

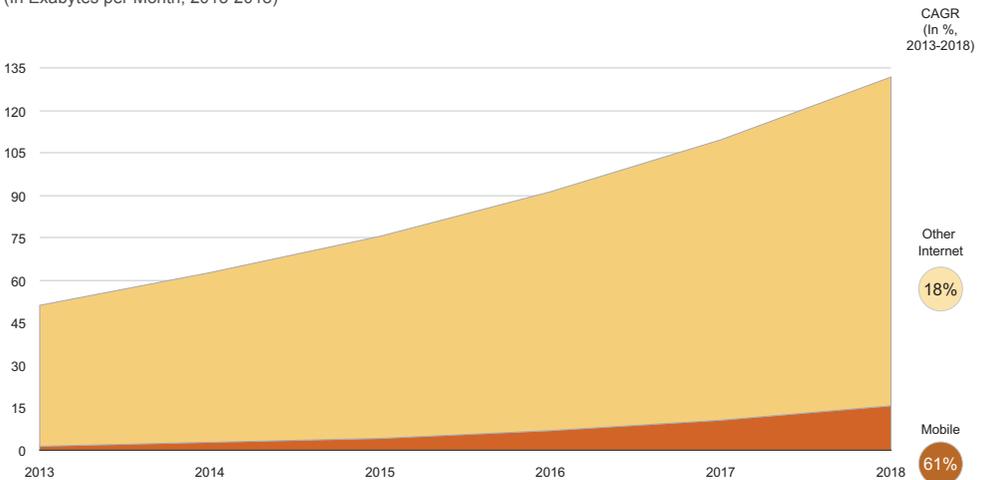
LEVERAGING BIG DATA



ONLINE DATA TRAFFIC VOLUME IS GROWING AT UNPRECEDENTED RATES with mobile data growing the fastest albeit from a low base

Although it is hard to measure data accurately, it is clear that data is growing at exponential rates around the world. The sheer volume of information will require new analytical skills and more storage capacity. One type of data that could be measured is online data/mobile data

Total Internet Data Traffic
(In Exabytes per Month, 2013-2018)

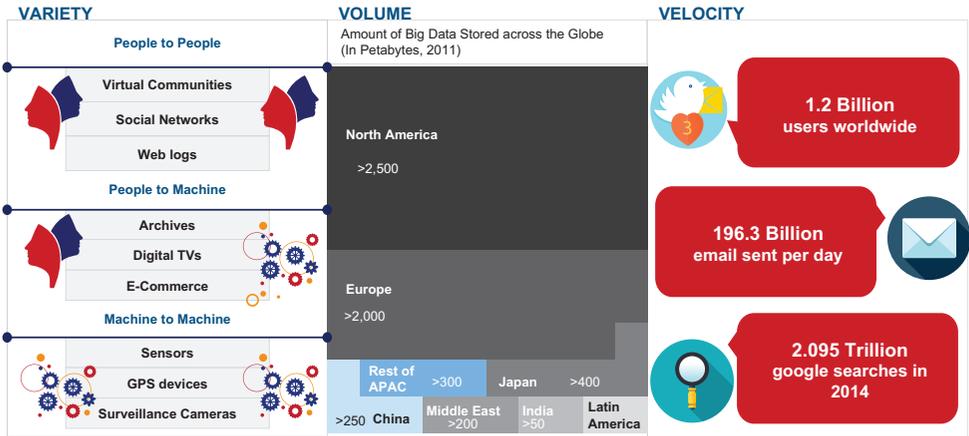


Source: "Cisco Visual Networking Index", Cisco, 2014

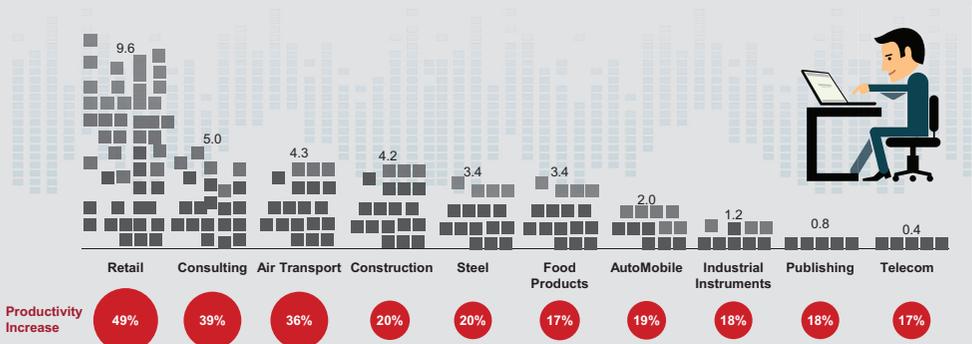
THE VOLUME, VELOCITY AND VARIETY OF “BIG DATA” have led to higher productivity and have enabled customization

Analytics of interactions between people, between machines, and between people and machines have been helpful in identifying trends about consumers and have become a part of companies' efforts to improve their productivity and sales. Still, to get insights from Big Data, companies have to overcome certain challenges, such as filtering noise

Big Data



Productivity and Sales Increase Due to Big Data Analytics (In % and US\$ Billion, 2010)

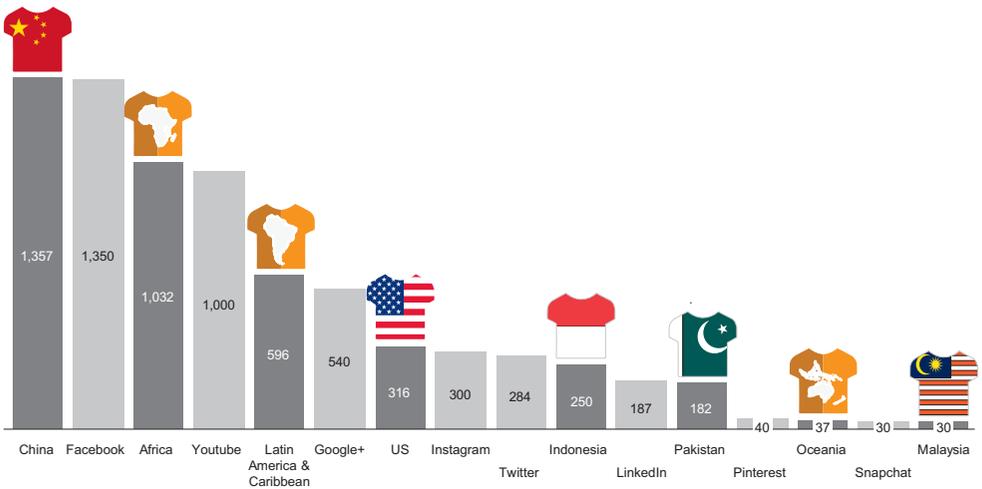


Sources- Upper and Lower Charts: "Big data: The next frontier for innovation, competition, and productivity", McKinsey Global Institute, 2011; "Email Statistics Report 2014-2018", The Radicati Group, 2014; "Google Annual Search Statistics", Statistic Brain, 2014; "Big Data", Wipro Applying Thought, 2011

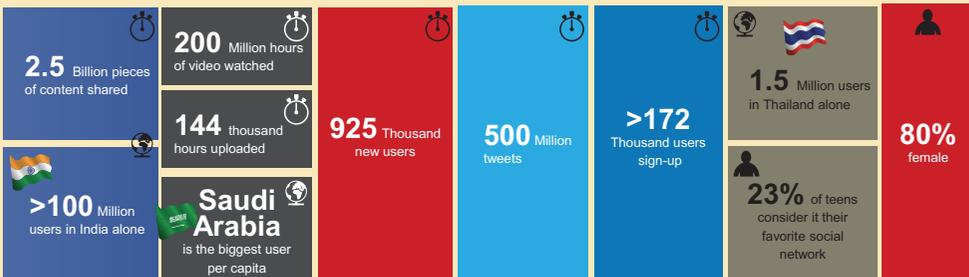
UNSTRUCTURED DATA IS ALSO ON THE RISE, driven by the popularity of social networks, which now reach 28% of the global population

The surge in the use of social media is producing a new stream of data. While social networks are mostly made up of young users, older users are joining at an even more rapid pace as smartphones prompt this age cohort to experiment with new applications. The number of active users of the largest social networks is now equivalent to the population of entire countries or continents; Facebook's user base rivals the population of China. The frequency of use of social networks—with people accessing them, in many cases, several times a day—hints at the immense amount of information on the web

Leading Social Networks by Country/Region Equivalence in Terms of Number of Users
(In Million People and In Million Active Users, Latest Available Data)



Key Statistics



Frequency (per day)

Large User Country

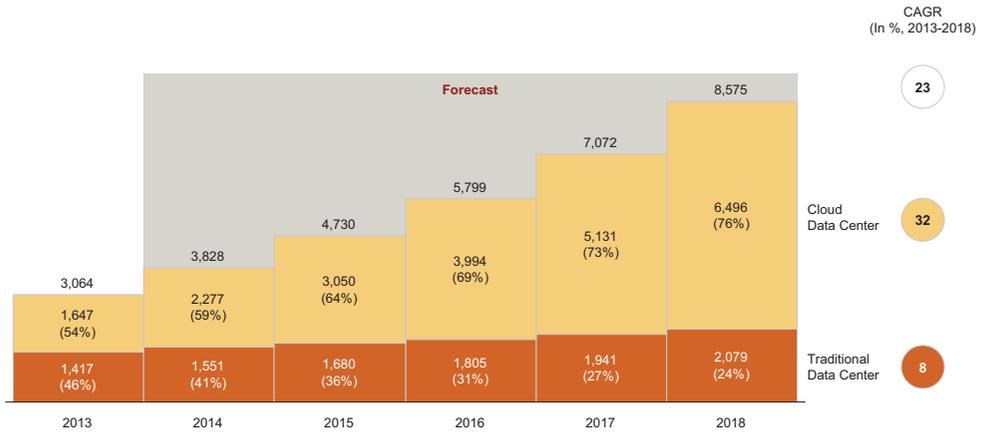
Demographic Characteristics

Sources- Upper and Lower Charts: Digital Insights Website; We Are Social; The Social Media Hat Website

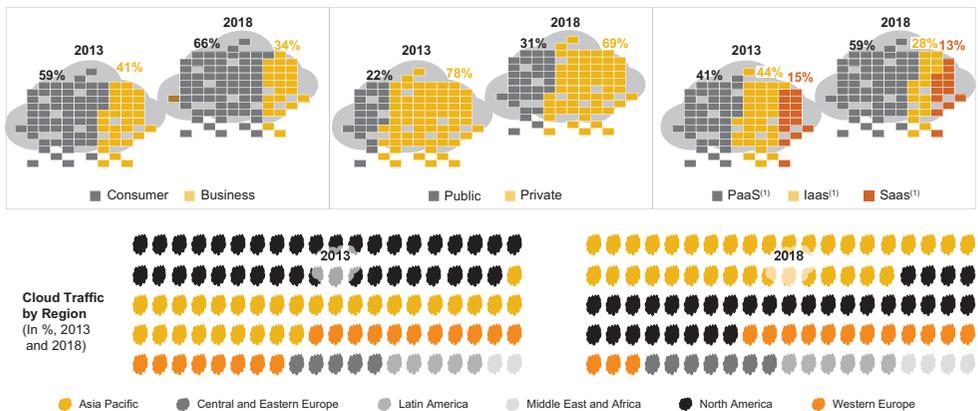
AN INCREASING AMOUNT OF DATA IS BEING STORED IN THE CLOUD, particularly from users in Asia and North America

For many organizations and people, the cloud has emerged as the answer to their data challenges – providing a scalable, flexible and automated platform that can handle both structured and unstructured data. The cloud is also a cost-effective way to support big data technologies (and data analytics) while reducing overhead costs. Risks remain, however, especially with respect to data security

Global Data Traffic over Time from Traditional and Cloud Data Centers
(In Exabytes per Year, 2013-2018)



Breakdown of Cloud Traffic by Type
(In %, 2013 and 2018)



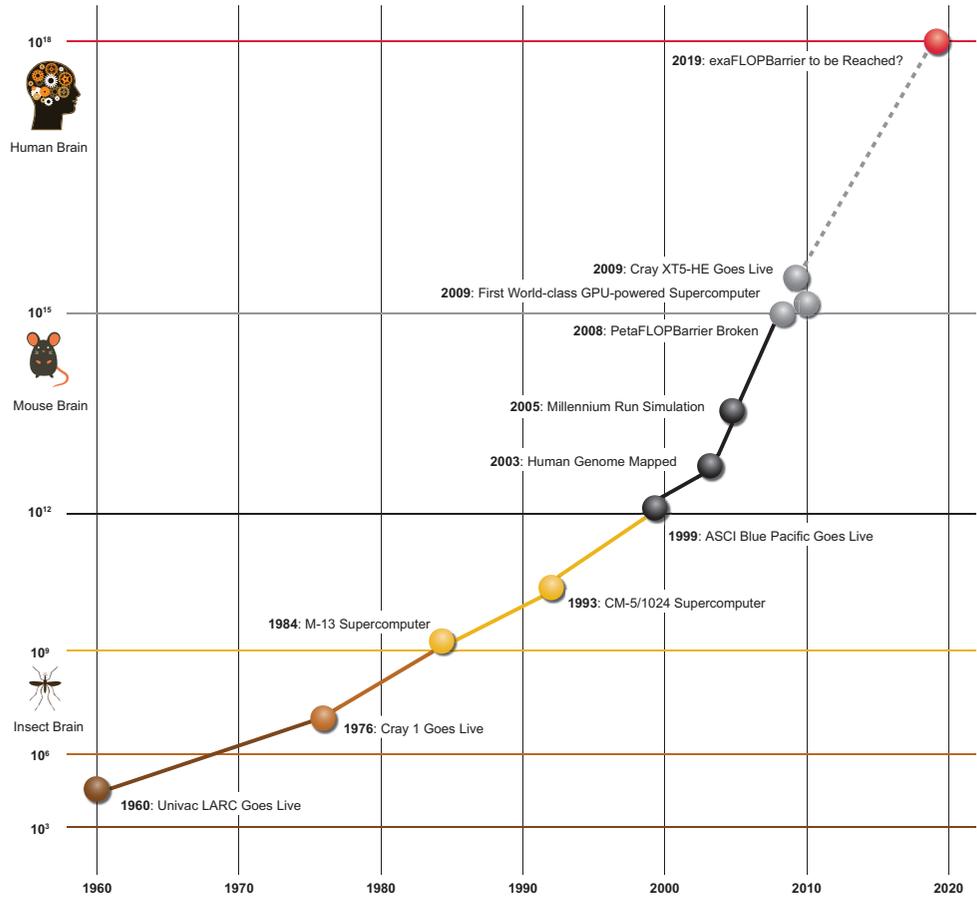
Note: (1) PaaS refers to Platform as a Service, IaaS refers to Infrastructure as a Service, and SaaS refers to Software as a Service
Source- Upper Chart: "Cloud Forecast and Methodology 2013-2018", Cisco, 2014
Source- Lower Charts: "Global Mobile Data Traffic Forecast Update, 2013-2014", Cisco, 2014

INFORMATION MANAGEMENT HAS BEEN FACILITATED BY THE INCREASED POWER OF TRANSISTORS, which have become much faster

As processing power has increased, the estimate of how much time it will take to match the capacity of the human brain has decreased to around the year 2020. It would appear that Moore's law--predicting the doubling of the number of transistors on an integrated circuit every two years--has been met. In fact, some experts believe we have reached "More Moore", with transistor size and cost decreasing

Computer Power Milestones (In Floating Point Operations per Second, 1960-2019)

Floating Point Operations per Second (FLOP)
Equivalent computing power

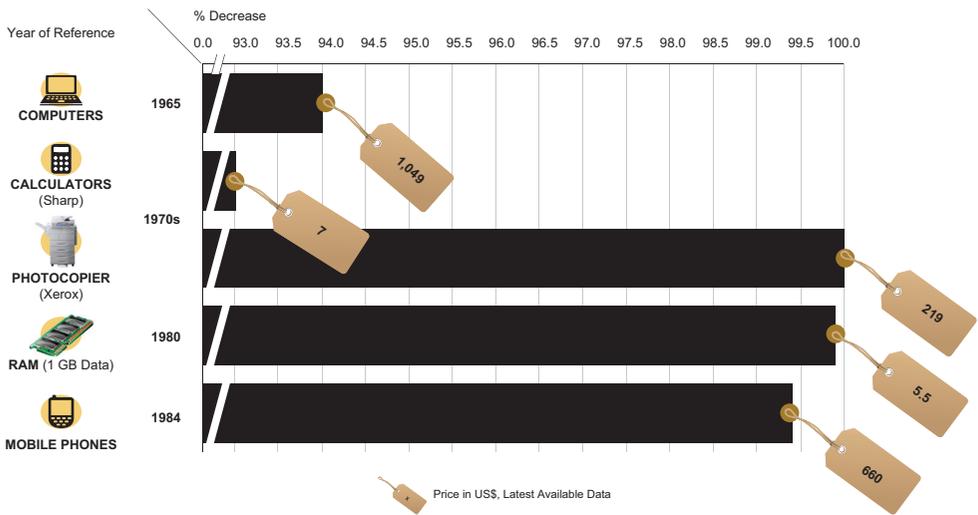


Source: Advanced Micro Devices

TRANSISTOR AND TECHNOLOGY-DEVICE PRICES HAVE DROPPED SUBSTANTIALLY; going forward transistors will continue to drop in size but prices may inch back up

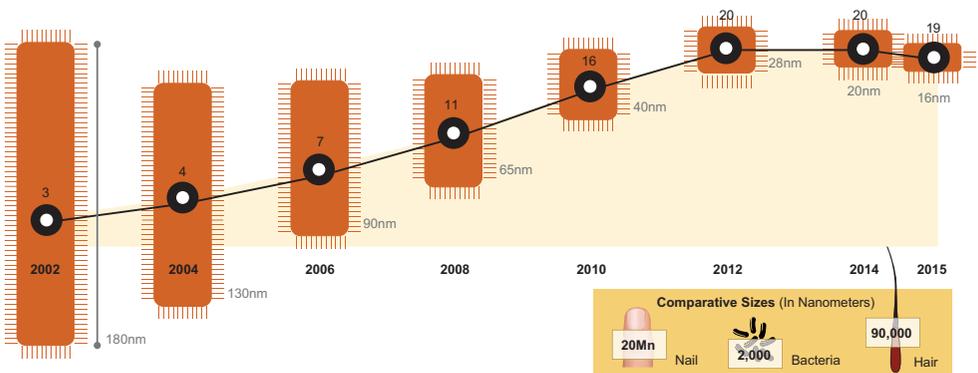
Transistors' size will continue to decrease in the future but prices will rise slightly, according to the Linley Group. With price reductions as high as 100% for 1GB of RAM since 1980, and big improvements in computation capacity in personal computers, the handling, storage and analysis of huge amounts of data have become possible. Technological developments have also enabled the processing of data in the cloud where there have been additional savings

Price of Sample Technologies over Time
(In % Decrease, Various Years)



Evolution of Transistors

(In Millions of Transistors bought per US\$ and In Nanometer Length, 2002-2015)



Sources- Upper Chart: Direct Capital; Amazon

Source- Lower Chart: "No Moore? A Golden Rule of Microchips Appears to be Coming to an End", The Economist, Nov. 2013 (based on Linley Group)