



# THE AGE OF THE CLOUD

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# The Age Of The Cloud

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*Cloud Computing and Artificial Intelligence (AI) are probably not on the top of your list of conversation topics nor is it something most people think about regularly. Nevertheless, it turns out there are some interesting changes happening in the IT market that will start to have a real world impact on everyone. Lower barriers of entry for companies, access to best in class technologies for everyone and accelerating innovation and entrepreneurship leading to much improved productivity will have profound consequences for the world.*

Everything from smart digital assistants like “Siri” on your iPhone to autonomous cars and augmented reality like “Pokemon Go” is being enabled and enhanced with the addition of new types of computing models based on Cloud infrastructure and AI.

We believe that a new era of computing is upon us, and that this has much to do with what is now possible in our digital lives thanks to artificial intelligence. However, the opportunity to lead in this space will continue to require massive infrastructure upscaling and R&D investment, causing most companies to access these newfound capabilities through only a handful of major computing platforms. The tide will not lift all boats.

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While the Internet has been with us for around twenty years, it is only in the past few years that digital technologies have started to penetrate just about every part of the world around us. Billions of people are now walking around with mobile devices that are able to handle a large variety of sophisticated apps. In addition, digital technologies are enabling us to instrument, interconnect and make just about everything more intelligent - cars, appliances, medical equipment, roadways, pipelines, pharmaceuticals and agriculture. We can use real time information and powerful analytics to help us understand and optimize the very way everything works in an attempt to make the world more efficient and smarter.

This is the world of The Internet of Things, and it is built in the Cloud. On the following pages, we give our view of the outlook for Cloud Computing and in another white paper, “The Artificial Future”, we discuss the implications of Artificial Intelligence.

## But what is Cloud Computing actually?

Cloud Computing is outsourcing of IT investments, servicing and development to a third party. Applications are run via the internet. Customers have been attracted to the Cloud because of the following benefits:

- 1) **Focus** – you don’t need to have in-house IT capabilities but can focus on your core competences as a business.
- 2) **Speed** – it can take few minutes to set up standard Cloud services compared to the weeks/months you previously spent on building your own capacity.
- 3) **Profitability** – according to IDC Research the return on Cloud investments can be 500-600 pct.
- 4) **Costs** – total cost of compute power is 20-40 pct. lower.
- 5) **Scalability** – instant ramp up and down of usage, you only pay for what you use.
- 6) **Security** – Cloud companies can deliver much better levels of security than the client can.
- 7) **Access** – to best in class analytics and artificial intelligence solutions.

It is expected that 90 pct. of US corporations will have some form of Cloud usage within the coming two years, and IP traffic to the public Cloud is expected to grow 50 pct. per annum up to 2020. Today approximately five pct. of global servers are in public Cloud centres, but because of their much higher capacity utilization, they run 20 pct. of global compute today, a number that will rise to 50 pct. by 2020.

### **Cloud as utility computing**

The prevailing metaphor used to describe this new form of utility computing is the evolution of power plants in the 19th century. In the early days of electricity, companies usually generated their own power with steam engines and dynamos. But with the rise of highly sophisticated, professionally run electric utilities, companies stopped generating their own power and plugged into the newly built electric grids.

Cloud service providers offer computing-as-a-service, with near unlimited scalability at very attractive prices. Instead of having to buy computing resources up front, users now have the flexibility of only paying for whatever Cloud resources they actually use. Furthermore, turning to an external Cloud service provider is often a faster and less costly way to implement a new application than relying on the internal IT organization.

### **Cloud as the industrialization of IT**

Many IT investments have evolved over the years with little architectural discipline, and a lot of different equipment, architectures and processes. Historically, different departments insisted on getting their own servers for their own business applications, rather than using the global shared facilities. Such legacy data businesses often spent the bulk of their energies on the maintenance and integration of their varied applications.

Not surprisingly, these older companies were challenged to keep up with born-digital Internet companies' customer-facing applications. These applications generally required a more agile development approach to respond to fast changing market conditions, as well as the ability to efficiently support the fast growing volumes of mobile users and devices. The massive scalability, flexibility and agility required to support these new workloads were now driving a much needed industrialization of IT. IT had to become much more disciplined in every aspect of its operations, as had been the case with manufacturing about 30-40 years ago.

Before that time, most manufacturing plants were fairly inefficient, and were turning out products of varying quality. Then, following the success of Toyota and other companies around the world, businesses started to apply much higher discipline to manufacturing processes. Company after company



embraced the Toyota Way, Six Sigma, Lean Production and similar methods in their manufacturing and logistics operations – leading to major improvements in their productivity and quality. Data centres have now become the production plants of Cloud-based services, a transformation that has been pioneered by born-to-the-Cloud companies like Amazon.com and Alphabet's Google - companies that can deliver very well-engineered IT infrastructures, applications and mass customised services.

### **Cloud as the transformation to digital business**

Beyond utility computing and the industrialization of IT, Cloud is now a major force that is shaping the economy and helping every company on its digital business journey.

As Cloud increasingly becomes the norm, the edge it gives a company is falling. It still has a major role to play in delivering competitive advantage, but using Cloud is now a competitive necessity. To derive significant competitive advantage from Cloud you need to think about how to leverage it to enable digital transformation, change how you do business, and disrupt your market.

A good example could be General Electric's (GE) vision for "digitising" which appears to be the most far-reaching of the industrial companies. GE is building a Cloud-based ecosystem of data analytics and device control apps that work with their own - and other companies' - connected industrial equipment. GE's Predix platform is an open-source software stack upon which developers can build, deploy, run and scale industrial specific applications. GE expects that by 2020, related revenues will contribute approximately USD 14 Billion in sales, and internal cost reductions will be approximately USD 1 Billion. The numbers could be very large.

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Perhaps more important for this particular story is that GE is migrating its data centres to Amazon's Cloud business AWS, while reducing its own in-house datacentres from 34 to four over the next three years. Jim Fowler, General Electric's chief information officer, noting that GE has been around for 140 years, says, "AWS is our trusted partner that is going to run our company for the next 140 years." As an example, the GE Oil & Gas division has started this journey by migrating more than half of its core applications to AWS while achieving a 52 pct. reduction in its total cost of ownership.

Not only the largest companies but actually anybody with an idea can go to Amazon AWS, Google or Microsoft, sign up for a platform as a service and be up and running in little time. But what makes the Cloud so disruptive is that it compels legacy players to change their business models, including pricing strategy, sales channels and even basic technology. The winners will prevail by making it easy for developers to collaborate and for users to adopt the technology cheaply and easily, thereby growing the ecosystem, as GE is a great example of.

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The Cloud is now disrupting every industry it touches. The world's most advanced technologies are not only available to large enterprises who can afford to maintain expensive IT staff, but can be accessed by anybody with an internet connection. That is a real game changer.

Cloud is definitely a growth industry, but also an industry where we believe the big will get most of the growth because of the very high capex requirements and investments in product development that only the largest companies can afford.

## The Players

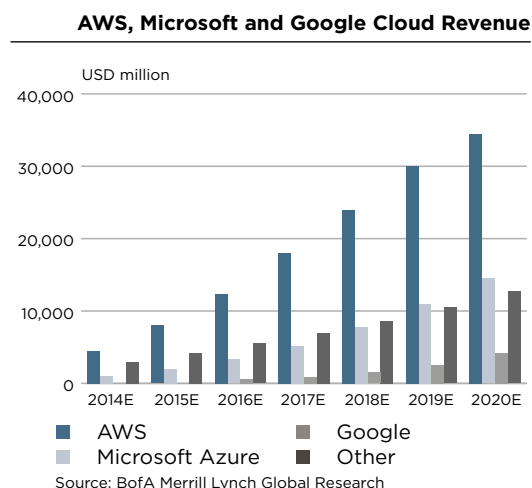
It is probably fair to say that Cloud Computing as we know it today was "invented" by Amazon back in 2006. At that time, Amazon had built up unique software and services based on more than a decade of infrastructure work for the evolution of the Amazon E-Commerce Platform. The thinking then developed that offering Amazon's expertise over the internet could trigger a whole new world of innovation as developers and enterprises no longer needed to focus on buying, building and maintaining expensive infrastructure. Today AWS is in profitability terms a bigger part of Amazon than the e-commerce platform.

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Today AWS has more than one million customers globally that span from the smallest start-ups to the largest multinationals like GE, Unilever, Pfizer, Siemens, Airbnb and government organizations like CIA and Govnet, a Cloud solution for the US government. According to Gartner, AWS has 10 times the compute power vs. the following 14 competitors and is a clear number one in Cloud Computing as can be seen in figure 1 in the following column.

Today, AWS targets two primary markets. Infrastructure as a Service (IaaS) and Platform as a Service (PaaS). However, recent AWS product announcements reflect Amazon's ambition to target broader segments of enterprises' IT spending including collaboration, e-mail, business intelligence, database, etc. and adjacent markets such as mobile and console game development. Given that we see a potential market of 300 billion USD in Cloud services and that AWS in 2016 is expected to generate sales of 12 billion USD we see the growth potential of the company as unlimited.

Figure 1



It is estimated that AWS captured 80 pct. of the IaaS and PaaS market opportunity in 2015 within the Big 3 (Amazon, Google and Microsoft). As competitors invest in their Cloud platforms, we expect Amazon's market share to decline in the years ahead. Despite this, we expect Amazon to maintain its leadership position and estimate that AWS' revenue in 2020 will be more than two times that of the second largest competitor.

Microsoft and Google are latecomers to the Cloud party, as Microsoft Azure only got started in 2010 and Google Cloud Platform in 2011. Both companies leveraged the existing compute assets that were running the companies' internal processes and businesses, and offered it to third parties. This is a formidable selling point for the Cloud business model since Google, Amazon and Microsoft probably run some of the world's best and most scalable IT infrastructure, something that other companies outside IT are not capable of replicating.

It is widely accepted that Microsoft Azure will be growing faster than competition in the years ahead, simply because of the fact that Microsoft is so dominant in enterprise software, and that the company will be very well placed in the years to come as more enterprises move to the Cloud. Furthermore, Microsoft does have

the financial muscles to invest in order to stay ahead of most of the competition.

Although Google so far only has 3-4 pct. market share compared to AWS' market share of 54 pct., Google's client list is impressive and includes companies like Snapchat, Spotify, Coca Cola and Apple. Google is probably the most aggressive of the Big 3, applying what they call "Moore's Law" pricing, a pricing policy that follows cost compression driven by Moore's Law. Therefore, Google is considered the cheapest Cloud offering today.

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Google's service offering is not as compelling as its competition's - something we believe will be addressed in the years ahead as Google develops its offering. Specifically, we view Google ahead of competition in application of artificial intelligence (AI) solutions, an area the company invests heavily. We cover AI in more detail in the white paper "The Artificial Future".

## Conclusion

We believe the investment implications of Cloud Computing and the accelerating technology change it brings are profound. To begin with, it is a deflationary trend, and legacy technology companies will be negatively affected as hardware and software

moves to the Cloud. But the positive ramifications are more profound:

- Legacy businesses outside technology can operate more effectively, save costs and focus on core competences.
- Barriers of entry in most industries will be much lower because of Cloud Computing since small companies do not need to invest in IT infrastructure in order to get into business.
- Creativity and entrepreneurship will expand enormously as people and companies get access to best in class technology on a global scale, thereby increasing overall corporate productivity in the years ahead.

The opportunity to significantly reduce costs and improve quality while exploring new sources of revenue and growth is compelling. While none of us can predict how things will play out, and even less how long it will take, the transition to the Age of the Cloud does seem inevitable.

C WorldWide Asset Management has been invested in Alphabet (Google) since 2009 in our Global and Ethical strategies and since 2014 in our Stable Equities strategy, and in Amazon since July 2016 in our Global and Ethical strategies.

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TO CREATE  
STRONG  
RETURNS  
– IT IS OUR  
**PASSION**



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