



Fundamental, Incisive,
Thematic, Thought-leading

Industry
China Internet

Date
24 April 2016

Asia
China
Technology



Alan Hellowell
Research Analyst
(+852) 2203 6240
alan.hellowell@db.com

Eileen Deng Alvin Jiang
Research Associate Research Analyst
(+852) 2203 6227 (+852) 2203 6241
eileen.deng@db.com alvin.jiang@db.com

Ross Sandler
Research Analyst
(+1) 415 262-2028
ross.sandler@db.com

Karl Keirstead
Research Analyst
(+1) 212 250-7867
karl.keirstead@db.com

F.I.T.T. for investors

Cloudy with a chance of monetization

"Growth story of the decade"; AliCloud floats above the rest

US colleagues Karl Keirstead and Ross Sandler describe public cloud services as "the biggest and most disruptive trend impacting the technology industry." DB estimates the total addressable market for cloud to be USD500b. Cloud service providers have captured only a low-single-digit piece of this TAM. In China, the opportunity is even younger and less penetrated. AliCloud is the clear hometown favorite, with 65% of DB survey respondents using its solutions. Alibaba is our preferred play on cloud over Tencent and Baidu, which have much smaller cloud businesses that should also grow appreciably.



Cloudy with a chance of monetization

"Growth story of the decade"; AliCloud floats above the rest

US colleagues Karl Keirstead and Ross Sandler describe public cloud services as "the biggest and most disruptive trend impacting the technology industry." DB estimates the total addressable market for cloud to be USD500b. Cloud service providers have captured only a low-single-digit piece of this TAM. In China, the opportunity is even younger and less penetrated. AliCloud is the clear hometown favorite, with 65% of DB survey respondents using its solutions. Alibaba is our preferred play on cloud over Tencent and Baidu, which have much smaller cloud businesses that should also grow appreciably.

China: catching the "growth story" even earlier on; both public and private

The value proposition of the public cloud is simple: enabling deep cost savings and freeing up resources for enterprises to pursue more core business activities. While public cloud revenues at AliCloud and others continue to grow in the triple digits, China is also seeing strong growth in private cloud, as government bureaus, SOE's and large private companies heed government exhortations to reform their hidebound IT regimes behind its "Internet+" initiative. Before the introduction of the cloud, about 70-80% of companies' IT budgets and time were spent on low-value-added areas such as infrastructure maintenance, upgrades and integration. With external cloud operators taking over these burdens, management is able to concentrate on growth-centered initiatives, with cloud assisting in saving time and expense. Some 72% of respondents to our survey indicate that they are reducing significantly their IT spend through the use of cloud computing services. Alibaba Research Institute, for instance, estimates that 70% of computing costs can be saved.

China's CIO speaks: results of DB proprietary survey

As part of our overview of China's nascent cloud industry, we surveyed more than 50 CIO's, CTO's, Directors and VPs of IT. Results revealed cloud computing to be the #1 priority this year, followed by security services at #2, and IT infrastructure and datacenters at #3. These companies expect to spend approximately 27% and 30% on cloud computing services in 2016 and 2017, respectively, compared to 20% in 2015. Over 50% of the respondents stated that they were able to save up to 40% of their IT spending thanks to cloud computing.

Breaking BABA into SoTP. Lifting TP to USD109, with USD6.5 for AliCloud

With this report, we apply a sum-of-the-parts methodology to our valuation of Alibaba. We now use SoTP for all three companies (Tencent, Alibaba and Baidu.) Beside a 6% contribution from AliCloud, we assume that 7% of Alibaba group value comes from Ant Financial, and 1% from logistics arm Cainiao.. These three companies span businesses with very different operating profiles, profitability and growth trajectories, which merit the adoption of specific valuation approaches for each major business unit. Key risks for these companies include heightened/diminished competition in areas such as cloud, regulatory decisions out of Beijing and macro trends.

Alan Hellawell

Research Analyst
(+852) 2203 6240
alan.hellawell@db.com

Eileen Deng

Research Associate
(+852) 2203 6227
eileen.deng@db.com

Alvin Jiang

Research Analyst
(+852) 2203 6241
alvin.jiang@db.com

Ross Sandler

Research Analyst
(+1) 415 262-2028
ross.sandler@db.com

Karl Keirstead

Research Analyst
(+1) 212 250-7867
karl.keirstead@db.com

Top picks

Alibaba (BABA.N),USD80.78	Buy
Tencent (0700.HK),HKD162.80	Buy
Baidu (BIDU.OQ),USD192.74	Buy

Source: Deutsche Bank

Companies Featured

Alibaba (BABA.N),USD80.78	Buy
	2015A 2016E 2017E
P/E (x)	46.0 32.6 26.4
EV/EBITDA (x)	52.5 31.8 22.5
Price/book (x)	8.6 5.6 4.8

Tencent (0700.HK),HKD162.80	Buy
	2015A 2016E 2017E
P/E (x)	34.0 30.9 24.3
EV/EBITDA (x)	21.3 18.5 14.6
Price/book (x)	9.6 8.1 6.2

Baidu (BIDU.OQ),USD192.74	Buy
	2015A 2016E 2017E
P/E (x)	12.0 24.5 17.7
EV/EBITDA (x)	23.5 19.7 12.9
Price/book (x)	4.9 4.3 3.4

Source: Deutsche Bank



Table Of Contents

Growing opportunities in shifting IT budgets.....	3
The cloud opportunity	5
Defining cloud	11
Alibaba	24
Tencent.....	66
Baidu	78
UCloud.....	85
Microsoft Azure	89
AWS (China)	91
Kingsoft Cloud	92
Other local competitors	93
Appendix	98



Growing opportunities in shifting IT budgets

Key highlights:

- The “Internet +” initiative announced by the Chinese leadership in early 2015 is driving an unprecedented focus on IT investment across government departments, SOE’s and private sector companies. China’s overall IT spending on cloud services specifically is set to increase to 24.5% of that of the West by 2018 (from 5.7% in 2015), due in large part to China’s IT managers viewing cloud services as mission-critical. Indeed, the country’s CIO’s ranked it as a #1 priority in a survey we carried out recently. Bain & Company¹ expects Chinese enterprises to allocate 20% of their IT budgets to cloud computing by 2020, compared to just 5% in 2014, implying a six-year CAGR of 30.8%. Our survey revealed an even more aggressive 30% allocation to cloud by 2017.
- Constant innovation and expansion in the functionality of public cloud products, such as improving security features, have driven growing enterprise awareness of the benefits of using the public cloud. This has attracted a growing number of large organizations shifting from their own private solutions to the public cloud. On the other hand, the SME sector (representing approximately 60% of Chinese GDP), where the companies often lack the necessary financial resources and expertise to set up and maintain their own IT infrastructure system, provide a natural target market for public cloud service vendors.
- Major domestic cloud vendors have recently begun delivering impressive growth, especially towards the end of 2015. Market leader AliCloud commenced commercial operations in 2009 and, as the accompanying table indicates, recorded 126% YoY growth in the December quarter. Tencent began offering external cloud services in 2013, and Baidu only in September 2015.
- Alibaba has become the dominant local player in China’s cloud business. Our forecasts envisage AliCloud’s continued dominance going forward, although more recent entrants Tencent and Baidu should grow share through 2020.

China’s cloud spending to reach 24.5% of the West by 2018 from 5.7% last year

Figure 1: Estimated 4Q growth YoY and est full year revenues, 2015

Vendor	4Q growth	2015 revenue (RMBm)
AliCloud	126%	2,341.0
Tencent Qcloud	100%+	250-350
Kingsoft Cloud*	300%+	200

Source: Deutsche Bank
Note: 1) 300%+ revenue growth for Kingsoft is for the CY2015
2) AliCloud’s revenue for CY2015 is actual

¹ All information used from Bain & Company in this report are used with permission from Bain & Company (www.bain.com)



Figure 2: Revenue breakdown for TAB

Revenue segments	CY2015	% of total revenue	CY2020E	% of total revenue	5-Yr CAGR
Alibaba					
E-commerce	86,074.0	91.2%	294,459.3	65.9%	28%
Cloud computing	2,341.0	2.5%	124,715.2	27.9%	121%
Youku	-	0.0%	16,858.6	3.8%	
Others	5,969.0	6.3%	10,853.2	2.4%	13%
Total	94,384.0		446,886.2		36%
Tencent					
Value added services	80,669.0	78.4%	144,177.0	52.8%	12%
Online advertising	17,468.0	17.0%	84,233.3	30.9%	37%
Cloud computing	250.0	0.2%	27,068.8	9.9%	155%
Others	4,476.0	4.4%	17,527.3	6.4%	31%
Total	102,863.0		273,006.4		22%
Baidu					
Online marketing services	64,037.0	96.5%	142,706.4	89.9%	17%
Cloud computing	75.0	0.1%	7,287.0	4.6%	150%
Others	2,269.7	3.4%	8,825.0	5.6%	31%
Total	66,381.7		158,818.4		

Source: Deutsche Bank, Company data
 Note: Cloud revenue for Tencent and Baidu are estimates

- In addition to the domestic players, foreign vendors are rapidly gaining market traction. This is largely driven by their extended global presence that is becoming paramount for Chinese businesses seeking to expand operations beyond the mainland borders, a wider range of cloud solutions, and more mature technology relative to the domestic players.
- IDC expects China's public cloud market to grow at a three-year CAGR of 31.2% from 2015 to 2018. We consider this figure excessively conservative, and instead propose a much zippier CAGR of 149.0%. Our discussions with industry leaders ranging from Alibaba to Tencent to UCloud, and accompanying discussions with company CIO's, indeed suggest much more vigorous growth during this period.



The cloud opportunity

Do the market research firms have it all wrong?

Cloud revenues began accelerating sharply into 2015

China cloud revenues expanded at an estimated 60% YoY in 2015 to reach roughly from US\$353.3m in 2014 to US\$571.7m in 2015 according to our estimates (vs. an IDC estimate of about 53% growth to US\$1,420.4m). We expect this growth to *accelerate* through 2016, as leaders such as AliCloud and Tencent QCloud take what were previously internally focused solutions and monetize them by configuring them for external commercial use.

China's leader in the space, AliCloud, for instance reported RMB819m (roughly USD128m) as revenue for the quarter ended in December 2015 (+126.2% YoY) contributing to an acceleration of over 113.6% growth for the full calendar year 2015 (RMB2.3bn). AliCloud December quarter revenues imply an annual run rate higher than that of Google Cloud Platform, and a level already 1/3 the size of Azure globally. As a result of our extensive interviews and channel checks, we moreover envision 135.5% compounded annual growth for the Hangzhou-based company from 2015 through 2018.

IDC compares China public cloud sector versus US market;

One could argue that it is far too early to celebrate China's future cloud opportunity with the same vigor that our US colleagues demonstrate in their November 2, 2015, piece ("Amazon Web Services – The Growth Story of the Decade"), given that Chinese public cloud market revenue accounted for just 2.4% of that recorded in the US in 2014, according to IDC. The leading market research firm expects China's public cloud market to increase to 3.5% of its US counterpart by 2018, implying a CAGR of about 36% from 2014 to 2018.

China's enterprises to allocate 30% of their IT budgets to cloud services by 2017 – DB CIO Survey, 2016

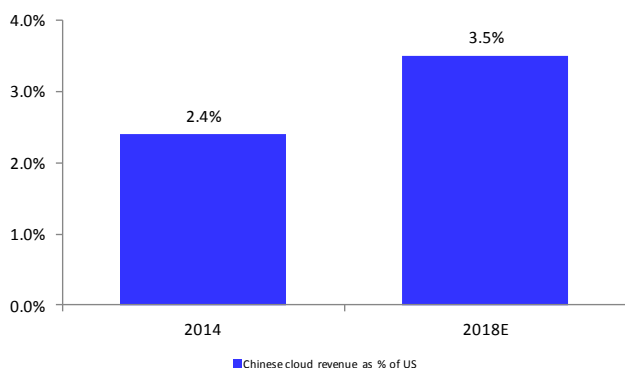
DB compares China versus broader western markets

As discussed earlier, we estimate that China cloud accounted for about 5.7% of that of the West in 2015. We expect it to reach approximately 24.5% of western spend levels by the end of 2018 (western peers will have spent an estimated US\$10bn and US\$36bn in 2015 and 2018, respectively).

In the following figures, we show this stark contrast between DB expectations for China's cloud spend intensity compared to the West on one hand, and IDC's comparison of China and the US on the other. While differing methodologies may explain to some extent the yawning expectation gaps shown below, we feel that many have indeed underestimated the sheer demand for cloud services emerging in China.

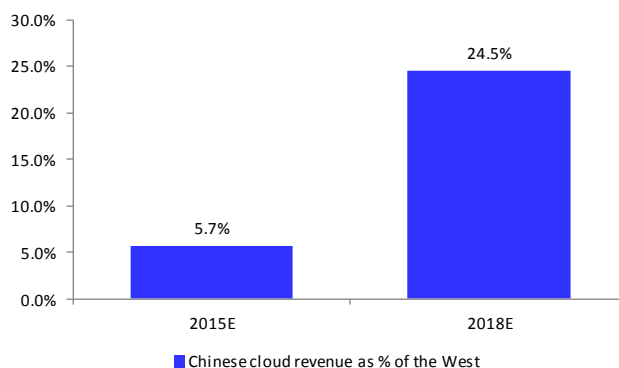


Figure 3: China cloud relative to the US – IDC



Source: Deutsche Bank, IDC

Figure 4: China cloud relative to the West – DB



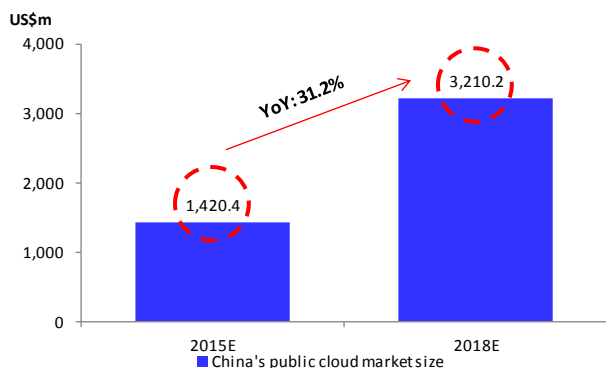
Source: Deutsche Bank

DB forecasts 149% CAGR for China cloud through 2018, versus IDC at 31%

A broader domestic public cloud computing spend CAGR of 149% from 2015 to 2018 underpins our more optimistic forecasts above. We expect China market revenues to reach approximately US\$8,824.6m in 2018. Again, this puts us on an entirely different trajectory than other research houses. We present IDC and DB forecasts below.

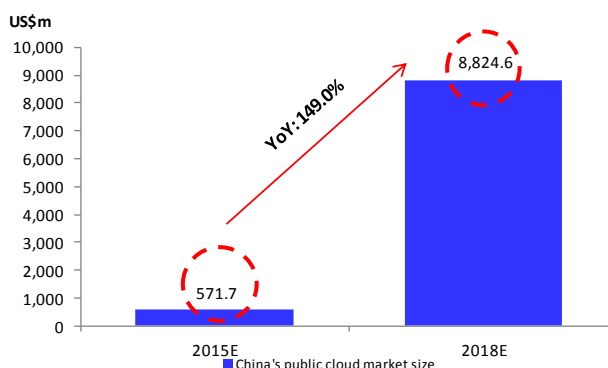
We expect China's cloud computing market to grow by 149% from 2015-2018

Figure 5: IDC growth forecast for Chinese public cloud



Source: Deutsche Bank, IDC
 Note: IDC recently revised its framework to include on-demand private cloud services in addition to public cloud and virtual private cloud services provided by the vendors

Figure 6: DB growth forecast for Chinese public cloud



Source: Deutsche Bank, CIO survey – 2016

China to represent one-half of Asia-ex Japan cloud spend by 2018

Placing China's cloud industry into a more immediate regional context, China outpaced Australia last year to become the largest contributor to the Asia ex-Japan public cloud market with a 30.0% market share (vs. Australia's 26.1%). IDC forecasts that China will account for a 36% share by end of 2018. We on the other hand expect China to account for more than 50% of the region's overall market by the end of 2018.

China under-investing in IT: #1 priority on cloud

China is the third-largest market for enterprise IT spending, after the U.S. and Japan, according to Gartner² forecasts. Gartner expects that spending by Chinese enterprises on technology products and services will climb 6.5 percent

² Gartner press release "Gartner Highlights Top 10 Strategic Technology Trends for China in 2015-2016" September 23, 2015 <http://www.gartner.com/newsroom/id/3135717>



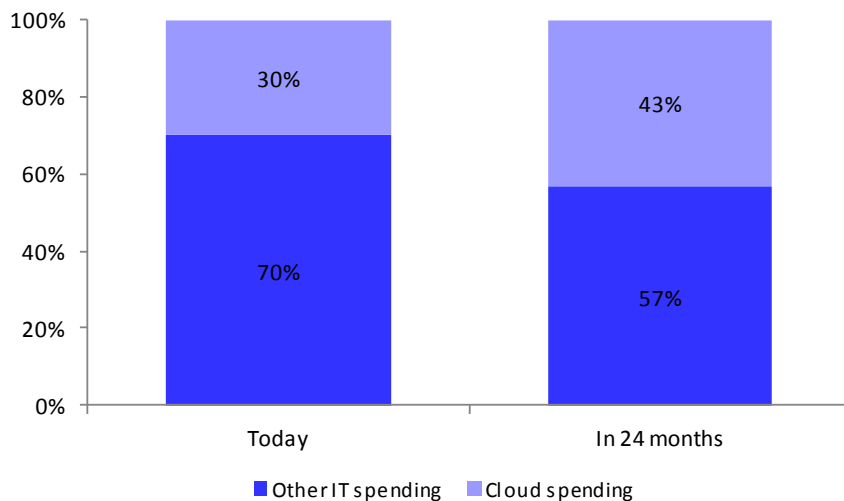
from \$146.4 billion (RMB 913.3 billion) in 2015 to \$155.8 billion (RMB 972.4 billion) in 2016. We estimate that China's IT spending penetration (IT spending as a percentage of revenue) is roughly 2%, compared to a 3.5% global average. Given its significantly lower base compared to the world at large, we expect the higher growth trajectory in Chinese IT spending to continue in the future. Interestingly, the respondents in our Chinese CIO survey expect approximately a 20% increase in their overall IT budgets in 2016. We instead expect much of our forecast growth to come from rapid expansion in the number of companies adopting cloud-based solutions.

Respondents in our survey ranked cloud computing services and security services as #1 and #2, respectively for both 2015 and 2016. Respondents identified cost savings on hardware, networking, and IT management as the major benefit from cloud computing services whereas greater agility remains the main reason for the global trend towards public cloud.

*Cloud computing services #1
priority for 2016 – DB CIO
Survey, 2016*

Further, enterprise IT budget allocations for cloud computing services have seen a growing trend over the years. According to a recent survey carried out by IDC in January 2016 (IDC CloudView 2016 Survey), companies across the world currently spend approximately 30% of their overall IT budgets on cloud services. These companies expect to increase their allocation to 43% in 24 months' time (Figure 7).

Figure 7: IT budget allocation on cloud services – World

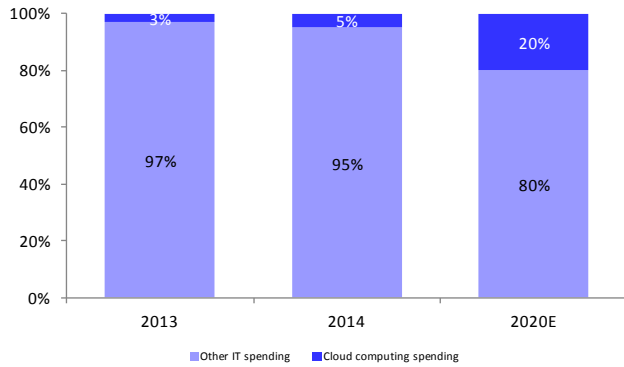


Source: Deutsche Bank, IDC CloudView Survey, January, 2016

As shown in Figure 8, Bain & Company expects China's enterprises to allocate about 20% of their IT budgets to cloud computing services, compared to approximately 5% allocated in 2014. However, our CIO survey revealed more aggressive enterprise spending in cloud computing services with the responding IT heads expecting the allocations to be 27% and 30% in 2016 and 2017, respectively, compared to 20% in 2015 (Figure 9). These findings were also in line with the responses we received from our channel checks and interviews with major customers of the top cloud service vendors. Separately, IDC expects roughly 40% of IT budgets in the Asia ex-Japan region to be spent on cloud-based solutions and expects investment to increase to 45-50% by 2020.

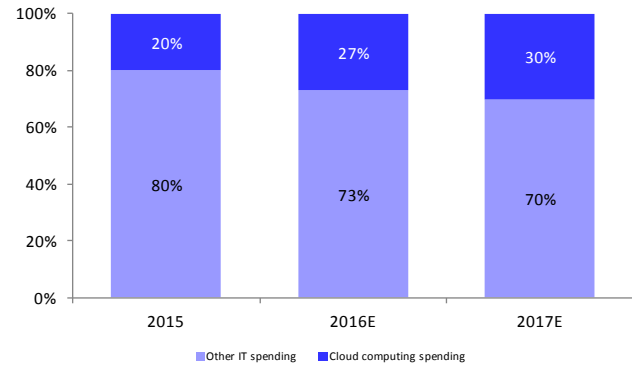


Figure 8: China's growing IT budget allocations on cloud computing – Bain & Company.



Source: Deutsche Bank, Bain & Company

Figure 9: China's growing IT budget allocations on cloud computing – results from our CIO survey



Source: Deutsche Bank, CIO survey - 2016

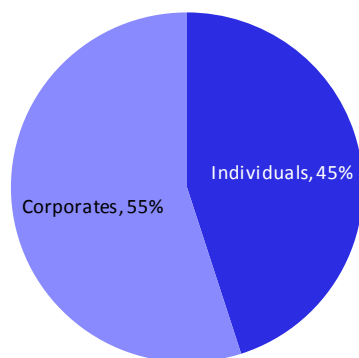
Corporate customers – the real revenue base

Our CIO survey revealed that companies eventually seek some form of cloud service (private, public, or hybrid) to support approximately 70% of their IT workload. These companies also expect to increase their IT budget allocation on cloud to 30% by 2017, with some large companies already planning to devote 70% to the effort (we discuss these findings in detail later in this report).

We expect corporate sector contribution to cloud services to reach 70% by 2020

As shown in Figure 10, in 2014, approximately 55% of IT spending on the public cloud in China was attributable to the corporate sector, the subject of our aforementioned survey. Individual customers accounted for a smaller 45% of market revenue, according to IDC. We expect the corporate component to grow to above 70% by 2020.

Figure 10: Individual vs. corporate – China (2014)



Source: Deutsche Bank, IDC

China cloud spend: more demand from new economy companies than traditional industry

Traditional enterprises, many of which manage their IT workload on-premise, generally follow a more gradual “lift and shift” transition to cloud services, starting with light-weight development and test segments. On the other hand, startups are more likely go “all-in” with cloud services being adopted



wholesale from the companies' inception. In the west, the ratio between traditional enterprises and startups in the public cloud market is about 75%:25%. In China, however, a large portion of cloud customers is startups, operating in sectors such as internet, mobile, and gaming. This is quite natural given the relatively nascent stage in which Chinese cloud market is operating at the moment compared to more developed markets such as the US. A lack of awareness regarding the benefits of cloud, security concerns, and a lack of progressive thinking around IT have hampered the transition to cloud by China's traditional enterprises. We believe this segment presents greater monetization potential than do China's first adopter startups.

Public versus private

Public clouds involve shared resources; private clouds are dedicated

Cloud services in their most basic form can be divided into public and private. A public cloud is where a company gains access to *shared* IT infrastructure and services on a third-party vendor platform (with other users on the same cloud). The external vendor is responsible for managing the customer's data and applications saved in the datacenters operated by the vendors. The customer generally pays for the services on a usage or fixed subscription basis. A private cloud is a platform *dedicated* to a single customer. It could be a customer owned and operated cloud (in such case it's more or less similar to a centralized on-premise system) or a virtual private cloud on a third-party vendor platform where the access is limited to the particular customer only.

China sees outsized spend on private clouds; Ali and others more focused on public clouds

Preference between public and private clouds depends on key factors such as customer scale, affordability and sensitivity of information. During our CIO survey, 80% of respondents stated security as their biggest concern with migrating their workload to a cloud environment. Large companies that are concerned with the security of their sensitive information and can afford their own infrastructure and service costs related to setting up and maintaining their own clouds (e.g., financial institutions, large internet companies, government institutions) tend to prefer private clouds. Figure 11 illustrates the clear preference for private cloud amongst government ministries, SOE's and large traditional industries (Source: Bain & Company).

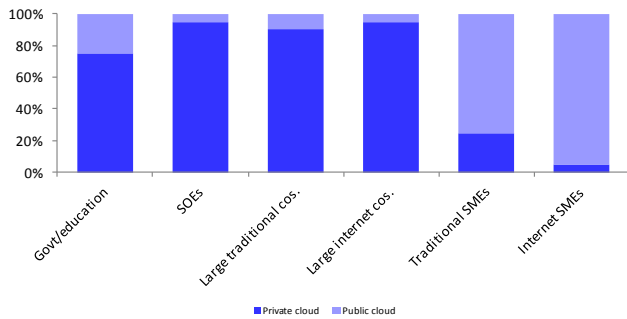
Security is the biggest concern in migrating IT workload to a cloud environment, with large enterprises and government institutes preferring private clouds

On the other hand, small and medium-scale companies that do not have sufficient financial backing (eg, most SME's), or companies that do not deal with particularly sensitive information represent the common profile of a public cloud customer.

Our CIO survey revealed a similar pairing (Figure 12), whereby companies with fewer than 1,000 employees largely use public clouds (more than 50% of total workload allocated to cloud) while larger companies tend more toward private and hybrid clouds.

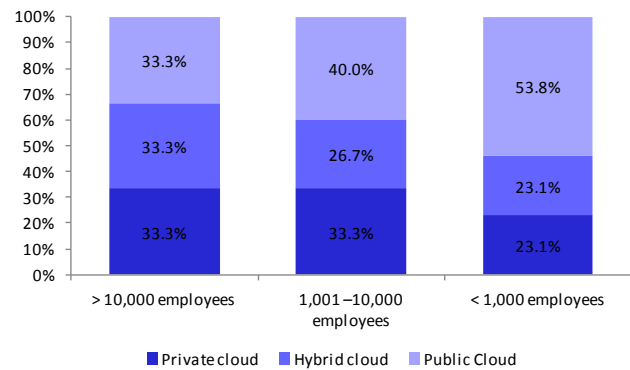


Figure 11: Govt. and large cos. prefer private clouds over public clouds – 2014



Source: Deutsche Bank, Bain & Company

Figure 12: Findings from DB CIO survey – 2016



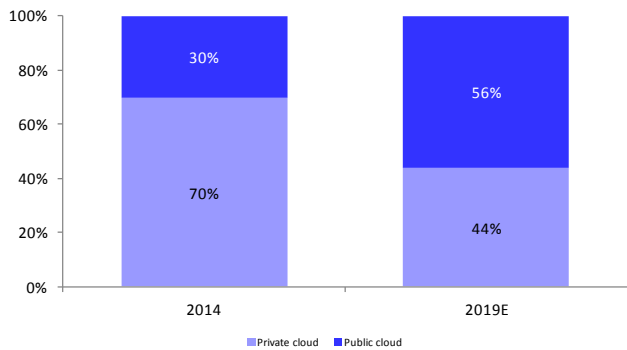
Source: Deutsche Bank, CIO survey - 2016

The world increasingly embracing public cloud; private cloud still core to China

According to Cisco, 70% of global cloud computing services were carried out through private clouds in 2014. Nevertheless, private clouds have seen a steady decline over the years. Continuous improvement in security features amongst public cloud service suppliers, and growing enterprise awareness of the benefits offered by public clouds, have driven a growing number of enterprises to move to public clouds. Cisco expects public clouds to account for 56% of total global cloud workload by 2019 (Figure 13). Our CIO survey indicates that private sector Chinese companies allocate a majority of their overall cloud workload (~40%) to public cloud (Figure 14). The survey does not include a large part of the cloud market – government, SOEs and large enterprises. These groups maintain a clear preference for private cloud.

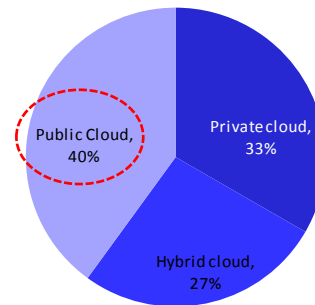
Improving security features attracting growing adoption of public clouds. Cisco expects public clouds to account for 56% of total global cloud workload by 2019

Figure 13: The growing global popularity of public clouds



Source: Deutsche Bank, Cisco

Figure 14: Allocation of workload by the private sector in China (DB CIO survey – 2016)



Source: Deutsche Bank, CIO survey – 2016

We raise this point as major players such as Alibaba, Tencent and Kingsoft are heavily focused on the public cloud market and tend to address private cloud only through partnership. Encouragingly, under the country's "Internet Plus" initiatives, several of China's state institutions and provincial bodies have entered into agreements with public cloud service providers such as AliCloud for cloud computing services. Those government institutions and private sector companies that do not deal with particularly sensitive information, have resource constraints and/or are working to reduce costs, are increasingly considering adopting public cloud solutions in China.



Defining cloud

Identifying different “cloud formations”

We identify mainly four types of cloud services in China. These products are generally defined by the level of IT services customers obtain from the vendors.

Traditional IT:

Under the traditional IT model, enterprises manage the complete IT resource base “on-premise”. All levels of the IT stack, from the basic hardware (e.g., server, networking tools) to operating systems to software applications (e.g., CRM, ERP) are owned and maintained at the enterprise’s own datacenter. Given the considerable amount of time and resources incurred in purchasing, operating, and updating these resources, the traditional IT model is considered the most expensive model. Over time, enterprises have adopted several measures such as centralization of the IT system, in-house private clouds, and outsourced management by third-party vendors.

Infrastructure-as-a-Service (IaaS):

IaaS is one of the very basic levels of cloud computing services, whereby services at the lower level of the IT pyramid, such as servers, storage, networking, and virtualization software, are provided in a cloud environment. For instance, use of a public cloud (or a hosted private cloud) vendor of IaaS services would relieve an enterprise of the need to own and maintain its own datacenters. The services are managed by a third-party vendor. The service provider would then charge customers on a usage or subscription basis. More importantly, use of IaaS provides businesses with improved system efficiencies through adjustable scalability.

Platform-as-a-Service (PaaS):

PaaS vendors facilitate enterprises with cloud-based platforms for developing, running and managing software applications. PaaS services include managing operating systems, middleware, and runtime. PaaS solutions help businesses reduce the complexity of the application development process and let developers instead focus on creating high-quality software applications.

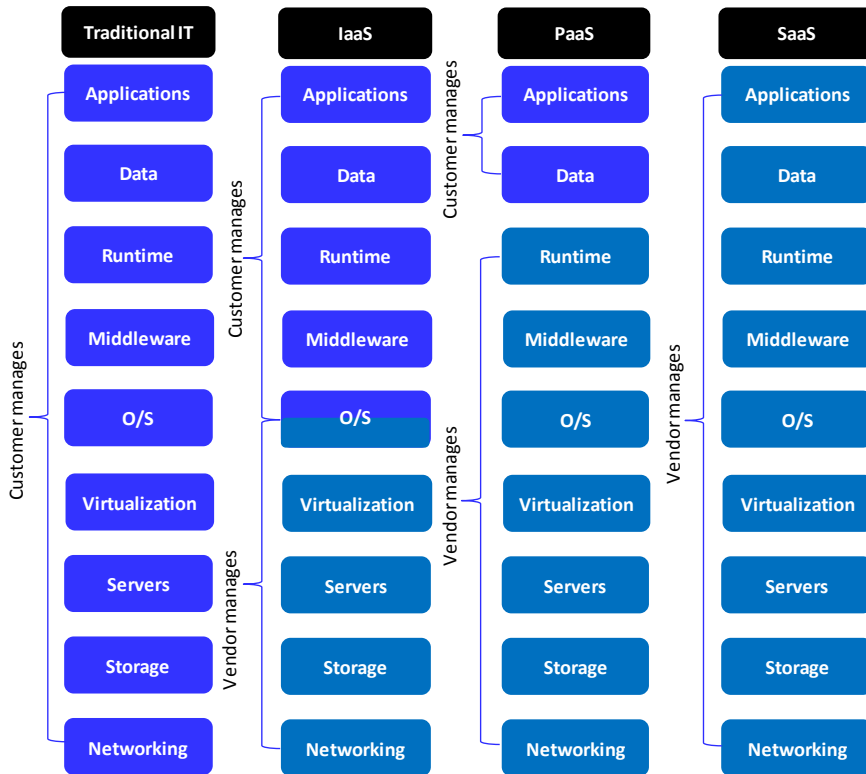
Software-as-a-Service (SaaS):

SaaS solutions address the top layer of IT requirements, being largely software applications. Users can access applications such as enterprise resource planning (ERP), customer relationship management (CRM), human resource management (HRM), and management information systems (MIS).

The following figure illustrates clearly the “division of labour” between what the customer manages and what the vendor looks after.



Figure 15: Different levels of cloud services



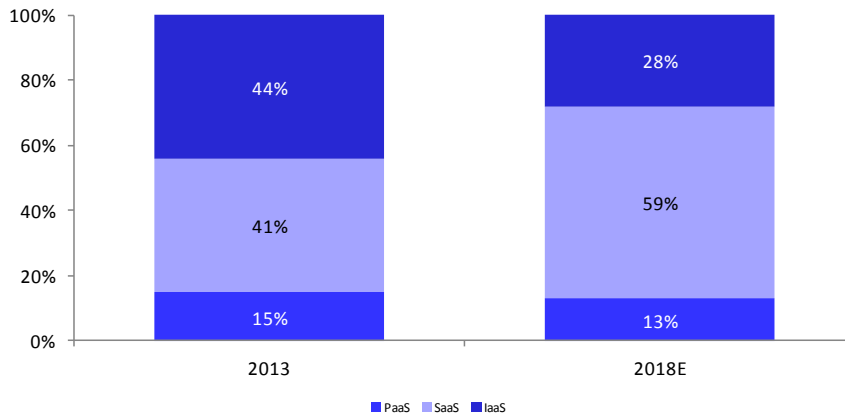
Source: Deutsche Bank, Microsoft

World is slowly moving away from IaaS to SaaS; so is China

The world at large (largely driven by the developed markets) is gradually moving away from IaaS to more lucrative SaaS solutions, as shown in the following charts. Cisco expects SaaS to account for about 59% of total cloud market by 2018. According to the results from our CIO survey, IaaS currently represents approximately 35% of the respondents' total cloud-based workload while PaaS and SaaS account for 30% each. Similar to the global scenario, our channel checks also envision a growing shift towards SaaS solutions in the domestic cloud space in the future.



Figure 16: World at large shifting towards SaaS



Source: Deutsche Bank, Cisco

Different IaaS services in demand among different verticals

Through our analysis of key customers of Tencent Qcloud, we were able to identify how prioritization of cloud services differs among different industries. In the following table, we present the top three cloud products in demand based on customer vertical. Irrespective of industry, virtual servers (elastic computing services) are the most in-demand cloud product across all industries. The ranking of other products largely depends on the respective industry. For instance, in the gaming sector, database services ranked (in terms of demand) #2 while in the financial services sector, both database and private virtual clouds ranked #2. In the medical sector, cloud-based communications ranked #2 followed by database services.

Figure 17: Cloud product popularity across different verticals

Demand-based ranking	Sector		
	Gaming	Financial services	Video
#1	Virtual servers (Elastic computing services)	Virtual servers (Elastic computing services)	Virtual servers (Elastic computing services)
#2	Databases	Virtual private cloud, Databases	Databases, CDN
#3	CDN	Security	Cloud communication, Video on demand, Caching memcached
Demand-based ranking	Sector		
	O2O services	Medical services	
#1	CDN	Virtual servers (Elastic computing services)	
#2	Virtual servers (Elastic computing services), Databases	Cloud communication	
#3	Storage, Cloud image, Security	Databases	

Source: Deutsche Bank, Tencent Qcloud



The basic drivers of China cloud growth

How clouds evolve, and where China is in this evolution...

At China's current early phase of cloud market development, winners are predominantly determined by the breadth and quality of their services. The US (e.g., AWS) was operating at this stage of development in around 2008-2012. As the market gradually progresses and reaches critical mass (e.g., 2013/2014 in the West), competition heightens with new entrants, and the conversation moves from features to price at the commodity end of the spectrum. Once the major players find their footing and respective places in the market (roughly 2015/2016 in the West), the focus reverts to features, products, and more importantly support levels. By this time, late adopters such as traditional enterprises start entering the picture following a "lift and shift" approach.

We believe that China is currently placed where the US was in around 2010-2011 with the contenders largely focusing on R&D and the expansion of their products/solutions offerings while trying to establish their presence. Having reviewed the customer base of the major domestic vendors profiled in this report, a large portion of their paying customers are startups, with just a few large traditional enterprises. We would thus expect China to take at least another 2-3 years to witness a notable contribution by these large traditional enterprises.

Significant small and medium-sized business base

According to China's Assets Supervision and Administration Commission, the country has about 40m small and medium-sized businesses, a vast majority of which lack the financial resources and expertise to set up and maintain their own IT infrastructure system (unlike their larger-scale peers.)

China's SME's clearly a big driver to incremental growth. Who is best positioned?

Further, as at the end of 2014, just 10-20% of China's total spending on enterprise IT was driven by SMEs. Large companies and state organizations incurred the most (i.e., 80-90% of the total), according to Bain & Company. However, in terms of the global landscape, according to IDC, SMEs (defined as companies with less than 500 employees) play a bigger role in cloud spending, with a contribution of over 40%.

Cloud spend by SMEs in China is markedly lower than in the world at large

A more recent survey of 257 companies conducted by IBM Greater China revealed that 47.7% of China's internet companies are already using cloud services. The report further revealed that 15.6% of traditional companies and 25% SMEs had used cloud computing services by the end of 2015. Given the greater ease and affordability offered by public clouds compared to operating in-house IT systems, a growing number of SMEs are embracing the cloud computing concept in China, basically following the precedent of nearly every other major market globally.

Cloud opportunity to follow Chinese business presence in overseas markets

Over the past several years, Chinese businesses (initially state-owned enterprises, or SOE's) were amongst the first to invest outside China, expanding their presence around the world in the form of non-financial outbound direct investment. With continuous strong government backing, China now has become the world's 3rd largest outbound direct investor. According to the Ministry of Commerce (MOC), China recorded US\$118bn



(14.7% YoY) in non-financial outbound direct investments (ODI) in 2015, including US\$40.1bn worth of M&A deals (593 deals). Further, the private sector has become more active in driving China ODI. We have moreover seen a gradual shift in target regions from traditional BRICS economies to more developed economies, including the US and Europe.

Emerging markets leading data explosion: perfect setting for cloud-based data analytics?

In the EMC sponsored Digital Universe study carried out in 2014, IDC predicted that the amount of data around the world would increase from 4.4ZB (Zeta bytes) in 2013 to 44ZB by 2020, with IoT (the internet of things) accounting for about 10% (from 2% in 2013) of it. More importantly, IDC also predicted that the percentage of data stored in the cloud would double from 20% in 2013 to 40% in 2020. The study also revealed that the even though as of 2013, 60% of the world's data had been generated by mature markets such as the US, Japan, and Germany, the situation would change by 2020. By 2020, approximately 60% of data will likely be generated by emerging markets including China, India, Russia, Brazil, and Mexico. These findings clearly show the growing opportunities presented in the big data analytics area for companies such as Tencent, Alibaba, and Baidu, which deal with a massive amount of user data on a daily basis.

By 2020, approximately 60% of data will likely be generated by emerging markets including China

Competition is brewing in the domestic IaaS market

Can "TAB" lead in cloud too?

Cloud services are poised to become a large part of China's technology sector. While the country's triumvirate of leading platforms "TAB" (Tencent, Alibaba and Baidu) seems at this early stage also likely to dominate China's cloud sector, several other listed players (including international players such as Amazon AWS and Microsoft Azure) and start-ups have value propositions that should also appeal to the market.

China's cloud service space to be served by players from various backgrounds including internet companies, telecommunication operators, and third-party datacenters

In our wide-ranging discussions with IT managers, CTO's and other executives across China's industrial landscape, assessments of China's major cloud players ultimately tend to center on each vendor's current capabilities, and its roadmap to stay ahead of the evolving needs of that specific company. The graphic we present in Figure 18 captures IDC's more qualitative rankings, which map largely to our own recent due diligence. As shown in the figure, China's IaaS market is served by vendors from very different backgrounds including internet companies (e.g., Alibaba's AliCloud, Tencent's Qcloud), telecommunication operators (e.g., China Telecom's eCloud, China Unicom's Wo Cloud), and third-party datacenter operators (e.g., 21Vianet).

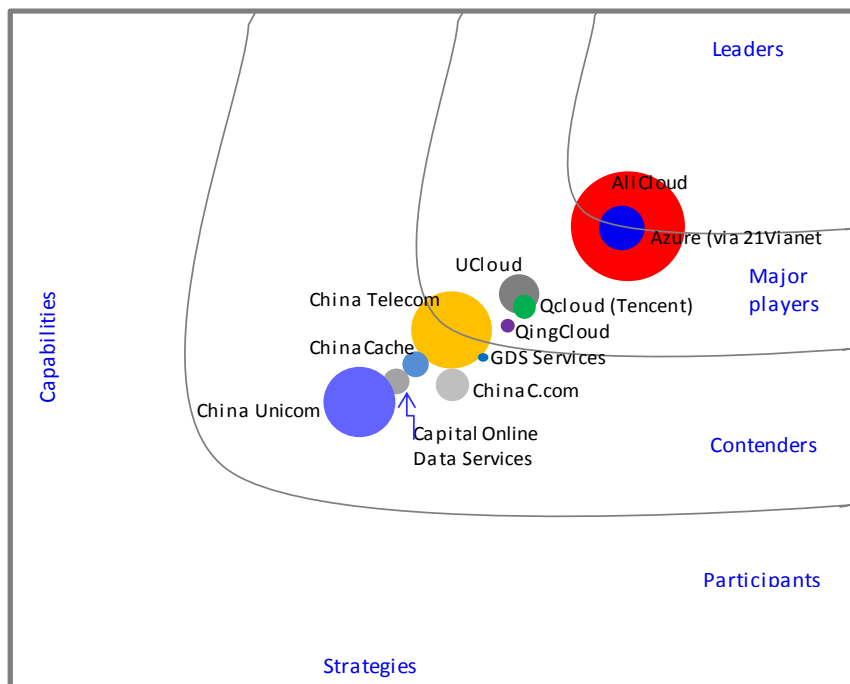
AliCloud: the clear category leader

The figure very clearly illustrates schematically what our wide-ranging due diligence has yielded over the past few months: namely, that AliCloud has achieved clear dominance as China's local champion, offering an unrivalled array of solutions moreover with the industry's largest scale. Microsoft Azure, in concert with local partner (as per regulatory requirements) 21Vianet (China's #1 operator of third-party datacenters), presents a similar breadth of products but with a much smaller footprint.

AliCloud leads the domestic public IaaS market by a clear margin



Figure 18: AliCloud leading the domestic public IaaS market by a clear margin



Source: Deutsche Bank, IDC (2015)
 Note: 1) Capabilities: how well each vendor is developing its capabilities to execute its strategy; 2) Strategies: how well each vendor's strategic focus is aligning with customer requirements during 3-5 years; 3) Size of each vendor: the size of the shapes used to represent each vendor reflects each vendor's market share

Microsoft has been able to secure its place as a leading player along with AliCloud in the domestic market while ranked #4 in terms of scale behind eCloud (China Telecom) and Wo Cloud (China Unicom), ranked #2 and #3, respectively.

Interestingly, start-up company UCloud (ranked #5 in terms of scale), has worked itself up the ladder to become the 3rd major player in the domestic IaaS space, followed by Tencent's Qcloud who is ranked #9 (in terms of scale). Further, with their already established large-scale datacenters, the telecommunication operators are natural candidates in the cloud service market. IDC identifies two of the three telecommunication operators of China, China Telecom (through eCloud) and China Unicom (through Wo Cloud) as contenders in the domestic IaaS market.

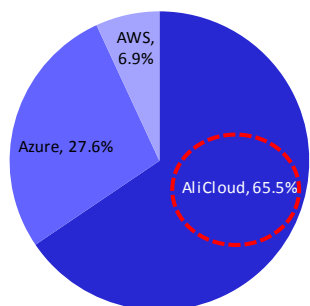
DB survey: AliCloud much clearer winner than other surveys suggest

Our own findings from the CIO survey also suggest that AliCloud leads the domestic IaaS market with 74% of the respondents selecting AliCloud as their first choice for cloud services. Further, as shown by the following figures, AliCloud and Azure rank #1 and #2, respectively, among customers that prefer a single vendor as well as those that prefer multiple vendors. Companies that preferred several vendors ranked Tencent's Qcloud #3. Interestingly, Amazon's AWS, while still operating on an "invitation-only" basis, has been able to attract growing attention from local companies as shown by its ranking among the top players.

Over 65% of China cloud customers prefer AliCloud as their single cloud vendor – DB CIO Survey, 2016

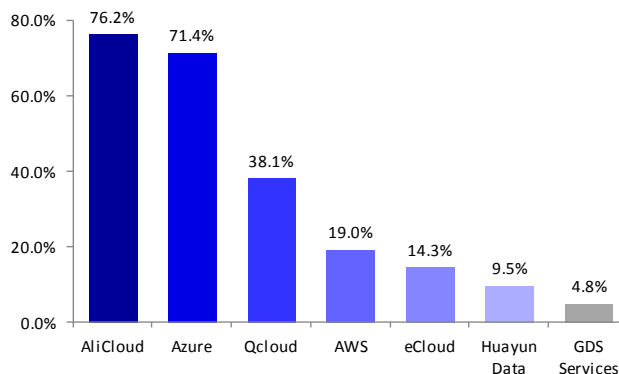


Figure 19: Vendor preference – customers using a “single” vendor



Source: Deutsche Bank, CIO survey – 2016

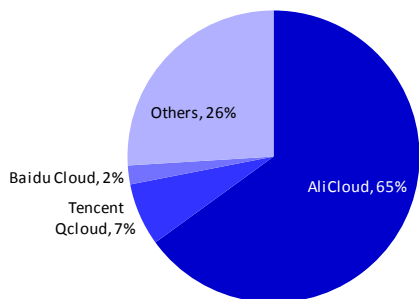
Figure 20: Vendor preference – customers using a “several” vendors



Source: Deutsche Bank, CIO survey - 2016

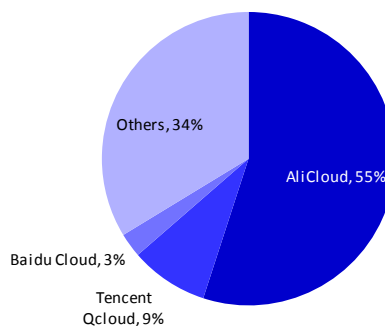
Given growing competition from well established foreign operators and smaller specialist players in the domestic market, we expect a share shift away from Alibaba, Tencent and Baidu by the end of 2018.

Figure 21: “TAB” market share – 2015E



Source: Deutsche Bank

Figure 22: “TAB” market share – 2018E



Source: Deutsche Bank

How Amazon and Microsoft approach the market

As per the prevailing government regulations, the only way for foreign cloud operators to enter the domestic market is via partnership with domestic companies. For those parties setting up operations in the Shanghai Free Trade Zone, these regulations have been relaxed. Microsoft’s Azure offering for instance was launched in China through partnership with 21Vianet in 2013. Azure was followed by Amazon in December, 2013, via partnership with CBC Capital, Ningxia Hui Autonomous Regional Government, and the Beijing Municipal Government.

Foreign players gaining traction, with Azure coming in at #2– DB CIO Survey, 2016

In response to the entry of these and other foreign players to the market, local players have significantly reduced pricing on their cloud products. We estimate that AliCloud for instance reduced prices by about 50% in 1H14 and continues to do so as part of its customer attraction and retention strategy. AliCloud similarly offers discounts for its long-standing customers upon re-subscription. Tencent also reportedly applied similar price reductions on its cloud products. We discuss price-based competition in detail later in this report.



Expansion into overseas markets

According to IDC, approximately 25% of enterprises across the globe will allocate a part of their cloud-based workload to cloud service providers from the Asia Pacific region. Aware of the great growth potential presented especially by the growing Chinese corporate presence across the globe, major Chinese vendors such as AliCloud, Tencent, and UCloud have taken their expansion outside China. These operators face intense competition from international players such as AWS and Azure, which have already established a solid footing in the global cloud service market. Nevertheless, based on our discussions with Chinese cloud operators, we understand that the immediate focus of the global expansion exercise is to establish their presence, predominantly among Chinese enterprises and increase customer awareness, rather than entering into direct competition with the major players.

Approximately 25% of enterprises across the globe to allocate a part of their cloud-based workload to service providers from the APAC region - IDC

Importance of a strong cloud eco-system

While products, support services, and technical infrastructure are important factors for a cloud vendor, an expansive eco-system is also critical. For instance, global market leader AWS works with 50+ system integrators from the likes of Accenture and PWC at the higher end, to cloud-first partner organizations (e.g., Second Watch, Cloudreach, CTP) to the traditional offshore parties. As we discuss under individual names, almost all of the Chinese cloud vendors have commenced partnership programs, which are still largely focused on expanding their infrastructure facilities and geographical presence.

Space for more than one player in the market

As we have discussed already, AliCloud currently dominates the Chinese public cloud. While China is still at a relatively nascent stage compared to other developed markets such as the US, one element that seems universal to all markets around the world is the vast growth potential presented in the cloud space. Furthermore, most large companies prefer not to put all their eggs in one basket but rather allocate their workload among 2-3 players. During our customer survey, 42% of the respondents stated that they would prefer to partner with more than one operator while 58% preferred using a single vendor.

There is space for more than one player in the cloud market as customers prefer partnering with multiple vendors

Vendor preference varies across services

Analysis of customers' preferences for multiple vendors further establishes that depending on the particular IaaS solution, the customers' vendor preferences vary. For instance as shown by the figure below, while customers pick AliCloud as #1 preference for database and storage services, they prefer Azure for elastic computing, security, and CDN services.

Figure 23: Product-based varying vendor preferences

Major IaaS vendors	Major IaaS services				
	Database	Storage	Elastic computing	Security	CDN
AliCloud	#1	#1	#2	#2	#2
Azure	#2	#2	#1	#1	#1
AWS	#4	#3	#3	#4	#3
Tencent QCloud	#3	#3	#4	#3	#4

Source: Deutsche Bank, CIO Survey – 2016



In light of all these factors, we can expect shared dominance by at least 2-3 players in the future battling to expand their presence through not only price cuts but also more value-added products and services as they inch up the technology stack. We are also likely to witness continued efforts by the larger players to expand their eco-system via a hybrid strategy of build-and-own and partnerships.

Competition still largely focused on pricing

Price cuts a standard feature in the cloud industry

In the face of intense competition and improving cost efficiencies, the global cloud market has witnessed a series of price cuts by almost all players, seemingly a perpetual ripple effect resulting from previous price reductions by the major players. A recent study carried out by Tariff Consultancy ("Pricing the Cloud 2 – 2016 to 2020", November 2015) revealed that cloud computing prices dropped by about 2/3rd on average since 2014. AWS cut cloud prices some 51 times since 2006, with the latest cut (about 5%) having taken place in January 2016 on 3 major Linux-based EC2 products. In response to this latest price cut by AWS, Microsoft in turn also cut Azure prices on select cloud products by roughly 17%.

China has a continued focus on price-based competition relative to the West's growing attention to value-added-services-based competition

Is the race to zero slowing? Incumbents' growing focus on service differentiation

Tariff Consultancy has observed that the frequency and magnitude of cloud price cuts have gradually declined over time, showing a growing focus by western operators on value-added products and solutions rather than just pricing to attract customers to their platform.

China's continued low-price strategy

Operators such as AliCloud on the other hand, which have just commenced their global expansion programs, seem to be largely following a low-price-strategy as they try to establish a foothold in new markets. AliCloud announced close to 20 major price reductions in 2015. In the following figure, we present a timeline for price cuts by major Chinese IaaS vendors in 2014 and 2015. Please note that this is not an exhaustive list.



Figure 24: Timeline for price cuts by major Chinese IaaS vendors

Timeline	Vendor	
	AliCloud	Tencent Qcloud
Mar-14	- up to 30% on 11 ECS products - 42% on cloud storage - 15% on database services	
May-14	- ~10% across the board in the Qingdao region - ~70% on storage services	
Jun-14	- 87% on international bandwidth prices in HK	
Nov-14	- 25% on cloud services for mobile developers	
Jan-15	- OSS price up to 15%	
Apr-15		
May-15	- CDN price by 21.2%	- CDN price by 25%
Oct-15	- ODPS price by 50%, - KV database price by 25%, - OTS database by 50%	
Timeline	Ucloud	Baidu Cloud
Apr-15	- UHost up to 30% - UDisk up to	
May-15	- offered promotional price cut of 83.5% on CDN until June 2015	- announced to offer higher speed for its CDN free of charge
Oct-15		

Source: Deutsche Bank, China Electronic Information Industry Development Research Institute, Company data

Pricing policies in comparison

The following table profiles different pricing methods applied by the major Chinese IaaS operators and two leading international vendors operating in China. All operators mentioned offer hourly usage-based billing except Microsoft Azure, which offers more granular billing by the minute. All vendors offer a pre-reserved-based billing option by which rates are lower than under usage-based billing. The level of discounting offered and requirements for minimum payment differ among each operator. For instance, Microsoft Azure requires a minimum payment of US\$6,000, whereas other operators such as AliCloud and AWS do not require any minimum payment.



Figure 25: Pricing methods applied by different vendors

Vendor	AliCloud	Tencent cloud (Qcloud)	Baidu cloud
Pricing methodology	- Pay-as-you-go Usage-based billing (per hour basis)	- Pay-as-you-go Usage-based billing (per hour basis)	- Pay-as-you-go Usage-based billing (per hour basis)
	- Subscription method Fixed subscription per month/annum Rates are lower than under pay-as-you go method	- Subscription method Fixed subscription per month/annum	- Subscription method Fixed subscription per month/annum
Vendor	UCloud	Azure	AWS
Pricing methodology	- Pay-as-you-go Usage-based billing (per hour basis)	- Pay-as-you-go Usage-based billing (per minute basis)	- Pay-as-you-go Usage-based billing (per hour basis)
	- Subscription method Fixed subscription per month/annum Rates are lower than under pay-as-you go method	- 12-month prepaid method Prepaid subscription per annum with minimum spend of US\$6,000. Offers 5% discounts subject to certain exclusions	- Reserved instances for certain products (e.g., EC2) Reserve instances (1-year and 3-year terms) making either partial payment or full payment Offers discounts up to 75% (varies based on the type of the instance)

Source: Deutsche Bank, Company data

The business model: AliCloud Elastic computing example

How are cloud services priced?

AliCloud offers a growing multitude of services, rendering an exhaustive characterization of the company's business challenging. In this section, we focus on their largest source of revenues, elastic computing (ECS).

A fully automated self-serve system

As a public cloud service provider, AliCloud offers a highly automated self-serve website for customers (buy.aliyun.com). When purchasing ECS services, enterprise customers need simply to choose:

- Location
- Network type (eg. Classic network or dedicated network)
- Instance configuration (eg. Instance I or II)
- Network bandwidth (up to 200Mbps)
- Mirror type (Windows or Linux)
- System storage (storage starting at 20Gb)
- Payment method:
 - Up-front payment (from one month to three years)
 - Pay-as-you-go (from one hour to several years)

So you want to buy cloud services: our Shenzhen start-up example

In the following figure, we portray a basic customer scenario involving an entry-level start-up with modest cloud needs. As the table indicates, this customer will pay RMB3,938 per month for a "classic" implementation involving two 4GB cores using 50M fixed bandwidth using a public mirror configuration which supports Windows Server.



Figure 26: Customer example: Shenzhen-based small start-up, minimum configuration, classic network

Parameters	Customer configuration
Location	Shenzhen
Network	Classic (IP address is automatically allocated by AliCloud. Configuration is simple and easy. "Classic" is designed for entry level customers.)
Instance configuration	Instance I (Intel Xeon CPU, DDR3 memory)
Core configuration	2 cores at 4GB per core
Bandwidth	Fixed bandwidth - 50M
Mirror configuration	Public mirror, Windows Server (2012, 64b Chinese version)
Storage	Efficient cloud disk
Contract term	1 month
Price per month	RMB3,938

Source: Deutsche Bank, Company data

Discount grows as configuration beefs up...

Should this customer grow the two-core 4GB configuration to 16GB per core (increasing capacity 4X), pricing rises a mere 8% to RMB4,262. In expanding further to eight cores at 64GB per core (a further 16X increase), pricing increases only 49%. These mild increases likely relate to the fact that AliCloud can dynamically allocate spare capacity to meet these augmented needs, with little incremental cost.

...but no discounts on bandwidth

However, doubling fixed bandwidth allocation to 100M roughly doubles pricing. This is because bandwidth resources are effectively monopolized by telecom carriers in China. The two major operators selling bandwidth – China Telecom and China Unicom – offer little or no volume discounts. Thus even AliCloud is unable to reduce per unit pricing for bandwidth even as customers purchase faster speeds. In the US market, competition around bandwidth is intense, and thus significant volume discounts are offered.

Steep discounts on cloud space as demands grow, but bandwidth sees no discounts on volume

Geography influences pricing

There is some amount of variability in pricing based on geography in our AliCloud example above. While pricing in markets such as Beijing, Hangzhou and Shanghai is on par with the example above, a Qingdao-based customer for instance would pay RMB3565.5 for the same configuration (or 9.5% less).

AliCloud US prices 22-24% higher than our Shenzhen example

Hong Kong-based customers would pay a 23% premium to Shenzhen-based customers for the same ECS configuration as the Shenzhen-based example above. Singapore-based customers generally pay the same as in the Shenzhen example above.

Looking further overseas, a Silicon Valley-based customer would pay 24% more than his Shenzhen-based peer above, while a Virginia-based start-up would pay 22% more than the base case above.

Paying for usage flexibility

Should the customer cited above seek to pay by the hour (at RMB6.5 per hour), the implied cost per hour would be 19% more expensive than the monthly configuration above.



Cost structure of a public cloud operator

Growing scale drives cloud margin improvement

With public cloud services largely in their infancy, and with the industry only now beginning to shift from a period of particularly heavy investment, it is difficult to pinpoint the cost structure of an average public cloud operator. Having spoken with leaders in the space, we view the following elements as comprising a bulk of the operating costs of a public cloud services provider:

R&D accounts for a large portion of a cloud vendor's cost structure at the initial growth stage

Figure 27: The key operating costs of a public cloud services provider

Cost item	% of total cost	Comments
R&D	40%	R&D as % of total cost should consistently remain at a high level as more value added services development workloads are required with growing customer base.
Equipment depreciation	25%	Equipment depreciation as % of total cost should see decline due to the economies of scale, but maintain a high level at the start-up phase
Network bandwidth	25%	Network bandwidth as % of total cost is not easy to cut down. Telecom carriers control the bandwidth resources in China, and thus internet companies have to purchase bandwidth at a expensive price.
Sales & marketing	10%	10% is based on that the company adopts direct sales strategy and build a in-house sales team

Source: Deutsche Bank interviews

We expect items such as R&D and equipment depreciation to decline steadily as a percentage of revenues as a cloud provider continues to grow scale. We also envision sales and marketing falling toward 5% as the business scales.

In the following sections we profile several of the leading players in the Chinese cloud space.



Rating
Buy

Asia
China

Technology
Software & Services

Company
Alibaba

Reuters
BABA.N

Bloomberg
BABA US

Price at 21 Apr 2016 (USD)	80.78
Price target - 12mth (USD)	109.00
52-week range (USD)	93.88 - 57.39
NASDAQ 100	4,541

Alan Hellawell
Research Analyst
(+852) 2203 6240
alan.hellawell@db.com

Ross Sandler
Research Analyst
(+1) 415 262-2028
ross.sandler@db.com

Sitting on top of the cloud

Undisputed domestic market leader

AliCloud continues to extend its offerings beyond its e-commerce walled garden, driving strong revenue growth as paying customer counts balloon. Our CIO survey revealed that approximately 65.5% of the respondents using a single vendor work with AliCloud as their sole service provider. With this report, we throw light upon the valuation of assets such as AliCloud, Ant and Cainiao. Maintain Buy in recognition of the non-ecommerce growth opportunity and lift our target price 20% due to the significant value addition we expect from these segments. This report has been published in conjunction with our FITT report "Cloudy with a chance of monetization".

Riding a growing customer base to scale and eventually profitability

AliCloud was borne of the company's need to provide scalable disk space and computing power to its own e-commerce operations, from which demand has historically varied dramatically throughout the online shopping season.. The company is now China's best-appointed vendor of public cloud services.

Forecasting 136% CAGR in revenue though FY2018

We expect AliCloud revenue of RMB16.6bn by end FY2018, for a three-year CAGR of roughly 136%. We envision ever-growing scale to deliver AliCloud through breakeven in 2H 2017 and toward AWS's OM range of 24-25%. AliCloud's run rate is higher than that of Google Cloud Platform and 1/3 the size of Azure globally.

Lifting TP 20% to US\$109 on new SoTP. Create your own scenarios!

We apply 8x CY17E EV/Sales to AliCloud, and discount back to CY16E. We choose 8x (vs. 10x on peer AWS), on smaller scale. Our AliCloud valuation is US\$16.8bn, or US\$6.5 per ADS (6% of BABA valuation). We hope that expanded disclosure might support our new valuation views of assets such as AliCloud, Ant Financial and Cainiao. [Click here](#) to access our interactive model. Down side risks: slower revenue and user growth; intensifying competition.

Forecasts And Ratios

Year End Mar 31	2014A	2015A	2016E	2017E	2018E
Sales (CNYm)	52,504.0	76,204.0	100,433.5	143,318.2	195,835.5
EBITDA (CNYm)	26,303.0	25,636.0	33,426.8	46,288.7	67,229.5
Reported NPAT (CNYm)	23,076.0	24,149.0	69,007.7	34,327.5	50,825.6
Reported EPS FD(CNY)	9.90	9.58	26.72	12.97	18.98
DB EPS FD(CNY)	11.80	12.96	16.04	20.06	26.09
OLD DB EPS FD(CNY)	11.80	12.96	16.04	19.80	25.05
% Change	0.0%	0.0%	0.0%	1.3%	4.2%
DB EPS growth (%)	105.0	9.8	23.7	25.1	30.1
PER (x)	-	46.0	32.6	26.1	20.0
EV/EBITDA (x)	-	52.5	31.8	22.0	14.1
DPS (net) (CNY)	0.00	0.00	0.00	0.00	0.00
Yield (net) (%)	-	0.0	0.0	0.0	0.0

Source: Deutsche Bank estimates, company data

¹ DB EPS is fully diluted and excludes non-recurring items

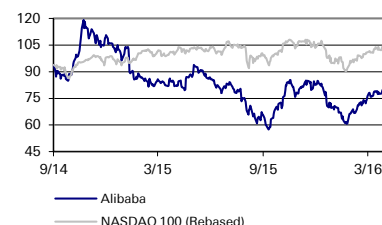
² Multiples and yields calculations use average historical prices for past years and spot prices for current and future years, except P/B which uses the year end close

Key changes

Price target	91.00 to 109.00	↑	19.8%
Sales (FYE)	100,427 to 100,433	↑	0.0%
Op prof margin (FYE)	-	↑	0.0%
Net profit (FYE)	69,004.6 to 69,007.7	↑	0.0%

Source: Deutsche Bank

Price/price relative



Performance (%)	1m	3m	12m
Absolute	3.4	14.2	-2.0
NASDAQ 100	2.6	9.6	2.4

Source: Deutsche Bank



Model updated: 22 April 2016

Running the numbers

Asia
China
Software & Services

Alibaba

Reuters: BABA.N Bloomberg: BABA US

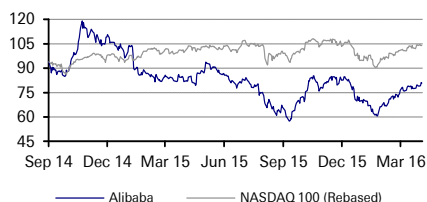
Buy

Price (21 Apr 16) USD 80.78
Target Price USD 109.00
52 Week range USD 57.39 - 93.88
Market Cap (m) EURm 170,605
USDm 192,580

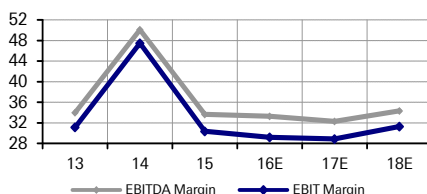
Company Profile

Founded in 1999, Alibaba leads the China retail market through Taobao (the largest online shopping platform in China based on GMV), Tmall (the largest 3rd party platform for retailers/brands in terms of GMV) and Juhuasuan (a leading China group buying platform). The company caters to global wholesale market through Alibaba.com and China wholesale market through 1688.com. Alibaba also serves the global consumer market place via. AliExpress and also provides cloud computing services such as data mining, processing and storage.

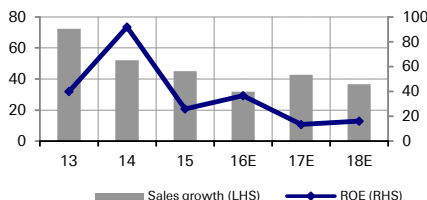
Price Performance



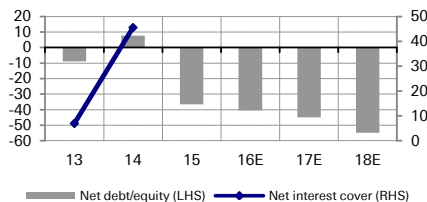
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 31-Mar

Financial Summary

	2013	2014	2015	2016E	2017E	2018E
DB EPS (CNY)	5.76	11.80	12.96	16.04	20.06	26.09
Reported EPS (CNY)	3.52	9.90	9.58	26.72	12.97	18.98
DPS (CNY)	0.00	0.00	0.00	0.00	0.00	0.00
BVPS (CNY)	4.6	18.3	60.2	93.0	110.2	134.0
Weighted average shares (m)	2,294	2,175	2,425	2,479	2,552	2,606
Average market cap (CNYm)	na	na	1,444,860	1,247,155	1,247,155	1,247,155
Enterprise value (CNYm)	na	na	1,346,827	1,061,935	1,019,429	945,907

Valuation Metrics

P/E (DB) (x)	na	na	46.0	32.6	26.1	20.0
P/E (Reported) (x)	na	na	62.2	19.6	40.3	27.6
P/BV (x)	0.00	0.00	8.56	5.64	4.76	3.91
FCF Yield (%)	na	na	2.3	3.3	4.4	5.2
Dividend Yield (%)	na	na	0.0	0.0	0.0	0.0
EV/Sales (x)	nm	nm	17.7	10.6	7.1	4.8
EV/EBITDA (x)	nm	nm	52.5	31.8	22.0	14.1
EV/EBIT (x)	nm	nm	58.2	36.2	24.6	15.4

Income Statement (CNYm)

Sales revenue	34,517	52,504	76,204	100,433	143,318	195,835
Gross profit	25,473	40,159	52,607	68,571	93,301	127,581
EBITDA	11,731	26,303	25,636	33,427	46,289	67,229
Depreciation	675	1,024	237	958	2,349	4,072
Amortisation	305	359	2,264	3,141	2,562	1,869
EBIT	10,751	24,920	23,135	29,328	41,378	61,289
Net interest income/(expense)	-1,533	-547	6,705	47,314	2,320	3,569
Associates/affiliates	-6	-203	-1,590	-2,548	-2,793	-2,714
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	894	2,429	2,486	2,863	3,076	3,294
Profit before tax	10,112	26,802	32,326	79,505	46,774	68,152
Income tax expense	1,457	3,196	6,416	8,096	9,815	14,789
Minorities	117	88	59	-146	-161	-177
Other post-tax income/(expense)	-128	-239	-112	0	0	0
Net profit	8,404	23,076	24,149	69,008	34,327	50,826
DB adjustments (including dilution)	5,348	4,446	8,514	-27,594	18,763	19,035
DB Net profit	13,752	27,522	32,663	41,413	53,091	69,860

Cash Flow (CNYm)

Cash flow from operations	14,476	26,379	41,217	49,813	67,690	82,218
Net Capex	-2,202	-4,776	-7,705	-7,533	-9,316	-11,750
Free cash flow	12,274	21,603	33,512	42,281	58,374	70,468
Equity raised/(bought back)	-28,349	-3,425	61,334	0	0	0
Dividends paid	0	0	-61	0	0	0
Net inc/(dec) in borrowings	26,932	12,789	-22,713	0	0	0
Other investing/financing cash flows	2,682	-28,318	-45,681	-2,009	-25,266	-3,917
Net cash flow	13,539	2,649	26,391	40,272	33,108	66,551
Change in working capital	5,964	4,682	13,528	1,666	9,849	6,594

Balance Sheet (CNYm)

Cash and other liquid assets	34,083	37,966	110,490	150,762	183,870	250,421
Tangible fixed assets	3,808	5,581	9,139	13,027	17,984	23,794
Goodwill/intangible assets	13,523	15,359	51,613	48,927	63,110	61,242
Associates/investments	5,341	30,340	52,110	98,878	108,115	114,910
Other assets	7,031	22,303	32,082	26,524	30,049	34,365
Total assets	63,786	111,549	255,434	338,119	403,128	484,731
Interest bearing debt	33,101	41,075	52,593	52,593	52,593	52,593
Other liabilities	19,639	29,656	44,770	43,131	58,855	72,643
Total liabilities	52,740	70,731	97,363	95,724	111,448	125,236
Shareholders' equity	10,509	39,739	146,097	230,567	281,095	349,087
Minorities	537	1,079	11,974	11,828	11,667	11,489
Total shareholders' equity	11,046	40,818	158,071	242,394	292,762	360,576
Net debt	-982	3,109	-57,897	-98,169	-131,277	-197,828

Key Company Metrics

Sales growth (%)	72.4	52.1	45.1	31.8	42.7	36.6
DB EPS growth (%)	141.4	105.0	9.8	23.7	25.1	30.1
EBITDA Margin (%)	34.0	50.1	33.6	33.3	32.3	34.3
EBIT Margin (%)	31.1	47.5	30.4	29.2	28.9	31.3
Payout ratio (%)	0.0	0.0	0.0	0.0	0.0	0.0
ROE (%)	40.0	91.8	26.0	36.6	13.4	16.1
Capex/sales (%)	7.3	9.1	10.1	7.5	6.5	6.0
Capex/depreciation (x)	3.1	3.6	3.3	2.1	1.9	2.0
Net debt/equity (%)	-8.9	7.6	-36.6	-40.5	-44.8	-54.9
Net interest cover (x)	7.0	45.6	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

Alan Hellawell

+852 2203 6240

alan.hellawell@db.com



Alibaba's AliCloud

Dominating our cloudy forecasts

Key highlights:

- We take our TP on Alibaba from US\$91 to US\$109 as a result of our new SoTP approach, which reveals a US\$6.5 per share valuation related to AliCloud alone. Despite our constructive long-term views around this high-growth business, our modeling of cloud delivers less incremental value to our Alibaba TP than AWS does to colleague Ross Sandler's Amazon TP, as Alibaba's core business is far more profitable than the frequently loss-making core e-commerce business of Amazon.
- AliCloud dominates China's domestic cloud computing market. We expect this dominance to grow as the company distances itself from its competition through a broader diversity of offerings and more competitive pricing. Foreign entrants meanwhile have yet to achieve a solid foothold in the domestic market.
- As revealed in our CIO survey, 74% of respondents stated that AliCloud was their first choice while 65.5% of the IT heads who rely on a single vendor ranked AliCloud as their preferred vendor. Furthermore, 34% of the total respondents allocate 80-100% of their cloud service workload to AliCloud.
- Alicloud's internal customers (largely merchants on its e-commerce platforms) still account for a majority of its customer base (86.7% by December 2015) and are likely non-paying. With the rapid growth in demand from external customers, we forecast the representation by external customers to increase to over 30% by the end of 2020.
- AliCloud's low price strategy acts as a shield against new entrants in the domestic market, while at the same time serving to attract new customers in the global market. It continues to capture operating cost efficiencies, fueling its aggressive expansion through a combination of owned-and-operated infrastructure and partnership-based business models.

We are pleased to offer the investor an updated [link](#) allowing access to our interactive model

Undisputed domestic market leader, and with a global focus

Alibaba's AliCloud ("Aliyun" in Chinese) offering was borne of the company's need to provide scalable disk space and computing power to its own e-commerce operations, demand from which has historically varied dramatically throughout the online shopping season, from the lull of the Chinese New Year holiday season to the very peak of Singles Day on November 11th. Alibaba enjoys a clear first-mover advantage in China cloud. As discussed earlier, our CIO survey revealed that approximately 65.5% of the respondents using a single vendor preferred AliCloud as their sole service provider while those who preferred multiple vendors also ranked AliCloud #1. In light of these findings and the company's strong growth over the past few years, we estimate that AliCloud's market share likely grew to about 65% by the end of year 2015. We expect the company to continue to enjoy a CAGR of 119% in revenue over the next five years.

We estimate that AliCloud's market share in the domestic IaaS cloud space reached over 40% by end of 2015



Mild competition from foreign entrants in the short to medium term

As of today, several international cloud operators; including Amazon's AWS, Microsoft's Azure, IBM and Rackspace; have expanded their operations into Mainland China. According to our survey and separate channel checks, Azure and AWS are consistently gaining market traction largely driven by factors such as their:

- Extensive global presence,
- Mature technology and capabilities,
- Wider range of products and services, and
- Better customer service (e.g., operational and management services).

Nevertheless, given Alibaba's connectivity to no less than 9m merchants in China, and with some amount of regulatory support in this sensitive area of business, these foreign cloud computing service providers have found penetrating the China cloud very challenging.

Rapidly expanding global reach

AliCloud has already taken steps to expand its footprint beyond China to serve not just Chinese firms operating overseas but also international firms with operations worldwide. Nevertheless, given competition from already established players such as AWS and Azure in North America, AliCloud will likely continue to target first and foremost Chinese companies operating in the region. We also expect AliCloud offerings to spread to other regions such as North Africa and Middle East, where we would expect it to serve local companies as well.

Silicon Valley: where the overseas push began

AliCloud established its first overseas data center in Silicon Valley. The company currently has five overseas data centers: two in Silicon Valley, two in Hong Kong, and one in Singapore. The data center in Singapore serves as AliCloud's headquarters for its international operations. Management recently claimed that AliCloud's overseas business grew fourfold in 2015. AliCloud also plans to set up data centers in the Middle East, Japan, Europe, and Southeast Asia. Alibaba in 2015 announced that it would invest US\$1bn in AliCloud for the purpose of expanding AliCloud's data center network over the coming years. AliCloud currently has less global presence than its main international rivals such as AWS, Microsoft Azure, and Google Cloud. These major international peers are advantaged by their early expansion across the globe.

*A global expansion strategy
with an initial focus on
Chinese businesses operating
overseas*

Given the span of Chinese businesses investing across the world (please see our introductory section above), the faster that AliCloud can expand its international data center network, the faster it will be able to tap into China-flagged businesses operating in foreign territories. Once the planned data centers in Japan, Germany and Dubai are brought into operation, the total number of servers would further increase. A part of these datacenters is to operate through AliCloud partnerships entered into under its Market Alliance Program. In terms of revenue, these overseas operations still account for a very minimal portion of Alibaba's overall cloud revenue at present.



Barriers facing AliCloud's expansion outside of China

- *Lack of pre-existing international data center network, connectivity issues*

Roughly half of AliCloud's server base is in China (five of 10 data centers). A clear advantage of having a large domestic server base is the faster and more reliable connectivity that a vendor can offer local businesses. However, Chinese companies with a large user base located outside of China are likely to face issues using a cloud provider whose network is predominantly still located in China, such as slower connectivity.

- *Number of languages supported by AliCloud's platform*

In November 2015, AliCloud officially launched its international website, supporting English-language based search and other forms of support. It is the only foreign language comprehensively supported on the platform currently. Management plans to enhance its system to accommodate more languages in the future. AWS claims to support close to 35 languages on its platform, while Microsoft Azure supports about 56 languages.

- *Global user data protection and security concerns over China cloud*

A major concern among users in using any form of public cloud computing service includes potential threats to data protection and privacy. With the propagation of cyber-attacks both in China and globally, international customers would scrutinize cloud services vendors such as Alibaba at least as closely as its global peers. In October 2015, hackers attempted to hack 20m+ active Taobao accounts via AliCloud. In January 2016, AliCloud announced a strategic partnership with ZhongAn Insurance (the country's first online insurance service provider) to introduce China's first cloud insurance package. As per the terms of the policy, AliCloud customers will be compensated (up to RMB1m) for any problems encountered in relation to cloud services and information security. The insurance would cover a range of areas, including data privacy and data loss, caused by hacker attacks. The company's engineers claim to analyze over 100 terabytes of data on a daily basis to identify any security threats. AliCloud for instance was able to avoid close to 150m cyber-security attacks detected on Taobao and Tmall platforms in 2014.

Partnership-based expansion improving cost efficiencies

In addition to building its own data center network through its Market Alliance Program (MAP), AliCloud entered into strategic agreements and joint ventures with well established brands in many of the international markets in which it plans to set its foothold. In addition to sharing their physical resources, AliCloud aims to leverage these partners' in-depth knowledge about local customers and thereby offer more localized cloud services and solutions that are unique to each market.

Partnership-based model offers faster and more cost effective expansion strategy

AliCloud has entered into several strategic partnerships with international companies such as:

- **Intel (US):** To promote tailor-made technology solutions jointly developed by AliCloud and Intel using Intel's architecture



- **Equinix (US):** To facilitate AliCloud customers accessing AliCloud platform through Equinix Cloud Exchange in Silicon Valley or Hong Kong
- **Towngas (Hong Kong):** To jointly build and operate data center in Hong Kong targeting local start-up companies
- **PCCW (Hong Kong):** To expand Alicloud's cloud services in Hong Kong mainly focusing on local start-up companies
- **LINKBYNET (France):** For use of LINKBYNET's extensive cloud infrastructure network and services
- **Singtel (Singapore):** To support AliCloud's expansion in the APAC region by sharing Singtel's already established customer base, cloud service expertise, and other ICT resources

These relationships enable AliCloud to use the aforementioned partners' data centers and other infrastructure such that AliCloud can offer its own services. AliCloud also entered into a joint venture with Meraas Holdings in Dubai to expand its services to North Africa and the Middle East. As a result, AliCloud will be able to save on the costs of setting up its own data centers to offer localized cloud computing services in these regions. For instance, through its partnership with Equinix (which operates cloud exchanges in about 21 countries), AliCloud's customers are able to directly access the AliCloud platform through Equinix Cloud Exchanges situated in the US (eg - Silicon Valley) or Hong Kong (source: Forbes).

The downside of entering into such relationships includes capturing a smaller fraction of customer revenue, possibly gaining diminished access to customer information, and other disadvantages associated with having to share the customer, and broader business, with a partner.

Collaboration in the cloud: Paytm and AliPay

In January 2016, AliCloud entered into an exclusive agreement with Paytm, India's largest mobile-based commerce and payment platform, to integrate the Alipay and Paytm platforms with an investment amounting to INR1.2bn (roughly US\$17.6m). According to the agreement, while Chinese Alipay users will be able to use Alipay to make payments to Indian merchants, Paytm users will be able to shop Alipay's extensive merchant base in many markets including China, the US, the UK, and Japan. The revenue sharing will be based on a commission-driven model. AliCloud will also assist Paytm in areas such as data analytics and near-field communication (NFC). Alibaba (including Ant Financial) holds about 40% stake in Paytm, according to India's Economic Times. Paytm currently has 120m+ registered users and process 2.5m+ transactions per day on average, according to India Times.

Continued resort to low-price policy as a market-winning strategy

During our study, we observed that as a part of its global expansion plans, AliCloud seems to have followed a low-price-centric strategy in entering the US market compared to its operations in the APAC region in the face of intense competition from established international players including AWS, Azure and Google Cloud. Recent discussions with management lead us to believe that the company's near- to medium-term pricing strategy will be to continue to pass on cost savings gained from scale efficiencies (mainly as part of Alibaba Group) to its customers in order to gain further market traction.

AliCloud to continue its low-price-centric strategy over the near to medium term in order to gain further market traction



The cloud eco-system: a key enabler

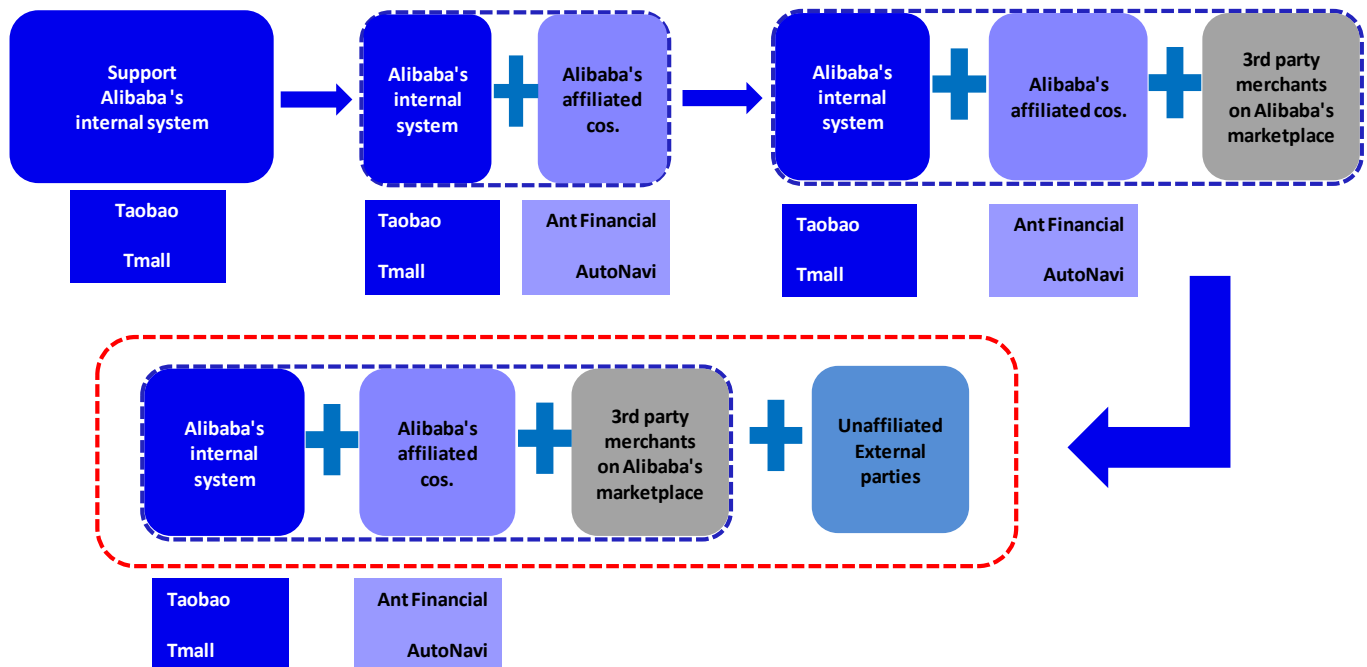
AliCloud is more than just a discrete set of IT solutions; it actually forms the foundation on which Alibaba's entire eco-system is built. While AliCloud benefits from a massive internal eco-system of merchant-customers, complementary customer offerings, etc., AliCloud's Market Alliance Program, if executed to plan, should pave the path for an even more comprehensive cloud eco-system beyond just serving as an IaaS provider.

AliCloud forms the foundation for Alibaba's entire eco-system

Forming the foundation for Alibaba's eco-system

Alibaba launched its cloud computing service arm in September 2009 under a separate entity called Alibaba Cloud Computing Ltd. ("Aliyun" in Chinese and "AliCloud" in English). As we mention earlier in our report and graphically present below, AliCloud started mainly to serve Alibaba's internal e-commerce network. It, however, was soon expanded to serve external parties as well.

Figure 28: From internal support system to growing business segment



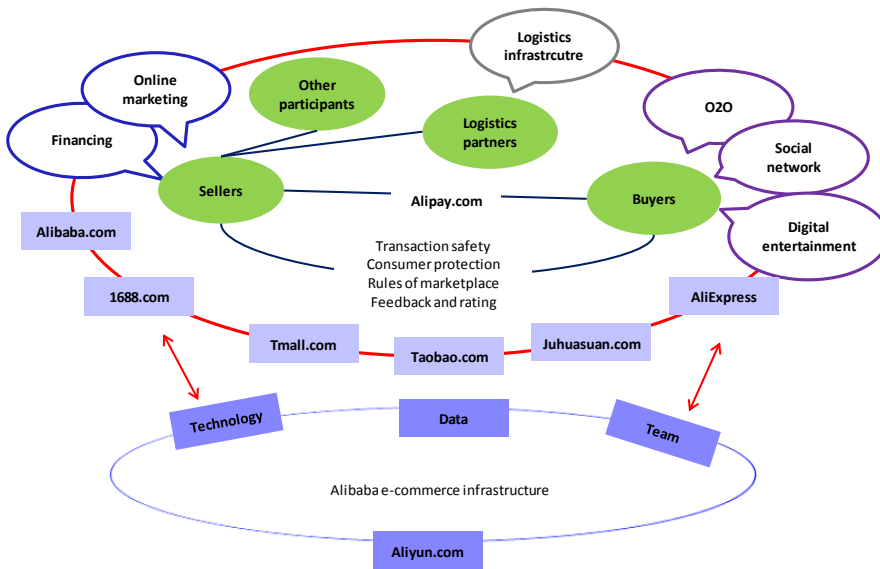
Source: Deutsche Bank, Company data

It is the most recent phase of expansion to include "unaffiliated external parties" that should launch AliCloud to even greater scale and more importantly vault it from an historic role as a supporting cost center to a commercially successful market leader.

The following figure offers another simple schematic illustrating how AliCloud is in many ways a basis on which everything operates and interacts.



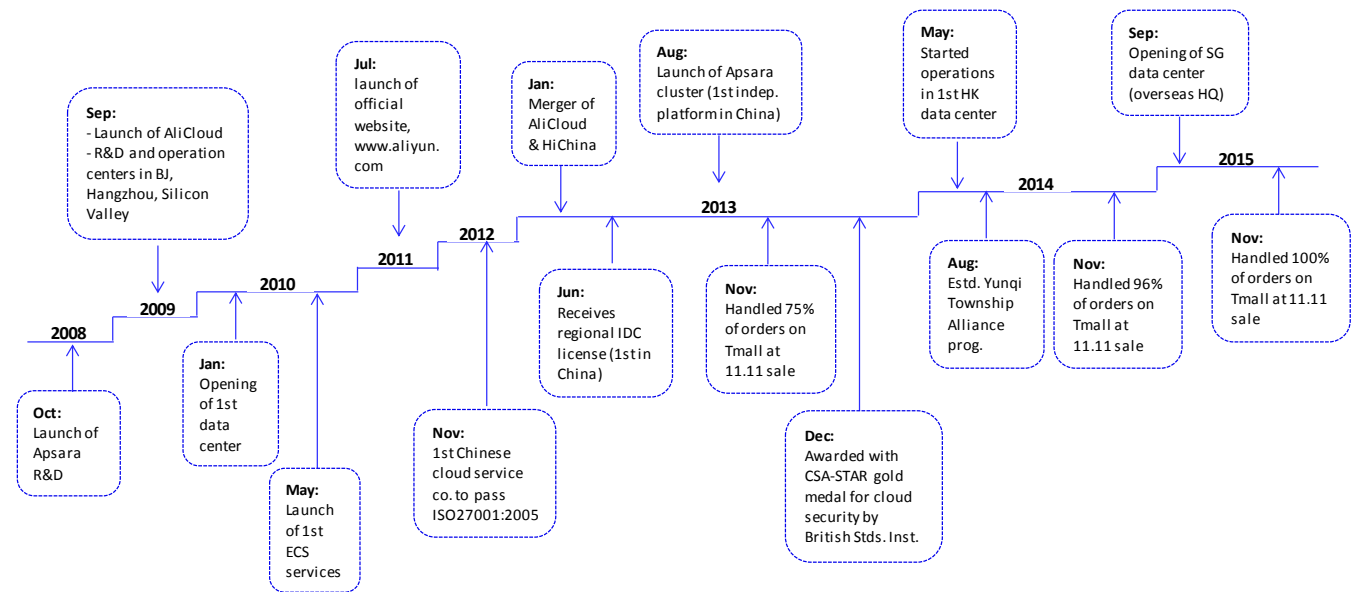
Figure 29: Forming the foundation for Alibaba's eco-system



Source: Deutsche Bank, Company data (F-1)

As shown below, AliCloud has evolved very rapidly its credentials to serve outside customers. AliCloud became the first Chinese cloud service company to pass ISO27001:2005³, receive a regional IDC license, and launch the first independent platform for managing cluster resources (Apsara).

Figure 30: AliCloud's key milestones



Source: Deutsche Bank, Company data

³ The ISO27001:2005 indicates that the recipient has met the requirements relating to implementation, maintenance, monitoring, review, and improvement of information security management systems.



[Blockchain and AliPay: improving efficiencies of a sister company](#)

Alipay, in collaboration with AliCloud, explores the possibility of using blockchain-based cloud computing service platform to improve cost efficiencies by removing intermediaries in the transaction process. Developed based on the Bitcoin protocol, a blockchain is a distributed database that has “blocks” of information on recent transactions. Each completed block will link with the previous block in chronological order, creating a “chain” of blocks. The data recorded in these blocks are timestamped (i.e., cannot be tampered with or revised by anyone). With 350m+ registered users and 80m+ transactions per day on average, Alipay dominates the domestic mobile payment market with approximately 70% market share, according to iResearch. The vast scale of Alipay’s operations conversely should provide the blockchain the big data advantage through storage of valuable customer credit information in the system. We separately discuss Ant Financial’s venture into cloud operations in the following section.

[Do you really want to know how this stuff works?](#)

In this section, we seek to open, only by a sliver, the “Pandora’s Box” of complexity that is cloud computing. For AliCloud, it all begins with Apsara, the in-house developed computing system. Apsara supports in managing cluster resources within each data center, and also schedules the parallel execution of offline and online applications. It provides the platform for many of AliCloud’s public cloud services such as Open Table Service (OTS), Open Storage Service (OSS), and Open Data Processing Services (ODPS). AliCloud in turn forms the foundation on which Alibaba continues to build its eco-system.

According to AliCloud, one Apsara cluster can cover up to 5,000 servers, representing close to 100,000 CPU cores and a storage size of hundreds of petabytes, rendering the platform one of the world’s most powerful computational engines. Apsara, backed by its major supporting components including Fuxi (for job scheduling and managing cluster resources) and Pangu (distributed file system) provides the foundation for AliCloud’s eco-system.

[AliCloud product offerings](#)

[Ever-expanding cloud service portfolio](#)

As we present in Figure 31, AliCloud offers a variety of cloud computing services including:

- Elastic computing & networking
- Storage
- Database
- Middleware
- Security & management

As of July 2015, AliCloud offered over 50 cloud solutions. In the quarter ended in December 2015 (3Q16FY) alone, AliCloud added 19 more products to its portfolio. While elastic computing remains AliCloud’s core offering, the company also sees significant future growth potential in areas such as database, content delivery networks (CDN), big Data, machine learning, and security.



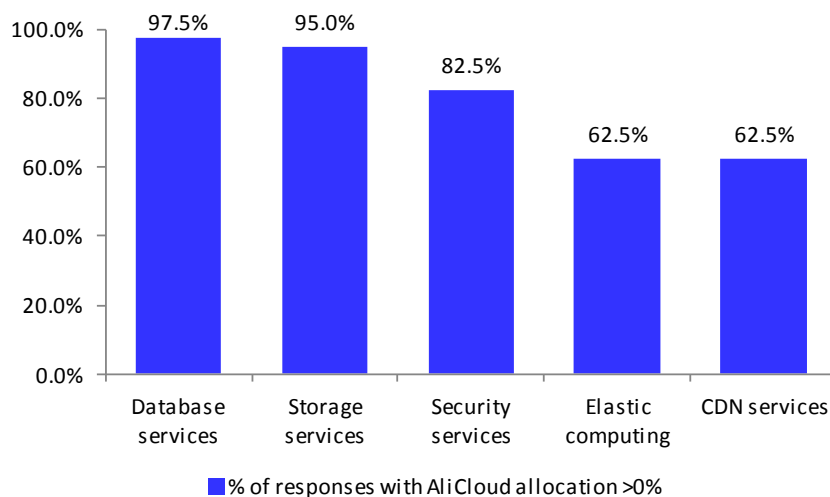
Figure 31: AliCloud's product portfolio

Product category	Sub-services	Product category	Sub-services
Elastic computing	-Elastic Compute Service (ECS) -Block Storage -Virtual Private Cloud (VPC) -Server Load Balancer (SLB) -Auto Scaling -E-MapReduce -ROS -Ali Cloud Engine (ACE) -Container Service -Ali Cloud HPC	Database	-Relational Database Service (RDS) -Ali CloudDB for MongoDB -Ali CloudDB for Redis -Ali CloudDB for Memcache -Ali CloudDB for PetaData -Ali CloudDB for OceanBase -Analytic DB -Data Transmission -Data Management
Storage and CDN	-Open Storage Service (OSS) -Block Storage -Network Attached Storage (NAS) -Table Storage -Archive Storage -Message and Notification Service (MNS) -Content Delivery Network (CDN)	Cloud Shield	-Yundun DDoS -Yundun DDoS IP protection -QuickShield -AliCloud Data Encryption Service -Anti-fraud service -Data security insurance
Networking	-Server Load Balancer (SLB) -Virtual Private Cloud (VPC) -Express Connect -Content Delivery Network (CDN)	Large Scale Computing	-Open Data Processing Service (ODPS) -Batch computing -Data Integration -E-MapReduce
Management and monitoring	-Cloud Monitor System -ROS -Action Trail	Internet middleware	-Enterprise Distributed Application Service -Messages -Distribute Relational Database Service (DRDS)
Application Service	-Simple Log Service (SLS) -Media Transcoding -Performance Test -API gateway	Domain and website	-Cloud Virtual Host -DNS -Cloud mail -Enterprise website
Mobile services	-Mobile Analytics -Ali Cloud Mobile Push -HTTPDNS		

Source: Deutsche Bank, Company data

While AliCloud continues to expand its product/service offerings, customer demand remains predominantly centered on key services such as elastic computing, storage, database, and security services. The following figure shows the results from our CIO survey, where database services rank as the most-in-demand.

Figure 32: Top AliCloud products in-demand



Source: Deutsche Bank, CIO survey – 2016



In the following sub-sections, we briefly discuss these major cloud offerings. Please refer to Appendices for a detailed discussion on the comprehensive list of AliCloud's offerings.

Elastic computing and storage services

As shown above, elastic computing and storage services are two of the highest-in-demand products AliCloud's product portfolio. Approximately 62.5% and 95% of the AliCloud customers who took part in our survey claimed to use its elastic computing and storage services, respectively. While the company does not disclose product-wise revenue contribution, we estimate elastic computing and storage services to be more than 80% of AliCloud's top line.

We estimate elastic computing services and storage services contribute to over 80% of AliCloud's revenue

Some of the major solutions offered by AliCloud under the elastic computing and segment include:

- **Elastic Compute Service (ECS):** AliCloud ECS offers customers with scalability and efficiency through a virtual computing platform that can be tailor-made to meet each customer's unique business needs.
- **Object Storage Services (OSS):** AliCloud OSS is another cloud service with high customer demand as EC2 that offers mass cloud-based storage services to customers.
- **Content Delivery Network (CDN):** Originally used for Alibaba's internal system requirements, CDN was officially launched for external enterprise customers in 2014.
- **High Performance Computing (HPC):** AliCloud introduced China's first HPC platform for commercial use in December 2015. In January 2016, the company announced its partnership with NVIDIA (a leading US-based chipmaker) to develop China's first HPC platform built using GPU (Graphical processing unit) computing.
- **AliCloud Virtual Private Cloud (VPC):** AliCloud VPC offers users with access-controlled dedicated cloud network free of charge as it is still at beta-testing stage.
- **Server Load Balancer (SLB):** AliCloud SLB helps users in maximizing and expanding the external service capacities to meet the fluctuating workload requirements of the applications.

Database management services and analytics

According to our customer survey results, AliCloud's database management services were ranked as the segment with the highest customer demand (97.5% of respondents). Accordingly, we estimate the database management service segment to account for about 10% of AliCloud's overall revenue as the second-highest contributor. Below we discuss some of the key database solutions offered by AliCloud.

- **Relational Database Services (RDS):** AliCloud RDS provides users with cloud-based access to four relational databases namely, Microsoft SQL, MySQL, PPAS, and PostgreSQL with MySQL being the most demanded database.
- **Oceanbase – a powerful system for online financial transactions:** Alibaba claims that its own internally developed relational database management system Oceanbase is the world's first distributed relational database dedicated to the financial services industry. Built



on proprietary technology, Oceanbase assists with transaction processing on Alibaba's marketplaces, such as Taobao and Tmall and with Alipay.

- **Data Transmission:** AliCloud data transmission offers its customers data migration, real-time synchronization, and data subscription services. It supports several databases including MySQL, Oracle, Postgres Plus Advanced Server, and SQL Server.
- **Analytic DB:** Alicloud Analytic DB is a real-time cloud-based database built using online analytical processing (OLAP) approach. It facilitates real-time analysis of multi-dimensional data with just millisecond latency. Analytic DB assists customers in processing large amount of highly data rapidly and identifies useful trends. AliCloud released the service for commercial use in November 2015.

Security services

AliCloud is China's first cloud-based security provider to win ISO27001 Information Security Management System Certification. We view AliCloud security services as offering a wider range of cloud-based security solutions compared to its peers. Based on the results of our CIO survey, about 82.5% of the company's customers currently use AliCloud's security services. The team continues to test new solutions for launch in the future. Some of these services are:

- **Anti-DDoS:** Offers protection against DDoS attacks (Distributed Denial of Service) where multiple Trojan infected systems are used to attack a single system creating a denial of service.
- **QuickShield:** Helps users to access protected applications through a secured network that shields against range of network attacks on traffic.
- **Data encryption service:** Helps customers comply with regulatory requirements related to data security and protect privacy and confidentiality of the business data stored on the cloud.

Vertical-focused solutions

Customizing its cloud resources to meet varying requirements from one sector to another, AliCloud offers various cloud solutions targeting key verticals such as gaming, O2O, IoT, finance, healthcare, multimedia, and the government. As we discuss below, in addition to AliCloud, another prominent subsidiary of Alibaba, Ant Financial, also entered into cloud space providing finance sector specific cloud services.

Ant Financial Cloud (AFC)

In September 2015, Ant Financial announced the launch of dedicated cloud services for the financial institutions such as banks, insurance companies, and mutual funds, leveraging its own specialized resource base and expertise in the financial service sector as well as AliCloud's cloud offerings. It offers customized services to meet each customer's unique requirements and aims to attract 1,000 financial service customers within the next five years. In addition to the IaaS solutions (which are mainly provided in partnership with AliCloud), AFC offers PaaS and SaaS solutions.



AliCloud's competitive strengths

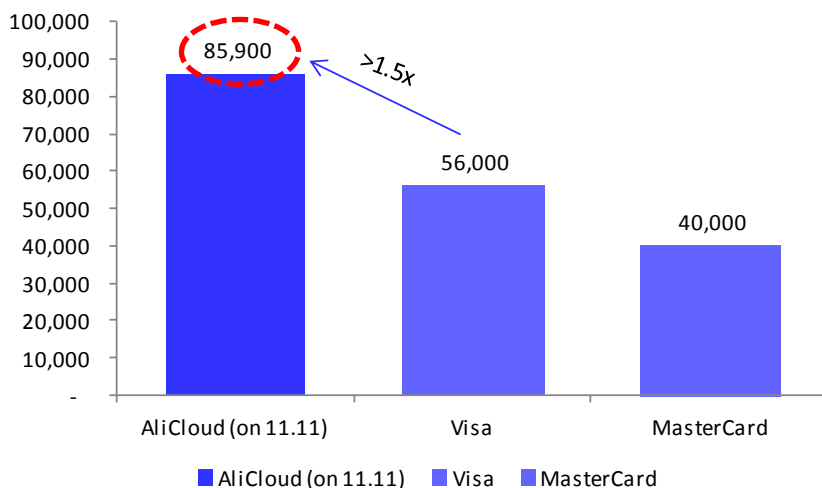
Proven processing capabilities

AliCloud's great processing capability was one of the many things on display during Alibaba's 11.11 online shopping event last year. As shown in the following chart, payment processing speeds surpassed even that of the world's largest payment card company, VISA. On 11.11.2015, AliCloud processed as many as 85,900 payments per second (and 140,000 orders per second), which is 1.5+ times more than the recorded maximum capacity of VISA, and 2+ times better than that of MasterCard.

AliCloud processed 85,900 payments per second during the 11.11 shopping event in 2015, 1.5+ times more than VISA's recorded maximum capacity

Leveraging its expansive server network, AliCloud can switch between data centers, automatically transferring transactions if issues arise with a particular server. AliCloud can transfer transactions to servers situated over 1,000km away. This distributed nature enables AliCloud to provide uninterrupted service, especially during peak occasions such as the Singles Day event.

Figure 33: Number of payments processed per second



Source: Deutsche Bank, AliCloud
Note: AliCloud - # of payments processed on 11.11.2015; VISA and MasterCard - the recorded capacity

In October 2015, AliCloud's FuxiSort (the distributed computation framework) set four new world records at Sort Benchmark competition. As shown in the below table, under Daytona (for general purpose sorting) GraySort category, FuxiSort sorted 100TB of data in 377 seconds (i.e., 15.9TB per second) beating the 2014 record time of 23.4 minutes by Apache Spark. AliCloud has used 3,377 commodity servers of high processing power in sorting the data under Daytona category. These global wins further showcase the resources and capabilities possessed by AliCloud in delivering highly efficient service to its customers by handling large scale data.



Figure 34: AliCloud's FuxiSort's record breaking processing time

Sort Benchmark competition	2014 world record	2015 world record
Daytona GraySort	Apache Spark: 4.27TM/minute	FuxiSort: 15.9TM/minute
Indy GraySort	Baidu: 8.38TB/minute	FuxiSort: 18.2TM/minute
Daytona MinuteSort	Samsung: 3.7TB/minute	FuxiSort: 7.7TM/minute
Indy MinuteSort	Baidu: 7.0TB/minute	FuxiSort: 11TM/minute

Source: Deutsche Bank, Company data

Rapidly growing customer base with increasing contribution from external customers

AliCloud currently serves 1.8m+ customers with the assistance of 1,200+ employees including 900+ engineers and 20,000+ developers. The customer base covers several sectors including:

- Financial services
- Digital entertainment (e.g., gaming)
- Mobile communication
- Consumer electronics
- Education and
- Healthcare.

These include small and medium-size entities as well as large corporations and state organizations such as the Weather Administration, Customs Authority, and several municipal and provincial authorities. Presently, a majority of AliCloud's customers are internet companies. The company intends to cultivate customers in more traditional sectors, such as manufacturing, as a next step of expansion. Further, as Chinese enterprises are still in the process of fully comprehending the benefits of adopting the cloud concept, we are yet to see any customer case of going "all-in" with cloud services as we have seen in the West.

AliCloud customers speak

As we discuss in previous sections, 74% of respondents in our CIO survey stated that AliCloud was their first choice while 65.5% of the IT heads who rely on a single vendor ranked AliCloud as their preferred vendor. Furthermore, 34% of the total respondents allocate 80-100% of their cloud service workload to AliCloud. Among the various reasons customers stated for selecting AliCloud, the following reasons turned up frequently (we list them in the order of frequency):

- Secure service,
- Low cost,
- High system stability, availability, and reliability,
- Constant use of Innovative technology, and
- Better products/services and timely service

Some 34% of total respondents allocate 80-100% of their cloud service workload to AliCloud – DB CIO Survey, 2016



These customers also identified certain areas in which they propose that AliCloud needs further improvements, including:

- Limited product/service range relative to foreign players,
- Under-utilization of mature/advanced technology compared to foreign players,
- Lack of awareness among users (especially in the global market), and
- Frequent operational and maintenance issues.

A relatively minor 16% of current AliCloud users stated their intention to shift to a different operator mainly driven by the above-mentioned weaknesses in AliCloud services. These respondents rank Microsoft Azure and Amazon AWS #1 and #2, respectively among the preferred vendors, reflecting a persistent threat posed by these foreign entrants in the domestic market.

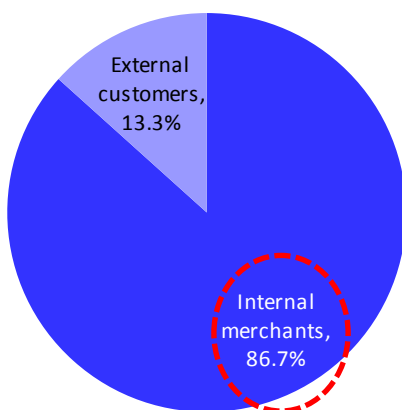
Much of AliCloud is pre-revenue as service is free to Taobao merchants

As shown by Figure 35, we believe that Alicloud's internal customers (largely merchants on its e-commerce platforms) still account for a majority of its customer base (86.7% by December 2015). Our current understanding is that internal merchants are not charged for cloud services, likely because a) their usage of cloud computing services is still minimal, and b) Alibaba is still trying to grow its user base aggressively and thus has no need to monetize this customer segment. Also, recall that Taobao in its most basic form is a free service to its merchants. While a storefront can buy keywords and other advertising tools, one can indeed operate on the C2C with little or no expenses paid to Alibaba.

Internal customers still account for a majority of AliCloud's customer base, and nearly all are non-paying

We believe that AliCloud's 240,000-strong *paying* customer base on the other hand is entirely external customers. Paying customers amount to 13.3% of AliCloud's total customer base, as we show in the pie chart below. With the rapid growth in demand from external customers, we forecast the representation by the external customers to increase to over 30% by the end of 2020. We believe that Taobao, TMall, and Ant Financial are currently not on the public cloud but will migrate eventually.

Figure 35: Growing contribution by external customers



Source: Deutsche Bank, Company data

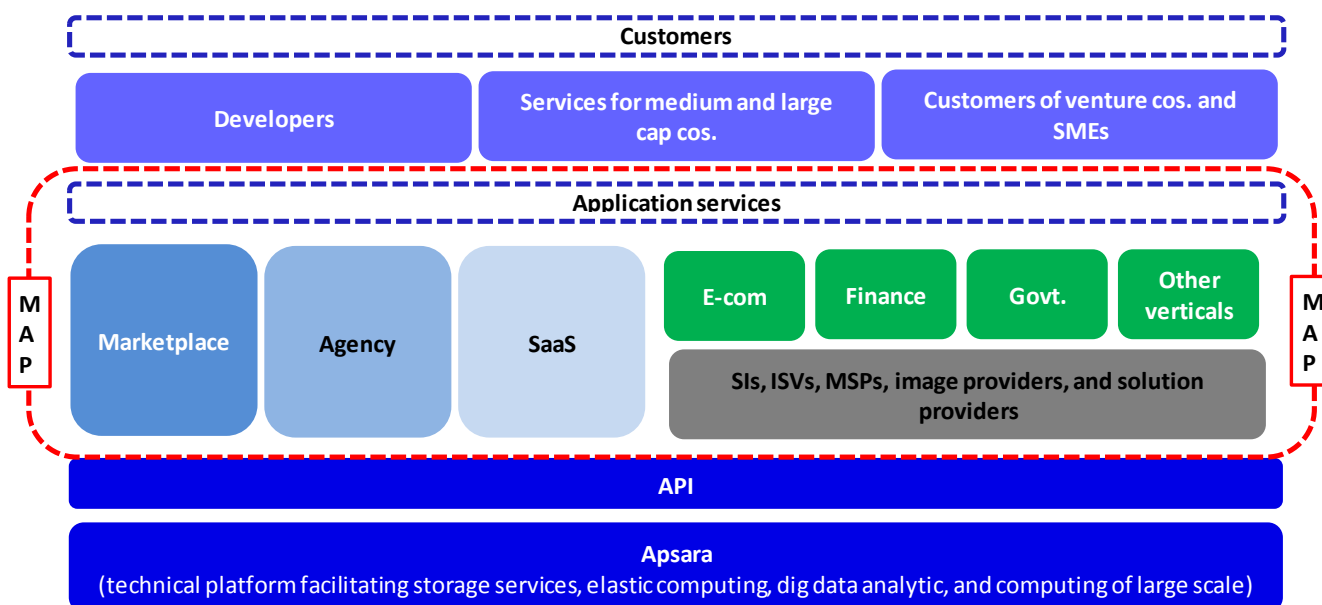


Connecting with the right partners through the Market Alliance Program (MAP)

In its attempt to build a comprehensive cloud computing eco-system, AliCloud is continuously expanding its list of partners in, as well as outside of, China. In July 2014, AliCloud entered into a strategic partnership with Inspur Group, a major rival to AliCloud until that point, to develop a comprehensive eco-system in the Chinese cloud computing industry. As we graphically show in Figure 36, in addition to partnering with international operators in expanding its server network worldwide, through its Market Alliance Program, AliCloud focuses on entering into partnerships with parties providing cloud computing services that complement AliCloud's core operations.

AliCloud seeks to build a comprehensive cloud computing eco-system through its Market Alliance Program

Figure 36: Driving towards a comprehensive cloud eco-system through partnerships



Source: Deutsche Bank, Company data

AliCloud has heretofore entered into strategic agreements and joint ventures with several renowned parties around the world. The company plans to enter into collaboration with 2,000+ partners in complementary areas such as SaaS (Software-as-a-Service), PaaS (Platform-as-a-Service), and open source project development. Recent examples of such partnerships include names such as Mesosphere, Appcara, Bankware Global, Panzura, Cloud Comrade, and Appnovation. Through these partnerships, AliCloud expects to diversify its family of offerings, improve network efficiency and further save on infrastructure costs. The following table profiles some of the key partnerships AliCloud inked under its MAP initiatives.



Figure 37: Some of AliCloud's worldwide partnerships under MAP

Company	Business description	Nature of partnership
Intel (US)	information technology company	To promote tailor-made technology solutions jointly developed by AliCloud and Intel using latter's architecture
Equinix (US)	Operates cloud exchanges and provides data centers	To facilitate AliCloud customers accessing AliCloud platform through Equinix Cloud Exchange in Silicon Valley or Hong Kong
Towngas (Hong Kong)	Public utility services	Jointly build and operate data center in Hong Kong targeting local start-up companies
PCCW (Hong Kong)	Information technology and telecommunication company	To expand AliCloud's cloud services in Hong Kong mainly focusing on local start-up companies
LINKBYNET (France)	Provider of cloud and web hosting services	For use of LINKBYNET's extensive cloud infrastructure network and services
Singtel (Singapore)	A telecommunication company	To support AliCloud's expansion in the APAC region by sharing Singtel's already established customer base, cloud service expertise, and other ICT resources
Meraas Hldg (Dubai)	A conglomerate invested in various sectors including leisure, tourism, asset management, and development	To assist AliCloud in promoting its services among corporates and government institutions in the North Africa and Middle East regions
Mesosphere (US)	Provides solutions that simplify the use and management of Apache Mesos	To offer its solutions for management and use Mesos clusters on AliCloud
Appcara (US)	Offers software platforms for running and managing various apps in cloud platforms	Deploy Appcara App360 software and hardware platforms on AliCloud
Bankware Global (Korea)	Offers software products and comprehensive IT solutions to the financial sector customers	To support Ali CinCloud in providing SaaS services in financial services sector of China
Panzura (US)	Provides cloud storage services	Offer Panzura Virtual Cloud Controller and Panzura SkyBridge on AliCloud marketplace
Cloud Comrade (Singapore)	Offers cloud-computing related consultancy services for enterprises	Offer access to its already established customer base and cloud service expertise
Appnovation (US)	Offers open technology solutions	Assist AliCloud with the expertise and resources in the PaaS sector
Yonyou Software (China)	A leading software vendor in the country and a leading independent vendor for enterprise software in APAC region	Expand AliCloud's services in the APAC region using Yonyou's leading position as an enterprise software vendor in the region
GDS Services Ltd. (China)	China's leading provider of high-end data center services	To promote enterprise cloud services in the domestic market
Nvidia Corp (US)	A leading international supplier of system-on-a-chip (SOC) gadgets and GPUs (Graphic processing units) for mobile computers	To jointly develop solutions on artificial intelligence and cloud computing and develop China's first high-performance, GPU-based cloud computing platform
Accenture (US)	A leading multinational company providing solutions in consulting, strategy, technology, digital and operations	Support in areas such as machine learning and big data analysis
SAP (Germany)	A leading international enterprise software service provider	To offer SaaS services offered by SAP on AliCloud

Source: Deutsche Bank, Company data

In a recently signed strategic alliance formed with GDS Services Ltd., AliCloud revealed plans to develop a comprehensive cloud management solution that provides hybrid cloud services in areas such as procurement, maintenance, and cloud operations. This agreement also involves setting up a common platform for sharing the customer base. According to the agreement, AliCloud will combine its cloud computing technology with GDS's CloudMix platform and large network of high-performance data centers to improve enterprise-level cloud computing services in China.



Depending on the nature of services offered by each party, AliCloud categorizes its partners into major four categories:

- **Solution partners:** These partners assist in providing sector-specific cloud solutions to customers. Financial services, healthcare sector, energy and environment protection, and government affairs are some of the major sectors under which several partners have signed up with AliCloud's partner program. E.g., Neusoft, DHC Software Co. Ltd., Bitech,
- **Cloud service partners:** Application migration, system operation and maintenance, cloud hosting resources, and business consulting services are some of the major areas in which cloud service partners provide their services. E.g., ChinaNetCloud, Beyondsoft, Staycloud.cn, SKYARCH Cloud Dalian
- **Technology partners:** Partners that offer complementary cloud services such as ISVs (independent software vendors), SaaS vendors, and security. E.g., Joinf, Winbons, Xiaoneng
- **Channel service partners:** Includes value-added resellers (VAR), digital agencies, system integrators (SI), and managed service providers (MSP).

Alibaba has clearly established its leadership in China as an Infrastructure-as-a-Service (IaaS) provider; over 90% of its services are in the IaaS space. As a result of its MAP initiatives, we expect AliCloud to continually extend its presence to several other levels of the cloud computing service spectrum in the long run.

The "Plus" initiatives

During a press conference following the "two sessions" (the legislative sessions convened by the Chinese People's Political Consultative Conference (CPPCC) and the National People's Congress (NPC) in March 2016), Chinese Premier Li Keqiang reiterated the government's growing interest in promoting use of cloud computing technology in improving efficiency and providing high-quality service to the people. He quoted a popular folk saying in China, "As man is doing, heaven is watching" with a slight twist, relating to the role played by cloud computing "Cloud is watching, watching how the power is being used", according to China Daily.

AliCloud through its "Plus" program aims to support the Chinese government's "Internet Plus" program, as well as support emerging innovative small and medium-sized enterprises through its "Founder Plus" initiative. In collaboration with the government, AliCloud has offered its expertise and resources to help modernize traditional industries including energy, finance, education, and healthcare. The following table shows some of the services provided by AliCloud under the "Internet Plus" initiative:



Figure 38: Supporting the “Internet Plus” initiative

Institution/area of support	Nature of support
China Customs	In collaboration with Datatech, a tech company, AliCloud would develop an advanced system to improve the Custom’s data processing power throughout the Custom’s checkpoints network of 1,800 centers.
Sinopec	A cloud-computing based system to improve Sinopec’s oil production and emissions tracking system. The two parties are also in talk of other areas of possible cooperation including, O2O commerce, IoT, online payments and financing, etc.
Zhejiang Security Bureau	Streamlining its enterprise messaging system and back office operations, replacing its decentralized network with a centralized system supporting real time processing capabilities.
Meteorological Administration (CMA)	A cloud-based system to process historical weather data that span over >60 years.
Cloud hospital	Develop (in collaboration with DHC Software and Xi’an International Medical Investments) a cloud-computing based platform to integrate the hospital network through out the country facilitating patient information sharing, online-based appointments and payments, etc.
Gene research and precision medicine	In collaboration with BGI and Intel Corp, launch of the first cloud-based platform for research on and application of precision medicine in Asia
Quantum computing lab	Co-founded with Chinese Academy of Sciences to conduct researches to discover security techniques for data centers and e-commerce platforms and to improve computing performance to enable analysis of complex data faster
Taofu Chengzhen	An incubator programme for supporting start-up SMMEs (Small, medium and micro enterprises) in commercializing their innovative product ideas. Foxconn joints hands with AliCloud in this initiative. The 2 parties will also work with Intel, Valley Capital, and Zhubajie.com to develop necessary infrastructure for the growth of innovative SMMEs.

Source: Deutsche Bank, Company data

Alibaba’s initiatives are well situated on a broader canvas of cooperation between China’s leading platforms and the Chinese government. During the World Internet Conference in December 2015, China’s “Big Three” internet platforms, Alibaba, Baidu and Tencent, formed an alliance to assist the government in promoting its “Internet Plus” initiatives. This alliance will be chaired by Mr. Jack Ma.

Through the “Founder Plus” program, AliCloud has partnered with:

- 20 research firms and incubators
- 30 venture capital funding firms
- 20 development, marketing and distribution firms

...to provide these emerging SMEs with essential services such as basic business expertise and guidance, fund-raising assistance, tax advice, marketing and distribution services, and office space. These services also include free cloud-based training and resources worth RMB30,000 – RMB400,000 for eligible founders.



Alibaba in a similar vein recently initiated its “Create@AlibabaCloud” program in Singapore as part of its efforts to penetrate the Southeast Asian market, targeting start-up companies beyond China. Under this program, eligible candidates can receive a range of support: 1) grants worth US\$10,000 (valid for one year) to purchase cloud services from AliCloud with the best-performing companies receiving US\$18,000; 2) after-sales support services once every six weeks; 3) assistance in marketing and branding campaigns via Alibaba’s offline and online channels; and 4) training in Chinese tax and finance regulations and laws. The company intends to expand the program to other Asian markets including Thailand, Indonesia, and Malaysia.

Cloud Marketplace

Leveraging Alibaba Group’s expertise as the largest e-commerce platform, AliCloud’s offers third-party complementary cloud service partners with a marketplace to sell promote their services to the customers. The major product/service categories include Infrastructure software cloud services, web development, enterprise applications, and security. The platform enables search filtering based on locality, preferred price range, and service-specific features creating an easy-to-use interface for visitors.



AliCloud Financial analysis

Key highlights:

- AliCloud delivered strong revenue growth of 126.2% YoY in the December 2015 quarter (3Q16FY). The rapid growth was largely driven by a broadening in AliCloud's paying customer base, and more general growth in the usage of cloud and demand for advanced services. CY2015 growth of 114% YoY represented a clear acceleration over 51.0% revenue growth in CY2014.
- Given its dominant position in the domestic market and heavy investment in expansion, we expect cloud revenue to continue to grow to reach to approximately RMB16.6bn by the end of FY2018, representing a three-year CAGR of about 136%.
- Assuming that the company's immediate focus remains on business expansion over margin improvement, we expect its low-price strategy to remain in effect in the near to medium term, until AliCloud has built what it feels to be a satisfactory customer scale. We would expect a US\$1bn run-rate to be a significant trigger to deeper monetization.

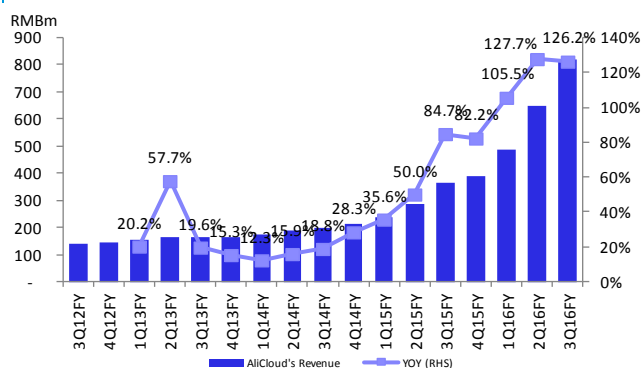
Overall revenue analysis

AliCloud has delivered strong revenue growth over the past several quarters, with revenue generally accelerating, as shown in Figure 39. In the December 2015 quarter (3Q16FY) for instance, AliCloud recorded 126.2% YoY growth. On an annual basis, revenue expanded by 64.4% in FY2015. This heightened pace of growth compares to a mere 18.9% rate reported a year ago. In its December quarter (3Q16FY) results filing, Alibaba attributed the growth in AliCloud to:

126% YoY revenue growth in December, 2015 quarter contributing to 2.4% of Alibaba group revenue

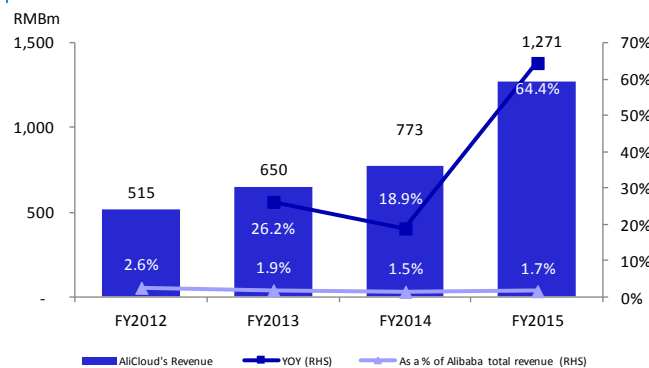
- A rise in its paying customer base
- Increased usage of cloud services and
- Growing demand for advanced cloud services such as database services and content delivery network (CDN) services.

Figure 39: Revenue continues to grow at an increasing pace



Source: Deutsche Bank, Company data

Figure 40: FY2015 saw 64.4% growth in AliCloud revenue

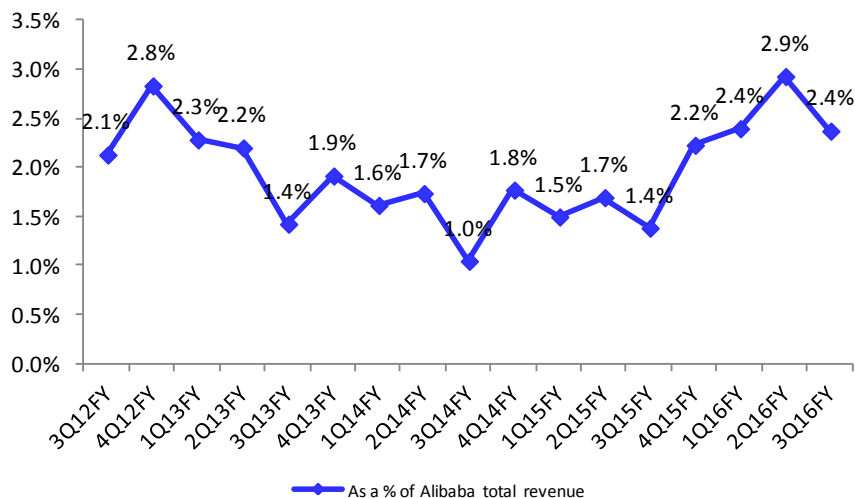


Source: Deutsche Bank, Company data



Even though the segment recorded healthy YoY growth in 3Q16FY, AliCloud's contribution to total group revenues remains just short of 2.5%. Nevertheless, this contribution is significantly higher than the 1.4% of revenues that AliCloud represented in 3Q15FY. Note that much of AliCloud revenues in the FY12-FY14 period shown in the above figure relates to HiChina, a company that Alibaba acquired in 2009. HiChina offers domain name, hosting and cloud-based services as well as website building for small and medium-sized enterprises.

Figure 41: Improving contribution to Group revenue



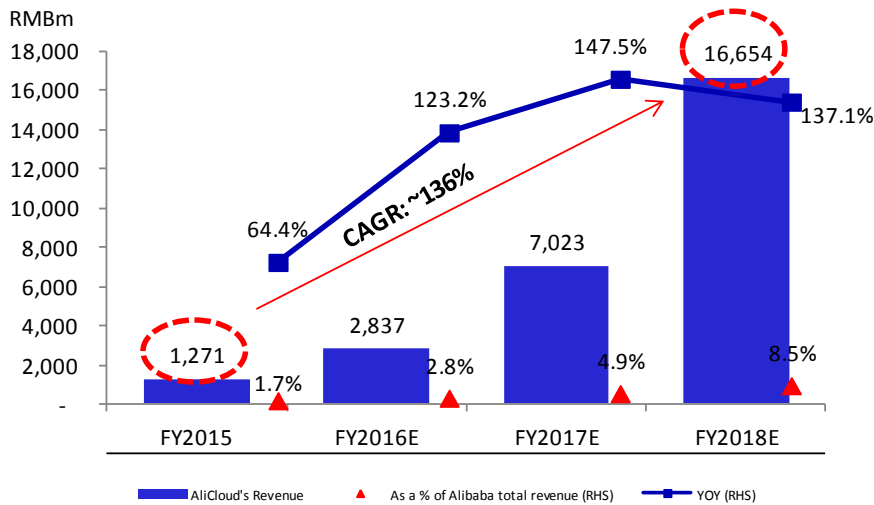
Source: Deutsche Bank, Company data

As shown in the following chart, we expect AliCloud revenue to grow approximately 123% in FY2016 to reach RMB2.8bn, contributing approximately 2.8% of total group revenue compared to 1.7% in FY2015. We expect cloud revenue to continue to grow to reach roughly RMB16.6bn by end of FY2018 recording a three-year CAGR of about 136%, significantly higher than the three-year CAGR of approximately 35% recorded from FY2012-FY2015. As a result, we expect revenue contribution to increase to 8.5% in FY2018. Given still-strong growth in Alibaba's e-commerce segment, it will take some time before cloud makes a significant contribution to group revenue.

We expect AliCloud to continue its extremely strong growth, recording 136% three-year CAGR through FY2018E



Figure 42: Continued growth in size and contribution



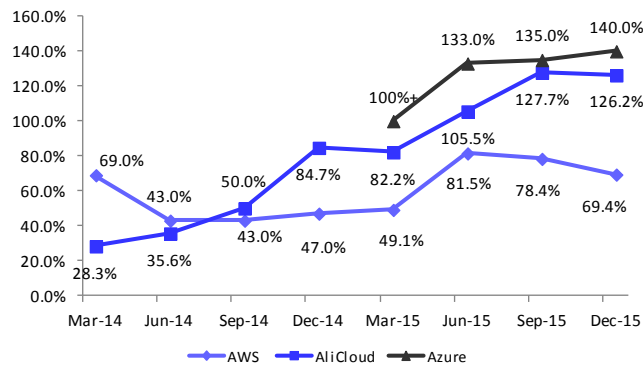
Source: Deutsche Bank, Company data

Reality check: how our AliCloud assumptions compare to AWS

Below we plot AliCloud revenue against that of its biggest rival in the international cloud space, AWS. Given that AWS has been operating in the cloud market for longer (10 years) than AliCloud, AWS has established a dominant global customer base, delivering more mature growth rates relative to Alibaba and Azure. As shown in Figure 43, both Azure and AliCloud have recorded faster growth in revenue compared to AWS over the last several quarters given these companies' relatively small revenue base compared to that of AWS. Indeed, annualizing AliCloud's December quarter revenue of US\$128m implies a run rate of US\$512, higher than that of Google Cloud Platform and 1/3 the size of Azure globally. With an operating history of only six+ years and smaller revenue base, AliCloud continues to record faster revenue growth. Our expectations for strong longer-term growth at AliCloud (Figure 44) are significantly predicated on the assumption that the business will follow a similar evolution to that of AWS in the future.

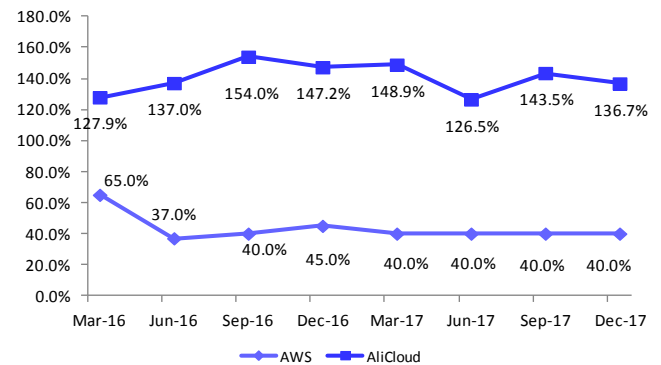
AliCloud, given its lower revenue base, should enjoy higher revenue growth relative to the much more mature AWS over the forecast period

Figure 43: A historical revenue growth comparison: AliCloud vs. AWS vs. Azure



Source: Deutsche Bank, Company data

Figure 44: Forecast revenue growth comparison: AliCloud vs. AWS (CY2016 – CY2017)

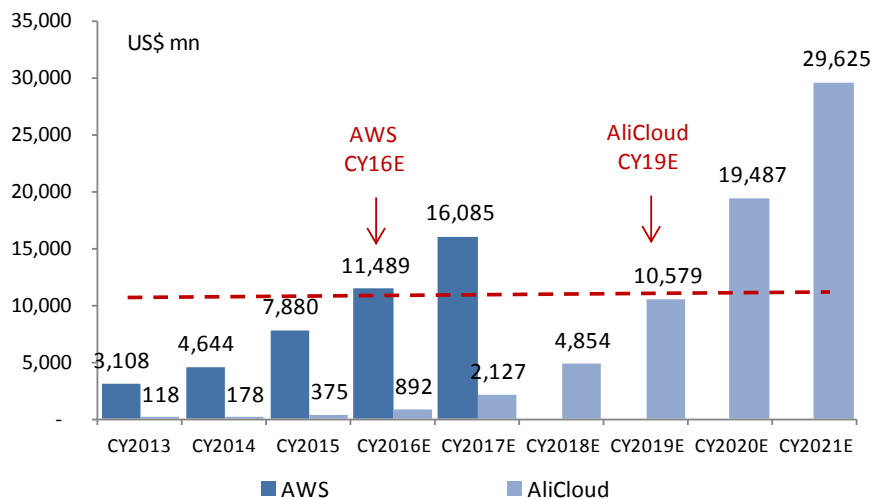


Source: Deutsche Bank



We expect AliCloud to ride both continued user growth and ARPU expansion by delivering more value-added services. We expect AliCloud to reach an annual revenue size of RMB67.7bn (US\$10.6bn) in CY2019, close to our revenue forecast for AWS in CY2016.

Figure 45: AliCloud ramping quickly to catch up the pace with AWS



Source: Deutsche Bank estimates, company disclosure

Impact of low-price strategy

As discussed in detail in previous sections, AliCloud continues to pursue a low-price strategy to expand its customer base, especially in developing regions outside of Mainland China. However, we do see higher pricing in some of the more mature markets such as Singapore. Management of AliCloud currently seems more focused on business expansion over margin improvement. Given the impressive pace of growth in AliCloud's paying user base and the company dominance in the domestic cloud (which we expect it to eventually leverage into monetization), we expect the current revenue growth momentum to continue.

As shown in the following table, prices of AliCloud products differ among regions. For instance, billed on a pay-as-you go basis, the hourly price of an ECS instance (2coreCPU+4GBMem) in the US West market is 22% lower than in Mainland China, while the same is sold at a 59% premium in Singapore.



Figure 46: Different pricing in different regions

Product category (US\$)	Mainland China	Singapore	US West
ECS (1 instance-on Windows) 2 Core CPU; 4GB memory			
Pay-as-you-go (per hour)	\$0.083	\$0.132	\$0.065
Prem(disc) over China		59%	-22%
Subscription (per month)	\$20.80	\$28.40	\$28.40
Prem(disc) over China		37%	37%
OSS			
Storage fee up to 1 TB (per GB)	\$0.026	\$0.029	\$0.026
Prem(disc) over China		13%	0%
Data transfer-downstream only (10GB (per GB/month))	\$0.12	\$0.12	\$0.08
Prem(disc) over China		0%	-33%
RDS (on MySQL) Single Zone; Shared CPU+1200MB memory			
Pay-as-you-go (per hour)	\$0.067	\$0.102	\$0.072
Prem(disc) over China		52%	7%
Subscription (per month)	\$26.00	\$39.00	\$29.00
Prem(disc) over China		50%	12%

Source: Deutsche Bank, Company data

Overall margin analysis

Given the nascent stage at which AliCloud is operating relative to its global peers, the company's immediate goal is to expand scale while guarding against potential competitive intrusion. We would expect the company to pay more attention to margin building once annual revenue reaches the US\$1bn threshold.

While extensive investment in business expansion and concurrent low-price strategy should continue to pressure margins, AliCloud should be able to save through scale-based cost efficiencies. Moore's Law is arguably no better represented than in the cloud business, as hardware and even software-based innovations continue to drive down operating costs. Moreover, being part of the country's largest e-commerce platform with unrivaled operating scale, years of accumulated operational experience and IT hardware/software resources and expertise, AliCloud should ride the various forms of leverage that we discuss in the industry section of our FITT to achieve profitability in the long term. We expect AliCloud to achieve operating breakeven sometime in CY2018 and enjoy a longer-term operating margin of over 20% (DBe CY2021 onwards) taking AWS as a benchmark.

We expect AliCloud to achieve operating breakeven sometime in CY2018, and enjoy a longer term operating margin of over 20% (CY2021 onwards)

Figure 47: Operating margin comparison

Operating margin	CY2015	CY2016E	CY2017E
AliCloud	-15%	-10%	-2%
AWS	24%	25%	24%
21Vianet	-8%	-2%	4%
ChinaCache	-9%	-7%	1%

Source: Deutsche Bank estimates for AliCloud and AWS, Bloomberg for 21Vianet and ChinaCache



Cost-down initiatives: “De-IOE”

Commencing in 2008, Alibaba (later followed by many other domestic companies) initiated a so called “De-IOE Movement,” which involved replacing IT infrastructure such as servers, storage hardware, and database management systems procured from IBM, Oracle, and EMC. The company instead sought to use less expensive solutions, predominantly from local suppliers and its own in-house systems (e.g., Oceanbase database management system). Nevertheless, it is not quite clear whether the company will continue to follow the De-IOE strategy given the constant requirement for high-performance infrastructure as the company continues to grow in scale.

Impact of the server rental model on margins

A key goal of AliCloud’s Market Alliance Program (MAP) is to enter into partnerships with exiting data center operators in both China and other international regions to save on the cost of operating its own data center infrastructure. Presently, a majority of AliCloud’s data centers are owned by AliCloud. Nevertheless, taking into account the servers added on a rental basis through these partnerships, the ratio of self-owned servers is on the decline. Accordingly, we believe that server-related costs can be reduced significantly, which should provide a nice tailwind to overall margins

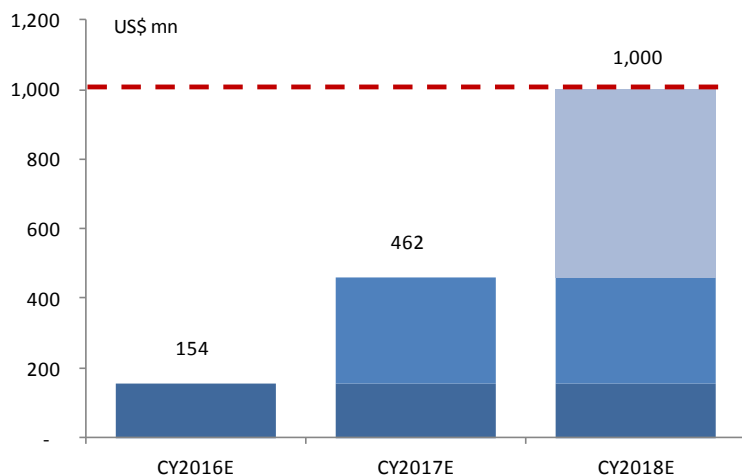
Investment plan

In 2015, Alibaba allocated US\$1bn to AliCloud to expand its data center network. While there is yet to be an announcement of a specific timeline for deployment of these funds, we believe the company intends to allocate some of this funding to set up data centers in several regions; including Japan, Europe, and the Middle East; as part of its global expansion initiative. We assume some part of this funding will be dedicated to building and expanding AliCloud’s network of partners under its Market Alliance Program. Taking AWS’s investment scale as a benchmark, we expect AliCloud’s US\$1bn investment over the next three years to rival the scale of AWS.

AliCloud’s US\$1bn investment over the next three years is a similar investment scale to AWS

AliCloud in January 2016 announced planned investments to launch and expand a “big data” platform that would initially offer roughly 20 solutions; including data processing, data analysis, machine learning, data application, and other aspects of data development chain. AliCloud also stated that it would recruit approximately 1,000 developers to work on this platform over the next three years.

Figure 48: Anticipated AliCloud investment pace



Source: Deutsche Bank estimate



Valuation and risks

Proposing an AliCloud valuation

Lifting target price to US\$109 on new SoTP approach

We apply 8x EV/Sales to AliCloud based on CY2017E revenue, and discount back to CY2016E. We choose CY2017E as our base year given that AliCloud remains at an early stage of growth. We adopt 8x as our multiple, or a 20% discount to the target multiple that colleague Ross Sandler places on AWS, given the relatively smaller scale of AliCloud's business. Our 8x CY17E multiple is 36% higher than the median of our selected international and domestic peers, which we believe is reasonable given AliCloud's much faster growth.

We arrive at a valuation of US\$16.8bn for AliCloud, representing US\$6.5 per ADS, or 6% of Alibaba Group total valuation.

We arrive at a valuation of US\$16.8bn for AliCloud, representing US\$6.5 per ADS, or 6% of Alibaba Group total valuation.

This valuation helps drive our TP to US\$109 on a new SoTP approach.

Figure 49: AliCloud valuation

RMB mn	CY2016	CY2017	CY2018	CY2019	CY2020	CY2021	CY2022	CY2023	CY2024
Revenue	5,707	13,611	31,063	67,704	124,715	189,597	249,340	302,631	332,894
USD mn	892	2,127	4,854	10,579	19,487	29,625	38,959	47,286	52,015
YoY%	144%	138%	128%	118%	84%	52%	32%	21%	10%
Target Multiple EV/Sales		8 x							
Enterprise value		108,884							
Net cash		10,000							
AliCloud Equity value		118,884							
Discounted value	107,752	118,884							
Discount factor	0.91	1.00							
AliCloud Equity value (USD mn)	16,836								
End Projected Share Count		2,582							
Value per ADS		6.5							

Source: Deutsche Bank estimates



Figure 50: International and domestic peers valuation

Company	BBG Ticker	Price	Market cap (USD)	Rate/Non-rated	EV (USD mn)	Revenue CY16E	Revenue CY17E	Revenue Growth CY16E	Revenue Growth CY17E	EV/Sales CY16E	EV/Sales CY17E	EBITDA Margin CY16E	EBITDA Margin CY17E
International peers													
Google	GOOG US Equity	752.67	524,409	Rated	451,803	71,697	84,922	16%	14%	6.3	5.3	57%	57%
Facebook	FB US Equity	112.42	319,979	Rated	304,980	26,097	34,053	36%	30%	11.7	9.0	63%	63%
Salesforce	CRM US Equity	76.14	51,656	Rated	49,633	8,134	9,774	22%	20%	6.4	5.3	23%	22%
Equinix	EQIX US Equity	325.11	22,441	Non-rated	26,720	3,570	4,000	31%	12%	7.5	6.7	46%	47%
Workday	WDAY US Equity	76.26	14,871	Rated	14,490	1,564	2,082	35%	33%	9.8	7.3	8%	13%
Palo Alto Networks	PANW US Equity	140.31	12,399	Rated	12,265	1,640	2,195	43%	34%	7.9	5.9	23%	26%
Digital Realty	DLR US Equity	87.06	12,771	Non-rated	20,019	2,121	2,284	18%	10%	9.4	8.8	56%	57%
ServiceNow	NOW US Equity	65.11	10,509	Rated	11,151	1,384	1,798	38%	30%	9.3	7.1	19%	21%
Splunk	SPLK US Equity	49.71	6,580	Rated	6,278	900	1,142	35%	27%	7.5	5.9	12%	11%
Tableau	DATA US Equity	47.77	3,553	Rated	3,353	840	1,031	29%	23%	4.0	3.2	15%	18%
Rackspace	RAX US Equity	24.59	3,199	Non-rated	3,373	2,123	2,263	7%	7%	1.6	1.5	34%	33%
Domestic peers													
21Vianet Group	VNET US Equity	20.93	1,823	Non-rated	2,223	695	915	7%	7%	3.2	2.4	16%	20%
ChinaCache Internet	CCIH US Equity	8.91	240	Non-rated	173	230	250	7%	7%	0.8	0.7	5%	11%
Median						2,121	2,263	31%	25%	7.5	5.9	23%	22%
AWS						11,489	16,085	46%	40%	10.0	10.0	25%	24%

Source: Deutsche Bank estimates for rated companies, Bloomberg data for non-rated companies. Closing price as of 21 April, 2016

Adding Ant and Cainiao to our SoTP analysis

We apply this valuation of AliCloud to a broader SoTP approach to Alibaba Group. With the group connected to large assets that are demonstrating ever-clearer business models and monetization potential, we feel a sum-of-the-parts captures these respective segmental values. We apply:

- 1) 33x CY16E P/E for the e-commerce segment, taking global e-commerce peers average as a benchmark, consistent with our previous approach; We believe taking the peer average to be justified given Alibaba's larger business scale but smaller growth rate compared to its peers.
- 2) PV of 8x CY17E EV/Sales for AliCloud, referencing global cloud operators and Amazon Web Services as a benchmark;
- 3) Ant Financial Service valuation based on latest round of funding;
- 4) Cainiao valuation based on latest round of funding;
- 5) Net cash of FY16E Alibaba group, excluding AliCloud.



Figure 51: Sum of the parts valuation

US\$ mn	Valuation basis	Multiple	Valuation	Shareholding %	Valuation	US\$ per ADS	Seg % of group valn.
E-commerce	CY2016 P/E	33x	229,278	100%	229,278	88.8	81%
AliCloud	PV of CY2017 EV/Sales	8x	16,836	100%	16,836	6.5	6%
Ant Financial	Recent round valuation		60,000	33%	19,800	7.7	7%
Cainiao	Recent A round valuation		7,813	48%	3,750	1.5	1%
Net Cash			13,808	90%	12,427	4.8	4%
Valuation (US\$ mn)					282,091		
# of FD shares (m)					2,582		
Value per share (US\$)					\$109		

Source: Deutsche Bank estimates

In our new SoTP valuation, e-commerce still dominates valuation. Beside 6% contribution from AliCloud, we assume that 7% of the group value comes from the potential IPO of Ant Financial. We assume a 33% shareholding post-IPO for BABA based on the prevailing agreement between Alibaba Group and Ant Financial Services, and taking the latest round of funding valuation as a benchmark.

Assigning Cainiao valuation

We assign RMB50bn valuation to Cainiao, taking the company's A-round valuation as a benchmark. We meanwhile note domestic courier companies are actively pursuing A-share listings and A-share backdoors and U.S listings with valuations ranging from RMB17bn to RMB100bn (see accompanying table). We believe that U.S. peers have market cap much larger than Chinese logistics firm valuation given their bigger business scales.

The China courier market meanwhile has seen a 40% CAGR in past five years according to Logistics Digest. YTO ranked No.1 in 2015 in terms of parcel volume, followed by STO, ZTO, and S.F. Express. In terms of revenue scale, S.F. ranked No.1 in 2014, followed by EMS, STO, YTO and ZTO, according to Chinawuliu.

Figure 52: Logistics peers valuation

Domestic peers	Valuation (RMB bn)	Target funding market
Cainiao	50	A-round funding
S.F. Express	100	A-share
ZTO	50	U.S.
YTO	17.5	A-share backdoor listing
STO	16.9	A-share backdoor listing
International peers		
DHL	230	Germany
UPS	608	U.S.
FedEX	291	U.S.

Source: Bloomberg Finance LP for international peers market cap, Sina,Tech.cn for domestic peers valuation

We meanwhile expect Cainiao to contribute another 1% to our valuation. While a more detailed treatment of Ant Financial and Cainiao would clearly buttress our valuation assumptions, we hope to do more detailed work on these important assets with time.



Revision of estimates for Alibaba group

By incorporating the higher revenue growth of AliCloud, we lift our FY17/18 revenue forecasts by 1%/5%, respectively. We cut non-GAAP net margin by 10/20bps for FY17/18E to factor in the margin drag from AliCloud. As a result of these changes, we lift FY17/18E non-GAAP net income by 1%/4%, respectively. We largely maintain our FY16 forecast.

Figure 53: Revision of estimates

YE 31 March Figures in RMB,mn	FY2015	2016E					2017E					2018E				
		DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta
GMV(in RMB bn)	2,444	3,083	3,083	0%	-	na	3,761	3,761	0%	-	na	4,496	4,496	0%	-	na
Net Revenue	76,204	100,427	100,433	0%	100,902	0%	141,219	143,318	1%	130,186	10%	187,080	195,835	5%	164,377	19%
Gross profit	52,370	67,608	67,612	0%	67,856	0%	89,555	90,953	2%	87,542	4%	117,686	123,509	5%	110,050	12%
EBITDA (non GAAP)	40,753	52,277	52,279	0%	52,122	0%	64,858	65,710	1%	63,896	3%	83,463	87,023	4%	79,206	10%
EBIT (GAAP)	23,135	29,325	29,328	0%	29,126	1%	40,528	41,378	2%	38,772	7%	57,738	61,289	6%	60,833	1%
EBIT (non GAAP)	36,338	45,947	45,950	0%	29,669	55%	57,164	58,014	1%	40,937	42%	75,393	78,944	5%	57,353	38%
PBT (GAAP)	32,326	79,501	79,505	0%	79,992	-1%	45,898	46,774	2%	48,384	-3%	64,517	68,152	6%	69,456	-2%
Net income (GAAP)	24,149	69,005	69,008	0%	71,695	-4%	33,652	34,327	2%	39,041	-12%	48,032	50,826	6%	50,858	0%
Net income (Non-GAAP)	34,981	42,420	42,423	0%	44,637	-5%	52,254	52,930	1%	55,669	-5%	66,889	69,683	4%	70,065	-1%
EPADS (GAAP)																
Diluted (RMB)	9.63	26.72	26.72	0%	\$28.11	-5%	12.72	12.97	2%	\$15.14	-14%	17.94	18.98	6%	\$20.15	-6%
EPADS (Non GAAP)																
Diluted (RMB)	13.88	16.43	16.43	0%	\$17.56	-6%	19.74	20.00	1%	\$22.23	-10%	24.98	26.03	4%	\$27.77	-6%
Margin analysis (%)																
Gross margin	68.7%	67.3%	67.3%	0.0%	67.3%	0.1%	63.4%	63.5%	0.0%	67.2%	-3.8%	62.9%	63.1%	0.2%	67.0%	-3.9%
EBITDA margin	53.5%	52.1%	52.1%	0.0%	51.7%	0.4%	45.9%	45.8%	-0.1%	49.1%	-3.2%	44.6%	44.4%	-0.2%	48.2%	-3.7%
EBIT margin (GAAP)	30.4%	29.2%	29.2%	0.0%	28.9%	0.3%	28.7%	28.9%	0.2%	29.8%	-0.9%	30.9%	31.3%	0.4%	37.0%	-5.7%
EBIT margin (non-GAAP)	47.7%	45.8%	45.8%	0.0%	29.4%	16.3%	40.5%	40.5%	0.0%	31.4%	9.0%	40.3%	40.3%	0.0%	34.9%	5.4%
Net margin (GAAP)	31.7%	68.7%	68.7%	0.0%	71.1%	-2.3%	23.8%	24.0%	0.1%	30.0%	-6.0%	25.7%	26.0%	0.3%	30.9%	-5.0%
Net margin (non GAAP)	45.9%	42.2%	42.2%	0.0%	44.2%	-2.0%	37.0%	36.9%	-0.1%	42.8%	-5.8%	35.8%	35.6%	-0.2%	42.6%	-7.0%

Source: Deutsche Bank estimates, Bloomberg Finance LP for consensus data.

Down side risks

- Slower-than-expected revenue and user growth
- Intensifying competition from global/local e-commerce platforms
- Failure to monitor fraudulent transactions on the platform
- Difficulty integrating invested entities into Alibaba's ecosystem
- Inability to expand or monetize AliCloud business
- Regulatory uncertainties around Ant Financial Services



Appendix

AliCloud offerings

Elastic computing and storage services

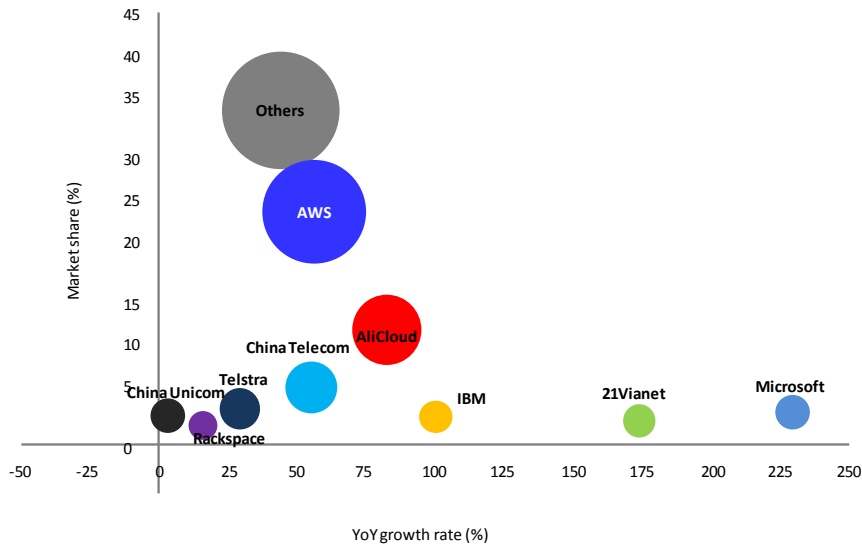
- **Elastic Compute Service (ECS):** AliCloud ECS offers customers with scalability and efficiency through a virtual computing platform that can be tailor-made to meet each customer's unique business needs. AliCloud ECS is able to release approximately 100 instances under 10 minutes and it takes only about five minutes to upgrade the memory and the CPU once restarted.

Through the remote terminal, users can monitor and manage the ECS instances purchased while readily available API (Application Programming Interface) allows users to fully control the ECS instance to improve overall efficiency. To meet the growing computing requirements of customers arising from growth in their businesses, AliCloud introduced AliCloud Auto Scaling. It helps users to automatically rescale ECS instances depending on the fluctuating needs of the business. The service is currently at the beta testing stage and as such is offered free of charge to the users. Further, through AliCloud Block Storage, AliCloud offers ESC customers with servers with low latency via block level storage services. Block storage assists customers in preventing accidental loss of data by automatically creating data back-ups.

As shown in the following graph, IDC ranks AliCloud as the #2 IaaS vendor in the server market across the Asia ex-Japan region (APEJ), based on 1H15 performance. Given the impressive revenue (largely driven by elastic computing and storage services) growth recorded even amidst continuous price cuts showcases AliCloud's growing dominance in the domestic and regional server and storage services. The other Chinese operators that made the list include China Telecom, China Unicom, and 21Vianet, in order of market share.



Figure 54: AliCloud, the 2nd largest server vendor in the APEJ region

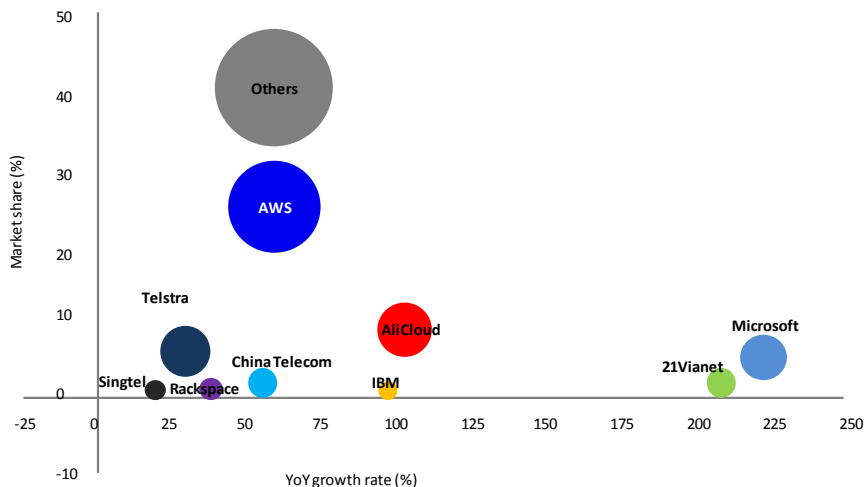


Source: Deutsche Bank, IDC (Asia ex-Japan Cloud Services Market Shares. 1H15)

- Object Storage Services (OSS):** AliCloud OSS is another cloud service with high customer demand as EC2 that offers mass cloud-based storage services to customers. With 99.9% availability, OSS can be automatically scaled up depending on the customer's storage requirements. AliCloud ensures OSS users over 99% reliability through its triple data backup system. The customers are charged only for the amount of storage used, which is an industry-wide practice.

IDC also has ranked the top storage service providers in the APEJ region. Accordingly, AliCloud is ranked #2 in terms of market share with other Chinese players, China Telecom and 21Vianet also being on the top list.

Figure 55: AliCloud is also the #2 IaaS vendor in the storage segment - APEJ



Source: Deutsche Bank, IDC (Asia ex-Japan Cloud Services Market Shares. 1H15)



- **Content Delivery Network (CDN):** CDN is a distributed computing infrastructure system in which servers are located in multiple datacenters to facilitate content delivery with low latency and high performance. CDN is a growing segment in the cloud computing market with increasing customer demand, attracted by the promise of low latency and high performance via the distributed computing infrastructure system. CDN demand has seen an added boost from the increasing use of video content. Originally used for Alibaba's internal system requirements, CDN was officially launched for external enterprise customers in 2014. AliCloud currently operates approximately 500 CDN nodes within China and over 30 nodes in 30+ countries around the world. Each of these nodes offers more than 40Gbps bandwidth and 40Tb-1.5PB storage.

In March 2015, AliCloud released the latest version of its CDN, CDN 6.0 along with its new concept "Cloud Delivery Network" where AliCloud clearly showcased its future focus on an integrated system that combines cloud computing services and big data to provide one-stop CDN solutions. AliCloud expects the industry to see more integrated CDN landscape that goes hand in hand with cloud computing and big data technology than a pure CDN market as in the past. As such, AliCloud believes that it is well positioned to reap benefits from these changing dynamics compared to traditional CDN service providers. Nevertheless, while AliCloud gradually expands its CDN customer base, it will face competition from established domestic vendors such as ChinaCache and ChinaNetCenter. ChinaCache, China's first CDN service provider still holds the #1 position in the domestic CDN service segment followed by ChinaNetCenter at #2, respectively.

The company mainly aims to improve its CDN services in areas such as video (e.g., video-on-demand, live streaming, content acquisition, etc.) and mobile. Some of the key features offered by the new version include:

- **HTTPS encryption:** ensures protection against content threats such as hijacking, tampering, and theft providing a secured communication for customers
- **Big data tools:** AliCloud connects CDN and its MaxCompute to facilitate easy transmission and analysis of big data
- **Mobile acceleration:** helps customers improve the availability and speed of online content and mobile apps irrespective of the mobile environment used (e.g., 2G, 3G, 4G, or wifi). AliCloud claims that its new CDN 6.0 helps customers improving their mobile-based performance by 40%.

AliCloud also revealed (for the first time) some important details in relation to the segment's performance in 2015. Accordingly, the segment reached more than 100,000 CDN customers by the end of the year, recording revenue growth of approximately 800% YoY.

Some of the recent stories (see below) showcase how AliCloud's CDN services have evolved over the years to successfully handle mass-scale customer requirements under strenuous conditions (e.g., preparation on short notice). We believe that AliCloud's performance during the Singles Day event in 2015 increased enterprise cloud users' confidence in the vendor's offerings and its capabilities.



- **New Year's Eve: Hunan TV** (after the broadcaster chose AliCloud as its official CDN service provider just two weeks before the event) used AliCloud CDN services to offer an uninterrupted live broadcast of the entire six hours of the 2016 New Year's Eve celebrations. This was further strengthened by AliCloud's extensively distributed CDN nodes network across the country covering all tiers of cities compared to many other domestic CDN service providers with presence limited to 1-2 tier cities. During the Evening, Hunan TV's CDN traffic peaked in lower (4-5) tier cities further adding credit to the decision to use AliCloud for the event. Also, five of the top 10 programs broadcasted during the Evening were supported by the AliCloud platform.
- **Spring festival:** During the Spring Festival 2016, Sina Weibo also used AliCloud's CDN services, recording the highest number of user visits ever.
- **High-Performance Computing (HPC):** High-performance computing uses parallel processing techniques and super computers to provide users with complex computational problem-solving capabilities and faster processing speed. AliCloud introduced China's first HPC platform for commercial use in December 2015. In January 2016, the company announced its partnership with NVIDIA (a leading US-based chipmaker) to develop China's first HPC platform built using GPU (Graphical processing unit) computing (GPU is a chip used for image processing and manipulating computer graphics rapidly). The two companies also intend to assist start-up companies operating in the deep learning and HPC industry. Deep learning is where the computers themselves learn from big data and improve their computational capabilities (e.g., image recognition technology).
- **AliCloud Virtual Private Cloud (VPC):** Given the reluctance of many enterprises to fully migrate to a public cloud mainly on the basis of security and data privacy concerns, almost all major cloud service providers have introduced hosted (virtual) private cloud services. AliCloud VPC offers users with an access-controlled dedicated cloud network free of charge as it is still at the beta-testing stage. Users can connect the VPC with their physical datacenters through the dedicated connections, facilitating a smooth data migration process. AliCloud also provides hybrid cloud solutions for enterprises that prefer to spread their workload among traditional on-premise system, private cloud, and public cloud.
- **Server Load Balancer (SLB):** AliCloud SLB helps users maximize and expand external service capacities to meet the fluctuating workload requirements of the applications. It is built to improve the availability, reliability and usability of the web applications by consistently distributing web traffic across multiple servers on the cloud and preventing a single point of failure.



In the following table, we present AliCloud's detailed computing, networking, and storage service portfolio with examples of competing products and a few selected customers.

Figure 56: AliCloud's detailed computing, networking, and storage service portfolio

Product	Definition	Competitor offerings	Sample AliCloud customers
Elastic computing and networking			
Elastic compute service (ECS)	Provides users with access to virtual servers with specific CPU, storage, memory, and network capacities that suit each customer's requirements	Qcloud CVM, Baidu BCC, UCloud host, China Telecom (eCloud), AWS EC2, Azure Virtual Machines	Zhejiang Gov., Philips health digital platform, 12308 China bus ticket, Vanke, TH fund
Auto scaling	Assists users by automatically adjusting the size of ECS instances to meet fluctuating computing needs of the users	AWS Auto Scaling	
High performance computing (HPC)	Uses parallel processing techniques and super computers to facilitate users with complex computational problem solving capabilities and faster processing speed	AWS high performance computing	
Container service	Facilitates running applications in packages (i.e. a filing system containing all the resources needed to run the application) using Docker container	Amazon EC2 container registry, Amazon EC2 container services	
Server load balancer (SLB)	Helps users in maximizing and expanding the external service capacities to meet the fluctuating workload requirements of the applications	Qcloud CLB, Baidu LB, UCloud LB, AWS elastic load balancing	12306 China rally ticket, Lenovo Group, Kuaidi, TH fund, Dazhangmen
Virtual private cloud (VPC)	Offers users with access-controlled dedicated cloud network	Qcloud VPC, UCloud net, Amazon VPC	Sinopec, Wasu, Dayima, HUBS1
Express connect	Provides high-speed secure private communication network enabling within as well as across networks	Qcloud direct connect, UCloud Connect, AWS direct connect	
Storage and CDN			
Object storage services (OSS)	Cloud-based mass scale storage and backup services	Qcloud COS, Baidu BOS, China Telecom (eCloud), AWS S3, Azure Storage, UCloud File	Aixiangji, Hik Vision, Momo, QingBaobao, Danale
Block storage	Stores data in blocks/volume to support ECS with automatic backup of data to ensure uninterrupted availability of data in case of system failure	Baidu CDS, UCloud Disk, Amazon EBS	
Table store	cloud-based NOSQL service offering mass scale storage services for both structured and semi-structures data	Amazon SimpleDB	
Archive storage	Offers low-cost cloud-based data archiving services for long-term massive archiving of data backup	Amazon Glacier	
Messaging services	a distributed message system that supports developers with free transfer of data to distributed components	Amazon SNS	Laoyuegou, Testin, FmRadio8, China National Radio
Content delivery network (CDN)	A distributed computing infrastructure system in which servers are located in multiple datacenters to facilitate content delivery with low latency and high performance	ChinaCache, Qcloud CDN, Baidu CDN, UCloud CDN, China Telecom (eCloud), Amazon CloudFront, Azure CDN	Tmall, Taobao, Alipay, Weibo, Xiami

Source: Deutsche Bank, Company data

Database management services and analytics

- Relational Database Services (RDS):** AliCloud RDS provides users with cloud-based access to four relational databases: Microsoft SQL, MySQL, PPAS, and PostgreSQL with MySQL being the most in-demand database. To provide an uninterrupted flow of service, AliCloud has set up a standby region for each relational database with the failover occurring within a few seconds if there is a system failure. The data migration from the on-premise to AliCloud RDS is carried out using the third-party mysqldump tool. AliCloud also has completed the beta testing of the cloud-based non-relational (NoSQL) database service MongoDB and expects to commercially release the service to customers in March 2016. Non-relational databases provide means to store and retrieve data modeled in forms other than tabular relations applied in relational databases. These non-relational databases have become increasingly popular in certain applications such as real-time web apps and big data analysis.



- **Oceanbase – a powerful system for online financial transactions:**

Alibaba claims that its own internally developed relational database management system Oceanbase is the world's first distributed relational database dedicated to the financial services industry. Built on proprietary technology, Oceanbase assists with transaction processing on Alibaba's marketplaces, such as Taobao and Tmall and with Alipay.

Oceanbase for instance supported 100% of Alipay's transactions during the Singles Day event in 2015 (up from 10% in 2014), further showcasing Alibaba's ability to handle a large amount of data under strenuous conditions, with a minimum of system disruptions. With the adoption of Oceanbase, Alibaba claims to have been able to save about 50% of the license fees formerly paid to commercial vendors for the same services in the past. Even though it currently only supports Alibaba's internal systems, the company expects to release it to external customers in 2016 through AliCloud's RDS. Separately, AWS launched its own relational database, Amazon Aurora, which is now commercially offered to customers on AWS RDS along with other commercial relational databases.

- **Data Transmission:** AliCloud data transmission offers its customers data migration, real-time synchronization, and data subscription services. It supports several databases including MySQL, Oracle, Postgres Plus Advanced Server, and SQL Server. The segment is currently at the beta-testing stage and has not announced a releasing date for commercial use. AWS recently introduced its own migration tool, Database Migration Service, which is still in preview stage.

- **Analytic DB:** Alicloud Analytic DB is a real-time cloud-based database built using an online analytical processing (OLAP) approach. It facilitates real-time analysis of multi-dimensional data with just millisecond latency. Analytic DB assists customers in processing large amounts of highly data rapidly and identifies useful trends. AliCloud released the service for commercial use in November 2015.

- **Big data platform:** In January 2016, AliCloud announced the launch of its big data platform, initially offering close to 20 solutions including:

- Data processing
- Data analysis
- Machine learning and
- Data application

...in addition to other aspects of data development chain. The platform also provides mobile analytics solutions. The company plans to recruit about 1,000 data developers in the next three years to develop services on the big data platform. The enormous customer data base, and the processing capabilities accumulated over the years through Alibaba's e-commerce platforms, should come handy in further developing new big data-based solutions for AliCloud's growing customer base.

AliCloud offers a big data-based computing service called "Max Compute", which it claims allows customers to process 100PB of data within just six hours. This workload is equivalent to 100m high-resolution movies, according to the *China Daily*. Further, the analytical database to be offered on this platform will have the capacity to search among 10bn categories of data within just 100 milliseconds.



The table below presents a detailed list of AliCloud's database and big data processing service portfolio with some examples of competing products.

Figure 57: AliCloud's detailed database and big data processing service portfolio

Product	Definition	Competitor offerings	Sample AliCloud customers
Database services			
Relational database services	Provide users with cloud-based access to relational databases such as Microsoft SQL and MySQL	Qcloud CDB, Baidu RDS, AWS RDS, Azure SQL Database	TH fund,Zhongan insurance, Edaijia, Yongyou Software
AliCloudDB for PetaData	Assists in storing PetaData level data within distributed relational database	Amazon Redshift	
AliCloudDB for MongoDB	Cloud-based non-relational (NoSQL) database service using MongoDB to store and retrieve data modeled in forms other than tabular relations applied in relational databases	Qcloud CMONGO, Baidu MolaDB, Amazon DynamoDB, Ucloud UDB	
AliCloudDB for Memcache	Cloud-based open caching service enabling speedy data processing and faster access to hotspot data	Qcloud CMEM, Baidu SCS, Ucloud Mem, Amazon ElastiCache	
AliCloudDB for Redis	Cloud-based provision of key-value databases (NoSQL databases)	Qcloud CRS, Baidu SCS, Amazon ElastiCache, Ucloud Mem	
Analytic DB	A real-time cloud-based database built using online analytical processing (OLAP) approach facilitating real-time analysis of multi-dimensional data	AWS Quicksight, Baidu OLAP Engine, AWS Redshift	Wangjubao, Ali health,Meiyou, Kuaidi
Data transmission	Offers data migration, real-time synchronization, and data subscription services	AWS database migration service	
Data management	A cloud-based data management system that is compatible with both relational (e.g., MySQL) and non-relational (e.g., MongoDB) databases	Ucloud UDB	
Big data processing			
MaxCompute	Facilitates processing of mass scale data (big data)	Tencent Big Data Suit, Tencent Machine Learning, Baidu ML, AWS Big Data	TH fund,Zhongan insurance
BatchCompute	Facilitates parallel processing of large scale operations in batches	Ucloud Hadoop, AWS high performance computing	Ray Vision, Genekang, GeneDock,BerryGenomks, Gene.@c,
Data integration	A platform for synchronization of data from different sources		
E-MapReduce	Hadoop and Spark based framework facilitating processing of mass scale data by using several ECS virtual servers for data computation	Ucloud UDDP, Baidu MR, Amazon EMR	
Data process center (DPC)	Offers user friendly data processing tools (e.g., data analysis, task scheduling, open data processing services, etc.) to provide business intelligence and data warehousing solutions at lower cost		

Source: Deutsche Bank, Company data

Security services

AliCloud is China's first cloud-based security provider to win ISO27001 Information Security Management System Certification. We view AliCloud security services as offering a wider range of cloud-based security solutions compared to its peers. The team continues to test new solutions for launch in the future. Some of these services are:

- Anti-DDoS:** Offers protection against DDoS attacks (Distributed Denial of Service) where multiple Trojan infected systems are used to attack a single system creating a denial of service. Through its network security expert service, AliCloud also offers customized services such as private optimization solutions for DDoS protection and security for major events.
- QuickShield:** Helps users access protected applications through a secured network that shields against a range of network attacks on traffic. It provides CC protection and integrated web application firewalls (WAF) to intercept application attacks in real time.



- **Data encryption service:** Helps customers comply with regulatory requirements related to data security and protect privacy and confidentiality of the business data stored on the cloud.

In the table below, we present AliCloud's detailed security offerings with examples from China.

Figure 58: AliCloud's security service offerings

Product	Definition	Competitor offerings
Cloud shield		
Situation awareness	Cloud-based situation awareness is a SaaS designed to perform a comprehensive and fast analysis using big data and identify potential security threats	
Anti-DDoS	Offers protection against DDoS attacks (Distributed Denial of Service) where multiple Trojan infected systems are used to attack a single system creating a denial of service	Qcloud high anti-DDoS service and Dayu Distributed Defense, Baidu SS, UCloud Security, UADS, and UWAF, AWS WAF
QuickShield	A customized network security system providing the customers with secured network access against potential network attacks on traffic	UCloud IPS, Qcloud security
Ann Knight (安骑士)	A free cloud-based software for server security management providing protection against Trojan attacks, bugs, attacks on passwords, etc.	
Patch management (补丁管理)	A cloud-based software to update and improve computer programmes by identifying and fixing bugs and security vulnerabilities	AWS OpsWorks
Fraud (反欺诈)	Use of big data technology and machine learning to help customers in identifying and resolving fraud accounting	
Ali Green Net (阿里绿网)	Assists customers identifying and avoiding risks of non-compliance using big data technology and deep learning	AWS Inspector, AWS CloudHSM
Content inspection API (内容检测API)	Provides content (e.g., pictures, text, video, etc.) related security threat detection services	
Data encryption service	Helps customers to comply with regulatory requirements related to data security and protect privacy and confidentiality of the business data stored on the cloud	UCloud Encryption, AWS key management services
Data security insurance	In collaboration with Zhong An Insurance, AliCloud offers insurance (up to RMB100m) against economic losses resulting from hacker attacks on customers data	
Internet security services	Private protection against DDoS attacks customized for each enterprise customer's specific requirements (e.g., major events)	Qcloud Dayu Distributed Defense
Prophets program (先知计划)	A private platform for enterprise customers to setup an emergency response center to gather information on security vulnerabilities within the company's system	
Managed server security (服务器安全托管)	A customised cloud server security service	

Source: Deutsche Bank, Company data



Management and monitoring services

AliCloud also offers services to assist its customers with keeping tabs on cloud resources and systems deployed across the organization and identify potential threats or issues in advance, including cloud monitoring, resource access management, resource scheduling, and operation audit.

- **CloudMonitor:** An open platform that screens servers and web applications on a real-time basis and provides SNS, email, or instant messenger-based alarms to ensure timely detection of any abnormalities.

The table below presents a detailed list of system and resource monitoring and management services offered by AliCloud with some examples from China.

Figure 59: AliCloud's management and monitoring services

Product	Definition	Competitor offerings
Management and monitoring		
CloudMonitor	An open platform that screens servers and web applications on a real time basis and provides SNS, email, or instant messenger based alarms to ensure timely detection of any abnormalities.	Qcloud CM, Baidu CM, Amazon CloudWatch
Resource access management	A cloud-based centralized system for access control	AWS IAM
Resource orchestration	A resource scheduling template to create a cluster of typical cloud services such as ECS, SLB, etc.	AWS CloudFormation
ActionTrail	An operation audit that assists customers to retain records on cloud resource operations	Qcloud CAT, AWS CloudTrail

Source: Deutsche Bank, Company data

Mobile services

AliCloud also offers certain mobile-centric service such as:

- **Mobile Analytics:** a mobile app for statistical data analysis offering a one-stop solution for developers in analyzing operational data. For instance, it assists in performing multi-dimensional analysis of user behavior that can be used in target marketing, improving user stickiness, and implementation of complex big data technology-based solutions.
- **Mobile Push (Agoo):** Based on big data technology, Mobile Push helps reduce development costs by enabling developers to directly connect with users (e.g., sending business reminders and information on promotional activities) and thereby enhance user activities and increase retention of applications. Taobao phone currently uses this app to send approximately 180m messages per day to about 30m active users.

Figure 60: AliCloud's offerings on mobile

Product	Definition	Competitor offerings	Sample AliCloud customers
Mobile services			
Mobile analytics	a mobile app for statistical data analysis offering one-stop solution for developers in analyzing operational data	Amazon mobile analytics	Wasu TV, English Speak
Mobile push	Enables developers to directly connect with users (e.g., sending business reminders and information on promotional activities)	Qcloud XinGe Push, Baidu SMS, Amazon SNS	Mobile Taobao, English Speak
HTTPDNS	HTTP based DNS (Domain Name System) directly accessible through AliCloud servers bypassing the customer's local DNS to avoid domain theft		

Source: Deutsche Bank, Company data



Internet middleware services

Alibaba continues to stretch its boundaries beyond provision of basic cloud-based infrastructure services to provision of PaaS and SaaS solutions through in-house solutions as well as through partnerships. In the table below we present the online middleware services offered by Alibaba along with competing products and some of Alibaba's customers using these services. Originally developed to support Alibaba's internal application system, these services were released for external customers in July 2015 after proving to be highly robust over the past several years. For instance, Alibaba claims that Message Queue currently supports more than 1,000 core applications within Alibaba Group circulating hundreds of billions of messages per day.

Figure 61: Alibaba's internet middleware services

Product	Definition	Competitor offerings	Sample Alibaba customers
Internet middleware			
Enterprise distributed application service (EDAS)	Provides one-stop solutions for developing large-scale online distributed applications		Honglin Capital; Sinopec
Message Queue	Cloud-based message queuing service enabling communication among applications across different networks and systems (may be temporarily offline) at different times	Baidu QNS, Amazon SQS	Tmall, Sinopec, Dingding, Hongling capital, CCTV.com., Guanyisoft
Distributed relational database service (DRDS)	A cloud-based online distributed database service providing scalability, read/write splitting, and horizontal partitioning		Xiami, Wangjubao, Ancun, HFD

Source: Deutsche Bank, Company data

Application services

Alibaba also offers application services such as open search, log data management services, and performance testing. We provide a detailed list of these services in the following table.

Figure 62: Alibaba's application services

Product	Definition	Competitor offerings	Sample Alibaba customers
Application services			
Log Service	A cloud-based log data management service to assist customers to store and monitor log data	Amazon Simple DB, Amazon Cloudwatch	
Alibaba engine (ACE)	A platform hosting applications compatible with several programming languages including Java, Python, PHP, and Node.js to simplify developers' development and maintenance work on ECS.	AWS Elastic Beanstalk, Baidu App Engine	
OpenSearch	Provides customers with customized search services to setup and manage their own search solution	Tencent Cloud Search, Baidu Elasticsearch, Amazon CloudSearch	Babytree, Koubei food delivery, feng.com
Media transcoding	cloud-based transcoding services for multimedia data (e.g., video, audio conversion to a playable format)	Qcloud VOD, Baidu MCT, UCloud Video, UCloud Live, Amazon elastic transcoder	
Performance testing	A platform to test the performance of a software application using simulation techniques (i.e. using real world scenarios) and identify any problems	Baidu APM, Baidu mobile app testing, AWS Device Farm	
Direct mail	Provides email services to merchants to send promotional messages, transactional emails, etc to their customers	Baidu SES, Amazon SES	Tmall, Alipay, Taobao
API Gateway	Cloud-based API hosting services on Alibaba products	Qcloud API, UCloud API, Amazon API Gateway	

Source: Deutsche Bank, Company data

Vertical-focused solutions

Ant Financial Cloud (AFC)

Stretching its boundaries beyond being a mere online financial service platform, Alibaba's financial arm, Ant Financial has decided to take things to the next level – cloud. In September 2015, Ant Financial announced the launch of a dedicated cloud services for financial institutions such as banks, insurance companies, and mutual funds, leveraging its own specialized resource base



and expertise in the financial service sector as well as AliCloud's cloud offerings. It offers customized services to meet each customer's unique requirements and aims to attract 1,000 financial service customers in the next five years. In addition to the IaaS solutions (which are mainly provided in partnership with AliCloud), AFC offers PaaS and SaaS solutions:

- **Basic infrastructure solutions:** Elastic computing, object storage, relational database services, load balancing, open cache services, open data processing services (ODPS), and open table service,
- **DevOps services:** Assists in managing the complete application lifecycle from development stage to deployment stage. It includes resource management (RMC) and deployment services (DEPS).
- **Real-time monitoring (RMS):** Facilitates centralized monitoring of cloud resources, real-time data analysis, etc.
- **Big data services:** Include machine learning services, big data analysis, job scheduling services, report building, and ETL (Extract, Transfer, and Load) development services.
- **Distributed middleware solutions:** Facilitates financial sector-focused modular development by providing a range of middleware solutions such as distributed message services (DMS), distributed service registry (DSR), distributed transaction services (DTS), and Distributed datasource services (DDS).
- **Security services:** AFC's provides comprehensive security solutions combining infrastructure security, regulation compliance, technical audits and operation security (e.g., database risk monitoring services, key management services, web attack monitoring services).
- **Mobile solutions:** Provides one-stop solutions for development, trial, deployment, and maintenance of mobile apps.

Ant Financial Cloud claims to save the system cost from RMB10 cents (incurred on average by a traditional model) to RMB1 cent per transaction while reducing the cost per loan transaction to below RMB1. In addition, following its system upgrade to cloud architecture, Alipay's payment transactions processing capacity has dramatically increased from about 2,000 per second to 60,000 per second, as per Mr. Tong Ling (chief architect of Ant Financial).

Ant Financial's online bank platform, MyBank predominantly uses a cloud-based system for its operations, saving massively on staff and other operational costs compared to traditional banks. Provided that MyBank's target customer base mainly consists of low net worth individuals, the significant reduction in system cost brought about by the use of cloud architecture could be passed on to customers in the form of lower transaction fees. MyBank uses big data technology to profile and evaluate potential customers (e.g., credit worthiness) for lending purposes. We believe that the great success achieved by Ant Financial in its own service platforms using cloud technology will play a greater role in raising confidence among potential external enterprise customers, which are naturally concerned about data privacy and security.



AliCloud and movie production - Rendering Cloud

Rendering Cloud allows moviemakers to use the extensive resource base in AliCloud for animations and “rendering” (adding special effects such as reflections, shading, realistic lighting, shadows, etc. to graphics and videos.)

AliCloud entered into a strategic agreement with Rayvision to offer these services, together becoming China’s biggest platform for cloud-based rendering services. Rayvision provides rendering and cloud computing services for the entertainment sector in 41 countries (and more than 10,000 studios) and claims to control more than 70% of the domestic market. With access to Alibaba’s significant computational power (through the computer system that is powered by more than 100,000 cores supporting its e-commerce network), AliCloud and Rayvision are expected to cut the cost for some rendering projects by approximately 40%, often reducing rendering time by weeks. AliCloud will also provide moviemakers with cloud storage facilities. The company is setting up a dedicated cloud computing lab for developing advanced film technologies.

Through this faster and lower-cost system, AliCloud expects to reach out not only to those small scale domestic filmmakers with financing difficulties, but also to much of the world’s 3D graphics user base of about 10m artists. Light Chaser Animations Studios and Shine Cloud are some of the other customers that currently use AliCloud’s rendering solutions.



Rating
Buy

Asia
China

Technology
Software & Services

Company
Tencent

Reuters
0700.HK

Bloomberg
700 HK

Price at 22 Apr 2016 (HKD)	162.80
Price target - 12mth (HKD)	175.00
52-week range (HKD)	165.70 - 125.00
HANG SENG INDEX	21,622

Alan Hellawell
Research Analyst
(+852) 2203 6240
alan.hellawell@db.com

Leverage what you know best

Early cloud offerings focused on video, games and mobile

Tencent QCloud at this early stage offers particularly robust solutions for China's video, gaming and mobile segments, reflecting long-held dominance in these areas. With relatively recent B2B connectivity to corporates (through official accounts and a growing advertising business), we expect strong growth as the company compliments these budding relationships with cloud services, though likely remaining a relatively distant #2 to AliCloud amongst the domestic names. This report has been published in conjunction with our FITT report "Cloudy with a chance of monetization".

More than 1m customers, a largely domestic-focused business

Tencent QCloud has been offering commercial services, both to affiliates such as 58.com and Didi Chuxing and to 3rd party customers, since 2013. Interviews across China's industry landscape reveal that the company is leveraging one of China's most ubiquitous and robust IT infrastructures to rapidly expand beyond the core industry offerings mentioned above.

Assuming similar growth contour to AliCloud but at much smaller scale

We estimate that Tencent derived roughly RMB250m from cloud services in 2015 (RMB600-700m if we include IDC, other services.) With little guidance from the company or industry at large, we grow Qcloud at the same trajectory as AliCloud, from 0.2% of Tencent total revenues in 2015 to 5.1% in 2020E.

Lifting revenue forecasts for Qcloud; Maintain TP of HK\$175

As a result of our incremental work on cloud, we increase our 2017/18E revenues for Tencent by 1%/3%, respectively. With Tencent Qcloud still at a very nascent stage, we do not assign a discrete valuation to it. Our Tencent TP is based on SoTP: 1) 13.4x FY16E PE for online game + VAS segments, taking China's online games universe average as a benchmark; 2) 1.1x PEG for mobile games, for the co's dominance in mobile gaming market; 3) 1.2x PEG for ads, due to a stronger outlook than the industry average; 4) net cash. Risks: slow-down of MAU growth, failure of mobile games, slower growth of advertising.

Forecasts And Ratios

Year End Dec 31	2014A	2015A	2016E	2017E	2018E
Sales (CN¥m)	78,932.0	102,863.0	131,893.3	168,821.1	197,967.0
EBITDA (CN¥m)	35,343.0	46,737.2	58,507.8	72,875.1	81,002.2
Reported NPAT (CN¥m)	23,810.0	28,806.0	37,889.5	48,248.0	53,364.6
Reported EPS FD(CN¥)	2.54	3.07	4.02	5.11	5.66
DB EPS FD(CN¥)	2.59	3.45	4.39	5.57	6.19
OLD DB EPS FD(CN¥)	2.59	3.45	4.40	5.60	6.17
% Change	0.0%	0.0%	-0.3%	-0.5%	0.3%
DB EPS growth (%)	42.3	33.3	27.3	26.8	11.1
PER (x)	35.6	34.0	30.9	24.4	22.0
EV/EBITDA (x)	21.8	21.3	18.6	14.7	12.3
DPS (net) (CN¥)	0.25	0.33	0.42	0.42	0.46
Yield (net) (%)	0.3	0.3	0.3	0.3	0.3

Source: Deutsche Bank estimates, company data

¹ DB EPS is fully diluted and excludes non-recurring items

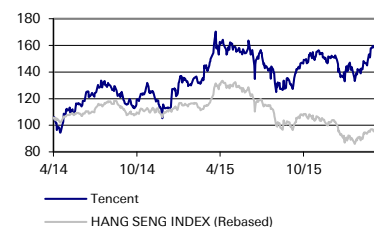
² Multiples and yields calculations use average historical prices for past years and spot prices for current and future years, except P/B which uses the year end close

Key changes

Sales (FYE)	131,948 to 131,893	↓	-0.0%
Op prof margin (FYE)	38.5 to 38.4	↓	-0.2%
Net profit (FYE)	37,994.9 to 37,889.5	↓	-0.3%

Source: Deutsche Bank

Price/price relative



Performance (%)	1m	3m	12m
Absolute	2.1	17.1	0.1
HANG SENG INDEX	4.6	13.3	-22.6

Source: Deutsche Bank

Comparatives

Alibaba (BABA.N), USD80.78		Buy	
	2015A	2016E	2017E
P/E (x)	46.0	32.6	26.4
EV/EBITDA (x)	52.5	31.8	22.5
Price/book (x)	8.6	5.6	4.8
Baidu (BIDU.OQ), USD192.74		Buy	
	2015A	2016E	2017E
P/E (x)	12.0	24.5	17.7
EV/EBITDA (x)	23.5	19.7	12.9
Price/book (x)	4.9	4.3	3.4

Source: Deutsche Bank



Model updated: 22 April 2016

Running the numbers

Asia
China
Software & Services

Tencent

Reuters: 0700.HK Bloomberg: 700 HK

Buy

Price (22 Apr 16)	HKD 162.80
Target Price	HKD 175.00
52 Week range	HKD 125.00 - 165.70
Market Cap (m)	HKDm 1,479,515 USDm 190,712

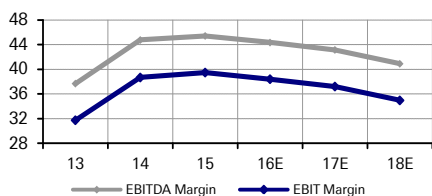
Company Profile

Tencent Holdings Ltd provides internet, mobile and telecommunication value-added services in China. The company has an instant messaging community in China. Tencent also provides online advertising services.

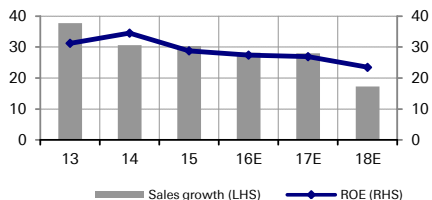
Price Performance



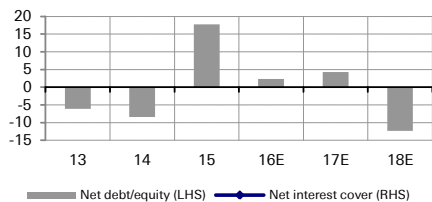
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 31-Dec

	2013	2014	2015	2016E	2017E	2018E
DB EPS (CNY)	1.82	2.59	3.45	4.39	5.57	6.19
Reported EPS (CNY)	1.66	2.54	3.07	4.02	5.11	5.66
DPS (CNY)	0.21	0.25	0.33	0.42	0.42	0.46
BVPS (CNY)	6.3	8.7	12.9	16.8	21.7	27.1
Weighted average shares (m)	9,180	9,234	9,283	9,303	9,305	9,306
Average market cap (CNYm)	498,025	850,368	1,089,661	1,235,060	1,235,060	1,235,060
Enterprise value (CNYm)	458,336	771,214	996,878	1,086,084	1,067,969	999,821

Valuation Metrics

P/E (DB) (x)	29.8	35.6	34.0	30.9	24.4	22.0
P/E (Reported) (x)	32.7	36.2	38.3	33.8	26.6	24.0
P/BV (x)	12.39	10.32	9.56	8.09	6.26	5.01
FCF Yield (%)	3.9	3.3	3.4	5.4	2.4	6.5
Dividend Yield (%)	0.4	0.3	0.3	0.3	0.3	0.3
EV/Sales (x)	7.6	9.8	9.7	8.2	6.3	5.1
EV/EBITDA (x)	20.1	21.8	21.3	18.6	14.7	12.3
EV/EBIT (x)	23.9	25.3	24.5	21.4	17.0	14.4

Income Statement (CNYm)

Sales revenue	60,437	78,932	102,863	131,893	168,821	197,967
Gross profit	32,658	48,059	61,232	74,987	93,872	106,154
EBITDA	22,784	35,343	46,737	58,508	72,875	81,002
Depreciation	3,590	4,801	6,110	7,835	10,028	11,759
Amortisation	0	0	0	0	0	0
EBIT	19,194	30,542	40,627	50,673	62,847	69,243
Net interest income(expense)	0	0	0	0	0	0
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinary	-43	-1	0	0	0	0
Other pre-tax income/(expense)	129	-1,528	-4,411	-3,141	-2,367	-2,367
Profit before tax	19,280	29,013	36,216	47,532	60,480	66,876
Income tax expense	3,718	5,125	7,108	9,506	12,096	13,375
Minorities	61	78	302	136	136	136
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	15,501	23,810	28,806	37,890	48,248	53,365
DB adjustments (including dilution)	1,478	414	3,604	3,543	4,318	5,032
DB Net profit	16,980	24,224	32,410	41,433	52,566	58,397

Cash Flow (CNYm)

Cash flow from operations	24,313	32,633	45,129	78,321	43,867	97,987
Net Capex	-4,771	-4,256	-7,709	-10,551	-13,506	-15,837
Free cash flow	19,542	28,377	37,420	67,769	30,362	82,150
Equity raised/(bought back)	308	299	0	0	0	0
Dividends paid	-1,541	-1,919	-2,322	-3,054	-3,889	-4,301
Net inc/(dec) in borrowings	4,699	20,619	29,267	0	0	0
Other investing/financing cash flows	-14,860	-22,383	-61,691	-45,965	-30,575	-36,717
Net cash flow	8,148	24,993	2,674	18,750	-4,102	41,131
Change in working capital	8,186	3,832	60,113	47,042	-19,317	45,524

Balance Sheet (CNYm)

Cash and other liquid assets	20,228	42,713	43,438	61,320	56,350	96,614
Tangible fixed assets	11,605	12,499	9,973	12,690	16,167	20,245
Goodwill/intangible assets	4,103	9,304	13,439	15,759	18,079	20,399
Associates/investments	40,245	81,417	169,145	213,557	243,353	279,291
Other assets	31,054	25,233	70,823	86,150	91,464	104,324
Total assets	107,235	171,166	306,818	389,476	425,414	520,874
Interest bearing debt	16,653	35,802	65,069	65,069	65,069	65,069
Other liabilities	32,119	53,240	119,649	165,883	155,873	200,682
Total liabilities	48,772	89,042	184,718	230,952	220,942	265,751
Shareholders' equity	57,945	80,013	120,035	156,323	202,134	252,650
Minorities	518	2,111	2,065	2,201	2,337	2,473
Total shareholders' equity	58,463	82,124	122,100	158,524	204,471	255,123
Net debt	-3,575	-6,917	21,631	3,749	8,719	-31,545

Key Company Metrics

Sales growth (%)	37.7	30.6	30.3	28.2	28.0	17.3
DB EPS growth (%)	19.1	42.3	33.3	27.3	26.8	11.1
EBITDA Margin (%)	37.7	44.8	45.4	44.4	43.2	40.9
EBIT Margin (%)	31.8	38.7	39.5	38.4	37.2	35.0
Payout ratio (%)	12.4	9.8	10.6	10.3	8.1	8.1
ROE (%)	31.2	34.5	28.8	27.4	26.9	23.5
Capex/sales (%)	7.9	5.4	7.5	8.0	8.0	8.0
Capex/depreciation (x)	1.3	0.9	1.3	1.3	1.3	1.3
Net debt/equity (%)	-6.1	-8.4	17.7	2.4	4.3	-12.4
Net interest cover (x)	nm	nm	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

Alan Hellawell

+852 2203 6240

alan.hellawell@db.com



Tencent Qcloud

Leverage what you know best

Key highlights:

- Tencent's Qcloud in our recent CIO survey was ranked the #3 preferred vendor by those customers who prefer multiple cloud vendors while ranking specifically #4 and #3 preference for elastic computing and storage services.
- Leveraging its strengths in areas such as gaming, video, and mobile, Tencent offers comprehensive cloud-based vertical solutions for enterprise customers in these sectors with customer-focus largely on SMEs.
- Continued focus on expansion in terms of geographic reach as well as product portfolio through partnerships and in-house developments. Tencent plans to invest RMB10bn over the next five years in datacenter expansion, recruitments and marketing.

We believe that Tencent Qcloud has grown appreciably since ranking #9 in IDC's 2015 China cloud rankings in terms of scale. Indeed, we believe Qcloud has grown to be China's #2 local player in the cloud computing market.

Tencent's Qcloud customer base largely comprises companies in the online game, video, mobile apps, finance, and e-commerce verticals. The video vertical, especially live video broadcasting, has recently been a source of strong demand. We estimate that the customer base now exceeds 1m, more than double that of 2015. Tencent expects traditional industry to exhibit growing demand as it transfers its traditional IT infrastructure to the cloud. Most Qcloud customers are Chinese enterprises. With regard to overseas customers, Tencent has already begun to cooperate with some Fortune 500 customers such as Honeywell

Tencent has adopted both the "own-and-operate" and "partnership" models as drivers to its expansion strategy. While normally applying an "own-and-operate" model with domestic customers, it often adopts a partnership model overseas. Tencent currently has three self-built domestic data centers and three self-built overseas data centers. Through its recently launched "Sea Program," Tencent provides data center services to Chinese enterprise through overseas partnerships.

The product line

Qcloud's major products/services

Similar to its peers, Qcloud started its offerings from the bottom of the stack, provisioning Infrastructure-as-a-Service. From its commercial release in 2013, Qcloud's product portfolio rapidly expanded to become one of the more comprehensive families of cloud-based enterprise solutions. Similar to other major cloud service providers, Qcloud is also now expanding its cloud portfolio beyond IaaS solutions to PaaS solutions by offering professional development services to its customers. Below we discuss some of the key customer solutions offered by Qcloud. The examples provided include: 1) Tencent's internal platforms (E.g., QQ, WeChat); 2) affiliated companies (e.g., 58.com), and 3) external customers.

Qcloud is ranked #4 and #3 by customers for elastic computing and storage services – CIO Survey, 2016



Computing, networking, and storage services

- Elastic computing and storage services:** The respondents in our customer survey picked Qcloud as their #4 and #3 preference for computing and storage services, respectively. Some 5.6% and 16.7% of those interviewed (those who use multiple vendors for cloud services) currently use Qcloud for computing and storage services, respectively. The platform is clearly smaller in scale than that of the dominant AliCloud.
- Content delivery network (CDN):** With a planned 400+ CDN nodes across the world and with 20T+ bandwidth, Qcloud seeks to offer customers 30% faster CDN service relative to its peers. The proposed global expansion will be via both ownership and partnership models. Management expects to complete the expansion shortly.

The table below presents computing, networking, and storage services offered by Qcloud, along with examples of other vendors and Qcloud customers.

Figure 63: Qcloud's computing, networking, and storage services

Product	Definition	Competitor offerings	Sample Qcloud customers
Computing and networking			
Cloud virtual machine (CVM)	Provides users with access to scalable virtual servers with customized features to meet varying customer requirements	AliCloud ECS, Baidu BCC, UCloud host, China Telecom (eCloud), AWS EC2, Azure Virtual Machines	Calibur of spirit, Webank, Xiaohongshu, ICNTV, Didi, LY.com
Cloud load balance (CLB)	Assists in improving service availability through automatic detection and elimination of cloud server failures	AliCloud SLB, Baidu BLB, UCloud LB, AWS elastic load balancing	Dizun, Gongbao grandma, Rexue sangguo, Three swordsman, seven heros, Calibur of spirit
Virtual private cloud (VPC)	Offers dedicated hosted cloud platform for the customers with dedicated private networks	AliCloud VPC, UCloud net, Amazon VPC	Futu5, Taikang Life, Webank, Dazhuzhai, Ele.me, Shexiaoxialu
Direct connect	Offers dedicated network services connecting customers' on-premise resources and cloud platform	AliCloud express connect, UCloud Connect, AWS direct connect	Futu5, Webank, MUCFC, HUBS1, Wukuang Securities, Northeast securities
Storage and CDN			
Cloud object service (COS)	Cloud-based mass scale storage and backup services	AliCloud OSS, Baidu BOS, China Telecom (eCloud), AWS S3, Azure Storage, UCloud File	CBAM, ICNTV, imgo.tv
Content delivery network (CDN)	Use of distributed server network to provide delivery of content with low latency and improved performance	ChinaCache, AliCloud CDN, Baidu CDN, UCloud CDN, China Telecom (eCloud), Amazon CloudFront, Azure CDN	Sougou search, Kuaisou, CNTV, Happy element, EQXIU, QINIU

Source: Deutsche Bank, Company data

Database and data analysis services

Amongst Qcloud's database services, those services seeing the heaviest customer usage included:

- Cloud database (CDB):** Qcloud's relational database service, CDB supports third-party relational databases MySQL and SQLServer while it offers its own relational database, TDSQL (Tencent Distribute SQL). Predominantly designed for the financial services sector, TDSQL facilitates migration from MySQL without any modifications. Tencent's own financial platforms including WeBank and Tenpay use TDSQL for their database management requirements.

Qcloud's in-house database, TDSQL, also supports Tencent's own financial platforms including WeBank and Tenpay

The table below lists Qcloud's database and analysis services along with examples of other vendors and Qcloud customers.



Figure 64: Qcloud's database and analysis services

Product	Definition	Competitor offerings	Sample Qcloud customers
Database services			
Cloud database (CDB)	Cloud-based relational database services compatible with MySQL, SQL Server, and Tencent's own TDSQL	AliCloud RDS, Baidu RDS, AWS RDS, Azure SQL Database, UCloud UDB	Quanmin Zhugong, Edaixi, Ele.me, Taikang Life, ICNTV, Webank, Wepay etc.
Cloud Redis store (CRS)	Cloud-based provision of caching and storage (key/value database) facilities using Redis protocol in both cluster and stand-alone versions	AliCloud for Redis, Baidu SCS, Amazon ElastiCache, UCloud Mem	
Cloud MongoDB Service (CMONGO)	Cloud-based provision of noSQL database services using MongoDB	AliCloudDB for MongoDB, Baidu MolaDB, Amazon DynamoDB, UCloud UDB	
Cloud cache service Memcached (CMEM)	Cloud-based open caching service (storage services for distributed key-value data)	AliCloudDB for Memcache, Baidu SCS, UCloud Mem, Amazon ElastiCache	Gongbao grandma, Happy element, Dovo game, Taikang Life, Weipai,
Data processing and analysis			
Tencent Cloud Search	Provides customers with customized search services to setup and manage their own search solution	AliCloud OpenSearch, Baidu Elasticsearch, Amazon CloudSearch	Wechat, QQ, Yingyongbao, QQ music, Tencent Video, QQ space
Natural language processing (NLP)	Use of machine learning technology and parallel computing to facilitate natural human language based search, data analysis, speech recognition, semantic analysis, transcoding, etc.		Wechat, QQ, Yingyongbao, QQ music, Tencent Video, WeTest
Tencent Machine Learning (TML)	Offers big data technology and parallel computing based machine learning platform for data analysis	AliCloud MaxCompute, Baidu ML, Tencent Machine Learning, AWS Big Data	Wechat, QQ, Yingyongbao, QQ music, Tencent Video, QQ space
Tencent Big Data Suit (TBDS)	Provides big data analysis platform using Tencent's years of experience in handling big data	AliCloud MaxCompute, Baidu ML, AWS Big Data	Edaixi, Huachengfeng, Tencent big data, GDT

Source: Deutsche Bank, Company data

Monitoring and management services

Qcloud offers a variety of cloud resource and operation monitoring and maintenance services, such as cloud monitoring and automated testing. It also offers users open API across its products, enabling users to adapt to more customized cloud service scenarios that best match their individual business requirements.

- **Blue Whale (BlueKing):** The Blue Whale (BlueKing) platform provides one-stop solutions for platform operators that use cloud technology and Service-Oriented Architecture (SOA) to develop operational and maintenance systems for their product offerings. Predominantly developed to improve the efficiency of Tencent's gaming operations, Blue Whale currently supports about 200 Tencent games. The company claims that the platform has improved operational efficiency 10 times. Blue Whale offers several types of services including:
 - Integration platform
 - Moving platform
 - Platform
 - Configurable platform
 - Management and control platform and
 - Data platform.

The table below presents cloud monitoring and management services offered by Qcloud, along with comparable products from other vendors and Qcloud reference customers.



Figure 65: Qcloud's cloud monitoring and management services

Product	Definition	Competitor offerings	Sample Qcloud customers
Monitoring and management			
Cloud Monitor (CM)	Offers three-dimensional cloud system and resource monitoring services. i.e., data analysis, real-time alert system, and personalized data reports	AliCloud CloudMonitor, Baidu BCM, Amazon CloudWatch	Feiyu, Giant game, Hulai game, Yinhan,CMCGE,37.com
Cloud Automated Testing (CAT)	Periodic network quality monitoring, data analysis, and real-time alert services using Tencent's proprietary network monitoring system		Feiyu, Giant game, Hulai game, Yinhan,CMCGE,37.com
Cloud API	Allows the users to access Qcloud APIs and customize it to create their own system for resource management, automated operation and maintenance system, development tools, etc.	AliCloud API Gateway, UCloud API, Amazon API Gateway	Tencent game, 58.com, Didi, Youxigu
Blue Whale (BlueKing)	Provides one-stop solutions for platform operators that use cloud technology and Service-Oriented Architecture (SOA) to develop operation and maintenance systems		58.com, DemonWare, Hi-REZ studios,Dreamsky, Locojoy

Source: Deutsche Bank, Company data

Video services

Having already proven its expertise in the video content space as a leading online video service provider, Tencent now shares its expertise and resources with external businesses through the provisioning of a range of comprehensive video services on Qcloud. These services include cloud-based platforms for live video streaming, video-on-demand, video-based communication, and short clip streaming. The table below profiles cloud-based video services available on Qcloud, along with a list of competing products and sample customers.

Figure 66: Video services on Qcloud

Product	Definition	Competitor offerings	Sample Qcloud customers
Video services			
Video on Demand (VoD)	Offers comprehensive range of video-on-demand services	Baidu VoD, UCloud Video	icntv, Souzhiyun,17talking,51yaoshi
Live Video Broadcasting (LVB)	Facilitates online real-time video and audio data streaming	AliCloud live streaming, Baidu live streaming, UCloud Live	
PSTN Multiparty Calls (PMC)	Internet-based multi-participant communication platform		Didi, Xinren Doctor, 58.com, Zhaopin,Laidian, Tencent RTX
Interactive Live Video Broadcasting (ILVB)	A comprehensive live broadcasting solution facilitating integration of multiple video/audio platforms to build a single interactive live broadcasting platform		QQ, Ke.qq.com, Qiqi broadcasting, Inker, ABC360
Micro Video Service (MVS)	Customized services for short video applications on mobiles offering services including storage, transcoding, playback, and review		QQ space, QQ, Wechat,Doupan, Weipai
Instant Messaging (IM)	Offers instant messaging services		Futus, Tencent Game, Qiqi friend, ABC360,Taitao

Source: Deutsche Bank, Company data

Mobile services

The mobile-based services offered on Qcloud include image processing and storage, wireless networking, facial recognition, and message push services. Leveraging its experience and expertise in the mobile space, Tencent expects to further expand its offerings for mobile application developers in the coming years. The following table presents a sampling of mobile-based services offered by Qcloud.



Figure 67: Mobile services offered on Qcloud

Product	Definition	Competitor offerings	Sample Qcloud customers
Mobile services			
Cloud Image (CI)	Offers mobile developers with a range of services including image storage , image upload/download, processing, etc.		Ele.me, Navinfo, Chetong, Jiakao, Chuye
Wireless Network Service (WNS)	Offers mobile app developers with secure network connection, high speed connectivity, etc.		37.com, LY, Weimei, mobile QQ
Face Recognition (FR)	Facilitates facial detection, recognition, verification, and analytical services	Baidu FR	QQ space, Webank, Tiantian Ptu
XinGe Push	Mobile-based message push service enabling customers to reach their users through notifications and messages	AliCloud Mobile Push, Baidu SMS, Amazon SNS	Palm heros, China calender, People's Daily, Happy Majiang, QQ lottery

Source: Deutsche Bank, Company data

Security services

Qcloud's continuously expanding cloud-based security services offer protection against DDoS attacks, detection and notification on system vulnerabilities, protection from system hacking, and special events coverage. It also offers security certificates upon the evaluation of customers' security systems. The table below lists security services offered on Qcloud.

Figure 68: Qcloud's security service offerings

Product	Definition	Competitor offerings	Sample Qcloud customers
Security services			
Qcloud Security (QS)	Provides network protection, detection of and protection against system intrusions and other system vulnerabilities	AliCloud QuickShield, Baidu BSS, UCloud Security and UWAF, AWS WAF	58.com, Wedian, ELong, Futus, Tubatu,
High anti- DDoS service	Protection against DDoS attacks	AliCloud anti-DDoS service, UCloud Security and UCloud ADS, AWS WAF, Baidu BSS	Giant game, Knowsec, Koudai, eLong, Tubatu
Security Certification (SC)	Provides security certification (for free) evaluating (on request) customers' security system in terms of protection against DNS hijacking, DDoS attacks, and other system vulnerabilities		CMGE, 365 calender, Lenovo, DNSPOD, icnTV
Dayu Distributed Defense	Provides business scenario-based protection (e.g., coverage for specific events) against web intrusions, DDoS attacks, CC attacks, etc.	AliCloud internet security services	Smartisan, Tubatu, eLong, Ctrip, LY, Futus
Business Security Protection (BSP)	Offers developers and other service proviers with multi-scenario security services including authentication coding, message filtering, anti-brush, etc.		58.com, Jumei, Weimob, JD.com, WeBank
Cloud reinforcement (CR)	Comprehensive security solutions for developers of mobile applications		Jiakao, Chuye, Navinfo, Ele.me

Source: Deutsche Bank, Company data

Qcloud has also opened big-data-based DDoS to its customers. In early 2016, Tencent began cooperating with IBM, Symantec and others to launch a cloud security service union, which aims to improve security levels for verticals served.

Clear vertical strengths in on-line gaming, video, and mobile

In addition to basic IaaS offerings, Qcloud provides targeted solutions to key focus sectors. For instance, Qcloud provides development tools and other related services (including app optimization, its Blue Whale Platform, and gaming reinforcement) to China's on-line gaming vertical. The group also provides services such as mobile networking, image management, and message push for mobile developers. Moreover, through its WeBank initiatives, Tencent has taken its first steps towards financial cloud services as it more broadly finds a foothold in the internet finance space.



Qcloud has launched PaaS solutions serving the video, game and mobile app sectors. Tencent also provides PaaS solutions to healthcare customers through partnerships with third parties. Qcloud aims to expand its vertical solutions further going forward.

Below we discuss two of the key verticals served by Qcloud with customized cloud services:

- **Gaming:** Qcloud offers its gaming customers customized cloud services covering the entire lifecycle, from development to release to maintenance of a particular game. WeTest, an in-house-developed automated testing system, helps game developers with effective and accurate test results on games in partnership with TestBird and Tencent Bugly. Tencent game cloud (GCloud) meanwhile provides four levels of services to game developers:
 - Access services: Includes access to high-quality network speeds, data compression (reducing network bandwidth by approximately 60%), capacity to process 200,000 packets per second, high concurrency, etc.
 - Logical services: Includes game updates (DOLPHIN), area service navigation (MAPLE), in-game voice, a distributed development network (PEBBLE), ranking, and a distributed computing platform.
 - Data service: Includes data storage (TCAPLUS) and data analysis services.
 - Operating platform: Includes log analysis and alarm monitoring, dynamic resourcing, and intelligent operation and maintenance.

Major gaming customers of Tencent's Game Cloud include

- The Four, Teenager Three Kingdoms,
- Dragon 3D,
- Souls Blade, Martial World,
- Time Hunter, and
- Big Spender 2.
- **Finance:** Qcloud's financial services focus on three sub-segments: insurance, securities, and consumer finance. It offers various services, including:
 - Customized cloud computing services (e.g., financial servers, TDSQL, encrypted VPN tunnels, big financial data analysis),
 - Financial compliance zoning,
 - Disaster recovery services.

Tencent's finance cloud has assisted 10 internet banking launches within the past six months. Major customers other than WeBank are Taiking Life, GF Securities, CNinsure, Fu Passers Securities, and Mama capital.



Marketplace platform

Similar to AliCloud, Qcloud offers users a marketplace for third-party vendors of cloud-related products and services, including application services, software services, data migration and other cloud operation and maintenance services, in addition to cloud resource management and monitoring services.

Customer base

While AliCloud mainly focuses on emerging SMEs in the e-commerce sector, Tencent's Qcloud currently has a more intense focus on gaming and software developers (e.g., developers of websites, mobile apps, smart hardware, etc.) and video streaming platforms, along with other specific verticals. In concert with various venture capital firms, Qcloud offers extensive cloud-based services to eligible start-up companies, along with assistance in required fund-raising, etc. Qcloud specifically provides free access to Qcloud for a period of six months while offering a 50% discount over the ensuing six months. (Please refer to our discussion below on "Cloud + Start-ups" for further detail.)

In addition to the key focus internet sectors discussed above, Qcloud – similar to its peers – is expanding into traditional sectors that have started to find their own footing in the internet space. These focus sectors include:

- Healthcare
- Education
- Finance and
- Smart devices

Further, with more than 40,000 state agencies operating official accounts on WeChat, Tencent already has ample access to the public sector. One can thus argue that Tencent is already well aligned to support the government's "Internet Plus" initiatives.

Tencent's cloud computing expansion plans

In September 2015, Tencent announced plans to invest RMB10bn (US\$1.57bn) to expand its data center network, with a special focus on China, North America, and Hong Kong. The investment is to span a period of five years from 2016 to 2020 with an average annual investment of RMB2bn. The areas of investment are to include the building and management of data centers, recruitment and marketing campaigns to promote its services. Qcloud currently has 15 datacenters in the Asia Pacific region, North America, and a few other overseas locations. Tencent also plans to add eight data nodes in the near future to expand its international presence. One of the latest datacenters (announced in June 2015) in Chongqing will add 300,000 more servers at completion, reports DatacenterDynamics. This is the result of a strategic agreement between Tencent and the Municipal Government of Chongqing. During the recent earnings call for the December quarter 2015, Tencent reiterated its continued commitment to invest in expanding its cloud service portfolio and verticals covered.

Tencent plans to invest RMB10bn over the next five years to expand its datacenter network across China, North America, and Hong Kong

Further, in November, Oracle and Tencent signed a strategic agreement to jointly offer cloud services in China. According to the Chinese government's requirements, foreign operators must enter into a partnership with a local player to offer their services to the domestic market.



In a move to expand its eco-system, Qcloud also entered into partnerships with players from different layers in the technology stack. We categorize these partners into two types:

- **Advisory service partners:** system integrators, consulting service partners, distributors, and training partners
- **Technical service partners:** SaaS/PaaS partners, independent software vendors (ISVs), tools software partners, and business software partners

Tencent's "Cloud + Program" initiative, launched in 2015, focuses on enhancing cooperation with SaaS developers, app developers, providers of big data services, and cloud integrators. "Cloud + Start-ups" meanwhile focuses on building out a comprehensive eco-system for cloud computing-based start-up services. IDC reports that, in collaboration with venture capital firms (e.g., Sequoia Capital, CDH Fund, Northern Light Venture Capital), Qcloud aims to invest approximately RMB100m worth of resources in the "Cloud + Start-ups" program.

Revenue and margin outlook

Tencent recently stated that its cloud operations recorded revenue growth of more than 100% YoY during the quarter ended in December 2015. We estimate that Tencent derives RMB600-700m in revenues from the broader IDC, CDN and cloud space if we include affiliates such as 58.com and Didi Taxi. We however believe that most of this revenue is derived from IDC and CDN. We estimate pure cloud computing revenue from Tencent at around RMB250m, or 0.2% of total revenue, in 2015. Adding in data center services, this number likely reached RMB600-700m last year.

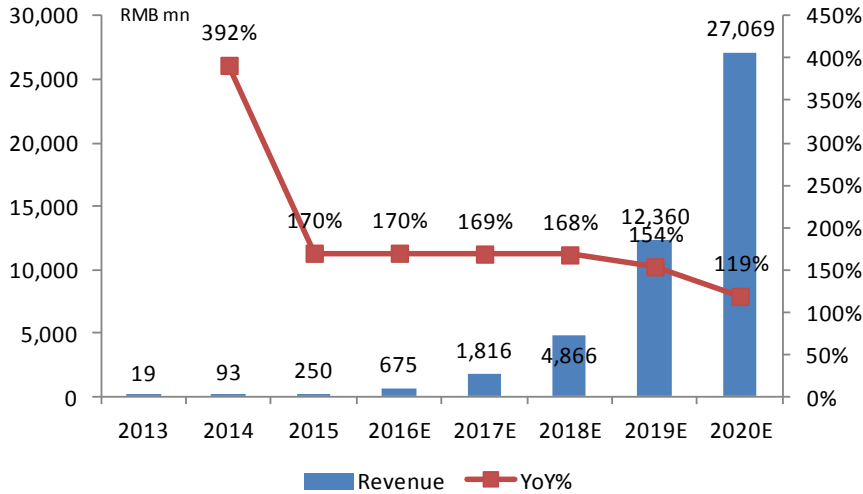
Qcloud recorded revenue growth of more than 100% YoY during the December 2015 quarter

Although Tencent only launched cloud services commercially in 2H13, we expect Qcloud to follow the same growth trajectory as AliCloud, enjoying triple-digit growth over next few years. We thus expect Qcloud's contribution to Tencent total revenue to grow from 0.2% in 2015 to 5.1% in 2020.

Similar to the early days of both AliCloud and AWS, we expect Tencent Qcloud to remain a margin drag until revenue grows to scale. We expect it to take at least a few years to turn profitable, similar to our forecasts for AliCloud.



Figure 69: Tencent Qcloud revenue growth estimates



Source: Deutsche Bank estimates

Revision of estimates

As a result of our incremental work on the company's cloud opportunity, we increase our 2017/18E revenues for Tencent by 1%/3%, respectively. We meanwhile cut 2016/17/2018E non-GAAP net margin by 10bps/40bps/80bps to factor in the margin drag from the cloud business. Non-GAAP net income therefore largely remains unchanged for 2016/17/18E.

Figure 70: Revision of estimates

YE 31 Dec	FY2015	2016E					2017E					2018E				
		DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta
Net Revenue	102,863	131,948	131,893	0%	128,735	2%	167,208	168,821	1%	162,991	4%	192,258	197,967	3%	194,142	2%
Gross profit	61,232	75,129	74,987	0%	75,117	0%	93,907	93,872	0%	94,388	-1%	105,039	106,154	1%	112,816	-6%
EBIT (GAAP)	40,627	50,805	50,673	0%	48,586	4%	63,197	62,847	-1%	61,056	3%	69,220	69,243	0%	68,473	1%
EBIT (non GAAP)	41,764	54,489	54,356	0%	48,914	11%	67,630	67,321	0%	61,632	9%	74,280	74,445	0%	72,154	3%
PBT (GAAP)	36,216	47,664	47,532	0%	47,776	-1%	60,830	60,480	-1%	61,602	-2%	66,853	66,876	0%	76,136	-12%
Net income (GAAP)	28,806	37,995	37,890	0%	37,919	0%	48,528	48,248	-1%	50,828	-5%	53,346	53,365	0%	64,756	-18%
Net income (Non-GAAP)	32,410	41,540	41,433	0%	39,733	4%	52,807	52,566	0%	48,605	8%	58,239	58,397	0%	63,135	-8%
EPADS (GAAP)																
Diluted (HK\$)	\$3.83	\$4.83	\$4.82	0%	\$4.81	0%	\$6.17	\$6.14	-1%	\$6.17	-1%	\$6.78	\$6.78	0%	\$8.03	-16%
EPADS (Non GAAP)																
Diluted (HK\$)	\$4.31	\$5.28	\$5.27	0%	\$5.12	3%	\$6.72	\$6.68	0%	\$6.60	1%	\$7.40	\$7.42	0%	\$8.36	-11%
Margin analysis (%)																
GP margin	59.5%	56.9%	56.9%	-0.1%	58.4%	-1.5%	56.2%	55.6%	-0.6%	57.9%	-2.3%	54.6%	53.6%	-1.0%	58.1%	-4.5%
EBIT margin (GAAP)	39.5%	38.5%	38.4%	-0.1%	37.7%	0.7%	37.8%	37.2%	-0.6%	37.5%	-0.2%	36.0%	35.0%	-1.0%	35.3%	-0.3%
EBIT margin (non-GAAP)	40.6%	41.3%	41.2%	-0.1%	38.0%	3.2%	40.4%	39.9%	-0.6%	37.8%	2.1%	38.6%	37.6%	-1.0%	37.2%	0.4%
Net margin (GAAP)	28.0%	28.8%	28.7%	-0.1%	29.5%	-0.7%	29.0%	28.6%	-0.4%	31.2%	-2.6%	27.7%	27.0%	-0.8%	33.4%	-6.4%
Net margin (non GAAP)	31.5%	31.5%	31.4%	-0.1%	30.9%	0.5%	31.6%	31.1%	-0.4%	29.8%	1.3%	30.3%	29.5%	-0.8%	32.5%	-3.0%

Source: Deutsche Bank estimates, Bloomberg for consensus data



Valuation

Our target price is based on a SoTP. We believe this approach captures the respective segmental values of Tencent's increasingly varied business model, each segment being at a different growth stage. We apply 1) 13.4x FY16E PE for online game + VAS segments, taking China's online games universe average as a benchmark, which we believe is justified since Tencent's game scale is larger but relatively lower growth than its small peers; 2) 1.1x PEG for mobile games, given the company's dominance in the mobile gaming market; 3) 1.2x PEG for ads, due to a stronger outlook than the industry average of 1.0x (taking other media companies as a benchmark.) The residual value is our projected net cash for Tencent as at the end of CY16E.

Figure 71: Sum of the parts valuation

HK\$m	Valuation basis	Valuation metrics	Multiple	PEG	NP/Revs CAGR	As % of NP	Seg % of group valn.	Valuation
Online games +VAS	PE 2016E	HK\$29658m 2016 non-GAAP NP	13x	1.9x	7%	48%	24%	397,421
Mobile game	PEG 2016E	HK\$16324m 2016 non-GAAP NP	23x	1.1x	21%	27%	22%	368,279
Online advertising	PEG 2016E	HK\$15259m 2016 non-GAAP NP	54x	1.2x	45%	25%	50%	823,026
Net cash		\$68,500					3.7%	61,650
Total valuation (HKDm)								1,650,376
# of FD shares (m)								9,433
Value per share (HK\$)								\$175

Source: Deutsche Bank

Risks

Key downside risks to our target price being achieved include:

- Slowdown in Wechat MAU growth, decline in Wechat user activity
- Underperformance in WeChat games monetization
- Inability to launch new Wechat games in a timely fashion
- Challenges in integrating Wechat in-house, and with partners' e-commerce offerings
- Competition from other internet names
- Worse-than-expected PC games performance
- Worse-than-expected advertising market conditions
- Larger-than-expected investment in Wechat and other new initiatives



Rating
Buy

Asia
China

Technology
Software & Services

Company
Baidu

Reuters
BIDU.OQ

Bloomberg
BIDU US

Price at 21 Apr 2016 (USD)	192.74
Price target - 12mth (USD)	226.00
52-week range (USD)	220.46 - 132.37
HANG SENG INDEX	21,622

Alan Hellawell
Research Analyst
(+852) 2203 6240
alan.hellawell@db.com

Searching but few clouds on the horizon...yet

Many of the factors in place, but not a major focus

Baidu is arguably well positioned to take a meaningful slice of China's cloud market, what with 555,000 active customers (mostly SME's) in the December quarter. We view the company as possessing the greatest potential of China's three large cap players to outgrow expectations, but do not sense significant focus on public or private cloud business expansion at the company. Maintain Buy on steady core search growth and further opportunity for corporate actions. This report has been published in conjunction with our FITT report "Cloudy with a chance of monetization".

The newest of China's Big Three to commercialize cloud

Baidu is only several months into having rolled out commercial cloud services. The company has gathered some important reference customers such as Air China. Despite these early wins, Baidu Cloud remains a very small fraction of leader AliCloud. As it stands now, Baidu seems to be emphasizing lower price points on its cloud products to encourage adoption. We intend to revisit the company's operations as scale and customer count grow.

Maintaining Buy for a host of other reasons

We reiterate our Buy recommendation on Baidu based on: 1) liquidity-driven performance (with its weighting in the MSCI China Index next month likely to rise from 2.80% to 5.05%; or 12.5 days of trading), 2) continued growth in the company's core search offering and 3) anticipation of further corporate activity in the area of food delivery and/or group-buying.

Maintain TP of US\$226 and Buy

We model a Baidu Cloud revenue stream of RMB591m by 2017E, affecting consolidated revenues only minimally. Maintain TP. We apply SoTP to Baidu TP: 1.0x PEG to core search; iQiyi on the announced take-out valuation; Ctrip based on DB's 1.1x PEG ratio; and net cash. Risks: slower growth of core search, failure of O2O business, slower mobile monetization.

Forecasts And Ratios

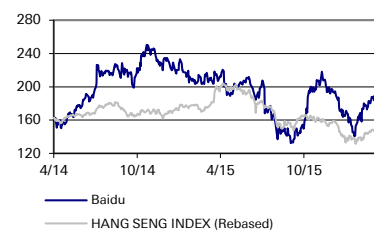
Year End Dec 31	2014A	2015A	2016E	2017E	2018E
Sales (CNYm)	49,052.3	66,381.7	80,189.8	99,395.7	116,690.1
EBITDA (CNYm)	16,776.1	15,040.4	18,004.6	25,252.3	29,589.3
Reported NPAT (CNYm)	13,187.1	33,713.9	16,168.3	22,483.4	26,020.8
Reported EPS FD(CNY)	37.60	96.23	46.10	64.74	74.90
DB EPS FD(CNY)	40.24	100.05	50.67	70.22	80.67
OLD DB EPS FD(CNY)	40.24	100.05	50.89	70.37	80.63
% Change	0.0%	0.0%	-0.4%	-0.2%	0.1%
DB EPS growth (%)	27.8	148.6	-49.4	38.6	14.9
PER (x)	29.6	12.0	24.6	17.8	15.5
EV/EBITDA (x)	23.1	23.5	19.8	12.9	10.3
DPS (net) (CNY)	0.00	0.00	0.00	0.00	0.00
Yield (net) (%)	0.0	0.0	0.0	0.0	0.0

Source: Deutsche Bank estimates, company data

¹ DB EPS is fully diluted and excludes non-recurring items

² Multiples and yields calculations use average historical prices for past years and spot prices for current and future years, except P/B which uses the year end close

Price/price relative



Performance (%)	1m	3m	12m
Absolute	3.0	13.7	-9.4
HANG SENG INDEX	4.5	16.6	-22.4

Source: Deutsche Bank

Comparatives

Tencent (0700.HK),HKD162.80	Buy		
	2015A	2016E	2017E
P/E (x)	34.0	30.9	24.3
EV/EBITDA (x)	21.3	18.5	14.6
Price/book (x)	9.6	8.1	6.2
Alibaba (BABA.N),USD80.78	Buy		
	2015A	2016E	2017E
P/E (x)	46.0	32.6	26.4
EV/EBITDA (x)	52.5	31.8	22.5
Price/book (x)	8.6	5.6	4.8

Source: Deutsche Bank



Model updated: 22 April 2016

Running the numbers

Asia

China

Software & Services

Baidu

Reuters: BIDU.OQ

Bloomberg: BIDU US

Buy

Price (21 Apr 16) USD 192.74

Target Price USD 226.00

52 Week range USD 132.37 - 220.46

Market Cap (m) EURm 59,682

USDm 67,369

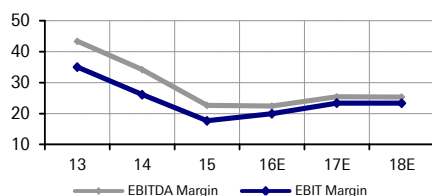
Company Profile

Baidu is a leading internet search engine operator in China. The company offers a variety of search services including algorithmic search, enterprise search; and music, news and image search. The company generates revenue from selling pay-for-performance key-word ads.

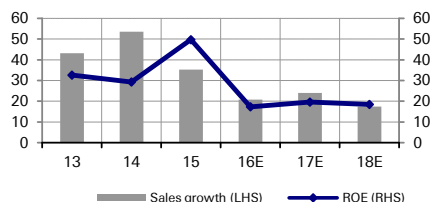
Price Performance



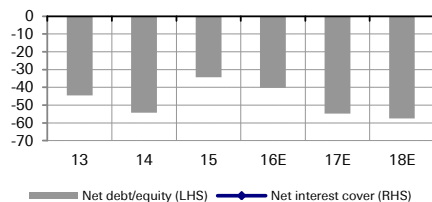
Margin Trends



Growth & Profitability



Solvency



Fiscal year end 31-Dec

Financial Summary

	2013	2014	2015	2016E	2017E	2018E
DB EPS (CNY)	31.49	40.24	100.05	50.67	70.22	80.67
Reported EPS (CNY)	30.02	37.60	96.23	46.10	64.74	74.90
DPS (CNY)	0.00	0.00	0.00	0.00	0.00	0.00
BVPS (CNY)	109.8	147.1	241.1	292.1	366.6	445.3
Weighted average shares (m)	350	350	349	350	346	346
Average market cap (CNYm)	258,733	417,178	420,757	436,283	436,283	436,283
Enterprise value (CNYm)	242,209	387,748	353,854	356,079	326,378	305,855

Valuation Metrics

P/E (DB) (x)	23.5	29.6	12.0	24.6	17.8	15.5
P/E (Reported) (x)	24.6	31.7	12.5	27.1	19.3	16.7
P/BV (x)	9.96	9.55	4.93	4.27	3.40	2.80
FCF Yield (%)	4.2	3.2	6.2	2.3	7.9	3.8
Dividend Yield (%)	0.0	0.0	0.0	0.0	0.0	0.0
EV/Sales (x)	7.6	7.9	5.3	4.4	3.3	2.6
EV/EBITDA (x)	17.5	23.1	23.5	19.8	12.9	10.3
EV/EBIT (x)	21.6	30.3	30.2	22.3	14.0	11.2

Income Statement (CNYm)

Sales revenue	31,944	49,052	66,382	80,190	99,396	116,690
Gross profit	23,148	34,139	42,293	50,991	64,096	76,037
EBITDA	13,844	16,776	15,040	18,005	25,252	29,589
Depreciation	2,652	3,972	3,319	2,005	1,988	2,334
Amortisation	0	0	0	0	0	0
EBIT	11,192	12,804	11,721	16,000	23,264	27,255
Net interest income/(expense)	861	1,364	1,321	1,281	1,485	2,763
Associates/affiliates	0	0	0	0	0	0
Exceptionals/extraordinaries	0	0	0	0	0	0
Other pre-tax income/(expense)	132	307	24,914	1,129	1,555	1,117
Profit before tax	12,185	14,475	37,956	18,410	26,304	31,136
Income tax expense	1,829	2,231	5,474	3,682	5,261	6,115
Minorities	-163	-944	-1,232	-1,440	-1,440	-1,000
Other post-tax income/(expense)	0	0	0	0	0	0
Net profit	10,519	13,187	33,714	16,168	22,483	26,021
DB adjustments (including dilution)	515	928	1,337	1,604	1,905	2,005
DB Net profit	11,034	14,115	35,051	17,772	24,388	28,026

Cash Flow (CNYm)

Cash flow from operations	13,657	18,091	28,601	13,247	37,964	20,974
Net Capex	-2,757	-4,827	-2,655	-3,208	-3,976	-4,668
Free cash flow	10,901	13,263	25,946	10,040	33,989	16,307
Equity raised/(bought back)	1,554	2,040	0	0	0	0
Dividends paid	0	-338	-400	-1,100	-528	-734
Net inc/(dec) in borrowings	6,025	7,708	-37,240	2,160	0	0
Other investing/financing cash flows	-20,803	-32,060	5,338	0	0	0
Net cash flow	-2,324	-9,386	-6,355	11,100	33,461	15,573
Change in working capital	1,119	3,300	6,796	-6,039	12,805	-7,263

Balance Sheet (CNYm)

Cash and other liquid assets	38,686	58,084	68,025	76,965	110,426	125,999
Tangible fixed assets	5,370	8,705	10,627	11,830	13,818	16,152
Goodwill/intangible assets	20,495	20,993	3,335	3,335	3,335	3,335
Associates/investments	635	2,879	37,959	38,285	39,038	40,155
Other assets	5,800	9,000	27,908	29,665	31,047	33,375
Total assets	70,986	99,661	147,853	160,080	197,663	219,015
Interest bearing debt	20,556	28,553	39,069	36,475	42,426	39,593
Other liabilities	9,764	16,603	24,569	22,881	31,118	29,015
Total liabilities	30,321	45,156	63,638	59,356	73,543	68,608
Shareholders' equity	38,425	51,526	84,204	102,152	126,987	154,274
Minorities	2,240	2,980	12	-1,428	-2,868	-3,868
Total shareholders' equity	40,665	54,506	84,216	100,724	124,120	150,407
Net debt	-18,130	-29,531	-28,956	-40,490	-68,000	-86,406

Key Company Metrics

Sales growth (%)	43.2	53.6	35.3	20.8	24.0	17.4
DB EPS growth (%)	3.3	27.8	148.6	-49.4	38.6	14.9
EBITDA Margin (%)	43.3	34.2	22.7	22.5	25.4	25.4
EBIT Margin (%)	35.0	26.1	17.7	20.0	23.4	23.4
Payout ratio (%)	0.0	0.0	0.0	0.0	0.0	0.0
ROE (%)	32.6	29.3	49.7	17.4	19.6	18.5
Capex/sales (%)	8.6	9.8	4.0	4.0	4.0	4.0
Capex/depreciation (x)	1.0	1.2	0.8	1.6	2.0	2.0
Net debt/equity (%)	-44.6	-54.2	-34.4	-40.2	-54.8	-57.4
Net interest cover (x)	nm	nm	nm	nm	nm	nm

Source: Company data, Deutsche Bank estimates

Alan Hellowell

+852 2203 6240

alan.hellowell@db.com



Clouds only in long-term forecast

Early days for Baidu

Technology...check! SME relationships...check! But lagging peers in product depth and limited geographical presence

As China's largest search engine, Baidu already possesses much of the necessary infrastructure and in-house technical expertise to cater for the rapidly growing cloud computing service market in China. Baidu's development staff represents approximately 45% of its workforce. The company moreover counted no less than 555,000 customers in the December 2015 quarter alone. Nevertheless, based on our channel checks with industry experts and major enterprise cloud customers, we believe that Baidu has yet to be recognized as a serious contender in the domestic cloud space. Our survey of 50 Chinese company CIO's yielded not one customer of Baidu's cloud product.

Baidu Cloud lags behind its peers, having only launched commercial cloud services in late 2015

Even though Baidu has been offering cloud storage services for more than three years, its comprehensive open cloud service portfolio was only officially announced at the Baidu World Conference held in September 2015. As a result, we believe revenues were likely negligible last year. Baidu's product offerings are relatively limited in range and depth compared to those of its peers, who enjoy early entrance advantages in the domestic market. Baidu Cloud's presence currently is largely limited to Mainland China, although we expect it to follow its larger peers along the path of global expansion. We believe it will take at least another year or two before Baidu creates a noticeable alternative to its peers in the domestic market.

Features and advantages

Baidu likes to characterize its cloud services as comprising three layers: a) cloud computing as a base, b) big data in the middle, and c) artificial intelligence on top.

Baidu Cloud currently claims to offer 29 products, with particular leadership in the fields of voice, picture and character recognition, as well as machine learning. Baidu Cloud also claims to have the lowest PUE (Power Usage Effectiveness) among its domestic competitors, contributing to Baidu Cloud's positioning as one of the more environmentally friendly cloud service providers.

Customer base

Baidu Cloud claims Air China as one of its larger clients. Baidu provides Air China with cloud computing and storage services to support its online operations and data storage. Other significant customers include GF Securities, CNMOOC (an online education website), Yinyuetai (an online music and video provider), and Baidu food delivery. A large portion of Baidu's cloud customer base is mobile app developers. Baidu seeks to leverage its position as a leading search engine by providing its cloud customers with promotional channels and online traffic referral.



A brief look at Baidu's cloud services platform

As mentioned above, Baidu's cloud focus is on three major growing segments:

- Cloud computing
- Big data
- Artificial intelligence

Like its immediate peers, Baidu offers a largely self-serve portal for public cloud products. In the case of elastic computing, customers need only fill in fields such as user name, password, and location, along with several parameters related to disk space and bandwidth needs. When comparing Baidu Cloud pricing that of China's other major providers, we found that Baidu's products are generally ~10% cheaper than competitors such as Alibaba and Tencent.

Below we present Baidu's cloud-related products.

Computing, networking and storage services

Figure 72: Baidu Cloud's computing, networking, and storage services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Computing, networking, and storage			
Baidu cloud computer (BCC)	Provides users with access to virtual servers with specific CPU, storage, memory, and network capacities that suit each customer's requirements	Alibaba Cloud ECS, Qcloud CVM, UCloud host, China Telecom (eCloud), AWS EC2, Azure Virtual Machines	AirChina, Pangu search
Baidu load balance (BLB)	Assists in balancing fluctuating workload requirements and improve availability through automatic failover	Alibaba Cloud SLB, Qcloud CLB, UCloud LB, AWS elastic load balancing	Weimob, Kesun
Baidu object storage (BOS)	Provides scalable storage services up to 5TB of data	Alibaba Cloud OSS, Qcloud COS, UCloud File, China Telecom (eCloud), AWS S3, Azure Storage	Talkweb, Bajiaoxing
Cloud disk service (CDS)	Offers cloud-based block storage services	Alibaba Cloud block storage, UCloud Disk, Amazon EBS	AirChina, Keruyun
Content delivery network (CDN)	A distributed computing infrastructure system in which servers are located in multiple datacenters to facilitate content delivery with low latency and high performance	Alibaba Cloud CDN, ChinaCache, Qcloud CDN, UCloud CDN, China Telecom (eCloud), Amazon CloudFront, Azure CDN	Music Tai, Baidu mobile game

Source: Deutsche Bank, Company data

Database and analysis services

Figure 73: Baidu Cloud's database and data analysis services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Database services			
Relational database services (RDS)	Provide users with cloud-based access to relational databases, Microsoft SQL and MySQL	Alibaba Cloud RDS, Qcloud CDB, AWS RDS, Azure SQL Database, UCloud UDB	Zoom Interactive, Keruyun
Simple cache service (SCS)	Cloud-based provision of key-value databases compatible with both Memcache and Redis	Alibaba Cloud for Memcache and Redis, Qcloud CMEM, UCloud Mem, Amazon ElastiCache	Taoyouxue, Good University online
NoSQL MolaDB	Cloud-based non-relational (NoSQL) database service using MolaDB	Alibaba Cloud for MongoDB, Qcloud CMONGO, Amazon DynamoDB, UCloud UDB	Baidu Tieba, Baidu mobile
Data analysis			
Baidu MapReduce (BMR)	Hadoop and Spark based framework facilitating processing of mass scale data	Alibaba Cloud E-MapReduce, UCloud UDDP, Amazon EMR	Genekang, Zoom interactive
Baidu Machine Learning (BML)	Offers a machine learning platform based on Baidu's internal machine learning algorithm to facilitate big data analysis	Alibaba Cloud MaxCompute, Tencent Big Data Suit, Tencent Machine Learning, AWS Big Data	Baidu food delivery, Baidu mobile game
Baidu OLAP Engine	A real-time cloud-based database built using online analytical processing (OLAP) approach facilitating real-time analysis of multi-dimensional data	Alibaba Cloud Analytic DB, AWS QuickSight, AWS Redshift	Baidu statistics, Baidu nuomi
Baidu Elastisearch	Provides customers with customized cloud-based search services as well as online analysis of semi-structured data	Alibaba Cloud Opensearch, Tencent Cloud Search, Amazon CloudSearch	Baidu cloud security, Baidu network

Source: Deutsche Bank, Company data



Intelligent multimedia services

Figure 74: Baidu Cloud's multimedia services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Multimedia service			
Multimedia cloud transcoder (MCT)	Cloud-based services for video and audio file transcoding compatible with several media file formats	Allicloud media transcoding, Qcloud VOD, UCloud Video, UCloud Live, Amazon elastic transcoder	Baidu Chuanke, Good University online
Live streaming service	Facilitates online real-time video and audio data streaming	Allicloud live streaming, Qcloud live video broadcasting, UCloud Live	
Video-on-demand (VOD)	Facilitates developers and companies in storing, managing and distributing video on demand through VoD platforms and applications	Qcloud VoD, UCloud Video	
Baidu face recognition (BFR)	Provides face detection and recognition services using big data and machine learning technology	Qcloud FR	Baidu magic picture, Baidu cloud
Optical character recognition (OCR)	Use of machine learning technology for optical character detection, recognition, and locating		Baidu translation, Baidu notes

Source: Deutsche Bank, Company data

Middleware services

Figure 75: Baidu Cloud's middleware services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Middleware services			
Baidu application engine (BAE)	A platform hosting applications compatible with several programming languages including Java, Python, PHP, and Node.js as well as database services such as MongoDB, MySQL, and Redis	AWS Elastic Beanstalk, Allicloud Engine	Calender 365, Beva.com
Queue & notification service (QNS)	Distributed messaging services compatible with topic and queue modes	Allicloud message queue, Amazon SQS	Baidu cloud push, Nuomi

Source: Deutsche Bank, Company data

Security and management

Figure 76: Baidu Cloud's security and management services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Security and management			
Baidu Security Service (BSS)	Provides protection against DDoS attacks, cloud server protection, detection of web vulnerabilities, port security, etc.	Qcloud high anti-DDoS service and Dayu Distributed Defense, Allicloud anti-DDoS, UCloud Security, UADS, and UWAF, AWS WAF	
Baidu Cloud Monitor (BCM)	Assists customers by monitoring cloud services and sites for any abnormalities and notifies the customers	Allicloud CloudMonitor, Qcloud CM, Amazon CloudWatch	AirChina, Pangu search

Source: Deutsche Bank, Company data



Application services

Figure 77: Baidu Cloud's application services

Product	Definition	Competitor offerings	Sample Baidu Cloud customers
Application service			
Simple email service (SES)	Provides onut-going only email services that can be used by the companies to send out promotional emails and other notifications to their cusomters	AlIcloud direct mail, Amazon SES	Dodoca, Taoyouxue
Simple message service	A short message service that can be used by the companies for sending notifications, verification codes and other messages as SMSs	AlIcloud Mobile Push, Qcloud XinGe Push, Amazon SNS	Keruyun, Dodoca
Application performance management (APM)	Assists customers in monitoring the performance of their applications and identify any performance related issues through real-time data analysis	AlIcloud performance testing, AWS Device Farm	Baidu picture, Baidu mobile security
Questionnaire research services	Offers questionnaire-based survey services using 10m users across 300 cities with an average response rate of 2000 completed questionnaires within 3 days		Nuomi, Zhidahoo
Mobile app testing	Helps customers with testing mobile-based applications for functionalibilty, compatibility, depth performance, etc.	AlIcloud performance testing, AWS Device Farm	Nuomi

Source: Deutsche Bank, Company data

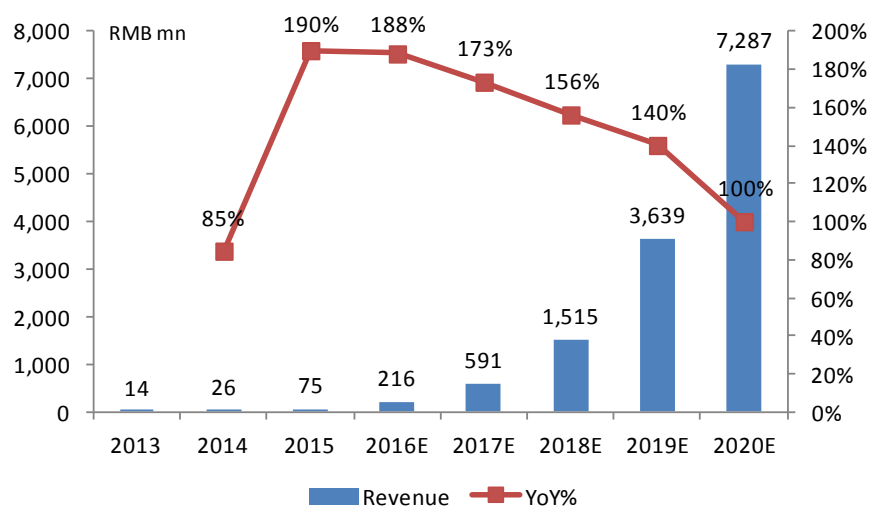
Cloud revenue forecasts

Tweaking up 2017/18E revenue by 0.2%/0.4% on cloud revenues

Given Baidu's relatively late entry into cloud computing behind the likes of Alibaba and Tencent, and what seems to be a relative lack of focus on this value proposition, we expect cloud revenue generally to be of relative insignificance to overall revenue and company valuation. We thus ever-sogently tweak up 2017/18E revenues to factor in Baidu cloud revenue. We expect revenue contribution to grow from 0.2% in 2015 to 0.8% in 2020. We expect the cloud business to run at a loss, similar to the early stages of AliCloud and AWS, that is until the revenue grows to scale. Non-GAAP margin forecasts therefore decline marginally due to margin drag.

We expect Baidu Cloud's revenue contribution to grow from 0.2% in 2015 to 0.8% in 2020

Figure 78: Baidu Cloud revenue forecasts



Source: Deutsche Bank



Revision of estimates

We expect Baidu's cloud business to have minimal impact on overall revenue for the next two years. We maintain revenue forecasts and non-GAAP net income largely unchanged for 2017/18.

Figure 79: Revision of estimates

YE 31 Dec Figures in RMBm except. EPS	FY2015	2016E					2017E					2018E				
		DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta	DB old	DB new	% change	Consensus	% delta
Net Revenue	66,382	80,452	80,190	0%	80,403	0%	99,173	99,396	0%	99,132	0%	116,280	116,690	0%	120,960	-4%
Gross profit	38,973	49,459	48,987	-1%	45,429	8%	62,173	62,108	0%	56,338	10%	73,781	73,704	0%	68,911	7%
EBIT (GAAP)	11,721	16,088	16,000	-1%	14,747	8%	23,335	23,264	0%	21,072	10%	27,293	27,255	0%	29,067	-6%
EBIT (non GAAP)	13,059	17,698	17,604	-1%	14,554	21%	25,234	25,169	0%	20,508	23%	29,290	29,260	0%	28,812	2%
PBT (GAAP)	37,956	18,499	18,410	0%	16,889	9%	26,375	26,304	0%	23,579	12%	31,174	31,136	0%	32,437	-4%
Net income (GAAP)	33,714	16,239	16,168	0%	14,059	15%	22,540	22,483	0%	19,501	15%	26,012	26,021	0%	27,727	-6%
Net income (Non-GAAP)	35,051	17,848	17,772	0%	15,001	18%	24,439	24,388	0%	20,670	18%	28,009	28,026	0%	29,346	-5%
EPADS (GAAP)																
Diluted	\$15.26	\$7.22	\$7.19	0%	\$6.25	15%	\$10.11	\$10.08	0%	\$8.90	13%	\$11.65	\$11.66	0%	\$12.26	-5%
EPADS (Non GAAP)																
Diluted	\$15.86	\$7.93	\$7.90	0%	\$6.75	17%	\$10.96	\$10.94	0%	\$9.17	19%	\$12.55	\$12.55	0%	\$12.81	-2%
Margin analysis (%)																
GP margin	58.7%	61.5%	61.1%	-0.4%	56.5%	5%	62.7%	62.5%	-0.2%	56.8%	6%	63.5%	63.2%	-0.3%	57.0%	6%
EBIT margin (GAAP)	17.7%	20.0%	20.0%	0.0%	18.3%	2%	23.5%	23.4%	-0.1%	21.3%	2%	23.5%	23.4%	-0.1%	24.0%	-1%
EBIT margin (non-GAAP)	19.7%	22.0%	22.0%	0.0%	18.1%	4%	25.4%	25.3%	-0.1%	20.7%	5%	25.2%	25.1%	-0.1%	23.8%	1%
Net margin (GAAP)	50.8%	20.2%	20.2%	0.0%	17.5%	3%	22.7%	22.6%	-0.1%	19.7%	3%	22.4%	22.3%	-0.1%	22.9%	-1%
Net margin (non GAAP)	52.8%	22.2%	22.2%	0.0%	18.7%	4%	24.6%	24.5%	-0.1%	20.9%	4%	24.1%	24.0%	-0.1%	24.3%	0%

Source: Deutsche Bank estimates, Bloomberg for consensus data

Valuation and risks

Valuation

Our valuation on Baidu is based on SoTP: we apply 1.0x PEG ratio to Baidu's core search business, based on 2016E EPS and 2016-2018E CAGR, implying 18x 2016E P/E. We believe a 1x PEG is justified given that Baidu's core search business is healthy, enjoying moderate growth. We value the share of iQiyi on the announced take-out valuation. We value the share of Ctrip based on DB valuation on Ctrip of 1.1x PEG ratio; and net cash. We exclude the O2O valuation from our SoTP given the lack of visibility.

Figure 80: Sum of the parts valuation

RMB, mn	Valuation basis	Valuation metrics	Multiple	NP CAGR	PEG	Shareholding %	Seg % of group valn	Valuation
Search service	PEG	2016E non-GAAP NP	18x	17.9%	1.0x	100%	85%	440,982
iQiyi	Spin off announcement					80.5%	3%	14,786
Ctrip	PEG					24%	6%	32,533
Net cash							6%	31,226
Total valuation (RMB, nm)								519,527
# of FD ADS (mn)								350
Value per share (RMB)								1,483
Value per share (US\$)								\$226

Source: Deutsche Bank

Risks

Key downside risks include:

- Lower-than-expected growth of core search business
- Execution risk in mobile monetization
- Decline in traffic growth and market share due to intensifying competition
- Slowdown in online advertising market growth
- Unfavorable regulatory policy



UCloud

A fast-growing underdog in the domestic cloud battle

Founded in 2012, UCloud is China's 5th biggest player (according to the most recent IDC rankings), and the fastest growing start-up in China's public IaaS cloud computing service market.

Taking a different track in its expansion

With most of its peers in the domestic IaaS space mainly focused on physical expansion at the initial stages of their growth stories, UCloud has concentrated more on R&D and product development. According to IDC, currently more than 50% of UCloud's staff (of 500+ in total) is dedicated to R&D. UCloud devotes a significant portion of investment to these efforts annually. As a result, a majority of the products offered on UCloud are based on its in-house technologies, with a limited amount of open source technologies having been implemented at lower levels, IDC reports.

Customer base

With 30,000+ enterprise customers around the world, UCloud originally focused on enterprise customers from the gaming sector (largely mobile gaming companies). UCloud has since expanded its customer focus into other areas such as:

- Fintech
- E-commerce
- Mobile applications (including mobile games)
- SaaS and PaaS software companies

We believe that UCloud's exposure to gaming customers has declined from 80% in the early years to well below 50% of its total customer base. Similar to other cloud operators, UCloud is also working to attract enterprise customers from traditional sectors such as the government and finance. The company for instance has signed an agreement for strategic cooperation with Inspur to jointly develop a government cloud platform. We profile UCloud's major cloud product offerings below:

With 30,000+ customers around the world, UCloud's customer focus is gradually shifting from gaming to other areas



Computing, networking, and storage services

Figure 81: Computing, networking and storage services offered on UCloud

Product	Definition	Competitor offerings	Sample UCloud customers
Computing and networking			
Hosting services (UHost)	Provides scalable virtual server facilities	AliCloud ECS, Qcloud CVM, Baidu BCC, China Telecom (eCloud), AWS EC2, Azure Virtual Machines	Lulishuo, Papa Sangguo, Baozou comic, Soasta, PBA, Iline.com
Load balancer (ULB)	Facilitates uninterrupted flow of operations by automatically switching among servers in case of any system failure	AliCloud SLB, Baidu BLB, Qcloud CLB, AWS elastic load balancing	Baozou Comic, Dragonfly.FM, Chuangtu Sanguo, QYER, Soasta, Chanyouji
Network (UNet)	Offer cloud-based networking resources including virtual private cloud services	AliCloud VPC, Qcloud VPC, Amazon VPC	Lulishuo, Papa Sangguo, Baozou Comic, Soasta, PBA, Iline.com
Extended Hybrid Cloud (UHybrid)	Offers hybrid cloud platform services	AliCloud, Baidu, Qcloud, AWS	Fight For Freedom, Youzan, CMGE
Physical Host (UPHost)	Offers customers with dedicated physical servers		Lulishuo, Kaikeba, AdMaster, Baobao, Mingdao
Connect	Offers dedicated networking access between the users' on-premise resources and the cloud resources facilitating smooth transition	AliCloud express connect, Qcloud Direct Connect, AWS direct connect	
Storage and CDN			
UCloud Disk (UDisk)	Offers cloud-based block storage services	AliCloud block storage, Baidu CDS, Amazon EBS	
Object storage (UFile)	Provides mass scale data storage services	AliCloud OSS, Qcloud COS, Baidu BOS, China Telecom (eCloud), AWS S3, Azure Storage	Xueba, Fight For Freedom
Content delivery network (UCDN)	Accelerated distribution of content using close to 500 nodes setup across the world		Lulishuo, Papa Sangguo, Baozou comic, Soasta, PBA, Iline.com
DataArk	Provides online real-time data backup services, protection against misappropriation of data, loss of data, etc.		

Source: Deutsche Bank, Company data

Database and analysis services

Figure 82: UCloud's Database and analysis services

Product	Definition	Competitor offerings	Sample UCloud customers
Database and data analysis			
UCloud DataBase (UDB)	Database services for both non-relational (compatible with MongoDB) and relational (compatible with MySQL) databases	Qcloud CDB, AliCloud RDS, AWS RDS, Azure SQL Database, Qcloud CMONGO, Baidu MolaDB, Amazon DynamoDB, AliCloud for MongoDB	Dota Legend, Baozou Comics, Benhual Campus 2, Shenglongba
UCloud Memory Storage (UMem)	Offers key-value database services and compatible with Redis and Memcache protocols	AliCloud for Memcache and Redis, Qcloud CMEM, Baidu SCS, Amazon ElastiCache	Benhual Campus2, Shenmozhi, TAL
Distributed Data Processing (UDDP)	Facilitates mass-scale (TB/PB level) data processing by using Hadoop framework (Hive and MapReduce)	AliCloud E-MapReduce, Baidu BMR, Amazon EMR, AliCloud MaxCompute, Tencent Big Data Suit, Tencent Machine Learning, Baidu ML, AWS Big Data	Baozou, TAL Group
UCloud Hadoop	Facilitates processing of PB level big data in scalable clusters using open Hadoop framework	AliCloud BatchCompute, AWS high performance computing	
UKafka	For data stream processing (real-time machine data analysis)		

Source: Deutsche Bank, Company data



Security services

Figure 83: Security services offered on UCloud

Product	Definition	Competitor offerings	Sample UCloud customers
Security services			
Cloud security	Protection against DDoS attacks, detection of unauthorized access, detection of system vulnerabilities and network attacks	AlIcloud QuickShield, Baidu BSS, Qcloud Security	
Web application firewall (WAF)	Detection and blocking of attacks on web applications, CC attacks, and other common web exploits	AWS WAF	Aipai, Dota legend, Diandian Yangche, Qingting FM, Renrendai, Youzan
Intrusion Prevention System (UIPS)	Facilitate secure communication through encryption and authentication, detection and blocking of attacks on applications and systems	AlIcloud Quickshield, Qcloud security	
Anti-DDoS security (UADS)	Protection against DDoS attacks on domain names, source IP, etc. through real-time response system	AlIcloud anti-DDoS service, Qcloud ADS, Baidu BSS	
Encryption (UEncryption)	Assists in meeting regulatory compliance requirements, business data privacy protection, etc. through encryption	AlIcloud data encryption service, AWS key management services	

Source: Deutsche Bank, Company data

Partnership-based overseas expansion

UCloud has set up 500+ nodes in China and 35+ nodes in 15+ countries. Seeking to grow beyond its local customer base, UCloud has also taken steps to expand into overseas markets, having opened data centers in Hong Kong (in collaboration with NTT Com Asia) and the US (in Los Angeles). The Hong Kong data center will operate as its gateway to the Asia Pacific region.

UCloud currently operates 14 datacenters across the world. In March 2016, UCloud entered into a partnership with Zenlayer, a leading managed IT solution provider for cross-border enterprises using SDN (software-defined networking) technology, operating about 50 datacenters around the world. UCloud seeks to leverage Zenlayer's sophisticated IT infrastructure resource base and bilingual (English/Chinese) capabilities to better serve UCloud's Chinese enterprise customers (predominantly in the gaming space) which are rapidly expanding into overseas markets.

UCloud's three core programs

UCloud has introduced initiatives to support three different customer profiles:

- 1. UCloud Enterprise Programme (UEP):** Targeting start-up operators in the internet sector, UCloud offers a range of services. These include customized services at discounted rates, free access to resources, funding through partnerships with various venture capital firms, assistance in recruiting and personnel training, and consultancy in planning and executing marketing campaigns.

- 2. UMarket: My customer, my partner**

While UCloud itself focuses largely on IaaS, it works quite extensively with its own customers to offer broader solutions together. The company for instance might work alongside an applications performance (APM) management platform to offer a combined IaaS and APM hybrid solution to a fintech customer.

- 3. Plus U:**

UCloud's +U Partners Plan seeks to support a range of ISV (independent software vendor) partners, SI (systems integration) partners and consulting firms to address customer cloud computing



needs. The program offers a wider range of solutions to enterprise in cloud computing. UCloud for instance works with GDS Services Ltd., a provider of high-performance data center infrastructure and services in key markets across China. Through the +U Partner program, the two companies jointly support GDS customer SFSC (Shanghai Foreign Service Co., Ltd.) as part of SFSC's internet transformation program.

The UCloud business model: direct sales Key

We believe UCloud to have created China's first direct cloud sales team. With other players such as AliCloud and QCloud drawing customers from online, UCloud from Day One had developed specific vertical focuses which were best serviced by specialized sales teams. The company to this day maintains specialist sales teams for instance focused on fintech, entertainment, internet, enterprise and others. UCloud offers contracts that can bill down to the minute. Long term contracts can meanwhile span over a year.

UCloud offers minute-based billing options for customers

Continued investor support

The table below shows the details of UCloud's three funding rounds since 2013. In April 2015, UCloud closed its Series C funding round, obtaining approximately \$100m, representing China's largest fund raising by a start-up IaaS operator so far. UCloud plans to invest these funds in areas such as big data, software development and expanding its talent pool.

Figure 84: UCloud's funding rounds

Funding round	Date	Amount	Major investors
Round A	Nov-13	US\$10m	Bertelsmann, DCM (lead)
Round B	Jun-14	US\$50m	Bertelsmann (lead), DCM, Legend Capital
Round C	Apr-15	US\$100m	Bertelsmann, DCM, Legend Capital (lead), GX Capital

Source: Deutsche Bank, Company data



Microsoft Azure

Reaping the benefits of being China's first international entrant

Our colleague Karl Keirstead is Deutsche Bank's lead analyst on Microsoft. As the first international cloud operator to enter the China cloud market, Microsoft Azure has grown to become the #4 player in the domestic market, according to IDC. Given Chinese regulatory guidelines restricting foreign players to entering the domestic market only through partnerships with local operators, Microsoft has chosen to work with 21Vianet to operate in the Chinese cloud market.

Azure is the clear #2 in the domestic cloud market, having grown the business 3.5x since 2014 with a majority of customers being multinational corporations and large local businesses

Azure recently announced that its business in China grew about 3.5x since its commercial launch in March 2014. The company has attracted 60,000+ customers to date, according to Mr. Ralph Haupter (Chairman/CEO of Microsoft greater China). Microsoft's Office365 also has grown about 1.5x (35,000+ commercial customers) since April 2014, according to IDC. A majority of Azure's customers are multinational clients and large local corporate such as Coca-Cola, CNTV, Hainan Airlines, and LETV. Microsoft Azure also serves domestic startup companies, but to a lesser extent than AliCloud or Qcloud.

Along with standard IaaS/PaaS services, Azure also offers packaged solutions, including gaming development, data management, open source software, and cloud mobile development to meet the different service requirements of its customers. Further, in addition to those international SaaS solutions introduced to the local market, Azure has entered into agreement with local SaaS vendors such as Kingdee and Yonyou to promote local SaaS solutions to the international market, according to IDC.

Right partners for the right job

Azure local partner 21Vianet is China's #1 operator of third-party datacenters. 21Vianet boasts 80+ datacenters with 500+ points-of-presence and 21,000 racks across 30+ cities, as per IDC. With sound operating experience and expertise in handling large-scale datacenter operations and network management, 21Vianet serves 2,000+ enterprise customers at the moment.

Azure has a partnership with China's #1 operator of third party datacenters, 21Vianet

In October 2015, in collaboration with HKT, Hong Kong's largest telecommunication network provider, Microsoft introduced HKT x Office 365, a business cloud service aiming at 300,000+ SMEs in Hong Kong. HKT provides high-speed fibre-optic broadband facilities for over 80% of the commercial buildings situated within Hong Kong, according to the South China Morning Post. Microsoft Hong Kong general manager Horace Chow expects cloud operations within Hong Kong to account for 40%+ of the company's total revenue in the future. Of the 1,400 partners that the company works with in Hong Kong, roughly 660 partners represent cloud service providers, reports the South China Morning Post.



Keeping pace with its global operations

As per the terms of the agreement, 21VBlueCloud (21Vianet's 100%-owned subsidiary) operates Azure's data centers in China (Microsoft has two datacenters in China supporting Azure, according to the South China Morning Post). According to IDC, subject to a one-week delay, Azure's Chinese operations achieved 90% of the functionality of its operations in the global cloud market. Any new updates or products will be tested first at the 21Vianet datacenter in Hong Kong before being released to the domestic market.

Given the extensive level of expertise and capabilities gained through its long history in software development and related services, and its extensive presence in the global markets, we see Azure's expansion (along with that of other large international players such as AWS) in the domestic market as playing a vital role in developing the local cloud service market. Azure's aggressive pursuit of a meaningful share in China could also present a real challenge to China's local operators, including the market leader AliCloud.

Findings from our CIO survey

Respondents to our CIO survey clearly picked Microsoft Azure as their #2 choice, be it vendors that prefer a single vendor or those that prefer multiple vendors. On the other hand, based on product-wise vendor preference, corporates preferred Azure over AliCloud for services such as elastic computing, security services, and CDN. Further, those customers that intend to shift from AliCloud to a different vendor ranked Azure as their next best alternative. The key reasons pointed out by these respondents for choosing Azure over AliCloud include:

- Great worldwide presence,
- Mature technology, and
- Broader range of products and services.

Azure is ranked as the next best alternative for those customers that intend to move out of AliCloud



AWS (China)

Global leader with more modest share of the China market

AWS' entry into China

The Beijing market was AWS's 10th "region" to be established globally, and its 4th in the Asia Pacific geography. AWS recently announced plans to add two more availability zones in Beijing. Once AWS establishes facilities in the autonomous Ningxia Hui region, China will become one of only a few countries comprising multiple "regions" in which AWS operates. Access to AWS China is currently by invitation only and is in limited preview. The region supports roughly 20 of AWS' 40 key cloud services offers worldwide. Qihoo 360, Madhouse, and Xiaomi are amongst AWS' major customers in China. Following local guidelines that the "data stays onshore", AWS is not allowed to transfer any of the data from its China operations outside of the mainland.

Relatively late to the China market, but rapidly gaining traction on proven market leadership outside China

Following prevailing regulatory requirements, AWS has entered into the domestic market under a multi-partnership approach, whereby it has for instance inked agreements with Cloud Valley of CBC Capital, Ningxia Hui Autonomous Regional Government, and the Beijing Municipal Government.

Consistent with its Global APN Partnership Programme, AWS also entered into partnerships with several consultancy partners (e.g., ChinaNetCloud, YunGoal, BambooCloud, CloudGoTech) and technology enablers (e.g., Kingdee, Neusoft, Asiainfo), as per IDC. Further, via its "AWS Active" program, AWS assists start-ups and developers, offering training, resources, and financing with an aim to expand its customer base by attracting these start-ups and developers.

While still at a nascent stage in the local cloud space, given its dominance in the global markets as the #1 public cloud vendor, AWS comes to China with years of experience, expertise, and large-scale infrastructure capabilities. With the added fact that China's public cloud market itself is still in its initial growth stage and offering vast future growth potential, we could expect AWS and Azure to become an increasing challenge to the domestic players in the medium to long term.

Findings from our CIO survey

AWS's growing market acceptance in the domestic cloud service space was apparent during our CIO survey. The companies that prefer single IaaS vendor ranked AWS #3 vendor, while those that prefer to partner with multiple vendors ranked it #4. More importantly, AWS was picked up as the #2 (Azure is #1 preference) choice by AliCloud's existing customers that plan to move out of AliCloud in the future.

AWS is ranked the #3 vendor by customers preferring a single vendor – CIO Survey, 2016



Kingsoft Cloud

In good company

Xiaomi: a powerful anchor customer

KingCloud was established in March, 2012 to specifically support the company's "Kuaipan" offering. Kuaipan is a free cloud storage application which runs on multiple platforms. The company within the year launched a storage service, and specifically the MI Cloud offering to support affiliate Xiaomi. Exactly four months later, in March 2014, Kingsoft launched its official cloud computing platform. The company has since launched well-regarded cloud services for the following segments, among others:

- Gaming – Kingsoft Cloud claims to provide cloud services to more than 50% of China's top gaming companies.
- Video – The company claims that it supports all major video start-ups, with one of the industry's most comprehensive families of cloud-related services (eg – streaming, transcoding, player SDK's.)
- Healthcare – The company was behind the first core hospital cloud in China. The company counts Peking University Hospital as one of its largest healthcare-related installations.
- Government

2015 estimated revenues RMB200m+

We estimate that Kingsoft Cloud realized roughly RMB200m in cloud-related revenues in 2015, much of which came from Xiaomi. The company claims to be China's largest Openstack-based public cloud provider. It also offers hybrid (private/public) solutions. Like many of the other companies featured in the report, Kingsoft Cloud offers all of the basic services, including:

- Elastic computing
- Cloud storage
- Relational database
- Load balancing
- CDN
- VPC

Kingsoft Cloud, in supporting Xiaomi's MiCloud claims to support the uploading of 300 terabytes in data per day, including on average more than 90m new pictures and 1.2m new videos, daily. We estimate that the service has 150m users.



Other local competitors

Resourceful telecommunication operators

China's telecom operators are also well equipped to offer cloud services, with their established datacenter networks and other infrastructure. Two of China's three telecommunication carriers, China Telecom and China Unicom, have been able to roll out relatively complete cloud offerings.

China Telecom – eCloud

Established in 2012 to manage the organization-wide cloud service requirements of China Telecom (China's #3 telecommunication operator), eCloud now offers its services to external customers including, government organizations, SMEs and internet companies. IDC ranks eCloud #2 in its rankings of IaaS vendors in China (based on market share) and identifies it as a contender in the domestic cloud market. China Telecom is covered by colleague Peter Milliken.

Largely IaaS-focused product portfolio

eCloud's product portfolio is mainly centered on IaaS solutions including elastic computing, storage, backup services, migration services, and networking services.

- Elastic computing: virtual computing server facilities.
- Storage: in addition to its own offerings, China Telecom also provides customers with REST APIs (Representational State Transfer APIs) to connect to AWS storage services (S3).
- Migration services: eCloud's migration services include a range of customized services (e.g., consultation, implementation) from the moment customers consider cloud migration to the migration point and beyond.

Leveraging China Telecom's wealth of customer data, eCloud also provides big data analytics services for targeted marketing, credit assessment, and consulting analysis. In addition, it offers big data-related PaaS solutions. eCloud also introduced Service Provider Certification and Cooperation Programme to assist developers of various internet services (e.g., O2O, e-commerce, online healthcare apps, and online education) with improved cloud-based application services and resource consolidation with third-party application service providers. eCloud's future product portfolio expansion areas include security, PaaS, and hybrid cloud offerings.

Customized solutions for different customer segments

Of China Telecom's 197m-large customer base (as of December 2015), a significant number are government organizations and large enterprises. eCloud aims to leverage its long standing customer relationships to expand its cloud business beyond fulfilling China Telecom's internal cloud service requirements. eCloud currently operates two cloud platforms to cater two different customer segments:



- Public cloud: built using CloudStack, eCloud's public cloud platform provides public cloud services to internet companies and SMEs.
- Hybrid cloud: Developed in collaboration with VMware, the hybrid cloud platform provides services largely to government organizations and enterprises.

Leveraging China's the largest datacenter network

China Telecom currently operates over 300 domestic nodes, 40+ overseas nodes, more than 10 global cloud sites, and two country-wide backbone networks (CN2 and ChinaNet). In 2015, China Telecom announced plans to build a third backbone, which would be largely dedicated to expand its cloud business operations in the future. In October 2014, China Telecom upgraded its cloud resource base deployment from "4+2" (i.e., 4 backbone nodes in Beijing, Guangzhou, Shanghai, and Chengdu + 2 large-scale datacenter parks in Guizhou and Inner Mongolia) to "8+2+X" with an aim to cover the entire country. The latest deployment programme will also focus on improving customer experience via virtualized datacenter-based cross regional resources.

This already established resource network has provided a critical scale advantage (in terms of time and cost savings on building up datacenter infrastructure, high quality bandwidth, etc.) in positioning itself as a major contender in the domestic cloud market.

Partnerships

Similar to most of other vendors in the cloud space, eCloud has also entered into strategic agreements with several independent parties operating in related sectors. Such partners include:

- VMware (virtualization and cloud services): eCloud will assist VMware in developing its hybrid cloud operations.
- Kingsoft (software services): the companies are jointly developing cloud computing resources including dataflow operations and datacenters.
- SAP (enterprise software services): SAP is assisting eCloud to offer SuccessFactors Human Capital Management services [a human capital management (HCM) service offered on cloud].

China Unicom – Wo Cloud

China Unicom's (China's #2 telecommunication provider) Wo Cloud was also initially setup to support internal cloud service requirements. It was opened to external customers in 2013. As discussed under our industry section, IDC ranks Wo Cloud #3 among China IaaS vendors given its scale of operations, while categorizing it as a contender in terms of capabilities and strategies relative to other major players. China Unicom is covered by colleague Peter Milliken.

IaaS-centric service offerings

Wo Cloud's cloud service offerings largely consist of IaaS solutions such as computing, storage, and networking. It also offers services related to software development, systems integration, IT outsourcing services, and cloud-related consulting services.



Leveraging government-centric customer base

Wo cloud's customer base includes government organizations, large enterprises, SMEs, as well as individuals and family customers. Wo Cloud has come to leverage China Unicom's long term relationship with the government organizations to introduce a customized cloud service, "e-government cloud". Several government institutions such as the Maritime Safety Administration of China, the Sichuan Province Government, the Ministry of Housing and Urban-Rural Development of China, and the Guizhou Electronic Port used Wo Cloud's service to setup internal cloud platforms.

Continued expansion of datacenter network

As the operator behind the second largest network of datacenters in China, China Unicom currently operates more than 200 datacenters around the country along its own national backbone network, China169, according to IDC. In April 2016, China Unicom announced plans to set up an internet datacenter network across the country that would host 4m servers for the expansion of its cloud operations. No disclosures were made about the time span of this project. While these telecom operators engage in cloud computing services, their focus largely would be on providing physical resources such as internet datacenters. It currently rents out its datacenters to rival cloud computing vendors including AliCloud, Tencent, and Baidu.

Partnerships

- Huawei: to develop a strategy for SDN innovation
- Yonyou: cooperation in many areas relating to cloud application, cloud computing, e-government initiatives, commercial software, etc.

A glance at other rapidly growing IaaS vendors

QingCloud

Commercially launched in 2013, QingCloud is also a key player in the Chinese cloud market largely focusing on IaaS solutions at the moment. Even though its range of product offerings is presently limited relative to its larger peers, the company continues to expand its portfolio including IaaS as well as PaaS and SaaS solutions. Similar to other players in the market, QingCloud also deploys an "in-house+partnership" expansion strategy in scaling up the IT services stack. As of September 2015, QingCloud has recorded some 35,000 registered users, according to IDC.

Through the use of advanced technologies (more than 50% of its staff consists of R&D personnel), QingCloud has been able to serve its customers with a response time of seconds. Further, most of its services are provided on automated platforms improving the cost efficiency in the customer service. For instance, its self-service platform eliminates any intermediaries and facilitates customer registration by the customers themselves. QingCloud has also automated its operation and management system through a peer-to-peer architecture. Furthermore, its open APIs allow users to tailor-make the services to address each one's unique business model requirements.

Another key factor that differentiates QingCloud from its peers is its billing methodology. While a majority of the domestic vendors charge the customers by the hour, QingCloud bills its customers by "seconds". It also offers customers with hourly pricing plans (as oppose to competitors' monthly/annual plans).



ChinaCache

As China's first and the leading provider of CDN services, ChinaCache is well positioned to leverage its resources and expertise in expanding its presence in the domestic cloud service market. While its CDN business runs as far as 1998, the cloud operations commenced in 2010. ChinaCache offers its cloud services mainly on two platforms:

- **ChinaCache Cloud – C3:** Predominantly set up to strengthen the company's CDN services, C3 largely provides project-wise services. In addition to the IaaS solutions, it offers customized supporting services including migration services, architecture consultancy, and operation and management services. The customer base consists of medium-scale companies operating in the traditional industries (e.g., manufacturing, media) and foreign companies. Sales are made through offline channels using dedicated sales team as well as the CDN sales team.
- **Webluker cloud acceleration services:** Webluker assists SMEs in network speed acceleration, real-time monitoring, traffic scheduling, and traffic analysis. The customer base largely consists of start-ups, internet companies (e.g., e-commerce, online gaming), and mobile services. Sales process is online and automated through a self-service platform.

JD Cloud

Following the lead by its peers in the growing cloud space, JD.com also commenced its cloud operations in 2015. The company is currently building its first datacenter in Eastern China and expects to launch the services in 2016. In its strategy for the year 2016, JD.com's CEO highlighted the company's increased focus on the development of the cloud segment in addition to its other two core areas of focus (i.e., e-commerce and related finance services).

In 2015, JD.com invested US\$168m for a 10% stake in Kingdee International Software Group, China's leading SaaS vendor. The two companies will jointly offer Chinese SMEs with cloud-based ERP services.

The two companies will jointly offer Chinese SMEs with cloud-based ERP services

Chinac

Chinac was established in 2010, and is headquartered in Wuxi. A private company, Chinac provides a range of IaaS, PaaS, cloud collaboration SaaS, cloud-based CDN and a wide range of other types of public cloud services. The company has also implemented private cloud solutions. Its vertical focus includes cloud for e-commerce, finance, gaming. Chinac also offers IDC-related services. Customers include leading local start-ups such as leading photo and video app developer Meitu, listed gaming company Changyou (CYOU), and foreign names such as LinkedIn (LNKD.) The company claims that its implementations commonly save 25% in total cost of ownership (TCO), 20-30% in operating costs and 60% in hardware costs. It also claims that Chinac cloud solutions can improve utilization by 60-80%.



99Cloud

Founded in 2012, 99Cloud is heavily focused on planning and implementing private cloud solutions for a largely China-based clientele. The company regards its developmental capabilities as a key differentiator, and important to growing commercially. 99Cloud is, for instance, one of the first corporate members of OpenStack Foundation and ranks 2nd in terms OpenStack IP contribution in China, 99Cloud's larger private cloud implementations include China Unicom (0762.HK) on the FSI side, and Bank of Huzhou as China's first claimed OpenStack-based core banking cloud. The company of note at the beginning of this year announced a strategic cooperation with public cloud leader AliCloud to provide hybrid cloud solutions (that is, solutions for private cloud operators which allow them to exploit the extensibility and cost savings public cloud resources when needed.)



Appendix

DB CIO Survey – 2016: An overall summary

We, April 2016 conducted a survey involving the IT heads (e.g., CTO's, CIO's, VP's of IT) of 50 Chinese companies. The sample covers companies of various sizes, and representing a number of sectors. Below we provide a summary of our key findings. We have discussed many of these results in detail throughout the body of report above. (Note that summary results are calculated based on the median to avoid the impact of outliers.)

Overall IT budgets and allocations to cloud computing

As shown by Figure 85, survey respondents expect their overall IT budgets to increase by approximately 20% in 2016. In terms of percentage allocation of IT budgets to cloud services, companies interviewed expect 27% and 30% allocations to cloud in 2016 and 2017, respectively. These estimates vary depending on the size of respondent companies. Estimated growth rates and allocations seem positively correlated to the size of the company.

Figure 85: IT spending growth 2014-2016E

Company size	IT spending growth (YoY)		
	2014	2015	2016E
< 1,000 employees	5.0%	7.5%	10.0%
1,001 –10,000 employees	15.0%	20.0%	20.0%
> 10,000 employees	30.0%	50.0%	80.0%
Overall median	15.0%	20.0%	20.0%

Source: Deutsche Bank, CIO survey – 2016

Figure 86: Cloud spending as a % of IT budget

Company size	Cloud spending as % of IT budget		
	2015	2016E	2017E
< 1,000 employees	10.0%	15.0%	25.0%
1,001 –10,000 employees	20.0%	26.0%	30.0%
> 10,000 employees	40.0%	50.0%	70.0%
Overall median	20.0%	27.0%	30.0%

Source: Deutsche Bank, CIO survey - 2016

Cloud, #1 priority for IT heads

A majority of IT heads (54%) stated that cloud computing helped in reducing IT costs, with an overall median estimated 22.5% cost reduction. The major areas in which these companies were able to reduce costs using cloud-based products (in the order of importance) are:

- IT hardware, networking and administration,
- Storage and backup,
- Database and analysis, and
- Security services

The following figure shows how Chinese companies' IT spending priorities have changed over time. With a response rate of 52% (up from 22% for 2015), these companies rank cloud computing services as their #1 IT service priority for 2016.



Figure 87: Cloud ranks as #1 priority

Major IT spending areas	2014	2015	2016
Cloud computing services	5	1	1
Security	4	2	2
Software applications (ERP, CRM, etc)	6	4	3
Business intelligence and data analytics	3	3	4
Infrastructure and data center	1	5	5
Networking	2	6	6
Response rate for cloud as #1	8%	22%	52%

Source: Deutsche Bank, CIO survey – 2016

On-premise vs. cloud

Data security is the biggest concern of responding companies (with an 80% response rate) in migrating internal workloads to a cloud environment. Other factors are availability (12%), and reliability (8%). Nevertheless, with increased awareness of the significant benefits associated with cloud services, companies are migrating a growing amount of IT workload to the cloud. As shown by Figure 88, respondents already maintain 70% of their workload in the cloud.

Figure 89 presents the allocation of workload among the major types of cloud services; IaaS, PaaS, and SaaS. IaaS is the biggest cloud service utilized by these companies, with 35% allocation,.

Figure 88: On-premise vs. cloud services

Company size	Different IT service options			
	On-Premise	Private cloud	Hybrid cloud	Public Cloud
< 1,000 employees	35.0%	15.0%	15.0%	35.0%
1,001–10,000 employees	30.0%	25.0%	20.0%	30.0%
> 10,000 employees	30.0%	20.0%	20.0%	20.0%
Overall median	30.0%	25.0%	20.0%	30.0%

Source: Deutsche Bank, CIO survey - 2016

Figure 89: Major levels of cloud services

Company size	Major types of cloud services		
	IaaS	PaaS	SaaS
< 1,000 employees	35.0%	30.0%	30.0%
1,001–10,000 employees	35.0%	30.0%	30.0%
> 10,000 employees	30.0%	30.0%	40.0%
Overall median	35.0%	30.0%	30.0%

Source: Deutsche Bank, CIO survey - 2016

Vendor preference

As depicted in Figure 90, 58% of IT heads interviewed stated that they prefer to partner with a single IaaS vendor while the rest (42%) preferred working with multiple vendors. Both segments of customers ranked AliCloud and Azure as their #1 and #2 choice, respectively. A majority of customers prefer AliCloud for database and storage services and Azure for elastic computing, security services, and CDN services (Figure 91).



Figure 90: Customer preference for a “single” vendor vs. “several” vendors

	One	Several
% of responses	58%	42%
Preferred vendors	#1: AliCloud #2: Azure #3: AWS	#1: AliCloud #2: Azure #3: Qcloud #4: AWS #5: eCloud
Key reasons	- Easy to manage - Data security - Lower cost	- Ability to better address different issues more effectively - Data security - Easy to manage

Source: Deutsche Bank, CIO survey - 2016

Figure 91: Product-based varying vendor preferences

Major IaaS vendors	Major IaaS services				
	Database	Storage	Elastic computing	Security	CDN
AliCloud	#1	#1	#2	#2	#2
Azure	#2	#2	#1	#1	#1
AWS	#4	#3	#3	#4	#3
Tencent QCloud	#3	#3	#4	#3	#4

Source: Deutsche Bank, CIO survey - 2016

One major observation coming from this survey is the growing demand for a global player with the expansion of local businesses outside Mainland China. Some 76% of respondents agreed that it is “very important” for them to partner with a vendor that has extensive global presence.

AliCloud customers’ feedback

Approximately 34% of the companies represented in our survey obtain 80-100% of their cloud services from AliCloud, while 74% stated that AliCloud was their first choice. Nevertheless, 16% of AliCloud’s current customers plan to move from AliCloud to a different vendor, citing the following as major factors driving their decision:

- Limited product/service range relative to foreign players,
- Lack of mature/advanced technologies compared to foreign players,
- Need for a vendor with greater global presence,
- Frequent operational and maintenance issues, and
- Need for cost optimization

Preferred vendors as next-best alternatives were (in order of preference):

- Microsoft Azure
- Amazon AWS
- ChinaC.com (Huayun Data)
- UCloud
- GDS Services

The figure below sets out the major strengths and areas for improvement customers see in AliCloud’s services. Customers view data security and low cost as the biggest strengths of AliCloud, while less developed technology and limited range of offerings relative to foreign players were named as AliCloud’s biggest weaknesses.



Figure 92: AliCloud's strengths and weaknesses

Level of importance	Strengths	Weaknesses
#1	Data security	Less functionality, under-optimized architecture and technology
#2	Low cost	Inadequate products/service range relative to foreign operators
#3	High system stability, availability and reliability	Operation and maintenance problems
#4	Innovative technology	Less familiar among users
#5	High performance and better products/experience	Data security concerns
#6	Timely response	
#7	Convenient and flexible	
#8	Wider domestic presence	
#9	Resourcefulness	
#10	Big data capabilities	

Source: Deutsche Bank, CIO survey - 2016

Survey sample profile

The figures below present the number of employees and annual revenue size of those sample companies participating in our survey, along with the industries in which these companies operate.

Figure 93: Number of employees

Number of employees	% of responses
0-500 employees	2.0%
501 – 1,000 employees	8.0%
1,001 – 5,000 employees	40.0%
5,001-10,000 employees	44.0%
10,001-20,000 employees	4.0%
> 20,000 employees	2.0%
Total	100.0%

Source: Deutsche Bank, CIO survey - 2016

Figure 94: Annual revenues

Annual revenue	% of responses
<10 million RMB	0.0%
10 million – 50 million RMB	4.0%
50 million – 100 million RMB	2.0%
100 million – 500 million RMB	12.0%
500 million - 1 billion RMB	40.0%
1 - 5 billion RMB	40.0%
Greater than 5 billion RMB	2.0%
Total	100.0%

Source: Deutsche Bank, CIO survey - 2016



Figure 95: Industries represented by the sample

The industry in which the companies are operating	% of responses
Retail	38.0%
Financial	6.0%
Consumer	30.0%
Internet	8.0%
Travel, Automotive or Transportation	4.0%
State or Federal Government	4.0%
Telecom/Communications	0.0%
Industrial Manufacturing/Materials	36.0%
Healthcare	4.0%
Energy	12.0%
Education	6.0%
Technology	6.0%
Other, please specify	2.0%
Total	100.0%

Source: Deutsche Bank, CIO survey – 2016

Figure 96: Sub-verticals of internet companies

Sub-verticals served by internet companies	% of responses
E-commerce	100.0%
O2O	50.0%
Online/mobile gaming	0.0%
Online travel	0.0%
Internet finance	75.0%
Other, please specify	0.0%
Total	100.0%

Source: Deutsche Bank, CIO survey - 2016

DB estimate for China's cloud market size

Based on our extensive research, discussion with industry experts and the results from the customer survey, we prepared the following estimates for China's cloud market from 2015-2018.

Figure 97: DB estimate for China's cloud market size

	CY2015E	CY2016E	CY2017E	CY2018E	3-yr CAGR
AliCloud revenue	371.6	891.7	2,126.6	4,853.5	135.5%
AliCloud market share	65%	65%	60%	55%	
Implied cloud market size	571.7	1,371.8	3,544.4	8,824.6	149.0%

Source: Deutsche Bank



Research contribution

The authors of this report wish to acknowledge the contribution made by Ishani Jayasinghe, an employee of Copal Amba, a third-party provider of research support services to Deutsche Bank AG.



Appendix 1

Important Disclosures

Additional information available upon request

Disclosure checklist

Company	Ticker	Recent price*	Disclosure
Tencent	0700.HK	162.80 (HKD) 22 Apr 16	1,7,14,15
Baidu	BIDU.OQ	192.74 (USD) 21 Apr 16	1,2,8
Alibaba	BABA.N	80.78 (USD) 21 Apr 16	8,14

*Prices are current as of the end of the previous trading session unless otherwise indicated and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Other information is sourced from Deutsche Bank, subject companies, and other sources. For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at <http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr>.

Important Disclosures Required by U.S. Regulators

Disclosures marked with an asterisk may also be required by at least one jurisdiction in addition to the United States. See Important Disclosures Required by Non-US Regulators and Explanatory Notes.

1. Within the past year, Deutsche Bank and/or its affiliate(s) has managed or co-managed a public or private offering for this company, for which it received fees.
2. Deutsche Bank and/or its affiliate(s) makes a market in securities issued by this company.
7. Deutsche Bank and/or its affiliate(s) has received compensation from this company for the provision of investment banking or financial advisory services within the past year.
8. Deutsche Bank and/or its affiliate(s) expects to receive, or intends to seek, compensation for investment banking services from this company in the next three months.
14. Deutsche Bank and/or its affiliate(s) has received non-investment banking related compensation from this company within the past year.
15. This company has been a client of Deutsche Bank Securities Inc. within the past year, during which time it received non-investment banking securities-related services.

Important Disclosures Required by Non-U.S. Regulators

Please also refer to disclosures in the Important Disclosures Required by US Regulators and the Explanatory Notes.

1. Within the past year, Deutsche Bank and/or its affiliate(s) has managed or co-managed a public or private offering for this company, for which it received fees.
2. Deutsche Bank and/or its affiliate(s) makes a market in securities issued by this company.
7. Deutsche Bank and/or its affiliate(s) has received compensation from this company for the provision of investment banking or financial advisory services within the past year.

For disclosures pertaining to recommendations or estimates made on securities other than the primary subject of this research, please see the most recently published company report or visit our global disclosure look-up page on our website at <http://gm.db.com/ger/disclosure/DisclosureDirectory.eqsr>

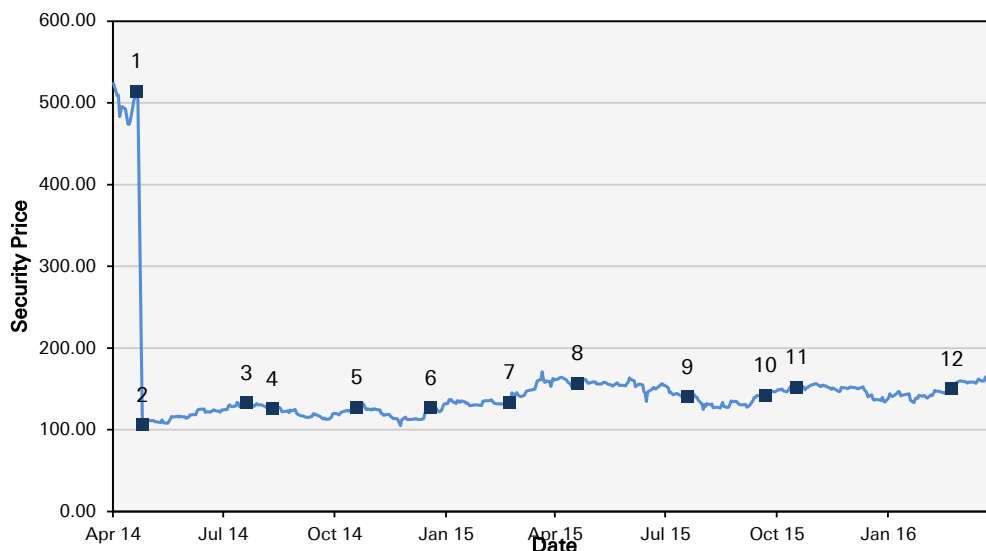
Analyst Certification

The views expressed in this report accurately reflect the personal views of the undersigned lead analyst about the subject issuers and the securities of those issuers. In addition, the undersigned lead analyst has not and will not receive any compensation for providing a specific recommendation or view in this report. Alan Hellawell



Historical recommendations and target price: Tencent (0700.HK)

(as of 4/22/2016)



Previous Recommendations

- Strong Buy
- Buy
- Market Perform
- Underperform
- Not Rated
- Suspended Rating

Current Recommendations

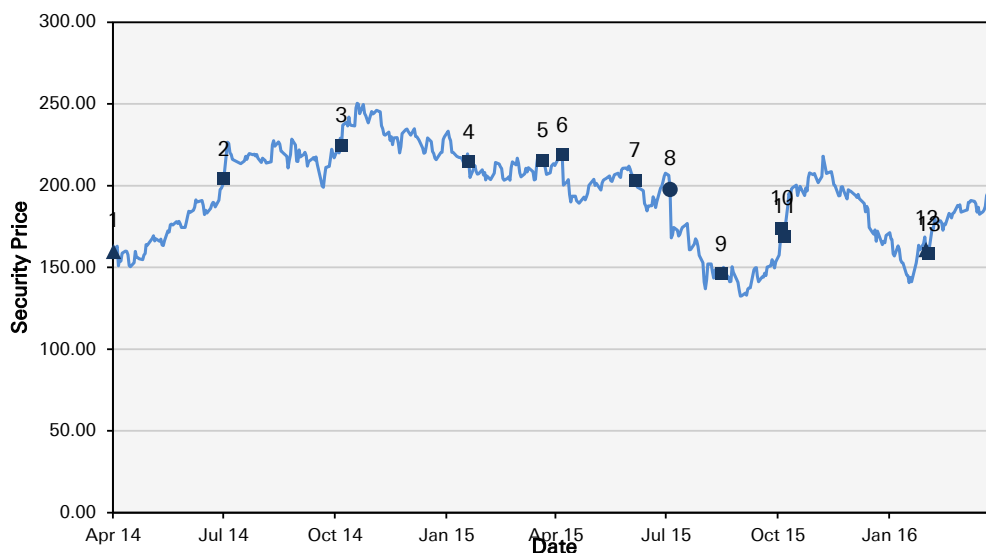
- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	14/05/2014:	Buy, Target Price Change HKD668.00	7.	18/03/2015:	Buy, Target Price Change HKD160.00
2.	19/05/2014:	Buy, Target Price Change HKD133.00	8.	13/05/2015:	Buy, Target Price Change HKD178.00
3.	13/08/2014:	Buy, Target Price Change HKD150.00	9.	12/08/2015:	Buy, Target Price Change HKD175.00
4.	03/09/2014:	Buy, Target Price Change HKD159.00	10.	15/10/2015:	Buy, Target Price Change HKD170.00
5.	12/11/2014:	Buy, Target Price Change HKD155.50	11.	10/11/2015:	Buy, Target Price Change HKD173.00
6.	12/01/2015:	Buy, Target Price Change HKD156.00	12.	17/03/2016:	Buy, Target Price Change HKD175.00

Historical recommendations and target price: Baidu (BIDU.OQ)

(as of 4/21/2016)



Previous Recommendations

- Strong Buy
- Buy
- Market Perform
- Underperform
- Not Rated
- Suspended Rating

Current Recommendations

- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

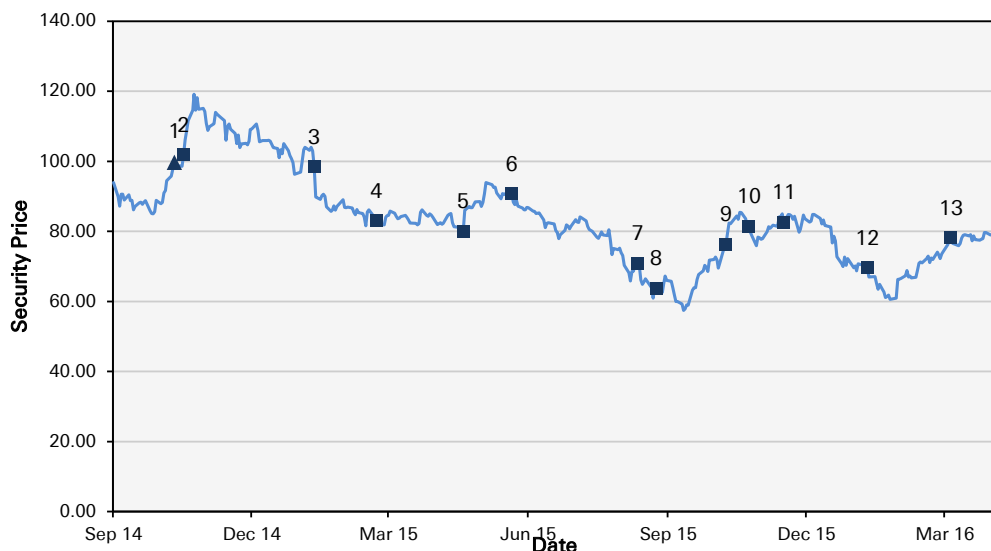
*New Recommendation Structure as of September 9,2002

1.	25/04/2014:	Upgrade to Buy, Target Price Change USD229.00	8.	28/07/2015:	Downgrade to Hold, Target Price Change USD206.00
2.	25/07/2014:	Buy, Target Price Change USD245.00	9.	08/09/2015:	Hold, Target Price Change USD170.00
3.	30/10/2014:	Buy, Target Price Change USD261.00	10.	28/10/2015:	Hold, Target Price Change USD179.00
4.	12/02/2015:	Buy, Target Price Change USD249.00	11.	30/10/2015:	Hold, Target Price Change USD189.00
5.	14/04/2015:	Buy, Target Price Change USD245.00	12.	24/02/2016:	Upgrade to Buy, Target Price Change USD220.00
6.	30/04/2015:	Buy, Target Price Change USD239.00	13.	26/02/2016:	Buy, Target Price Change USD226.00
7.	29/06/2015:	Buy, Target Price Change USD236.00			



Historical recommendations and target price: Alibaba (BABA.N)

(as of 4/21/2016)



Previous Recommendations

- Strong Buy
- Buy
- Market Perform
- Underperform
- Not Rated
- Suspended Rating

Current Recommendations

- Buy
- Hold
- Sell
- Not Rated
- Suspended Rating

*New Recommendation Structure as of September 9,2002

1.	29/10/2014:	Upgrade to Buy, Target Price Change USD112.70	8.	11/09/2015:	Buy, Target Price Change USD85.00
2.	04/11/2014:	Buy, Target Price Change USD112.10	9.	27/10/2015:	Buy, Target Price Change USD89.00
3.	29/01/2015:	Buy, Target Price Change USD105.10	10.	11/11/2015:	Buy, Target Price Change USD98.00
4.	11/03/2015:	Buy, Target Price Change USD98.00	11.	04/12/2015:	Buy, Target Price Change USD99.00
5.	07/05/2015:	Buy, Target Price Change USD104.00	12.	28/01/2016:	Buy, Target Price Change USD102.00
6.	08/06/2015:	Buy, Target Price Change USD102.00	13.	23/03/2016:	Buy, Target Price Change USD91.00
7.	30/08/2015:	Buy, Target Price Change USD89.00			

Equity rating key

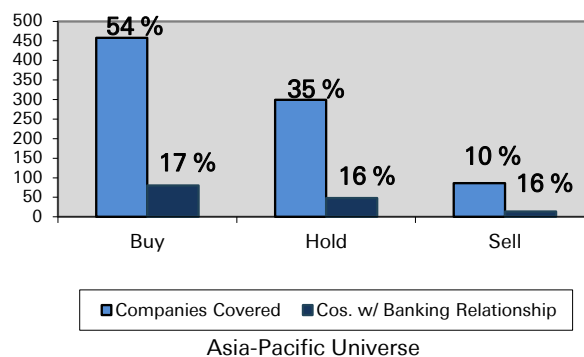
Buy: Based on a current 12- month view of total share-holder return (TSR = percentage change in share price from current price to projected target price plus projected dividend yield) , we recommend that investors buy the stock.

Sell: Based on a current 12-month view of total share-holder return, we recommend that investors sell the stock

Hold: We take a neutral view on the stock 12-months out and, based on this time horizon, do not recommend either a Buy or Sell.

Newly issued research recommendations and target prices supersede previously published research.

Equity rating dispersion and banking relationships





Regulatory Disclosures

1. Important Additional Conflict Disclosures

Aside from within this report, important conflict disclosures can also be found at <https://gm.db.com/equities> under the "Disclosures Lookup" and "Legal" tabs. Investors are strongly encouraged to review this information before investing.

2. Short-Term Trade Ideas

Deutsche Bank equity research analysts sometimes have shorter-term trade ideas (known as SOLAR ideas) that are consistent or inconsistent with Deutsche Bank's existing longer term ratings. These trade ideas can be found at the SOLAR link at <http://gm.db.com>.



Additional Information

The information and opinions in this report were prepared by Deutsche Bank AG or one of its affiliates (collectively "Deutsche Bank"). Though the information herein is believed to be reliable and has been obtained from public sources believed to be reliable, Deutsche Bank makes no representation as to its accuracy or completeness.

If you use the services of Deutsche Bank in connection with a purchase or sale of a security that is discussed in this report, or is included or discussed in another communication (oral or written) from a Deutsche Bank analyst, Deutsche Bank may act as principal for its own account or as agent for another person.

Deutsche Bank may consider this report in deciding to trade as principal. It may also engage in transactions, for its own account or with customers, in a manner inconsistent with the views taken in this research report. Others within Deutsche Bank, including strategists, sales staff and other analysts, may take views that are inconsistent with those taken in this research report. Deutsche Bank issues a variety of research products, including fundamental analysis, equity-linked analysis, quantitative analysis and trade ideas. Recommendations contained in one type of communication may differ from recommendations contained in others, whether as a result of differing time horizons, methodologies or otherwise. Deutsche Bank and/or its affiliates may also be holding debt securities of the issuers it writes on.

Analysts are paid in part based on the profitability of Deutsche Bank AG and its affiliates, which includes investment banking revenues.

Opinions, estimates and projections constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of Deutsche Bank and are subject to change without notice. Deutsche Bank has no obligation to update, modify or amend this report or to otherwise notify a recipient thereof if any opinion, forecast or estimate contained herein changes or subsequently becomes inaccurate. This report is provided for informational purposes only. It is not an offer or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy. Target prices are inherently imprecise and a product of the analyst's judgment. The financial instruments discussed in this report may not be suitable for all investors and investors must make their own informed investment decisions. Prices and availability of financial instruments are subject to change without notice and investment transactions can lead to losses as a result of price fluctuations and other factors. If a financial instrument is denominated in a currency other than an investor's currency, a change in exchange rates may adversely affect the investment. Past performance is not necessarily indicative of future results. Unless otherwise indicated, prices are current as of the end of the previous trading session, and are sourced from local exchanges via Reuters, Bloomberg and other vendors. Data is sourced from Deutsche Bank, subject companies, and in some cases, other parties.

Macroeconomic fluctuations often account for most of the risks associated with exposures to instruments that promise to pay fixed or variable interest rates. For an investor who is long fixed rate instruments (thus receiving these cash flows), increases in interest rates naturally lift the discount factors applied to the expected cash flows and thus cause a loss. The longer the maturity of a certain cash flow and the higher the move in the discount factor, the higher will be the loss. Upside surprises in inflation, fiscal funding needs, and FX depreciation rates are among the most common adverse macroeconomic shocks to receivers. But counterparty exposure, issuer creditworthiness, client segmentation, regulation (including changes in assets holding limits for different types of investors), changes in tax policies, currency convertibility (which may constrain currency conversion, repatriation of profits and/or the liquidation of positions), and settlement issues related to local clearing houses are also important risk factors to be considered. The sensitivity of fixed income instruments to macroeconomic shocks may be mitigated by indexing the contracted cash flows to inflation, to FX depreciation, or to specified interest rates – these are common in emerging markets. It is important to note that the index fixings may -- by construction -- lag or mis-measure the actual move in the underlying variables they are intended to track. The choice of the proper fixing (or metric) is particularly important in swaps markets, where floating coupon rates (i.e., coupons indexed to a typically short-dated interest rate reference index) are exchanged for fixed coupons. It is also important to acknowledge that funding in a currency that differs from the currency in which coupons are denominated carries FX risk. Naturally, options on swaps (swaptions) also bear the risks typical to options in addition to the risks related to rates movements.



Derivative transactions involve numerous risks including, among others, market, counterparty default and illiquidity risk. The appropriateness or otherwise of these products for use by investors is dependent on the investors' own circumstances including their tax position, their regulatory environment and the nature of their other assets and liabilities, and as such, investors should take expert legal and financial advice before entering into any transaction similar to or inspired by the contents of this publication. The risk of loss in futures trading and options, foreign or domestic, can be substantial. As a result of the high degree of leverage obtainable in futures and options trading, losses may be incurred that are greater than the amount of funds initially deposited. Trading in options involves risk and is not suitable for all investors. Prior to buying or selling an option investors must review the "Characteristics and Risks of Standardized Options", at <http://www.optionsclearing.com/about/publications/character-risks.jsp>. If you are unable to access the website please contact your Deutsche Bank representative for a copy of this important document.

Participants in foreign exchange transactions may incur risks arising from several factors, including the following: (i) exchange rates can be volatile and are subject to large fluctuations; (ii) the value of currencies may be affected by numerous market factors, including world and national economic, political and regulatory events, events in equity and debt markets and changes in interest rates; and (iii) currencies may be subject to devaluation or government imposed exchange controls which could affect the value of the currency. Investors in securities such as ADRs, whose values are affected by the currency of an underlying security, effectively assume currency risk.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction.

United States: Approved and/or distributed by Deutsche Bank Securities Incorporated, a member of FINRA, NFA and SIPC. Analysts employed by non-US affiliates may not be associated persons of Deutsche Bank Securities Incorporated and therefore not subject to FINRA regulations concerning communications with subject companies, public appearances and securities held by analysts.

Germany: Approved and/or distributed by Deutsche Bank AG, a joint stock corporation with limited liability incorporated in the Federal Republic of Germany with its principal office in Frankfurt am Main. Deutsche Bank AG is authorized under German Banking Law and is subject to supervision by the European Central Bank and by BaFin, Germany's Federal Financial Supervisory Authority.

United Kingdom: Approved and/or distributed by Deutsche Bank AG acting through its London Branch at Winchester House, 1 Great Winchester Street, London EC2N 2DB. Deutsche Bank AG in the United Kingdom is authorised by the Prudential Regulation Authority and is subject to limited regulation by the Prudential Regulation Authority and Financial Conduct Authority. Details about the extent of our authorisation and regulation are available on request.

Hong Kong: Distributed by Deutsche Bank AG, Hong Kong Branch.

India: Prepared by Deutsche Equities India Pvt Ltd, which is registered by the Securities and Exchange Board of India (SEBI) as a stock broker. Research Analyst SEBI Registration Number is INH000001741. DEIPL may have received administrative warnings from the SEBI for breaches of Indian regulations.

Japan: Approved and/or distributed by Deutsche Securities Inc.(DSI). Registration number - Registered as a financial instruments dealer by the Head of the Kanto Local Finance Bureau (Kinsho) No. 117. Member of associations: JSDA, Type II Financial Instruments Firms Association and The Financial Futures Association of Japan. Commissions and risks involved in stock transactions - for stock transactions, we charge stock commissions and consumption tax by multiplying the transaction amount by the commission rate agreed with each customer. Stock transactions can lead to losses as a result of share price fluctuations and other factors. Transactions in foreign stocks can lead to additional losses stemming from foreign exchange fluctuations. We may also charge commissions and fees for certain categories of investment advice, products and services. Recommended investment strategies, products and services carry the risk of losses to principal and other losses as a result of changes in market and/or economic trends, and/or fluctuations in market value. Before deciding on the purchase of financial products and/or services, customers should carefully read the relevant disclosures, prospectuses and other documentation. "Moody's", "Standard & Poor's", and "Fitch" mentioned in this report are not registered credit rating agencies in Japan unless Japan or "Nippon" is specifically designated in the name of the entity. Reports on Japanese listed companies not written by analysts of DSI are written by Deutsche Bank



Group's analysts with the coverage companies specified by DSI. Some of the foreign securities stated on this report are not disclosed according to the Financial Instruments and Exchange Law of Japan.

Korea: Distributed by Deutsche Securities Korea Co.

South Africa: Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10).

Singapore: by Deutsche Bank AG, Singapore Branch or Deutsche Securities Asia Limited, Singapore Branch (One Raffles Quay #18-00 South Tower Singapore 048583, +65 6423 8001), which may be contacted in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), they accept legal responsibility to such person for its contents.

Taiwan: Information on securities/investments that trade in Taiwan is for your reference only. Readers should independently evaluate investment risks and are solely responsible for their investment decisions. Deutsche Bank research may not be distributed to the Taiwan public media or quoted or used by the Taiwan public media without written consent. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation to trade in such securities/instruments. Deutsche Securities Asia Limited, Taipei Branch may not execute transactions for clients in these securities/instruments.

Qatar: Deutsche Bank AG in the Qatar Financial Centre (registered no. 00032) is regulated by the Qatar Financial Centre Regulatory Authority. Deutsche Bank AG - QFC Branch may only undertake the financial services activities that fall within the scope of its existing QFCRA license. Principal place of business in the QFC: Qatar Financial Centre, Tower, West Bay, Level 5, PO Box 14928, Doha, Qatar. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Business Customers, as defined by the Qatar Financial Centre Regulatory Authority.

Russia: This information, interpretation and opinions submitted herein are not in the context of, and do not constitute, any appraisal or evaluation activity requiring a license in the Russian Federation.

Kingdom of Saudi Arabia: Deutsche Securities Saudi Arabia LLC Company, (registered no. 07073-37) is regulated by the Capital Market Authority. Deutsche Securities Saudi Arabia may only undertake the financial services activities that fall within the scope of its existing CMA license. Principal place of business in Saudi Arabia: King Fahad Road, Al Olaya District, P.O. Box 301809, Faisaliah Tower - 17th Floor, 11372 Riyadh, Saudi Arabia.

United Arab Emirates: Deutsche Bank AG in the Dubai International Financial Centre (registered no. 00045) is regulated by the Dubai Financial Services Authority. Deutsche Bank AG - DIFC Branch may only undertake the financial services activities that fall within the scope of its existing DFSA license. Principal place of business in the DIFC: Dubai International Financial Centre, The Gate Village, Building 5, PO Box 504902, Dubai, U.A.E. This information has been distributed by Deutsche Bank AG. Related financial products or services are only available to Professional Clients, as defined by the Dubai Financial Services Authority.

Australia: Retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product. Please refer to Australian specific research disclosures and related information at <https://australia.db.com/australia/content/research-information.html>

Australia and New Zealand: This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act and New Zealand Financial Advisors Act respectively. Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published without Deutsche Bank's prior written consent. Copyright © 2016 Deutsche Bank AG



David Folkerts-Landau

Chief Economist and Global Head of Research

Raj Hindocha
Global Chief Operating Officer
Research

Marcel Cassard
Global Head
FICC Research & Global Macro Economics

Steve Pollard
Global Head
Equity Research

Michael Spencer
Regional Head
Asia Pacific Research

Ralf Hoffmann
Regional Head
Deutsche Bank Research, Germany

Andreas Neubauer
Regional Head
Equity Research, Germany

International locations

Deutsche Bank AG

Deutsche Bank Place
Level 16
Corner of Hunter & Phillip Streets
Sydney, NSW 2000
Australia
Tel: (61) 2 8258 1234

Deutsche Bank AG

Große Gallusstraße 10-14
60272 Frankfurt am Main
Germany
Tel: (49) 69 910 00

Deutsche Bank AG

Filiale Hongkong
International Commerce Centre,
1 Austin Road West, Kowloon,
Hong Kong
Tel: (852) 2203 8888

Deutsche Securities Inc.

2-11-1 Nagatacho
Sanno Park Tower
Chiyoda-ku, Tokyo 100-6171
Japan
Tel: (81) 3 5156 6770

Deutsche Bank AG London

1 Great Winchester Street
London EC2N 2EQ
United Kingdom
Tel: (44) 20 7545 8000

Deutsche Bank Securities Inc.

60 Wall Street
New York, NY 10005
United States of America
Tel: (1) 212 250 2500