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Cloud Computing

The Telco Opportunity

Telecom & Media Insights

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Contents

1 Abstract

In recent years, the increasing costs of setting up and maintaining IT infrastructure have been a cause for concern for enterprise CIOs[1]. Cloud computing provides businesses with a cost efficient and elastic solution for offloading maintenance, freeing up budget, and improving IT productivity and responsiveness. The rising interest in cloud computing has resulted in several telcos entering this space. Although operators have been late entrants, they have established a strong presence by leveraging their in-place assets and focusing aggressively in this market. The primary focus of telcos has been on IaaS[2], even if many also provide significant SaaS[3] applications. However, PaaS[4] has been largely neglected by most operators. Our analysis indicates that cloud computing presents several attractive commercial opportunities for telcos which should be tapped in a phased manner, without delay, in order to maximize returns. Although the IaaS proposition would be most fruitful for operators, other opportunities across SaaS, service delivery innovation, and PaaS will also offer significant potential. We recommend that telcos differentiate themselves by offering niche services which require industry and region specific customization. For example, a strong focus on specific industry verticals such as finance and healthcare will help them gain an edge over the competition. In terms of service delivery, telcos are best equipped to adopt virtual private cloud deployments and broker approach[5]. Customized offerings for large enterprises and SMEs[6] will further strengthen their position and enable them to become frontrunners in cloud computing.

1 Chief Information Officer.
2 Infrastructure as a Service.
3 Software as a Service.
4 Platform as a Service.
5 A broker is the single point of contact for an enterprise for all cloud computing requirements such as service provisioning, service level agreements (SLA) and compliance. A broker sits between the enterprise and multiple cloud service vendors and provides a layer of abstraction.
6 Small and medium sized enterprises.

2 Introduction

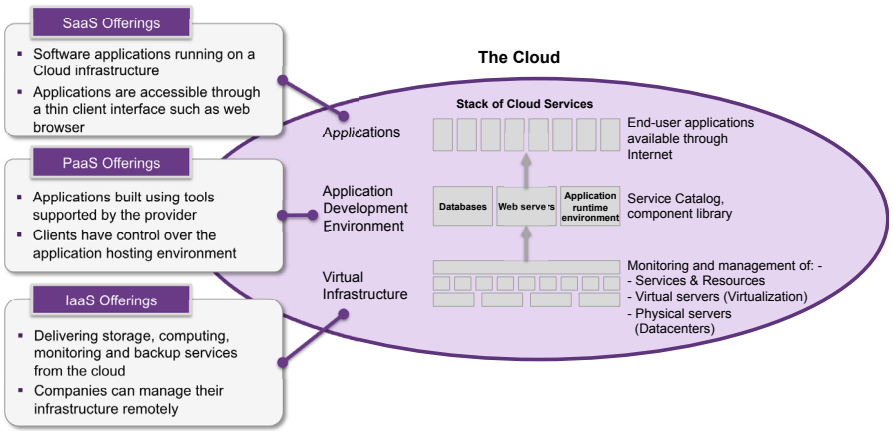
Given the revenue potential, telcos should not not delay their entry in the cloud computing space

Cloud computing is the latest technology trend in which IT infrastructure and software programs are accessed over the Internet or private networks. Cloud offerings can be largely categorized as Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) (see Figure 1). These services are delivered via three main models: public cloud[7], private cloud[8], and hybrid cloud[9].

Enterprises of all sizes are being increasingly drawn to cloud computing. Benefits such as reduced IT costs, pay-per-use, better resource utilization, and elastic scalability are driving its uptake. The percentage of CIOs interested in cloud computing has grown rapidly from 5% in 2009 to 37% in early 2010[10]. The rising interest in these services is driving increased enterprise spending, and as a result, cloud computing presents an attractive revenue potential for technology players and telcos alike.

While the benefits of cloud computing make it attractive for customers, concerns such as data security, privacy, and compliance have slowed down the pace of adoption. For instance, strict privacy laws that place limits on the movement of information beyond the borders of the European Union, have hindered the evolution of cloud computing in Europe.

Figure 1: Categorization of Cloud Computing Offerings



Source: Capgemini TME Strategy Lab Analysis

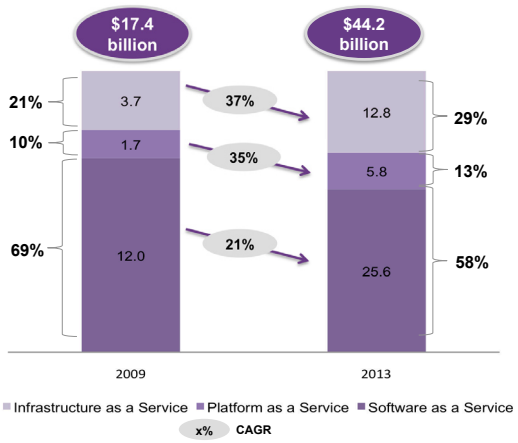
After carefully weighing the benefits and risks of cloud computing, several operators have advanced into this lucrative market. However, the key challenge ahead for these operators is to differentiate themselves in this highly competitive arena. In this paper, we take a close look at the cloud computing space, qualify the opportunity for telcos, and propose some recommendations around how operators can maximize the opportunity in this market.

7 Public cloud services are delivered to multiple customers from third party data centers over the Internet.
8 Private cloud is deployed within an enterprise for its internal use.
9 In a hybrid cloud model, some resources are provisioned and managed in-house while others are delivered from the cloud.
10 Harvard Business Review, *What We're Watching in Cloud Computing*, http://hbr.org/2010/06/what-were-watching-in-cloud-computing/ar/1.

3 Market Dynamics

Worldwide IT cloud services revenues are expected to grow rapidly at a CAGR[11] of 26% from 2009 to 2013 to reach US$44.2 billion. While SaaS will continue to contribute the highest to the overall revenue, its share is expected to decline, largely due to an increased enterprise focus on IaaS (see Figure 2). The rapid growth of IaaS will be fuelled by a keen interest from businesses on curbing the huge costs associated with IT infrastructure.

Figure 2: Worldwide IT Cloud Services Revenue (US$Bn) and Growth Rate by Service Type

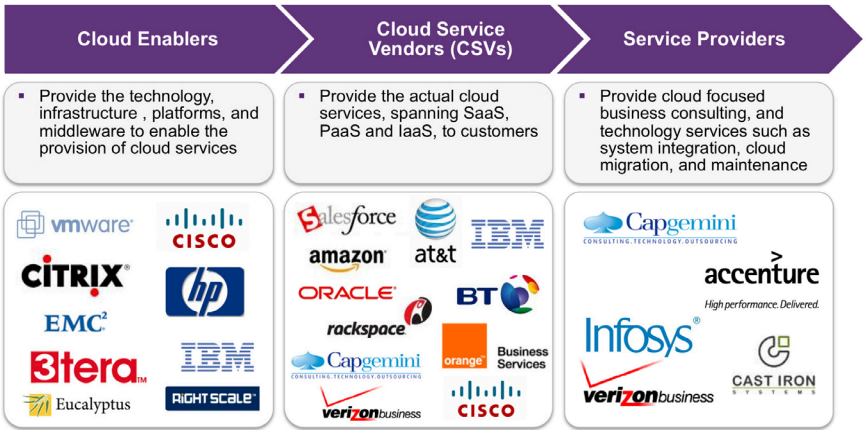


Source: Capgemini TME Strategy Lab Analysis; Forrester Research; Cloud Computing 2010, *An IDC Update*, September 2009

Several companies are competing aggressively to grab the largest share of the lucrative cloud computing market. These players fall largely under one of these three categories: enablers, vendors, or service providers (see Figure 3). The role of some mature players, however, can also span a number of categories. For instance, both Cisco and IBM are cloud enablers as well as CSVs[12].

11 Compound Annual Growth Rate.
12 Cloud Service Vendors.

Figure 3: Stakeholders in the Cloud Computing Ecosystem



Source: Capgemini TME Strategy Lab Analysis

Leading technology vendors such as Amazon, Salesforce.com, and Microsoft have established a firm footing in this market and offer a range of services spanning SaaS, PaaS, and IaaS (see Figure 4). In terms of revenues, the current CSV landscape is dominated by players such as Salesforce.com, Amazon, and Oracle. Salesforce.com, the leading provider of SaaS CRM[13] solutions, reported revenues of over US$1billion[14] in 2009, which is the highest amongst CSVs. The success of these leaders can be attributed to their technical prowess, early mover advantage, and the strong focus on cloud computing.

Figure 4: Enterprise Cloud Offerings of Select Vendors

Examples	Software (SaaS)	Application Development Platform (PaaS)	Servers	Storage
Oracle on Demand	✓	✗	✗	✗
Cisco Webex	✓	✗	✗	✗
Salesforce CRM	✓	✗	✗	✗
IBM Lotus Live	✓	✗	✗	✗
Salesforce Force.com	✗	✓	✗	✗
Google App Engine	✗	✓	✓	✓
Microsoft Azure	✗	✓	✓	✓
Amazon Web Services	✗	✗	✓	✓
BT	✓	✗	✓	✓
Orange Business Services	✓	✗	✓	✓
AT&T	✓	✗	✓	✓
GoGrid	✗	✗	✓	✓
Rackspace	✗	✗	✓	✓
EMC MozyEnterprise	✗	✗	✗	✓
Nirvanix CloudNAS	✗	✗	✗	✓

Source: Capgemini TME Strategy Lab Analysis; Company Websites

Though large technology players have emerged as leaders in cloud computing, several smaller companies such as Rackspace and Netsuite are trying to carve their niche. Telcos such as BT and AT&T have also entered this market. In the next section, we will evaluate the cloud computing initiatives and strategies of telcos.

13 Customer Relationship Management.
14 Company Websites; Annual Report.

4 Telco Activity in Cloud Computing

Compared to market leaders such as Amazon and Salesforce.com, telco entry into cloud computing has been reasonably late. While Salesforce.com started offering services in 1999, BT and T-Systems, one of the earliest telcos to offer cloud solutions, entered only in the 2003 to 2004 timeframe (see Figure 5). Despite the late start, several telcos such as BT, AT&T, and Verizon are competing aggressively with market leaders to establish a strong foothold. The majority of operators have taken the role of a CSV while a few such as Verizon also act as service providers. This section presents an overview of key telco strategies in cloud computing.

Figure 5: Select Examples of Telco Foray into Cloud Computing

	2003-2004	2007-2008	2009-2010	Planned
SaaS	BT Open Orchard T-Systems Dynamic Services	Telstra T-Suite Orange IT Plan	NTT Biz Security Telefónica Aplicateca TeliaSonera Business Class Cloud Services	
PaaS		T-Systems (Database and Middleware Environments)	SK Telecom Cloud Computing Platform	AT&T Telstra
IaaS		AT&T Synaptic Hosting Deutsche Telekom Zimory*	Orange Flexible Computing Verizon Computing as a Service BT Virtual Data Center AT&T Synaptic Storage and Compute	Telecom Italia NTT

Source: Capgemini TME Strategy Lab Analysis; Company Websites
Note: Deutsche Telekom spun off from Zimory as an independent subsidiary in November 2007

Several telcos have entered the cloud computing market with IaaS as their flagship offering and a strong focus on the enterprise segment

Target Segment

The cloud computing offerings of most telcos are targeted towards the enterprise segment. Enterprises and governments spend nearly US$2.4 trillion worldwide[15] on IT products and services, many of which can be delivered from the cloud. This high revenue potential makes the segment attractive for operators. Moreover, the consumer cloud space is nascent and the revenue opportunities limited.

Within the enterprise segment telcos are aggressively targeting SMEs due to the growing interest in this segment for cloud-delivered software. SME share in overall cloud services revenue is expected to increase from 25% to 40% between 2009 and 2015[16]. To benefit from this opportunity, several telcos offer services customized to fulfill SME needs. For instance, "IT Plan" from Orange is a packaged SaaS solution offering a suite of office productivity, messaging, and business applications targeted at SMEs.

15 Forrester Research, *The Evolution Of Cloud Computing Markets*, July 6, 2010.
16 Capgemini TME Strategy Lab Analysis; Analysis Mason, *Seize the US$35.6 billion global market for enterprise cloud services*, June 2010.

Figure 6: Categorization of Cloud Offerings from Telcos

Telcos	SaaS	IaaS	PaaS
BT	✓	✓	✗
Orange Business Services	✓	✓	✗
Deutsche Telekom/T-Systems	✓	✓	✓
TeliaSonera	✗	✓	✗
Belgacom	✗	✓	✗
Telefónica	✓	✓	✗
AT&T	✓	✓	✓ (Planned)
Verizon Business	✓	✓	✗
Telstra	✓	✓	✓ (Planned)
SK Telecom	✗	✓	✓
NTT	✗	✓	✗
Bharti Airtel	✗	✓	✗
Tata Comm	✗	✓	✗

Source: Capgemini TME Strategy Lab Analysis

Service Offerings

Telco offerings in cloud computing are centered around IaaS and SaaS with limited focus on PaaS (see Figure 6). IaaS is the flagship offering of most operators, and in general SaaS has taken a backseat compared to IaaS primarily because telco capabilities and experiences are more aligned towards delivering IaaS.

In 2008, AT&T made its debut in IaaS with its Synaptic Hosting proposition. Since then, several leading operators such as BT (Virtual Data Center), Orange (Flexible Computing), Verizon (Computing as a Service), and Deutsche Telekom (Zimory) have followed suit. In fact, the current IaaS offerings of most operators are as competitive as those from established players like Amazon and Rackspace. Over the next few years, all major telcos plan to focus most on IaaS in order to address the growing enterprise demand for cloud infrastructure services.

Although IaaS has captured most of the operators' attention, SaaS too has garnered significant interest. Many telcos offer a host of SaaS applications, usually in partnership with ISVs[17], for accomplishing a range of business tasks. For example, BT offers multiple CRM solutions in partnership with Salesforce.com and Netsuite, NTT has recently launched a cloud-based security solution, and T-System delivers SAP from the cloud. Communication and collaboration software such as hosted PBX[18], messaging, email, conferencing, and team collaboration solutions are the mainstay of SaaS offerings from leading operators.

Telcos have traditionally stayed away from PaaS, largely due to its unattractiveness both in terms of revenue and demand, when compared to IaaS and SaaS. Apart from T-Systems, which offers database and middleware environment to nearly 300[19] customers, few operators have shown significant interest in this category.

In addition to SaaS, PaaS, and IaaS some telcos such as Verizon, Orange and BT also offer professional services, helping customers identify and migrate the right applications to the cloud.

17 Independent Software Vendor.
18 Private Branch Exchange.
19 Forrester Research, *Market Overview Of Cloud IT Services From Major Telcos*, September 2009.

Entry Strategy

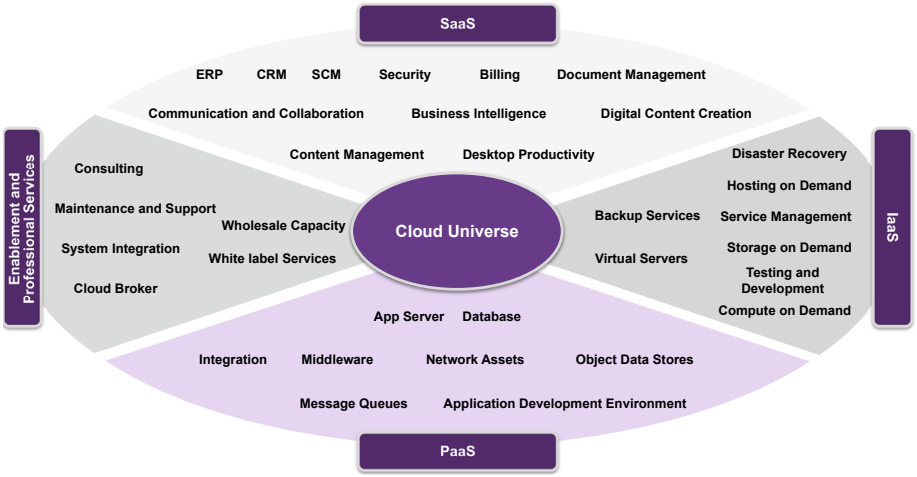
Partnership with technology players has been the foremost entry strategy of telcos in cloud computing. Operators have partnered with a range of vendors from hardware providers such as HP and Sun to virtualization specialists such as VMware and Citrix Systems. These partnerships have helped telcos significantly reduce their time-to-market and minimize the risks associated with developing complex technical capabilities in-house.

In addition to partnerships, a few operators have acquired technology companies to leverage their expertise to launch cloud services. For instance, AT&T acquired leading application services provider USInternetworking (USi) in 2006 for US$300 million to develop capabilities in delivering on-demand services and managed enterprise software solutions. Similarly, telcos such as BT, Verizon and T-Systems also acquired companies to develop expertise in launching certain cloud services.

5 Attractive Opportunities for Telcos in Cloud Computing

Cloud computing presents several opportunities for telcos to pursue (see Figure 7). Analysts estimate that by 2015, telcos will have a 23%[20] share in the overall cloud services market.

Figure 7: Universe of Potential Cloud Services

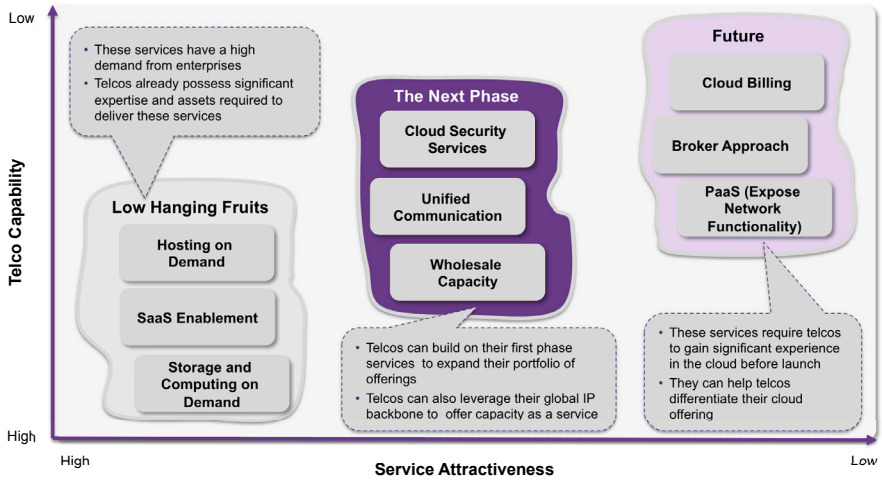


Source: Capgemini TME Strategy Lab Analysis; Forrester, Future View: *The New Tech Ecosystems of Cloud, Cloud Services, And Cloud Computing*, August 2008

Operator success in the cloud, however, will depend largely on selecting the right choice of services to launch. Telcos should consider a combination of factors such as the attractiveness[21] of a service, its complexity, and the expertise required to launch before determining the services to offer. Most importantly, operators should focus on those services for which they are well positioned to offer by leveraging their existing capabilities such as data center expertise, managed service experience, and global footprint. Based on this rationale, the most relevant commercial opportunities for telcos can be categorized into three different service buckets: low hanging fruits, the next phase, and the future (see Figure 8). In order to make the most of these opportunities, telcos should launch these offerings in a phased manner, starting with the low hanging fruits first.

20 Analysis Mason, *Seize the US$35.6 billion global market for enterprise cloud services*, June 2010.
21 Service attractiveness is a combination of customer demand and revenue potential.

Figure 8: Most Attractive Commercial Opportunities for Telcos in Cloud Computing



Source: Capgemini TME Strategy Lab Analysis

Hosting on-demand, SaaS enablement, storage and computing provide an immediate attractive opportunity for telcos

In the subsequent subsections we will detail the three service buckets.

Low Hanging Fruits

These are the services which provide an immediate attractive opportunity for telcos and should be launched first. Not only do these services have a high demand and revenue potential but also existing telco strengths are well aligned to deliver them rapidly. Hosting on-demand, SaaS enablement, and storage and computing on-demand fall under this category.

Hosting on Demand

Telcos are already proficient at providing managed hosting services for enterprises. In collaboration with technology partners, operators can rapidly virtualize their existing data center infrastructure, without excessive cost overheads, to offer on-demand hosting. Some operators such as AT&T and Orange already provide this service. Service delivery through the cloud will not only result in the optimization of telcos' existing infrastructure, but also attract a large number of customers interested in maximizing IT investment by migrating to the cloud. According to analysts, when compared to traditional hosting, cloud hosting can help enterprises save 50% in costs with an associated ten-fold increase in capacity[22].

SaaS Enablement

SaaS has the largest share of the cloud services market and its adoption within enterprises, especially SMEs, is rising. Telcos which have not yet ventured into SaaS can quickly establish a firm footing by partnering with a wide range of ISVs[23] and leveraging their existing infrastructure to deliver diverse SaaS applications. In addition to gaining a substantial share of the large and increasing enterprise spending on SaaS, these telcos can also improve customer loyalty by offering SaaS as a value added service.

22 nScaled, *Slashing Costs and Driving Capacity for SaaS Providers*, February 2009.
23 Independent Software Vendors.
24 Cloud Computing 2010, *An IDC Update*, September 2009; Capgemini TME Strategy Lab Analysis.
25 Central Processing Unit.

Computing and Storage on Demand
Computing, storage, and backup along with hosting constitute the bulk of US$5 billion[24] IaaS market. Telcos already offering on-demand hosting can cross-sell computing and storage through an integrated package. In addition to hosting, providing virtual CPU[25] instances (to meet the different computing needs of customers) and on-demand storage and backup will result in a comprehensive IaaS solution. In order to deliver these additional services, existing data center resources can be easily leveraged, thereby, minimizing incremental costs.

Phase 2
This phase includes the next line of services, which telcos should offer in order to expand their portfolio of cloud services and establish a stronger footing. Operators can sell these services on top of their existing cloud proposition. Cloud security services, unified communication, and wholesale services fall under this category.

Cloud Security Services
In terms of market share, telcos are one of the leading providers of managed security services. They can quickly leverage their existing expertise in network, application, and data security to deliver these services from the cloud. Cloud security is an attractive market, which is set to rise by 200%[26] during the period from 2008 to 2013. Telcos can capitalize on this opportunity by differentiated offerings such as Distributed Denial of Service (DDoS) protection. Operators have an inherent advantage in this area because they can look across their backbones and prevent potential attacks earlier than most other service providers.

Unified Communications (UC)
Enterprise customers are interested more than ever in a common platform for all their communications needs including IM[27], presence, voice, conferencing, and email. The unified communications market is expected to rise at 55.6% CAGR to US$4.3 billion between 2008 and 2014[28], fuelled by cloud computing. Telcos already deliver individual communication services like messaging, VoIP[29], and PBX to enterprise customers. They can build on this experience to offer a unified user interface and experience across multiple devices.

Wholesale Capacity
Reliable network connectivity, which includes fast and secure connections from the cloud data center to the customer premise, is imperative for the success of any cloud business. Telcos can offer capacity, over their global IP[30] backbone and private MPLS[31] networks, as a service to both cloud service vendors and enterprises. In addition to capacity, large global operators can also white-label a complete telco-focused cloud infrastructure solution for regional operators.

The Future
Telcos should also think beyond traditional offerings and leverage the commercial opportunities presented by more novel services and delivery mechanisms such as cloud billing, PaaS, and the broker approach.

26 Gartner, *Cloud-Based Computing Will Enable New Security Services and Endanger Old Ones*, June 2008.
27 Instant Messaging.
28 ABI Research, *Vertical Market Opportunities in Unified Communications*, Q4 2009.
29 Voice over Internet Protocol.
30 Internet Protocol.
31 Multiprotocol Label Switching.

Cloud Billing
Technical and cost challenges make it difficult for most cloud service providers to run their billing infrastructure in-house. Unlike subscription based billing, pay-per-use billing is complex and failing to get it right can result in revenue leakages. Telcos can leverage their experience in billing metered services to enter the cloud billing arena. Operators along with their billing partners can provide their expertise as a comprehensive cloud billing solution for vendors.

PaaS
As IaaS and SaaS space becomes mature and increasingly competitive, operators might shift their focus towards PaaS in order to diversify. PaaS is an attractive solution for ISVs and SMEs to improve their productivity and reduce costs by using cloud-delivered toolkits for application development and deployment. Operators can build on their existing experience with Service Delivery Platforms (SDP) to offer PaaS. Telco assets such as voice, location, and presence can be offered to help application developers build applications that can be monetized.

Telcos as Brokers
There is a growing demand for "cloud brokers" as intermediaries between end users and cloud providers. From SLAs with multiple vendors to compliance and security, the broker handles all cloud related issues for a customer. This approach also enables customers to switch cloud vendors without worrying about the operational details. Telco experience in delivering multiple services with stringent SLA requirements, strong enterprise presence, and long lasting relationship with enterprise IT departments gives them an edge in the cloud broker space.

Given the revenue potential and high demand of different cloud services, it is imperative that telcos do not delay their entry in this space. By diligently identifying and launching the right services at the right time, operators can maximize their share of wallet while the end customers would reduce IT CAPEX[32] and OPEX[33].

32 Capital Expenditure.
33 Operating Expenditure.

6 Recommendations

As seen in previous sections, several telcos have entered into cloud computing and are focusing primarily on IaaS and SaaS. However, there is a significant possibility of these services, especially IaaS being commoditized in the near future. As the intensity of competition increases and service differentiation dilutes, margins will fall. Therefore, customization and differentiation across their offerings, service delivery, and customer segment targeting, should be the hallmarks of a telco cloud strategy.

In the subsequent subsections we will illustrate how telcos can carve their niche in these different areas.

Service Offerings

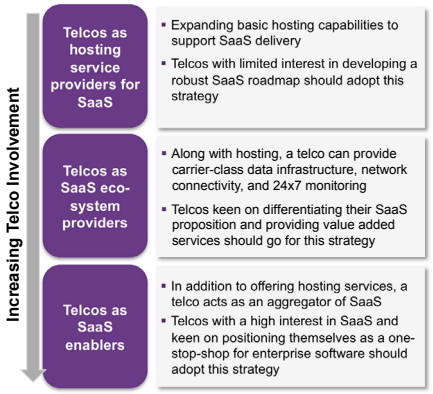
In addition to providing traditional IaaS, operators should focus on offering localized and customized services which have a potential of commanding high margins. This will help them stay relevant in the face of high competition from established players such as Amazon and Rackspace.

Telcos provide enterprise services across various geographies and have a good understanding of local market demand for these services including cloud. They are, therefore, best equipped to address the regional cloud services market needs. For example, in certain geographies cloud -based Virtual Desktop Infrastructure may have high demand, whereas other enterprises might be more interested in disaster recovery. By quickly identifying and addressing such opportunities, operators can gain an edge over the competition.

Offering customized cloud solutions can help telcos price their services at a premium

Offering customized cloud solutions can help telcos price their services at a premium. For instance, replicating the exact software testing environment on the cloud is a challenge for enterprises because many providers do not offer custom OS images and limit the type of configurations. By providing a customized virtual environment for companies to replicate their exact test conditions, operators can not only differentiate their offerings but also charge higher margins.

Figure 9: Telco Strategies in the SaaS Space



Source: Capgemini TME Strategy Lab Analysis; VON, *Telco Strategies to Win a Share in the SaaS Pie*, June 2007; Company Websites

34 Service Delivery Platform.

In the SaaS space, there are three different strategies which telcos can adopt (see Figure 9) with the level of involvement by operators varying significantly. Telcos should evaluate the level up to which they want to have a SaaS presence and accordingly adopt the right strategy.

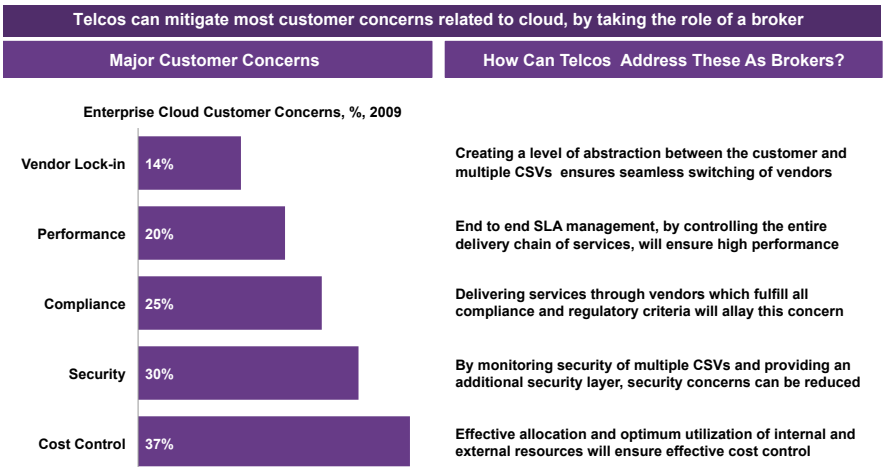
PaaS is an area which will see limited action from telcos in the near future. Before establishing a PaaS presence, telcos would need to carefully evaluate their technology readiness and experience with platforms such as SDP[34].

Service Delivery

Telcos should endeavor to deliver services in a way that customers can enjoy the cost benefits of public cloud and the security and reliability offered by private clouds. This can be achieved through Virtual Private Cloud (VPC) deployments. This model delivers services from a public cloud over MPLS-based Virtual Private Networks. VPC, therefore, offers the full security and privacy of a private cloud, but pushes hardware ownership to the service provider. Telcos can leverage their distinct strength in providing reliable private IP service to enable a cost effective and secure VPC solution.

In order to address customer concerns such as security, costs, and vendor lock-in, telcos can take up the role of a cloud broker

Figure 10: Telcos as Cloud Broker



Source: Capgemini TME Strategy Lab Analysis; Forrester, February 2009

In order to address customer concerns such as security, costs, and vendor lock-in, telcos can take up the role of a cloud broker (see Figure 10). This is another innovative approach to service delivery where telcos are well positioned compared to their competitors because of strong enterprise relationships and experience of delivering multiple services involving stringent SLAs. However, operators should build significant experience in cloud computing before adopting this approach, so that they can successfully tackle the complexities associated with end-to-end solution delivery.

Customer Segment

Large enterprise customers have multi-country operations and serious concerns about the security of their applications and data. Also, due to the sheer size and complexity of their operations, deploying cloud services, integrating them with on-premise systems, and continuous maintenance and support becomes a highly complex process. In order to target large enterprises, telcos should try and offer enhanced security and end-to-end cloud solutions across multiple countries.

35 Information and Computing Technology.

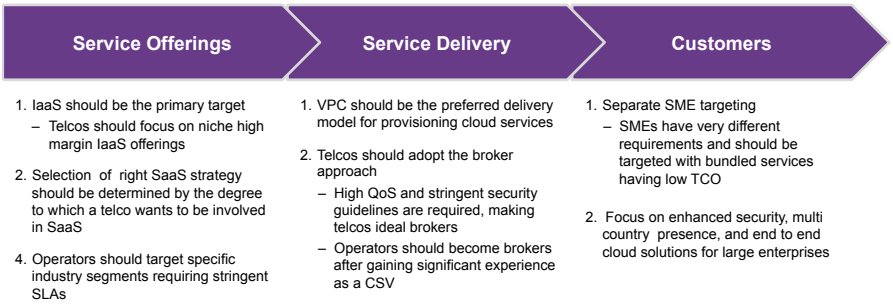
Telcos can differentiate themselves by offering niche IaaS for specific industry segments, provisioned through Virtual Private Clouds

The share of SMEs in the overall cloud services market is expected to rise rapidly in the next few years. SMEs prefer all their ICT[35] needs to be catered for by a single vendor and want solutions that are easy to deploy and support. Total Cost of Ownership (TCO), which also includes maintenance, upgrade and support is another factor which SMEs value more than the actual selling price of a solution. In order to effectively target this segment, telcos should focus on bundling different cloud services such as communication, security, and hosting in a simple package. Moreover, operators should offer standards-based cloud solutions and reduce overheads wherever possible, in order to minimize TCO.

In summary, telco focus should be on offering niche IaaS for specific industry segments, provisioned through VPCs (see Figure 11).

In conclusion, the revenue potential and high demand of cloud computing presents a real opportunity for telcos to offset the declining revenue from traditional services. Several operators have already entered this area and others should soon follow suit. The in-place assets of telcos such as data center capabilities, global IP backbone, and experience in delivering managed IT services can not only help them expedite their launch but also establish a leading position. However, there is significant possibility of cloud services, especially, IaaS being commoditized in the near future. Moreover, the competition is becoming increasingly intense with several players entering this lucrative market. Operators, therefore, need to constantly innovate and focus on the right services, delivery models, and industries where they are best positioned, by the virtue of their strengths, to carve their niche and gain an edge over the competition.

Figure 11: Summary of Cloud Strategies for Telcos



Source: Capgemini TME Strategy Lab Analysis

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