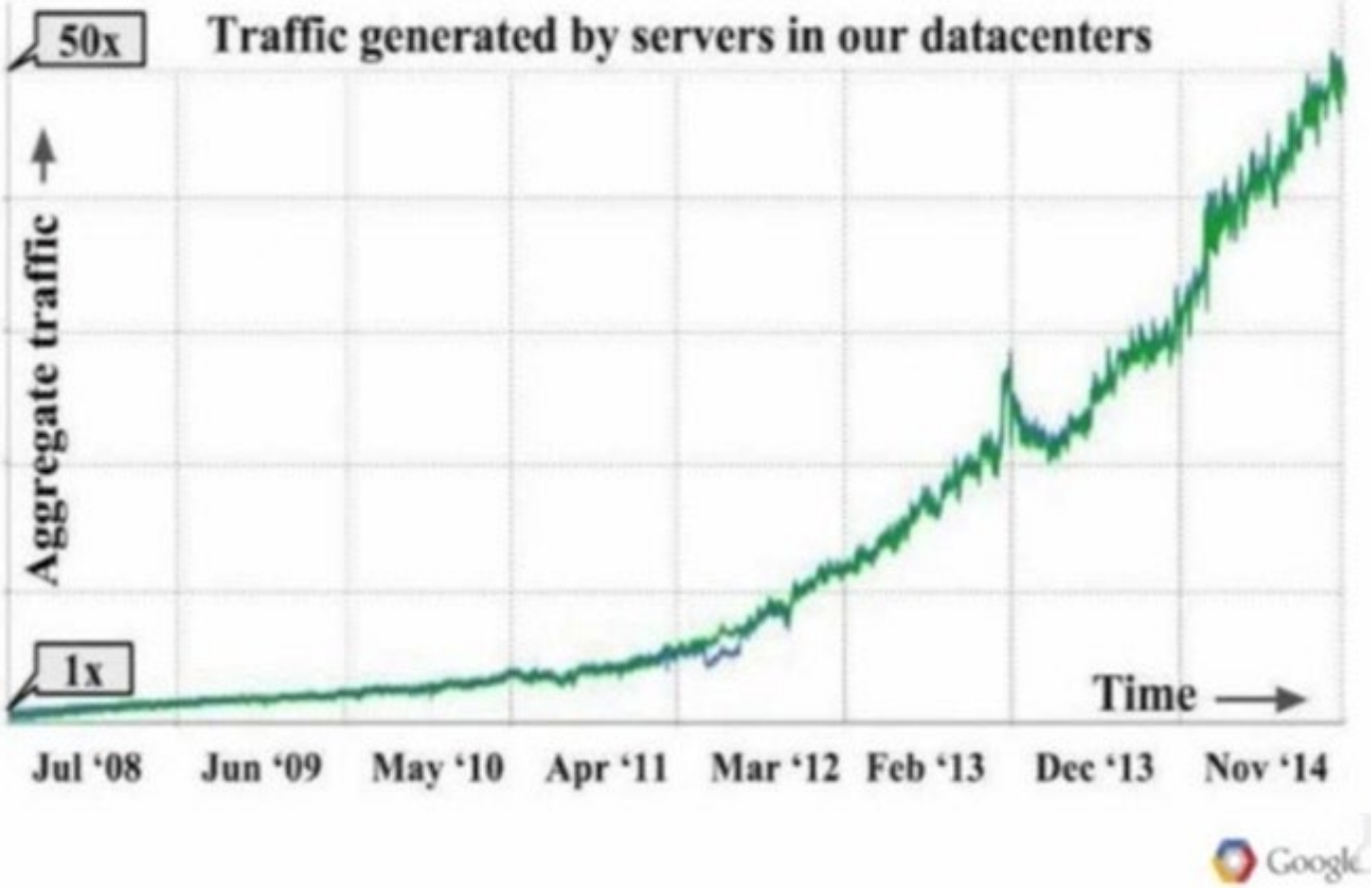
Google had no idea either.



Source: LightCounting

A closer look at Google's data

Extracting trends from a noisy set of data. It looked like the growth started to moderate in 2013-2014, but it spiked back up in 2015-2017

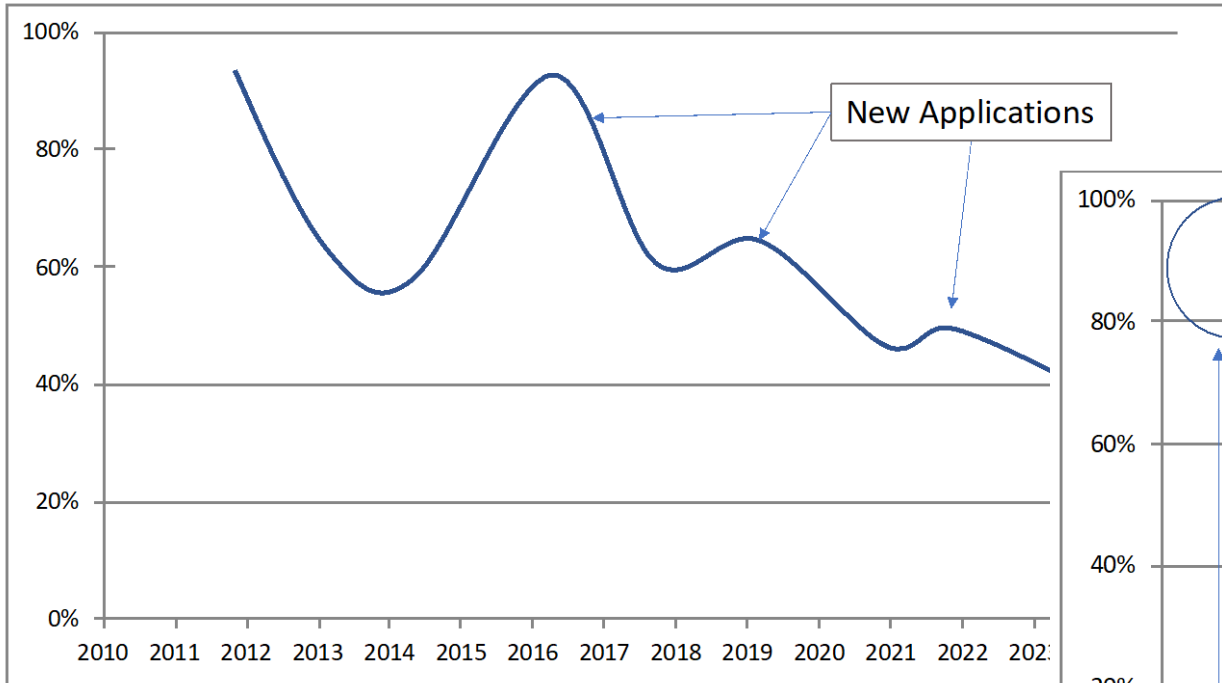


Date	Growth Rate
Jul-08	70%
Jun-09	47%
May-10	44%
Apr-11	39%
Mar-12	140%
Feb-13	75%
Dec-13	57%
Nov-14	52%

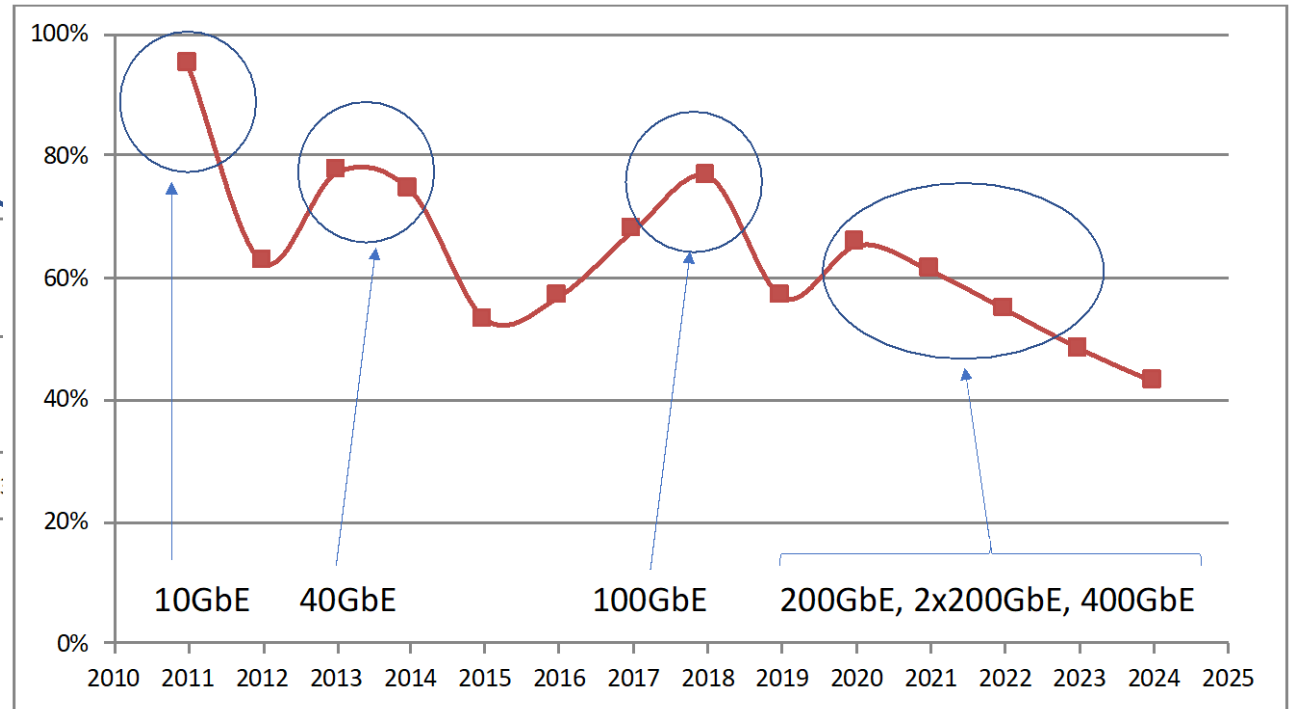
Source: LightCounting

Data Traffic and Bandwidth of Connectivity in DCs

Data Traffic Growth Rate (an estimate)



Connectivity Bandwidth Growth Rate (calculated from transceiver shipments)

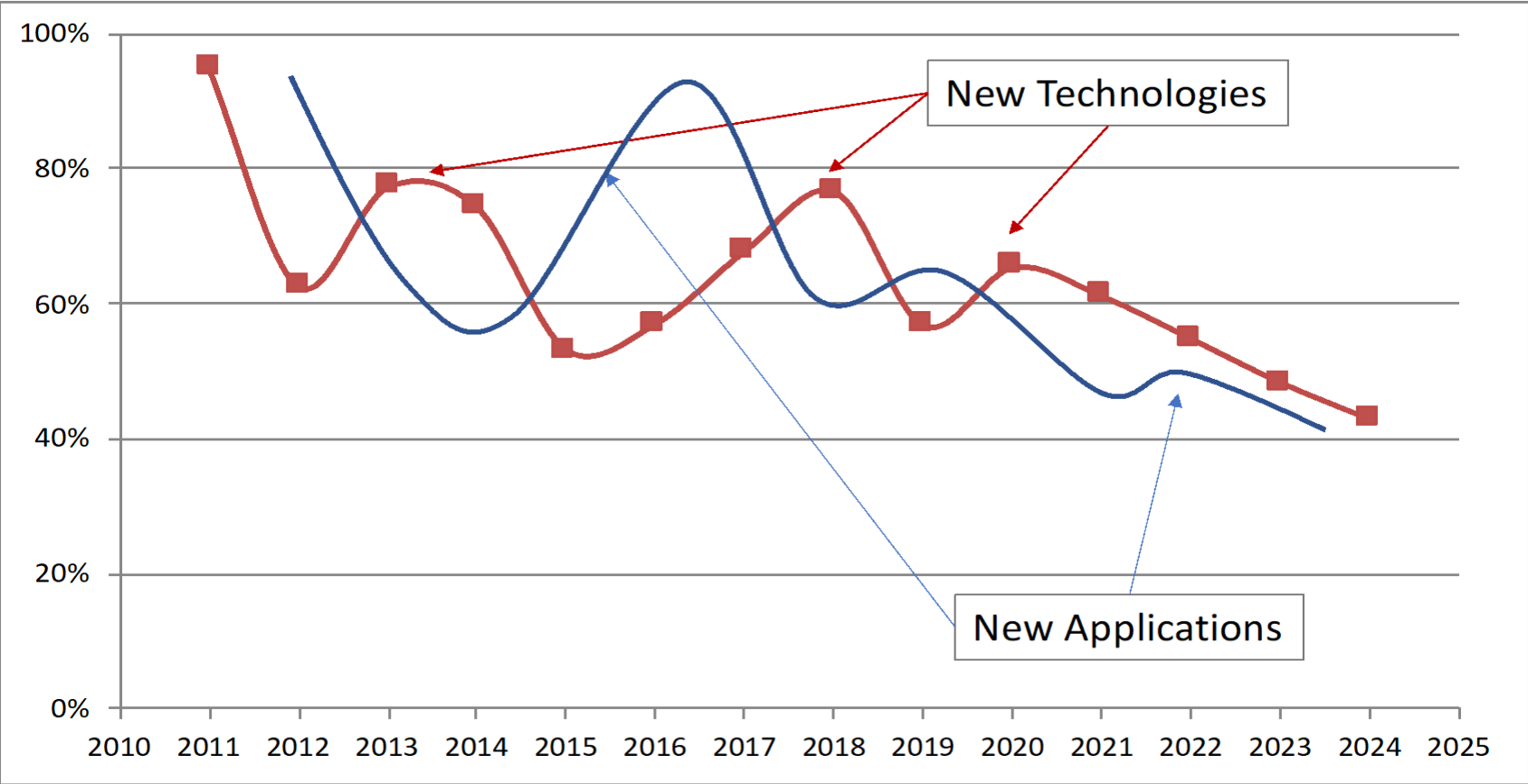


Source: LightCounting

Combining the two curves

The oscillations average over 5 year periods.

— Growth in bandwidth of optical connections — Growth in data traffic



Traffic growth rate is likely to slow down

Source: LightCounting



Thank You



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