Cloud-enabled telco opportunities

April 2013

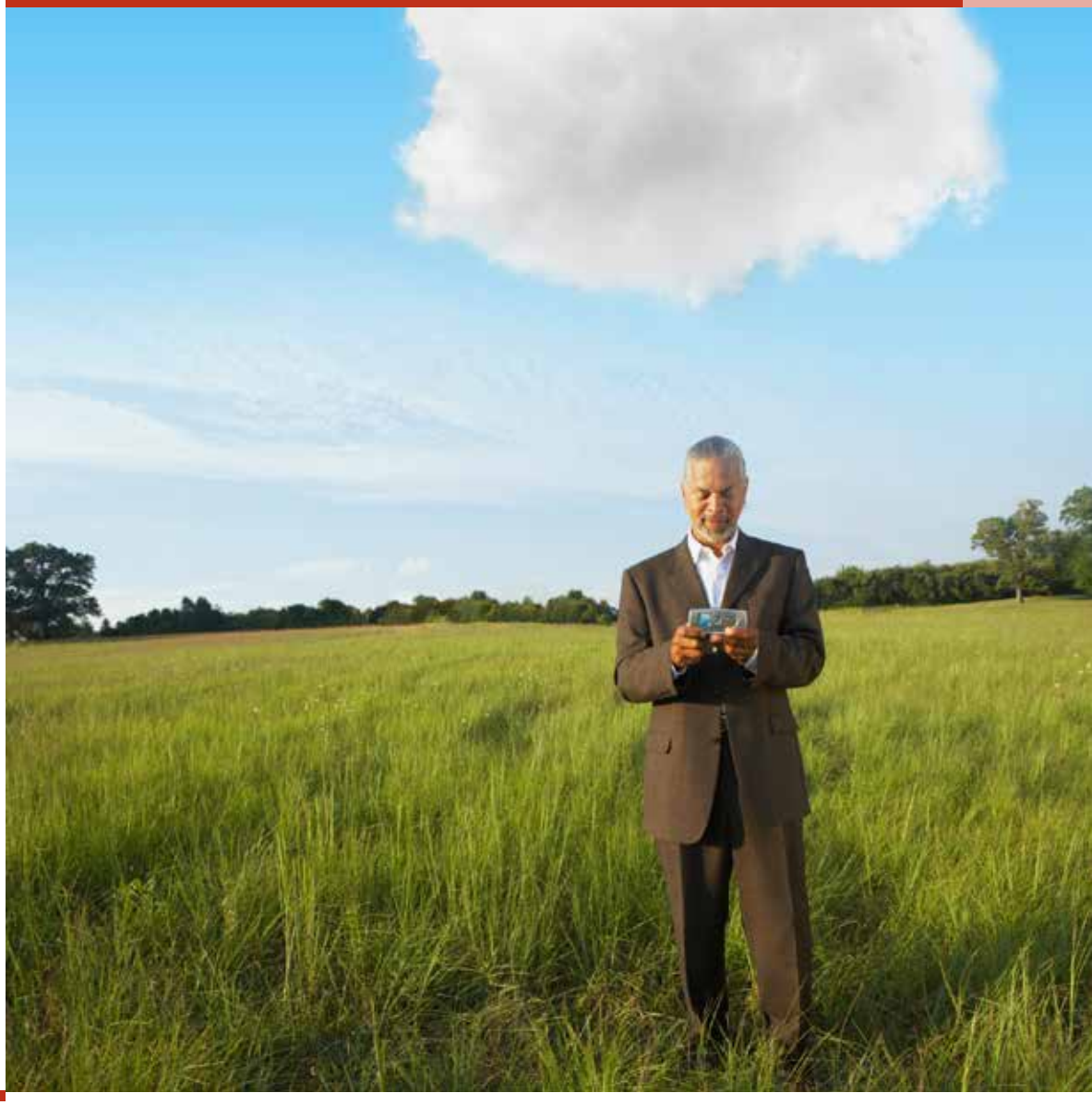

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Table of contents

Executive summary

- The shifting information and communications technology (ICT) landscape has placed greater revenue and profitability pressure on telecommunications operators (telcos) than ever before. Technology vendors are cannibalising telco revenues with over-the-top offerings, and forging customer relationships with value-added services. More than ever before, telcos are challenged with the need to evolve beyond network connectivity and provide distinctive service offerings – into the rapidly growing technology services market.

- Fortunately, telcos are well positioned to offer a number of cloud services, such as becoming cloud brokers by aggregating services, platform enablers by providing an ecosystem to leverage telco assets, enterprise enablers by optimising secure networks, and business enablers by providing industry -ready solutions across the value chain. Telcos are also ideally positioned with their distribution networks, retail stores, customer care relationships, billing capabilities, and partnerships to develop an ecosystem that simplifies the selection, management, and optimisation of cloud services to business customers.

- Telcos that can create a compelling end-to-end cloud proposition that integrates their network management capabilities, supported by an agile and service-oriented operating model, could carve out a differentiated and attractive offering to small and midsize businesses (SMBs) and enterprises.

- However, cloud delivery requires a fundamentally different business model compared with current managed services in business-to-business (B2B) settings—characterised by a high degree of self-service, automation, and repeatability in the end-to-end operating model.

- Telcos have traditionally been weak in these capabilities, suffering from complex and bespoke services that hinder their ability to standardise the service proposition. Furthermore, they now face challenges in migrating to a fit-for-purpose cloud operating model, due to a complex legacy of multiple networks, an overly fragmented product set, and disparate supporting tools and processes.

- To pursue these new opportunities, telcos will need to undertake a transformation journey to build the appropriate operating model. A key question will be whether they can continue to evolve their existing operational model for serving B2B customers or if building a cloud business might require them to forge something new. Changes required to implement this transformation include building professional services capabilities, instilling a services-oriented culture, developing key performance indicators (KPIs) that focus on customer value rather than siloed product revenues, and putting in place an industrialised service creation process.

- As cloud demand continues to grow rapidly, many telcos have been active in mergers and acquisitions (M&A) to build these capabilities, supplemented by organic investments to drive automation, repeatability, and a service focus. Furthermore, striking up a professional services partnership can help accelerate and strengthen telcos' capabilities in this area compared with systems integrators.

- There is no easy or quick route on this journey, but by putting in place the right building blocks, telcos have the opportunity to develop a strong, differentiated cloud proposition that few competitors will be able to match. The prize is to participate in the dramatic value shift that is taking place in enterprise ICT and to gain revenue growth by taking share from other players in the eco-systems that will deliver cloud based services. The uncomfortable reality for telcos is that the risk of not participating is relentless commoditisation of the B2B communications business.

Cloud services: an opportunity and a threat

Telcos' eroding position

There is a burning platform for telcos playing in ICT. The percentage of worldwide ICT spending attributed to telecom services has been steadily decreasing—from 48% in 2010 to 46% in 2012. Telecom services spending will continue to trend downward and is projected to comprise only 44% of overall ICT spending by 2016. Between 2011 and 2016, the telecom services market is expected to only grow at a compound annual growth rate (CAGR) of 1.9%, compared with the overall IT spending growth of 3.4%.[1]

At the end of the 1990's the pursuit of ICT growth brought complexity to telcos seeking to escape the commodity trap of a "vanilla network" by providing managed or outsourced network services and expanding into adjacent ICT segments. While some telcos successfully used this strategy to capture new revenue growth, they often failed to deliver acceptable financial performance from their B2B ICT businesses.

The telcos' profitability was diluted over a portfolio that was too broad, too deep, and over customised. Growth was achieved with insufficient discipline in portfolio management, reuse of solutions, and repeatable delivery and service management capabilities. As a result, compared with the large IT services providers and providers that originated from the managed hosting sector, telcos' ICT capabilities were costly and complex, and customer service, often, unpredictable.

The promise of cloud

Based on independent research, the global market for cloud computing is projected to grow to between $241 billion and $270 billion by 2020, with a CAGR of more than 22%.[2] Furthermore, US CIOs expect cloud-related investments to increase from composing only 5% of their overall ICT spending in 2012 to 13% in 2016.[3] This market clearly provides an attractive potential new source of revenue for telcos to replace revenue reductions in traditional voice and data services.

1 Gartner "IT Spending, Worldwide, 4Q12 Update"

2 Market Research Media, 2012

3 Forrester Research, Inc., "Cloud Investments Will Reconfigure Future IT Budgets", January 2013

As customers become more accustomed to consuming ICT through cloud delivery models, the cloud market will increasingly cannibalise legacy delivery models for ICT. Telcos have faced disruptive technologies in the past—Voice-over-IP (VoIP) cannibalising public switched telephone network (PSTN), and standard Internet Protocol (IP) networks cannibalising expensive legacy network technologies. Some telcos have acknowledged the need to sacrifice legacy service revenue to better meet the needs of customers. As an example, Orange, Telefónica, and Deutsche Telekom all released applications (apps) in 2012 that provide access to free voice calls and short message service (SMS) through an over-the-top (OTT)-based service across multiple networks and operating systems.

If cloud is destined to become as ubiquitous as other disruptive changes, then should telcos embrace a new business model for cloud and actively migrate their business models towards it, rather than follow a wait-and-see approach?

From ICT to cloud services

Telcos have successfully managed wide area network (WAN) propositions, but the step beyond that—into deeper outsourcing or specific managed services for customers—often resulted in bespoke features that are not part of the standard models telcos can repeatedly deliver. These bespoke features and contracts have led to a business model that seems to rely on a culture that is always on the edge of being out of control. The result has been a patchwork of process and systems fixes to get a new service launched.

Once the business allows contracts that have non-standard aspects to enter the system, then additional costs emerge to cope with the extra requirements. Problems often then emerge during contract delivery and operation because the operational model does not have the right processes, tools, and third-party agreements in place to execute the non-standard features. Taken to the extreme, the operational function becomes a best endeavours effort where it cannot confidently predict what service level agreement ("SLA") it will deliver against, leading to a growing volume of service credits and contract target failures.

To transform from an old operating model and implement a new, more efficient operating model is a daunting and difficult task. There are organisational, process, and product management and overall infrastructure transformation challenges that eventually prohibit the delivery of services through an agile, cost-effective environment.

Cloud services, the telcos will argue, are nowhere near as diverse or complex as the managed networks that they have built for their customers. Telcos are well positioned to serve the B2B cloud market, because they own the network upon which the cloud applications and services are delivered. They have experience in providing the enterprise-wide network service levels that corporate customers need. Telcos can be positioned to take the lead, given the reach of their networks and their ability to manage large communication and hosting centres. Identifying and delivering the right combination of services that creates a unique customer experience will be the key to their success.

That may be the case, but if the march towards cloud continues, then customers will increasingly look to providers that have demonstrated the capabilities to offer all of the benefits of cloud, in a manner that is simple, repeatable, and that scales with their needs for cloud services. Unfortunately for telcos, this is where they have fared less well: in their ability to modify their existing delivery flow, develop the appropriate automation, and streamline their processes and systems. Dynamically changing operations to a more predictable, repeatable model that is driven by profit creation and not just incremental revenue is not a trivial task for telcos that have a legacy network services business.

This reality risks relegating the telcos to commodity status. Owning the network may not be enough to justify being the cloud provider; if others are doing a better job of realising the benefits of cloud, customers may just allow the provider to buy the connectivity to link their service to the customer's infrastructure. For telcos to gain an advantage, they should expand their current smart network management environment into their cloud management and delivery infrastructure.

The emergence of cloud as the mainstream model for ICT will amplify the need for operational excellence and a seamless end-to-end operating model that enables a high degree of automation, customer self-service, and proactive management to limit any outages. Telcos will not be able to rely on adding more people and workarounds to manage their portfolio of customer contracts. Many new, best-of-breed cloud providers—distinct from the telcos—are establishing a track record in the repeatable operationalisation of well-defined, specific services.

Big questions

Cloud will change the way many businesses operate in the coming years. It will redefine the role of the CTO and the IT function within organisations, and equally it will redefine the way in which these organisations purchase from their service provider.

The big question for telcos is, recognising the lessons from previous business ICT initiatives, how should they exploit this opportunity? What roles should they take in the value chain (vis-à-vis OTT providers), and how should they reconfigure their operating model to address it?

Success requires change

In the rush to capture this opportunity, many telcos are adopting an incremental rather than a transformational approach to delivering cloud propositions. Companies deliver new services through existing operating models—and they are using the legacy sales, implementation, and customer service approaches without consideration of the capabilities required by cloud.

Telcos need a new business model centred around cloud and the capabilities required to deliver cloud. For the transition from legacy ICT to cloud business to succeed, telcos will need to implement four key organisational changes:

- P&L reporting lines and performance metrics should be redesigned to allow cloud services to cannibalise existing legacy services where this shift is driven by customer demand.
- Key customer relationships must be managed centrally to avoid being isolated by legacy business units (BUs).
- Key capabilities must be shared and leveraged across the cloud and legacy businesses. For example, the network infrastructure will potentially be the greatest source of competitive advantage for telcos to deliver cloud alongside pure-play providers and IT companies.
- Consulting capabilities are required to help customers make the transition to cloud.

In terms of service development, standardised services (within Infrastructure as a Service [IaaS], Platform as a Service [PaaS], and Software as a Service [SaaS]) should be created so they can be provided individually but will deliver more value as part of a bundled, end-to-end proposition (the whole proposition should be greater than the sum of the parts).

Cloud provides the business case for telcos to develop new, service-oriented businesses that will position them well for the new era of enterprise ICT demands. The current cloud propositions from telcos are predominantly a standalone reselling of solutions from other technology vendors. The challenge for telcos is to go beyond just reselling these solutions and to genuinely integrate this new capability with their legacy network, creating and cementing the telcos' advantage in the cloud market by virtue of their network skill. Otherwise, telcos risk providing nothing more than a commodity service, and customers will quickly discern towards innovators and procure networks separately.

This last point is the greatest hurdle for telcos to overcome, but this challenge presents a significant opportunity to reinvent the way they deliver services. They have an opportunity to shift from a network-oriented to a customer-oriented organisation.

Where to play in the value chain?

The market for B2B enterprise solutions is still dominated by legacy services residing on the premises. However, this delivery model is gradually changing, and 41 percent of companies now deploy some form of cloud services.[4]

The developed world is rapidly moving towards an anything-as-a-service state of computing, where cloud emerges as the dominant way to provide infrastructure, applications, and solutions—characterised by an off-premises, self-service, opex model of delivery. Although this concept is not new, the reality is now a short-term rather than a long-term paradigm—the majority of workloads will be ready for delivery over cloud within three years—and one that will contribute significant revenues to those service providers that can become preferred suppliers.

More than 50 percent of customers view specialist private cloud vendors as the preferred suppliers of cloud services in three years.[5]

This perception makes evident that the legacy service providers lag behind the smaller, pure cloud players in driving cloud propositions. There are two key reasons for this lag:

- ***The existing business model***—resistance to changing existing business models and concerns about cannibalising legacy products
- ***The existing operating model***—failings in the existing operating model to realign and redeploy the capabilities

As discussed in the previous section, these problems are especially true for telcos. Their existing models centre upon the network layer and require much greater adaptation to deliver cloud services.

The transition to cloud is hampered partly by supply-side obstacles—the entrenchment in existing business models and operating models—and partly by demand-side concerns

4 PwC, The future of IT outsourcing and cloud computing, November 2011 (survey based on interviews with 489 business executives).

5 PwC, The future of IT outsourcing and cloud computing, November 2011 (survey based on interviews with 489 business executives).

around the difficulty of transitioning, the cost, and the implications of cloud for access, security, and reliability.

Current enterprise cloud service providers can be allocated to one of four categories:

Category	Existing business model	Suitability for cloud service delivery
Systems integrators and IT outsourcers	• On-premises, integrated delivery • Hardware focused	
Telcos	• Bespoke service • Network focused	
Hosting providers	• Self-service model of delivery • Data centre focused	
OTT providers	• Standardised, mass-market offering • Delivered over the top • Software focused	

The telcos' model for legacy services lacks the integration and standardisation required for cloud delivery, and telcos therefore face a greater challenge than any of their competitors in transitioning to a cloud solutions delivery model.

A review of cloud service providers by PwC and leading analyst reports (such as Gartner) reflects that telcos are yet to be seen as key players in any of the cloud layers through their existing business. Their presence as leaders in cloud infrastructure has been made possible only through acquisitions (see emboldened companies in the following table).

Category	Service providers ranked "Leaders"	"Strong Performers"/"Challengers"
Software[6]	IBM, Microsoft, Salesforce.com	Cisco, Citrix, Google
Platform[6]	Salesforce.com	Cordys, LongJump, Microsoft, WaveMaker
Infrastructure[7]	Amazon, CSC, **Dimension Data (acquired by NTT), Savvis (acquired by Centurylink), Terremark (acquired by Verizon)**	Bluelock, GoGrid, Joyent

6 PwC analysis of vendor propositions and analysts opinion.
7 Gartner Magic Quadrant for IaaS, October 2012.

The opportunities for telcos

Before embarking on a process of transformation, telcos must identify the type of cloud provider they wish to be, as different roles will demand different sets of capabilities.

PwC has identified the following opportunities for telcos in the cloud-enabled world:

A. ***Repackage existing capabilities***—Leverage existing hosting and networking capabilities to develop and deliver cloud infrastructure and storage services. These services will be required for any other functionality that moves up the cloud stack (i.e., PaaS, SaaS, BPaaS). Utilise existing business services and operating functions that can be repurposed and delivered as a cloud service (e.g., billing). Position the new business as a platform enabler—build horizontal and/or vertical cloud enablement platforms that can protect and monetise the network, infrastructure, product, and data assets by providing an ecosystem to leverage those assets.

B. ***Mobility solutions***—Work with mobility development teams to create integrated solutions in the cloud with mobile and non-mobile applications.

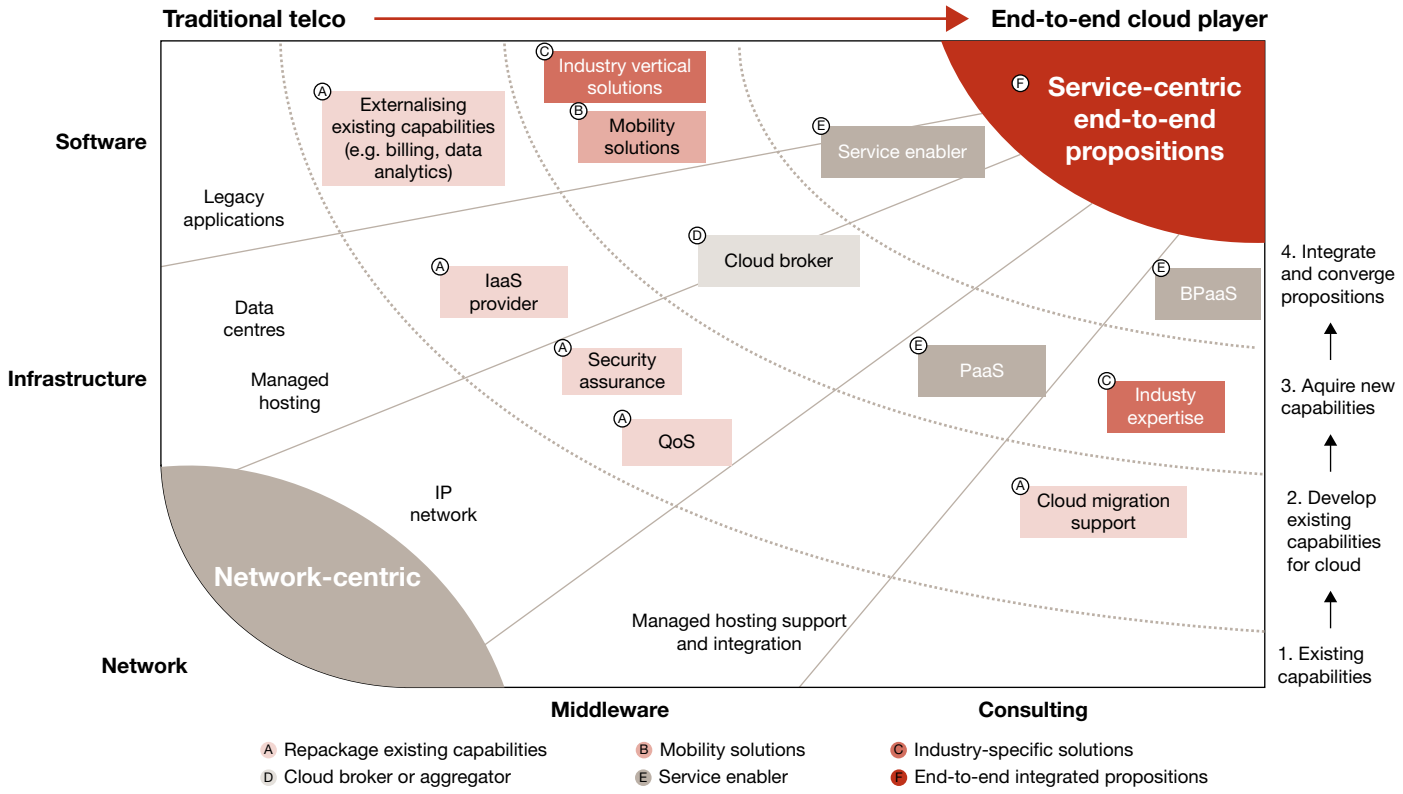
C. ***Industry-specific solutions***—Work with customers and partners to deliver industry-specific solutions across the value chain (i.e., solutions for highly secure and regulated industries like healthcare and financial services, or solutions for industries with high content-streaming, etc.). Also team with professional services companies that can provide industry-specific expertise.

D. ***Cloud broker or aggregator***—Aggregate public cloud services and provide some quality of service (QoS) or security assurance (network performance optimisation, data security).

E. ***Service enabler***—Complement core infrastructure, software, and platform capabilities with other assets and processes (e.g., data analytics and network application programming interfaces [APIs]) and provide them to third parties so they can better deliver their own services (application development, content delivery, revenue assurance through operator billing, etc.).

F. ***End-to-end integrated propositions***—Connect some of the services above the network layer (that is, software and business processes) into the network so they are standardised and integrated into the network, and then the operator can change the definition of what the network provides. The operator can push the network boundary upwards.

These opportunities can be viewed against the telco's evolution from a traditional network-centric provider towards a service-centric, end-to-end cloud provider with a converged product offering.



All of these opportunities should be viewed in terms of the desired customer segment and telcos' capabilities. A customer shift towards cloud offers telcos the opportunity to transform their business model, building a new fit-for-purpose platform that grows with increasing cloud adoption and gradually replaces the legacy business approach. This transformation opportunity includes the potential to redefine the way telcos offer service to their corporate customers. Given that telcos have been wrestling with the profitability, complexity, and lack of transparency in their B2B businesses for the last 10 years, continuing on the business-as-usual basis to migrate to cloud is probably not a realistic route to success against the new entrant specialist cloud service providers that don't have a complex legacy to protect or transform.

To access new capabilities and gain the scale required for global cloud services, telcos will need to consider strategic partnerships. Depending on the type of partnership, new avenues of revenues can be identified and implemented.

- ***Technology partners***—Develop partnerships with key technology solution companies, and integrate their services into the overall telco network and cloud structures.
- ***Customers as partners***—Develop partnerships with customers to gain unique insights into the development of services that can be industry specific and provide the opportunity for shared revenue models.
- ***Professional services firms as partners***—Work with professional services firms, which typically have keen insight to telco operations and services. They can combine that knowledge with their ability to access their firms' multi-industry expertise and C-level insight, and they can work with the telco to define products and services that can be jointly marketed and sold to directly address specific industry issues.

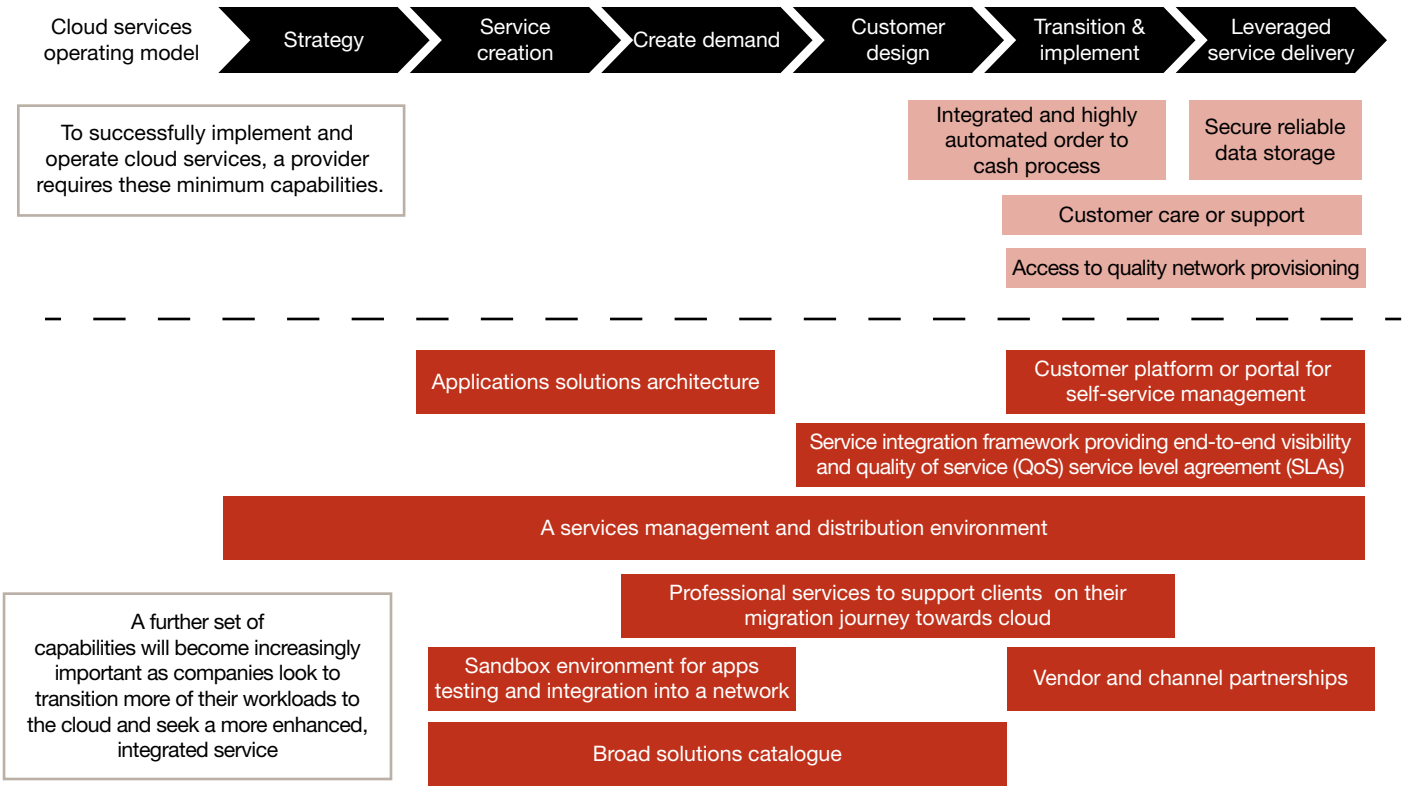
New business requires new capabilities

Based on our experience of best practice companies, to successfully implement and operate cloud services, a telco needs the following minimum capabilities:

- Secure, reliable data storage
- Customer care or support
- Integrated and highly automated order-to-cash process
- Access to quality network provisioning with the ability to guarantee a high level of availability (for example, greater than 98 percent)

A further set of capabilities will become increasingly important as companies look to transition more of their workloads to the cloud and seek a more enhanced, integrated service:

- Customer platform or portal for self-service management
- Applications solutions architecture
- A services management and distribution environment
- Professional services to support clients on their migration journey towards cloud
- Sandbox environment for apps testing and integration into a network (a sandbox environment can be viewed as a PaaS environment)
- Vendor and channel partnerships
- Broad solutions catalogue, including third-party cloud applications
- Service integration framework providing end-to-end visibility and quality of service SLAs



Telcos are stronger in some of these areas than their tech competitors, and vice versa for some of the other capabilities.

Telcos are stronger in the following areas:

- ***Network and hosting services***—Telcos have the ability to guarantee specific levels of quality through ownership of the network. Smaller carriers may need partnerships to extend the reach of these services.
- ***Management services***—Larger telcos currently provide comprehensive management services for their hosting and other telco-related WAN services (e.g., managed data services)
- ***Existing partnerships***—Large carriers have teamed with technology vendors to leverage their capabilities to deliver a cloud self-managed environment.
- ***Scale and scope***—Telcos are able to act as a single point of contact for a multitude of vendor partner products and services.
- ***Distribution channel***—Telcos typically have more established IT customer relationships and are able to up-sell and cross-sell more easily.

Telcos need to improve in the following areas:

- ***"Network blinkers"***—Telcos tend to analyse all situations from an infrastructure perspective. Instead, they should treat all cloud activities as an enterprise architecture exercise and consider the multiple dimensions of a client problem. This enables them to deliver more than infrastructure.

- ***Inability to leverage existing capabilities***—Despite clear synergies between emerging cloud propositions and the services already delivered by telcos, the telcos are failing to capture this opportunity due to:

  - Capital constraints for R&D
  - Complex organisations (e.g. separating IT-related initiatives from non-IT initiatives)
  - The inability to integrate complex services because of different product and marketing organisations
  - The inability to communicate between internal telco business and client organisations, which leaves potential service opportunities untouched
  - The inability to see the bigger, longer-term opportunity

- ***Legacy product constraints***—The legacy of the proliferated products is strong and restricts telcos to a set of processes and systems that limit their progression to cloud (particularly true for multinational corporate clients).

- ***Lack of simplification***—Products and services are convoluted and unbundled, which is not appealing to the smaller and midsize B2B customers. Telcos can offer out-of-the-box operational capabilities such as distribution, retail, customer care, and billing (which most other cloud providers targeting the SMB segment cannot offer); however, telcos are currently unable to act as cloud brokers or aggregators to structure service offerings into SMB-friendly products.

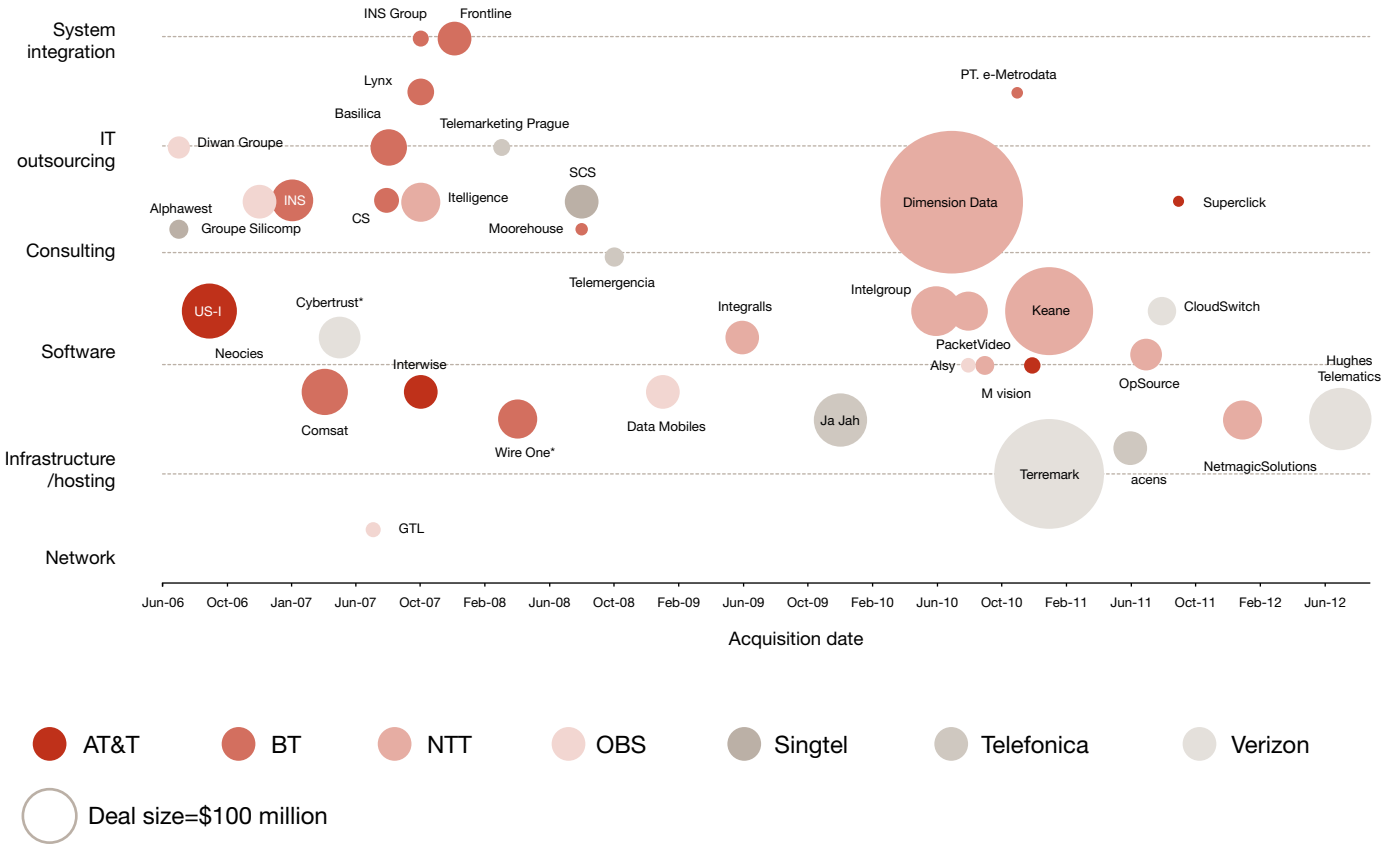
- ***Brokering***—Telcos should create an environment where the telco becomes the integration point for customers requiring multiple interfaces, applications and network services through a single point. As stated earlier, the partnerships that telcos develop combined with their infrastructure can position the telco as a hub for the trafficking of services.

For many telcos, it will be easier to build a standalone system and process stack for their cloud proposition and migrate their legacy products onto it, rather than reengineering their existing systems and processes.

To rapidly gain the capabilities they do not possess, telcos will need to form partnerships and conduct mergers and acquisitions to ensure they can deliver a competitive set of cloud propositions. Telcos will need to use these acquisitions to build a coherent cloud business. However, it should be noted that integrating these acquisitions into the core is certain to destroy them, so the telcos will need to use these acquisitions as the kernel of a new integrated business model.

A selected overview of M&A activity during the last few years shows how the size of the investments is increasing. Telcos are prepared to make even bigger bets as they realise the need to push into the IT space.

Timeline of selected acquisitions by telecoms operators in the global ICT sector



Note: Dimension Data, Terremark, Keane, and Hughes Telematics are represented at 50 per cent of acquisition value to fit onto the chart
Source: MergerMarket, press searches, August 2012

The telco transformation journey—steps to success

Whether a telco decides to reengineer the existing operating model or to set up a separate function to provide cloud services, the traditional telco model is not well suited for a cloud model and therefore extensive changes are recommended. PwC has identified eight key changes telcos should make to reposition themselves to optimise their cloud propositions. These eight changes should be viewed in the context of a longer-term transformation:

Step 1. Fix the basics

1. ***Service creation***—A standardised service catalogue is a critical element of delivering services profitably. The service creation process facilitates this standardisation by defining the architecture, process, and outputs to be followed. With such a process, telcos can rapidly respond to the changing needs of the cloud market (for example, dynamically orchestrating new processes based on new cloud-based applications with a time to market in weeks—not months). Extensive participation will be required of product teams, IT and networks engineering, and service delivery. This continual process will take time to mature. The primary challenges are to set up the process and then be disciplined about ensuring all service development goes through the process.

2. ***Reporting tools***—Reporting tools are critical to provide management with financial and operational visibility of the end-to-end service. This visibility enables them to identify service and portfolio improvements and ultimately can be productised to allow greater customer control, such as through a self-service portal.

Step 2. Build the capabilities

3. ***Professional services capability***—Telcos will need to recruit for solution selling, demand creation, identifying and implementing a complex transformation, and maintaining CxO relationships. Offering professional services requires specific expertise that is not widely available. Therefore, both internal development and selective recruitment likely will be required. This development and recruitment will take time, and telcos will be competing against the market for these capabilities.

4. ***Integration of network management capabilities***—Such integration will be a potential differentiator for telcos against IT and pure-play competitors. To develop cloud services that utilise and leverage telcos' networks, core engineering capabilities must be applied in a customer-centric world. This approach will require new tools and adding new responsibilities to traditional network operations teams.

5. ***Strategic partnerships***—Telcos need to build a broader cloud ecosystem with industry and technology partners to be able to provide end-to-end service. Telcos can position themselves as cloud brokers or trusted partners. This positioning will also be important to achieve speed to market, rather than taking an organic build approach. However, negotiating and implementing strategic partnerships will take time; therefore, telcos need to build a strong commercial and technical model covering the identification, negotiation, and management of partners.

Step 3. Transform the operating model

6. ***IT changes***—Telcos need to improve their customer service experience by building automated self-service ordering, provisioning, reporting, and billing systems. Cloud solutions developed for customer propositions must also be tested, consumed, and optimised for in-house use. Although ICT competitors lack network integration, they already have mature capabilities in IT infrastructure and are therefore able to implement more automated and efficient system processes

7. ***Change management***—Cultural change should be implemented as part of a broader programme to address a range of change issues: from product to service focus, from technology-out to customer-in, from selling to procurement to selling to CxOs, and from centralised to distributed (including offshore) teams. Selling services should be viewed as an end in itself, rather than just supporting the telco carriage business.

8. ***Single P&L***—Services also need to be profitable and not just sold to support the carriage opportunities. Services and carriage should be measured through a single P&L, and services should be priced economically rather than discounted to protect carriage margins.

Lessons learnt: Telcos progressing on the transformation journey

To rapidly build 'new' capabilities and accelerate the transformation, telcos will likely need to acquire current cloud providers. For example, the NTT-Dimension Data acquisition brought together cloud solutions and data centre infrastructure as well as an entrepreneurial culture. The Verizon-Terremark acquisition added data centre capacity.

To address cloud services further from core (but commoditised) IaaS offerings, strategic industry partnerships will need to be forged. Examples include the AT&T-IBM partnership for network-enabled cloud services that combine network security and private connectivity from AT&T and an enterprise cloud platform, and the OBS-SITA partnership for air transport industry cloud services.

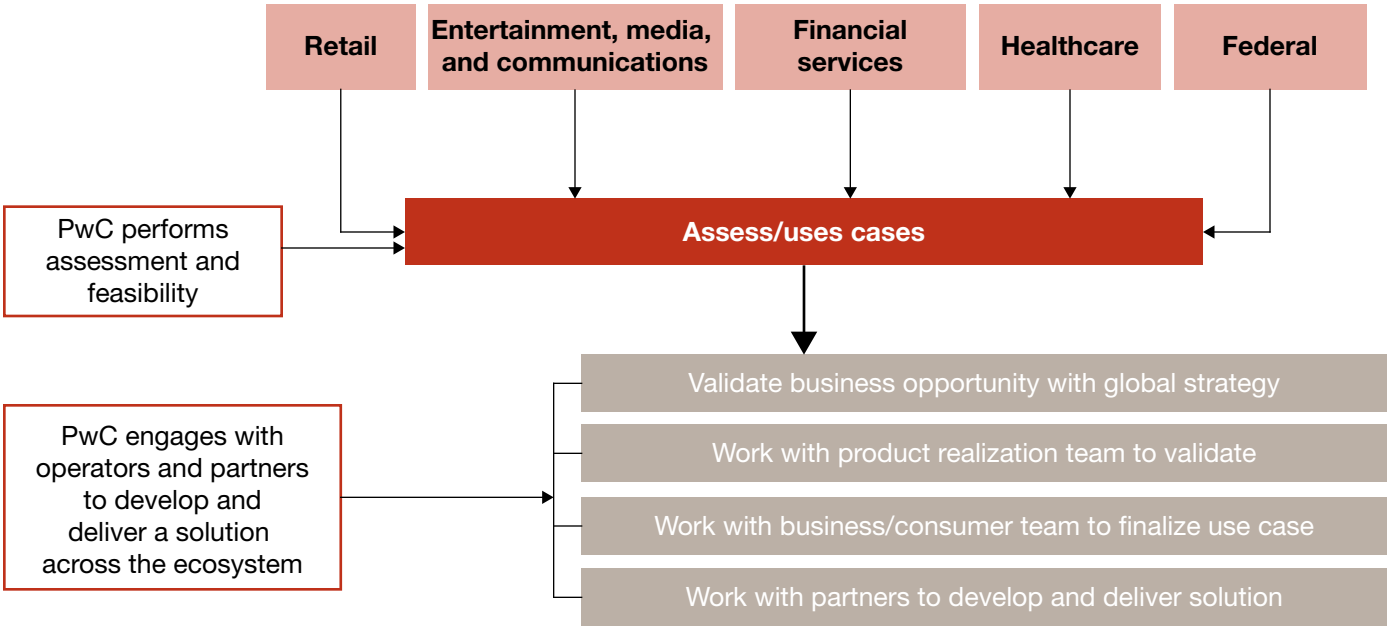
To seize the opportunity to play a strategic role in this new market, telcos will need to offer value-added capabilities on top of their network management capabilities. Deutsche Telekom, for example, already is delivering some videoconferencing services through the cloud. Telcos must act quickly to benefit from their competitive advantage in network management; otherwise, they risk IT and pure-play competitors gaining a stronghold amongst their existing customer base.

How PwC can help

At a time when telco services and cloud technology offerings are becoming commoditised, PwC believes the key to the telcos becoming relevant is to build strategic partnerships with technology and professional services providers.

PwC has developed a methodology and approach for assisting telcos with the identification of new service opportunities by industry, whilst identifying the appropriate partnerships where and when applicable. We bring to this methodology our deep understanding of all of the major industries.

We leverage our relationships and credibility with the CXOs of the companies we serve and have combined those relationships with our existing joint business relationships. The union of the two has created a culture of collaboration that generates a set of unique solutions for our customers and partners. We believe this partnering model will enable telcos to develop more targeted cloud solutions that offer the ability for reuse.



Contacts:

Pierre-Alain Sur
Global Communications Sector Leader
PwC US
+1 646 471 6973

Cledwyn Jones
Director
PwC UK
+44 20 7804 7698

Rolf Meakin
Global Communications Advisory Leader
PwC UK
+44 20 7213 1707

Joseph Tagliaferro
Director
PwC US
+1 908 391 0409

Mike Pearl
US Cloud Computing Leader
PwC US
+1 408 817 3801

Oliver Thomas
Manager
PwC UK
+44 20 7804 6161

John Chan
Senior Manager
PwC Australia
+61 8266 2220

Jasmin Young
Director
PwC US
+1 408 221 5588

www.pwc.com