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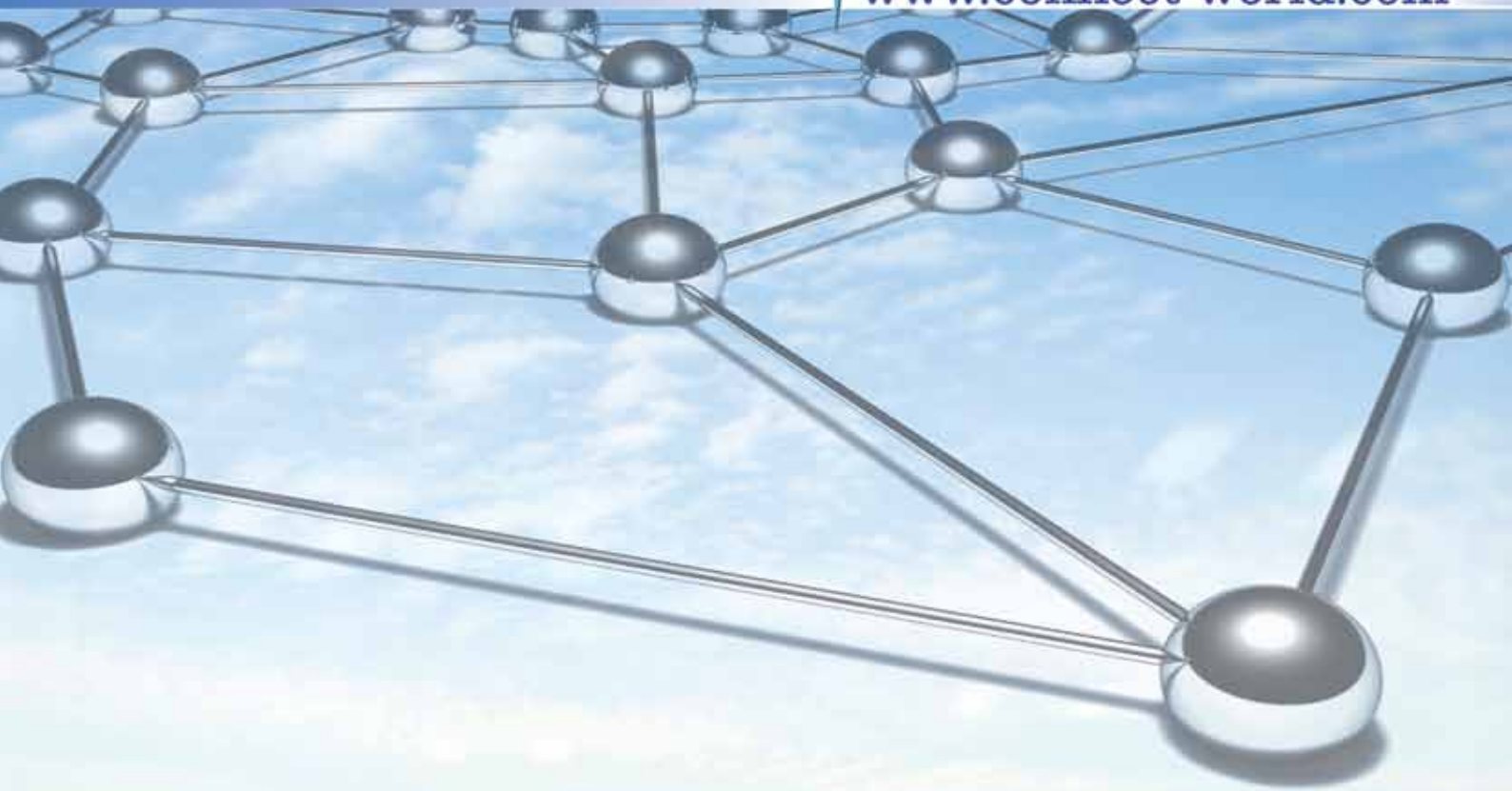

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Connections

The theme of this issue of *Connect-World Europe* is: *Feet on the ground, while on the air and in the 'cloud'.*

Cloud computing is not only a rapidly changing information technology but is also part of an accelerating wave of change impacting business and society. In an increasingly virtual world businesses are defined by information flows and the cloud is emerging as a rapid and powerful platform for innovation and experimentation. Cloud computing offers pay-as-you-go, provider managed, virtualised services using – more often than not – a fully distributed infrastructure architecture. It can be a public or private service.

Cloud computing enables government, as the biggest purchaser of ICT, to both increase efficiency and generate economic growth, and cut costs. Companies look to cloud computing to reduce the capital and operating expenses they have running their own dedicated data centres. Individuals will increasingly look to the cloud to provide a wide variety of sophisticated services on the thinnest client of all – the smartphone.

But cloud computing for telecom has to demonstrate it is robust and reliable. It must be implemented in a controlled fashion to avoid problems experienced in the past with public clouds and disaggregated value networks. Security and quality of service are critical success factors.

This edition of *Connect-World* explores the benefits and risks inherent in cloud computing.

Stuart Sharrock,
Editorial Consultant,
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Shaping the cloud

Heralded by some as a major paradigm shift, dismissed by others as a fancy name for a set of existing technologies, cloud computing is currently attracting plenty of interest. But can we see through the haze of hype to forecast the impact it will really have on businesses?

One thing is immediately clear: demand for cloud-based services is on the rise. A recent survey by Forrester Consulting found that today's IT landscape of retail, financial and manufacturing sectors is still heavily on-premises. But 63% of supply chain technology buyers and 64% of integration solutions purchasers said they are likely to adopt SaaS (Software as a Service) in the future.[1] This trend should not surprise anyone. At a time when credit capital is in short supply, the financial proposition offered by cloud computing - rapid ROI from low up-front expenditure - is an attractive one.

On the vendor side, meanwhile, the market for cloud services is starting in some ways to echo the dotcom boom, with a wave of new and as yet unproven companies emerging onto the market alongside more established names.

One major player that has been offering cloud-based solutions for more than a decade is Sterling Commerce. The company's cloud strategy delivers two options: on-demand solutions and managed services solutions. While both options are hosted "in the cloud", they differ in the degree of flexibility and control the customer has in extending and customizing the solution and managing upgrades, availability and access.

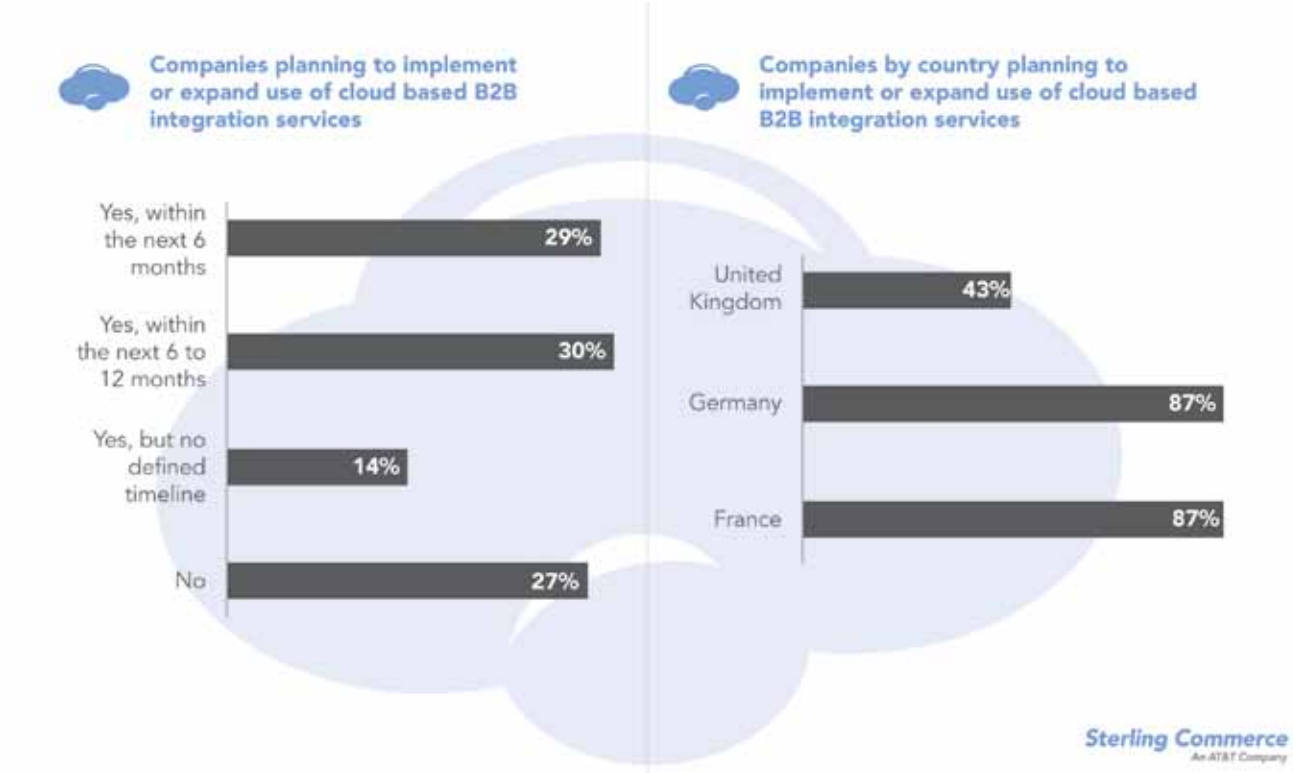
With over half of its solutions already available in the cloud, Sterling Commerce is now making its cloud offerings more comprehensive across the entire product portfolio. Both the Sterling Selling and Fulfilment Suite, a collaborative supply chain solution for managing the entire enquiry-to-cash process, and the Sterling Business Integration Suite, an end-to-end solution that addresses the critical challenges of B2B integration and secure managed file transfer, are now available "as-a-Service".

Delivering these kinds of solutions in the cloud helps companies reduce their IT burden and respond to customer and market demands more quickly. But is there a potential downside?

The abundance of cloud-based services available means that business are likely to end up using different components from different providers, creating a jumble of technologies which may not be able to connect and communicate efficiently. Furthermore, by moving systems out from behind the enterprise firewall, businesses are putting security in the hands of third parties.

The principal challenge of cloud computing will therefore be to integrate multiple cloud services while working securely, effectively and in compliance. In fact, 72% of respondees to a survey carried out amongst senior IT managers across UK, France and Germany plan to invest in a cloud-based B2B integration strategy in order to deliver costs savings and scale their infrastructure. Providers best placed to help organisations fulfil this task, a service we might call "cloud brokerage", will be those who, like Sterling Commerce, already have a proven track record in global B2B integration.

More information can be found at www.sterlingcommerce.com/emea



[1] *"Driving Business Value Through Choice," by Forrester Consulting, commissioned by Sterling Commerce, March 2010.*

Wireless Internet access as an incentive for economic growth in Bulgaria

by Veselin Bozhkov, Chairman, Communications Regulations Commission, Bulgaria

A national strategy for broadband Internet access has recently been adopted in Bulgaria, recognising broadband as one of the main tools for improving economic and social wellbeing. Within the plan, wireless access is seen as a viable alternative for providing Internet connectivity in remote and underdeveloped areas. Across the country, information and reservation services are developing rapidly, projects for mobile learning and e-health have been launched, and mobile commerce services are imminent.

Veselin Bozhkov is Chairman of the Communications Regulations Commission, Bulgaria.

Previously, Mr Bozhkov has held the following posts: Deputy Chairman of the Commission for Protection of Competition; Chief Auditor in the 'European integration and EU funds' Department of the Bulgarian National Audit Office; Chief expert in the Commission for Protection of Competition Planning Department of the City Council; part-time lecturer at the University of National and World Economy - Sofia; lecturer at the International Business College; guest lecturer at Moscow State University 'M.V. Lomonosov' and also at Madrid State University.

Mr Bozhkov holds a PhD in Economics from the Russian Academy of Management.

Over the past decade, wireless communications has strengthened its position worldwide as the most rapidly growing segment of the electronic communications sector. Mobile telephones and portable computers are an integral part of millions of people's lives all over the world and the continuous growth of their usage is a steady trend in both developed and emerging economies.

The mobility of today's customer requires permanent access to information and content for personal and business purposes, which would be impossible without an Internet connection. Thus, widespread broadband connectivity leads to an increase in gross domestic product GDP, employment, competitiveness of national economies and an improved quality of life. In addition, broadband access provides users with the opportunity to fully exploit the economic and social benefits of ICT.

However, significant differences in levels of broadband penetration, both in particular countries and across regions within countries, do exist. Therefore, wireless broadband is becoming an increasingly important factor for bridging the 'broadband gap'. In order to achieve this objective it is crucial to further develop the electronic communications sector policy at European and national levels and to implement a regulatory framework, which in turn will contribute to the overcoming of technological and regulatory barriers to the development of mobile communications services and which will create incentives for investment in disadvantaged regions.

As a full member of the European Union since January 1, 2007, Bulgaria has joined the implementation of the Lisbon strategy, which expects the EU to become the most competitive and dynamic knowledge-based economy in the world. In order to achieve this goal it is essential that "businesses and citizens must have access to an inexpensive, world-class communications"[1]. In November 2009 a national strategy for broadband Internet access was adopted, which recognises broadband as one of the main tools for improving the economic and social well-being of people.

[1] *Presidency Conclusions, Lisbon European Council, 23 & 24 March 2000*

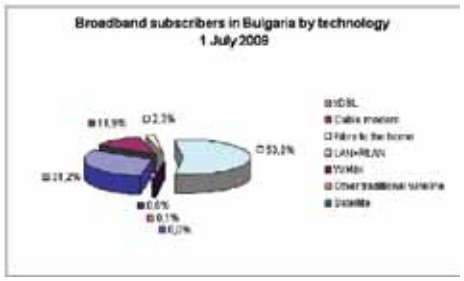
The national strategy will encourage the development of high-speed Internet infrastructure throughout the country, as well as the usage of administrative, medical, legal and educational electronic services. The main objective for the period 2010-2013 is to provide broadband connectivity to residents of remote settlements, including access through wireless technologies. The funding for such projects will be provided through the Operational Programme 'Regional Development' of the EU with the participation of private partners.

The transition to terrestrial digital broadcasting, resulting in released spectrum, is expected to provide an additional incentive for the development of wireless broadband service in Bulgaria and across the EU. The potential use of the digital dividend is related to the development of mobile broadband services, provision of broadband access in less populated areas, rollout of new wireless technologies, etc. Thus, the wireless access is a viable alternative for providing Internet connectivity in remote and underdeveloped areas where the application of other broadband technologies is economically inefficient.

According to expert estimates, despite the negative impact of the global economic crisis, wireless Internet enjoys huge interest worldwide. According to Maravedis[2] in the second quarter of 2009 global mobile data traffic increased by 30 per cent compared to the previous quarter. As reported by the same source, new users of BWA/WiMAX services in the world reached approximately 560,000 in the second quarter of 2009 alone (an annual growth of 74 per cent). An increase is expected also in the number of UMTS/HSPA mobile broadband subscribers, which, according to an Infonetics Research[3] forecast, is likely to reach 1 billion people worldwide at the end of 2013.

Broadband penetration in Bulgaria in mid-2009 was 31 per cent in terms of households and 11.9 per cent in terms of population, which is significantly lower than the EU average. However, the majority of customers still prefer traditional fixed-wire access.

Wireless broadband access in Bulgaria is in its initial phase but in the past two years we have witnessed a steady trend of growth in demand. At the end of the first half of 2009 WiMAX subscribers represented 0.8 per cent of all broadband subscribers in the country (Figure 1) compared with 0.5 per cent in 2008.



Source: Communications Regulations Commission, 2009

Figure 1: Broadband subscribers in Bulgaria by technology, July 1 2009

In the middle of 2009 fixed broadband subscribers using WiMAX technology launched on the Bulgarian market in 2007 still represented a relatively small number (about 7000), but over a two-year period they have increased six times. Four companies offer this service, although the proposed connection speeds are still lower than those of the competing undertakings offering cable, LAN and DSL services.

Evidence of the early stage of development of networks and services provided by 'point-to-multipoint' networks in Bulgaria is the low coverage of WiMAX networks in the country, which reached only half of the population at the end of 2008. In 2009, however, despite the economic slowdown, the WiMAX undertakings plan to invest more than BGN 46.6 million (approximately US$32 million) and cover 90 per cent of the population.

The growth in usage of broadband Internet via mobile devices, offered by all three mobile operators in the country, is considerable. A major factor for mobile operators to seek for new market niches is the high penetration of mobile voice services – 138 per cent in Bulgaria (EU average 120 per cent), which is forcing them to broaden their portfolio and offer services other than traditional voice services, such as data transmission.

Significant growth of mobile Internet service is reported in terms of subscribers with access cards or modems using 3G technologies (UMTS/HSPA). Their number doubled from end-2008 to mid-2009, reaching almost 80,000. Although mobile operators' revenue from this service accounted for only one per cent of their total revenues, its share is increasing with time.

In the short term the demand for mobile broadband service through WiMAX technology, recently launched on the Bulgarian market, is also expected to grow.

Overall, the Bulgarian market for electronic communications follows the global trend of deployment of innovative wireless services. The demand for mobile services and applications is growing as a result of the increased mobility of consumers, as well as the increased capacity of wireless connections. At the moment the fastest-growing service on the market is broadband access through mobile handsets, used mostly for business, entertainment and education. The most popular services are access to email on subscribers' mobile phones for business purposes and personal use, entertainment services (music and video, mobile games, radio, mobile blog, social networks, mobile TV), as well as file sharing. Mobile data offerings (both prepaid and post-paid) bundled with the purchase of a laptop and mobile device are also becoming increasingly popular among residential customers.

Other useful applications such as: information services, ticket reservation services, mobile video observation, notification of different services, navigation, GPS services and remote access to the office are rapidly developing. Projects have also been launched for mobile learning and e-health, enabling the provision of educational and healthcare services electronically. There are also other opportunities for the launching of new services, which represent market niches and potential new sources of revenue for telecom operators. Some of these new services will probably lead to the emergence of completely new industries (e.g. mobile content).

Furthermore, the forthcoming launch of mobile commerce in the country is also expected to turn into a significant incentive for the development of mobile broadband services. Currently, a utility bill payment service via mobile phones is offered on the market. However, in early 2010, a new service will be launched that will provide customers with always-on access to their bank accounts via mobile phones and the ability to make payments to banks and retail outlets.

Thus, wireless access, albeit with a slight delay compared to other EU countries, is gradually turning into a way of life in Bulgaria. It prompts the emergence of new requirements, the supply of innovative services and exciting business opportunities, which might be an engine of economic growth, especially in times of unfavourable economic conditions when traditional industries are experiencing serious difficulties. ●

[2] *Maravedis Press release "560,000 BWA/WiMAX Subscribers Added in Q2 2009, Reaching Approximately 4 Million Total Worldwide", October 2009*
[3] *Infonetics Research, Press release "Mobile broadband services expected to more than double by 2013", September 9, 2009*

Growing mobile broadband adoption with future-proof backhaul networks

by Robin Mersh, COO, Broadband Forum and Nikhil Shah, Head of Wireless Segment Development (Asia-Pacific), Juniper Networks

A new approach to mobile backhaul infrastructure is needed to cope with the explosive growth in mobile data traffic. Any such approach must bridge the gap between legacy and next-generation networks and services. The traditional time division multiplexing approach to mobile backhaul networks has limitations that make it difficult to meet the evolving demands of mobile networks. Multiprotocol label switching, however, is a promising candidate to meet these challenges with flexible, scalable and economical backhaul networks.

Robin Mersh is the Chief Operating Officer of the Broadband Forum and an ex-officio member of the Broadband Forum Board of Directors.

Mr Mersh joined the Forum as COO in July 2006 and is the senior full time executive. He has worked in the telecommunications industry for over 17 years, starting in sales and sales management for Cable & Wireless, moving onto BT, and then working in business development and alliance management for various OSS software companies in the USA.

Robin Mersh received a BA degree (with Honours) from Queen Mary and Westfield College, University of London in 1992.

Nikhil Shah is a VP of International Development on the Broadband Forum Board of Directors and a Head of Wireless Segment Development for the Asia-Pacific region at Juniper Networks. Mr Shah has over 15 years of global telecom industry experience including eight years at Lucent where most recently he developed and managed integrated solutions with Juniper, Riverstone, and OSS vendors.

Nikhil Shah received his Bachelors and Masters degrees in Computer Science from India. He holds a diploma in Business-Management from Mumbai, has completed the Greater Boston Executive Program at the MIT Sloan School in Cambridge, MA, and Advanced Project Management from Stanford University, California.

Mobile operators around the globe are experiencing a traffic boom in their networks. While voice continues to ramp up linearly, data is growing exponentially. It's easy to see why: consumers are demanding bandwidth-hungry mobile services such as Internet access, photo sharing and music downloads.

While a sizable proportion of consumers are still in the process of migrating from 2G to 3G, many operators are already exploring 4G adoption (LTE, mobile WiMAX) in a near term horizon. The 3G market for mobile handsets is growing at a compound annual growth rate (CAGR) of over 27 per cent, and will supersede 475 million units (including HSDPA handsets) by 2010 (Source: 3G Market Forecasts to 2010). At the same time, the global market for LTE handsets is expected to grow from 50k units (2010) to 82m by 2014. Similar growth drivers are expected in other LTE consumer segments

such as netbooks (Source: ABI report on LTE – 2Q 2009).

So why is LTE so compelling? Long Term Evolution (LTE) offers high data rates at a reduced price per bit, better spectrum efficiency and lower latency. In the LTE environment, expected throughput is in the range of 100 Mbps (peak data rate for 20 MHz spectrum allocation) and latency should be less than 10 ms. This can offer a rich user experience for consumers, comparable to what they have at home today with fixed connections, and mobility will be an added advantage. LTE will enable new business models around emerging services such as real-time online gaming, HD video streaming, video blogging and peer2peer file exchange.

The rapidly increasing consumer adoption of smartphones and USB modems is the primary driving factor behind mobile broadband penetration. Increased traffic should reflect higher revenues, though the average revenue per megabit for data service is far lower than for traditional voice and text messaging, yet consumers are demanding mobile broadband services at affordable prices. Due to the significant cost of providing mobile data service, mobile data tariffs today are still relatively expensive compared to fixed line broadband pricing.

This phenomenon has created an imbalance in mobile operator's balance sheets as well as their network capacity planning. To support the traffic growth, mobile operators are scrambling to build out their networks faster than ever before.

Mobile backhaul is a crucial part of the mobile network that links the radio access network and the mobile core network. In the end-to-end mobile infrastructure, no area of the mobile network feels the strain more than backhaul networks (from the viewpoint of scalability, performance, cost and ease of migration from previous generations to the next. i.e. 2G to 3G, or 3G to 4G).

A new approach to mobile backhaul infrastructure

Cell sites are getting increasingly complex as operators rapidly adopt 3G technologies such as high speed packet access (HSPA) and evolution data optimized (EVDO) and are already looking ahead to 4G technologies. Even as they migrate to these next-generation services and architectures, operators realize that the new 4G technologies (IP/Ethernet) and emerging 3G (Asynchronous Transfer Mode – ATM) services will need to coexist with existing legacy 2G (Time Division Multiplexing – TDM) for quite some time. Operators and transport providers must maximize their investment in infrastructure and are always reluctant to take out and replace existing technology. In addition, voice and text are still the dominant revenue generators, and it is hard to justify the expense and disruption of moving subscribers to new handsets.

Cost is a dominant factor in the design of the next-generation backhaul infrastructure. According to Infonetics Research, mobile carriers now spend as much as 30 per cent of their operating budgets on backhaul. As traffic for high-bandwidth data services continues to grow, this cost will increase exponentially. Operators must find a way to reduce the cost of mobile backhaul.

A vast majority of US mobile operators currently use leased T1/E1 lines for their mobile backhaul networks. In Western Europe and the greater part of Asia-Pacific, microwave (TDM encapsulations) based backhaul is widely deployed. Although TDM is known for its high reliability, this legacy approach is expensive and does not scale easily, since the carrier must add an additional full T1/E1 line when existing capacity is exceeded.

Clearly mobile operators need a new approach to cost-effectively scale their mobile backhaul networks. This new approach, in addition to being highly scalable and reliable, must bridge the gap between legacy and next-generation networks and services – providing the flexibility to support both.

The Broadband Forum's initiative for next-generation mobile backhaul networks

The Broadband Forum, a global standards organization focused on end-to-end IP network optimization, is tackling these backhaul challenges via its MPLS Mobile Backhaul Initiative (MMBI). The initiative proposes a framework for the use of IP/Multiprotocol Label Switching (MPLS) technology to transport radio access network (RAN) backhaul traffic over access, aggregation and core networks as shown in Figure 1. It describes possible deployment scenarios and provides recommendations on how to deploy MPLS in each of these scenarios to design flexible, scalable and economical backhaul networks.

The Forum has already published the MMBI Framework and Requirements technical specification and currently the Forum's members are working together to define standards based, interoperable architecture frameworks for 1) 2G and 3G networks and 2) LTE networks.

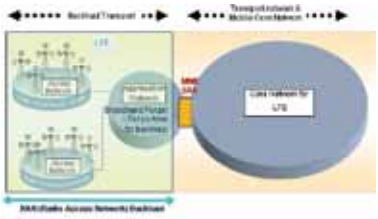


Figure 1: Scope of MPLS in mobile backhaul initiative

The mobile networking industry is recognizing an increasing role for IP/MPLS as the best strategic solution for backhaul. IP/MPLS offers the combination of cost, scalability and flexibility that mobile operators need to leverage existing investments while building out capacity for the burgeoning data traffic. IP/MPLS supports features such as:

- Co-existence of TDM (2G), ATM (3G) and Ethernet (4G) transport using pseudo-wire technology;
- Strong ATM-like Quality of Service (QoS) and traffic engineering techniques;
- Rapid service restoration after failure detection by leveraging fast-reroute, operation administration and maintenance (OAM) and failure troubleshooting tools; and
- Future-proof investment for migrating from 3G to all-IP based 4G/LTE.

Many mobile carriers have adopted IP/MPLS in their core network, as it is a familiar and proven technology that can be easily extended to the cell site. The transition to IP in the backhaul network is already taking place and will track with the accelerating growth of data-based services. Moving to IP/MPLS is simply a logical extension of a technology already in use in many mobile cores.

Many equipment vendors offer MPLS features within their products; however the lack of commonly agreed frameworks, architectures and deployment scenarios often results in additional avoidable costs in deploying MPLS services. To address this, the Broadband Forum also offers a certification program for vendors that enables service providers to choose standards-based, deployment-ready products for their backhaul

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"Synchronization is critical to maintain good voice quality, reduce interference and manage call handovers between base stations. There are several approaches to achieve this timing synchronization, including synchronous Ethernet, adaptive clock recovery and IEEE 1588 v2."

solutions, which empowers them to deploy backhaul solutions quicker.

Evolving the network from 2G/3G to 4G (LTE)

Broadband Forum is defining two architecture frameworks, one for 2G/3G and other for 4G/LTE, corresponding to the 3rd Generation Partnership Project (3GPP) work. In 2G/3G RAN, base transceiver stations (BTS) or simply base stations handle the radio interface with the mobile station and the base station controller (BSC) manages one or more base stations to provide control functions such as radio-channel setup and handovers. A hub-and-spoke topology enables communication from base station to controller and controller to base station as shown in Figure 2. The topology in 2G/3G RAN is also known as centralized topology. In this architecture, T1/E1 connections (TDM for 2G and ATM for 3G) between BTS and the BSC are carried over IP/MPLS based packet backhaul using pseudo-wire technologies.

Figure 2: 2G/3G RAN topology

In LTE RAN, the base station itself includes controller functionality and communicates with another base station directly via any-to-any topology. LTE base stations communicate with access gateways (aGW) via a star topology as shown in Figure 3.

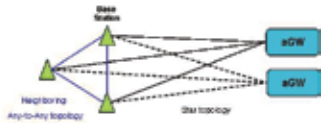

Figure 3: All-IP LTE RAN topology

Coexistence, interoperability, roaming, and handover between LTE and existing 2G/3G networks and services are inherent design goals, so that full mobility support can be given from day one. In LTE networks, IP is the only protocol used to support connectivity between the different mobile nodes as defined by 3GPP. To achieve any-to-any topology for LTE backhaul, the Broadband Forum has recommended leveraging Layer 2 virtual private networks (L2VPN) and Layer 3VPN based solutions (such as virtual private LAN service (VPLS) and border gateway protocol (BGP)/MPLS based VPNs).

Hybrid IP/MPLS and TDM backhaul architecture for 2G/3G

In a hybrid model, carriers can build out capacity to accommodate data traffic growth without having to re-engineer the voice network (leave voice on existing TDM networks). Mobile operators can leverage cost-effective alternatives such as metro-Ethernet networks or existing assets to support data traffic (for example, using the DSL infrastructure in Western Europe to offload the data traffic from the cell site). Deploying a hybrid model allows operators to develop greater familiarity with IP/MPLS technology and integrate voice traffic into the packet-based infrastructure at a later date.

Timing synchronization

Synchronization is critical to maintain good voice quality, reduce interference and manage call handovers between base stations. There are several approaches to achieve this timing synchronization, including synchronous Ethernet, adaptive clock recovery and IEEE 1588 v2. Network architects must consider which of these methods to use and ensure that their equipment vendors provide the necessary support while migrating to packet based backhaul.

To assist in this area, the Broadband Forum is assessing various requirements for supporting clock distribution to the base stations, including frequency, phase and time synchronization. The Forum is looking at different clock distribution scenarios over the mobile transport network, and provides recommendations in the context of QoS, resiliency, and efficient distribution based on topology (point to point or point to multi-point).

Matching SONET/SDH type reliability with IP/MPLS

Synchronous optical networking (SONET) and synchronous digital hierarchy (SDH) is known for its high reliability and fast recovery from failures, and therefore, carriers expect that new packet based backhaul will match that level of resiliency. IP/MPLS has already proved itself to be as reliable as SONET/SDH in many carrier deployments. The combination of functional recovery routine (FRR) and carefully engineered primary and secondary label switched paths (LSP) allows IP/MPLS-based network to recover in tens of milliseconds – on a par with SONET-based networks.

Managing and troubleshooting IP/MPLS-based networks

In the past there was an impression that IP/MPLS was difficult to manage and complex to troubleshoot, resulting in higher operating expenses. Carriers have been understandably reluctant to move to a new transport technology unless they were confident in its OAM tools.

However, today the management capabilities of IP/MPLS are extensive. With years of successful service provider deployments around the world, IP/MPLS now includes a robust set of standards-based OAM tools that greatly reduce troubleshooting time, such as MPLS Label Switched Path, ping, trace route, virtual circuit connectivity verification (VCCV) – test pseudo-wire state as well as bidirectional forwarding detection (BFD) – a hello protocol to connectivity, amongst others.

The traditional TDM approach to mobile backhaul networks has limitations that make it difficult to meet the evolving demands of mobile networks. However, IP/MPLS has proven itself over the years in fixed-line service providers as well as in mobile core networks. By transitioning mobile backhaul infrastructures to standards-based IP/MPLS solutions, operators can evolve from 2G to LTE, reduce operating expenses, scale efficiently, and most importantly, position themselves to compete effectively for the coming tidal wave of data-rich mobile services. ●

How cloud communications is changing today's business

by Dorota Oviedo, Research Analyst, Frost & Sullivan

Unified communications simplifies the user experience by integrating several real-time and non-real-time communication tools. Cloud-based unified communications takes this further by hosting applications as a shared service provided to end customers over a network, removing the need for on-premise equipment. Such services have great appeal during the current economic downturn and are expected to grow substantially over the next five years.

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She focuses on monitoring and analysing emerging trends, technologies and market dynamics in the unified communications and collaboration market in Europe. Prior to joining Frost & Sullivan, Ms Oviedo was a Research Associate at Addison Whitney and a Research Assistant at the Economics and Geography Department of the University of North Florida, Coggin College of Business.

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The concept of hosted enterprise IP communications services was first introduced over a decade ago, but has only started to gain mainstream acceptance in recent years as modern communications have become increasingly more sophisticated and thus difficult to manage in-house.

To the majority of the business world, Unified Communications (UC) is still a new buzzword. In fact, the technology tools that form UC have been in place for several years. However, it is only recently that enterprises have sought to integrate various telephony and desktop communication tools. UC allows all these different systems to work together in real time and consequently helps streamline all communication needs.

There is a certain amount of market confusion around the definition of UC. Frost & Sullivan defines a UC application as an integrated set of voice, data and video communications, all of which leverage PC- and telephony-based presence information. The underlying characteristic is that UC applications are meant to simplify communications for the end user by making it easy to 'click' to communicate or 'drag-and-drop' to communicate.

Organisations have several options for deploying UC technology, these include:

- Integrated best-of-breed on-premise applications from a variety of vendors, which could include one vendor to deliver instant messaging and PC presence, another to deliver audio/video/web conferencing and a third to deliver Voice over IP (VoIP), telephony presence and related services like unified messaging. It is difficult to excel in every niche and so some vendors focus on certain applications;
- An all-in-one application from a single vendor to deliver all presence information, chat, conferencing and voice capabilities;
- A hosted or managed service including all or most UC applications; and
- A hybrid implementation where some UC applications are deployed on the premise and others are hosted, but all are integrated for a unified user experience.

The multiple vendor solution currently represents the most popular deployment method. The hosted and managed services market segment is relatively small right now but is expected to grow rapidly in the near future.

UC focuses on simplifying the user experience by integrating several communication tools. Cloud-based UC is the seamless convergence of both real-time communication media (such as instant messaging, telephony or conferencing) and non-real-time communication media (such as email, voicemail or calendars) without the need for on-premise equipment.

Cloud-based UC represents a deployment model where the application is hosted as a shared service and provided to end customers over a network. Practical implementations of UC in 2010 are based on presence capabilities

Intelligent Mobile Connectivity for Remote Users

'The Altobridge Remote Community Solution'

Expensive satellite transmission used for backhauling calls, has been the major barrier facing Mobile Network Operators the world over when considering mobile service roll-outs to remote user groups in emerging markets - but not anymore.

No challenges, just solutions

Solving the challenges of transmission – and many others besides – is the Remote Community Solution from Altobridge, which delivers a more 'Intelligent' Base Transceiver Station (*BTS*) site to the MNO than any other solution.

Like peas in a pod, the new Altobridge POD BTS at the heart of the Remote Community Solution differentiates the system from others by delivering a series of intelligent 'green' functions' to the installation: Intelligent Transmission Management, Intelligent Power Management, an Intelligent Data-at-the-Edge™-of-the-network capability, and efficient handling of the BTS radio resource. All of these functions enable a compelling and unbeatable 'green' business case for a more efficient, low-cost, intelligent and profitable BTS site.

Intelligence Defines Altobridge Solutions

Intelligence designed into the Altobridge technology manages and restricts the use of expensive transmission bandwidth by combining two of its patented technology platforms. First is the Altobridge Split Architecture™, which ensures an 'on-demand' use of the satellite link when only revenue-generating traffic is occurring, and uses the lowest level of bandwidth in the industry at 5-8kbps per call. This system not only cuts transmission costs, it also cuts power consumption, which is further reduced with a 'night mode'.

The second is the Altobridge Local Connectivity™ Platform, which enables the intelligent switching of all local calls locally at the base station or handover between base station clusters. This eliminates unnecessary transmission costs, double satellite hops and improves network quality thereby encouraging longer call holding times resulting in increased call revenues. As up to 70% of calls can be local, significant opportunities exist to reduce transmission costs in all areas of the network.

The systems based on these platforms have proven to significantly cut backhaul and power costs and have been successfully deployed on wireless telecoms networks, aircraft and ocean-going vessels around the world. The benefits of these two technologies, combined in the Remote Community Solution with the POD BTS and including a Fully Managed Service offering and VSAT bundling, make this the most cost-effective solution for rural communities on the market and one which is being used in the Far East by leading mobile operators, including Maxis in Malaysia and MobiCom in Mongolia.

Green Power

One of the strengths of the Altobridge Remote Community solution is that it has one of the lowest power consumption figures on the market. Intelligent power optimisation is crucial to reducing power consumption. For solar installations, the solution has an intelligent 'Night Mode' reducing power use at night during low traffic periods. The intelligent control of the BTS can be used to vary services and coverage at night, or during periods of low power availability. Further power savings are achieved through intelligent management of the power amplifier.

A Perfect Acquisition

Following the strategic acquisition of the ADC Mobile Network Solutions base station and switching business in December 2009, Altobridge can now offer customers a broader portfolio of products and services resulting in even greater cost savings. These new offerings include both a complete end-to-end network solution and network extensions by interfacing with existing networks, both are available with Fully Managed Services.

Commenting on the acquisition, Mike Fitzgerald, Altobridge CEO, said, "When we acquired the Mobile Network Solutions division of ADC at the start of 2010, along with its full hardware portfolio, we acquired the perfect hardware solution with which to integrate our technology. By doing so, we can now offer MNOs the most intelligent, turnkey system for delivering lower transmission costs, lower power consumption and optimum returns from the delivery of mobile services to remote communities."

The Altobridge Remote Community Solution has been deployed in a number of places in Africa

Altobridge has three main business units: Remote Community solutions for MNOs, Software / IP licensing for vendor channel partners, and Government Solutions for private network requirements, the latter with its Secure Portable GSM Network in operational service with leading North American Government agencies. ●

For more information visit: www.altobridge.com

and include integration of telephony, instant messaging and conferencing, with companies adding more complex communications tools over time.

Most businesses still do not have a clear strategy for how UC will benefit their organisations. They need to be able to identify those UC components that will benefit the company the most and the way in which such components can improve or influence the bottom line. One of the clear benefits that cloud-based UC services offer is that they allow companies to experiment with different UC applications to determine the most beneficial elements for a specific organisation or even for user groups within the organisation.

Cloud UC services in practice

In December 2009 Cisco and BT made an interesting announcement regarding the launch of what they called pioneering hosted unified communications service. This was the first enterprise-class offering of this type on a global scale. Using cloud-based technology, Cisco and BT will deliver converged voice, mobile and data services, with utility-based, per user pricing and options to include endpoints and call traffic.

The offering is based on Cisco's Hosted Unified Communication Services infrastructure and a provisioning and service activation service fulfilment solution from VOSS. While it is not yet a full-blown UC solution, the service platform is designed as a basis to enable capabilities extension later on.

The service could not be launched at a better time because of the current economic conditions. The general macro-economic environment has a significant impact on the cloud-based UC services market. While traditional enterprise communications vendors see a significant revenue decline, economic recession generates strong interest in alternative delivery methods of communications.

During an economic downturn, increases in cost and a decrease in the availability of capital favour solutions based on operating expense (Opex). Companies have limited capital available for investment, but, at the same time, consider UC deployment as they look for ways to cut costs and increase productivity.

Deploying cloud-based UC services allows businesses to limit their upfront capital expenditure. Moreover, cost efficiencies are achieved in terms of moves, adds and changes to the system. Additionally, businesses can reduce their maintenance and support staffing requirements. Economic downturn actually creates a market opportunity in this instance.

Market to grow

Frost & Sullivan has recently analysed cloud-based UC services in Europe. While currently the market is estimated at 47 million euros, it is likely to grow rapidly to reach 1.6 billion euros in 2015.

The market is expected to grow at a compound annual growth rate as high as 79 per cent from 2009 to 2015 (Figure 3). Although increased market competition will create downward price and margin pressure, the average revenue per user is expected to gradually increase with the growing sophistication of service provided.

The research shows that both small businesses and large enterprises are interested in communications delivered as a service. In the case of small businesses, lack of internal IT and telecom skills is a major factor driving market growth. Although traditional Centrex services have not gained much popularity overall in the market they present an attractive alternative for small businesses.

Market drivers include economic recession and globalisation

Currently, cloud-based UC services have much greater appeal to the small and medium business (SMB) segment as only a few SMBs have the resources to buy, install and manage sophisticated data centres and communications applications. Their employees, though, are just as mobile and multitasking as those in large enterprises.

The elimination of complexities resulting from managing and integrating multiple applications and vendors, as well as testing a variety of UC applications, is attracting enterprises. While SMBs look for simple service bundles, large enterprises have very specific needs and expect a wide selection of advanced features that they can choose from.

The globalisation trend is also boosting cloud-based communications services. The economic globalisation process has an immense impact on the business environment. National and regional economies are increasingly integrated into the international economy through trade, FDI, capital flows, migration and the spread of technologies. Companies are also increasingly global, with offices located all over the world. This geographical dispersion creates the need for streamlining platforms.

As an alternative to complex and expensive customer premise-equipment migration, cloud-based communications services can be introduced, delivering the same capabilities to all offices around the globe.

The increased availability of hosted UC solutions and both vendors' and service providers' marketing efforts increase customer awareness. Additionally, UC market leaders promote the software-as-a-service model in general. Cisco and Microsoft are the two leaders in the nascent UC market with their expertise in IP telephony and IT respectively. They both increase the customer awareness of cloud-based solutions and consequently accelerate customer adoption by promoting cloud-based services. Cisco had advanced into the web conferencing space when it acquired the industry leader, WebEx. WebEx Connect brings together essential collaborative applications into a single interface. Microsoft in turn promotes its hosted messaging and collaboration solutions with Microsoft Online Services.

Cloud-based services offer businesses great level of flexibility. Organisations can rapidly enhance or expand their ICT capacity by adding new services without investing in the development of new skills or deploying new hardware and software. Businesses can decide on the number of seats they need at a given moment and the locations to which they want the capacity to be delivered. They can scale up or down in real time. It enables them to rapidly adapt to sudden changes in business volumes or business strategies.

On the other hand, reliability and security issues are among the main concerns of users. However, service provider brand name, service level agreements and successful deployment references are helping in winning customers over. Eventually, the cost-effective 'pay as you go' model of cloud services will represent the determining factor, especially in the SMB sector.

While the European cloud-based UC services market is still very fragmented, all major enterprise communications providers and vendors show interest in tapping into this opportunity in order to generate new revenue streams and leverage strong customer demand for Opex-based solutions.

Although the on-premise model with its control and security advantages will still dominate the enterprise communications market in the nearest future, offerings such as that from Cisco and BT have great market opportunity as the cloud-based services' share is expected to increase significantly. It will be exciting to see how the communications services market will develop. ●

Next generation services and the consumerization of IT

by Russ Daniels, VP and CTO, HP Enterprise Services

The Internet is evolving into a new phase characterised by 'everything as a service' and enabled by the cloud. This involves a shift to technology-enabled services which will allow businesses to differentiate and compete. The scale is vast, entailing massive amounts of data and inexpensive large scale computing resources, and will open up new opportunities for social, business and technology innovation. But such services demand a new approach to design and will require a hybrid service delivery model, with services delivered through a mixture of internal and external infrastructures.

Russ Daniels is Vice President and CTO of HP Enterprise Services. Previously, he was CTO of cloud services strategy. Mr Daniels has more than 25 years of experience in the technology industry, specializing in software architecture, enterprise management, and software development methodologies. In 2006, InfoWorld declared Mr Daniels one of the industry's top 25 chief technology officers.

Russ Daniels holds a bachelor's degree from Ohio University.

The vision of 'everything as a service' enabled by the cloud, represents the next phase of the Internet's evolution. Increasingly every aspect of our experiences as individuals will be enhanced through technology-enabled services. For businesses, providing these services will become core to their ability to differentiate and compete in the markets they address. Public institutions will depend on these services to achieve their missions.

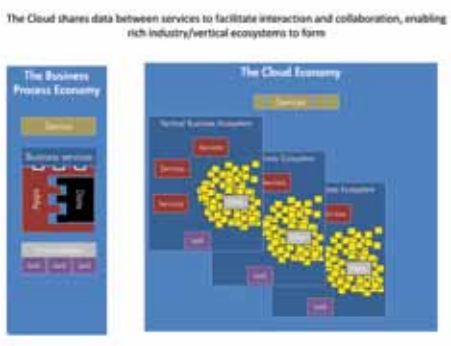
More than alternative ways to deliver the same business process automation solutions all organizations depend on today, new classes of services – exploiting massive amounts of data and inexpensive large scale computing resources – will facilitate rich interactions across complex ecosystems, opening vast new opportunities for social, business and technology innovations.

As always these new capabilities will require leaders to navigate uncharted territories, balance the immediate and urgent with the longer term and strategic, understand new technologies, and find the mix of risk and potential reward that best satisfies their organization's objectives.

In this paper we discuss some of the business, organization and technical issues.

Contributing technology trends

This shift to technology-enabled services depends significantly on the industry's shift to converged infrastructure. Over the next few years the only way to distinguish a server, storage, or network device will be to interrogate its current role, based on the software running on it and its configuration. These devices will be readily repurposed through automation technologies, allowing them to adapt to changing demands and priorities. Along with ubiquitous and increasingly high-bandwidth connectivity, this converged infrastructure provides us the ability to flex compute and storage capacity, supporting the required scale of data analytics at affordable cost.



It's easy to imagine this infrastructure capacity to be highly centralized, benefiting from the economic advantages of large scale delivery. Our view is that in fact this capacity will be provided in a highly distributed and localized way, exploiting the energy efficiency of containerized computing pods. These large scale but modular packages can and will be distributed widely. Introducing the concept of 'the cloud' didn't change the laws of physics and eliminate data locality as a technical requirement, nor political considerations and regulatory requirements that require certain processing to occur within specific political boundaries.

New design approaches

Addressing the opportunity to use technology-enabled services for rich interactions with customers, partners, suppliers and other ecosystem participants requires a new approach to designing such services and their implementations. For the services themselves we cannot define them as business processes (such as order to cash or concept to production), because when you move beyond the organization boundary you lose any ability to dictate business process (not easy even within an enterprise, as we all know). We are developing a design approach addressing this challenge, one that focuses on roles and responsibilities as the highest order abstraction. Our approach captures these concerns in a technology-independent description that maps into conceptual, logical, and physical designs generated by applying structured choices and constraints when moving from one level of design to the next.

At the implementation (logical and physical) level these services must conform to a set of design rules. They must be scale independent (able to handle low to high levels of demand economically), they must manage data through services independent of any specific application (limiting the need for complex application integration and master data management middleware), and they must rigorously separate information and programmatic functionality from any specific user experience (to deal with the explosion of access devices). These design rules are not satisfied by traditional applications, and in fact are not easy to satisfy for business process automation that requires support for transactional integrity and precise answers.

These new services tend to provide insights that are probabilistic, predictive and 'good enough', inadequate for financial account or inventory management but well suited for recommendation engines and similar purposes. For example, they're ideal for identifying the best offer to make to a potential customer. When such an offer is accepted, the order and fulfilment will move typically to a traditionally architected business process automation solution.

The hybrid enterprise

This mix of new services with existing services is one of the many reasons we're convinced that our customers will operate in a hybrid service delivery model, consuming services delivered in a mix of internal and external infrastructures, and a mix of existing and new designs. Organizations will for the long-term execute as Hybrid Enterprises. The IT function plays an even more challenging role in this future, tasked with sourcing and delivering technology-enabled services in a range of delivery models. Making the right sourcing choices will require sophisticated portfolio management that can match business requirements with the appropriate sourcing model, internal, external, dedicated, shared, single or multi-tenant. It also requires the right governance model to assure that the resulting mix provides the expected business outcomes. This service portfolio must include the productivity and collaboration services used by employees, especially as we address the consumerization of IT.

Consumerization and cloud-connected devices

Many organizations are responding to the gap between the user experiences employees have in their personal lives compared to those in their work lives. The ease of connecting with people and services emerging in our private on-line experiences contrasts starkly with the limited and complex solutions found within most large organizations. At first blush the solution is obvious: let's just bring the consumer products inside. Doing so not only can improve the employee experience but can decrease the cost to the organization of providing the redundant and sometimes inferior end-user devices employees are forced to use today.

Our view is that these devices can no longer be considered in isolation. Instead devices of all types will be 'cloud-connected', with much of the functionality integral to the user's experience not contained within the device, but delivered through Internet-based technology-enabled services accessed through the device. These services will be bound to the device with varying degrees of flexibility as device vendors experiment with different business models, partnerships and bundling looking for their particular sweet spot of market differentiation, customer 'stickiness', revenue and profit.

The additional challenge for IT organizations is clear. Rather than simply defining policies for devices they will have to understand the policies for the devices in combination with the services bound to them. For a device alone one can imagine the ability to send a message to wipe its content when lost to be enough to address the potential security concern, but if the device provides access to services the policy must extend to those services. Banning their use might make the policy easy to express but undermine the expected user experience benefit. Allowing their use necessitates a much broader policy consideration.

Summary

Every organization's effectiveness increasingly will depend on the technology-enabled services that it uses to generate value. The IT function's capability to make the right sourcing choices will be critical to optimizing the organization's results. This expands IT's purpose in two ways: first, as these services become a larger component of how businesses differentiate and how organizations produce their outcomes, making the right decisions about designing and sourcing these services becomes more central to the business. Second, expanding the use of technology from automating business process to facilitating rich interactions within and without the organization requires understanding how to leverage consumer innovations in the core business. Although the latter question can appear to centre on devices, in fact it's just another face of the broader challenge of managing the service portfolio.

Reaching for the cloud

by Jürgen Walter, Head of Business Solutions, Nokia Siemens Networks

Cloud computing has to demonstrate it is robust and reliable enough for the needs of the telecom business. Cloud computing for telecom will need to be implemented in a controlled and planned manner in order to avoid problems experienced in the past with public clouds and disaggregated value networks. Security and quality of service are critical success factors that have to be considered. Defining roadmaps and service level agreements will be key to operators' success.

Jürgen Walter is Head of the newly formed Business Solutions Business Unit at Nokia Siemens Networks and is a member of Nokia Siemens Networks' Global Executive Board. He previously headed the Converged Core business at Nokia Siemens Networks, was Head of Integration Planning of Nokia Siemens Networks and Head of Strategy at Siemens Communications.

Jürgen Walter holds a degree in electrical engineering from the Technical University of Munich.

A few years ago, when Amazon announced its Elastic Cloud Compute (EC2) web service allowing customers to 'rent' computing resources from its data centre, few realized that cloud computing, a concept that the top IT players had to embrace to defend their business, could bring major benefits to the telecom sector. The concept envisions a day when businesses and consumers will no longer need to own and manage technology infrastructure, platforms and software applications themselves, but use virtualized resources that are stored in the 'cloud' or the Internet, as a service and pay for what they use. Therefore for the telecom industry, which is facing major revenue and growth challenges and is in need of a transformation, cloud computing clearly is an opportunity worth considering.

The first signs of future growth can already be seen. Several European providers are already bundling cloud services with connectivity. Last year, Vodafone in partnership with EMC-owned Decho, launched a data backup service for consumer and businesses on its European network.1 Orange Business Services, the business-to-business wing of France Telecom has also recently announced its plans for the cloud for enterprise customers.2 The opportunities are limitless. For businesses, telecom operators could offer real-time applications, collaboration, security, infrastructure, cloud-ready networking and vertical solutions for specific industries.

However, its acceptance within the industry so far, has been limited. A key reason for this is that apart from communication service providers (CSPs) needing to identify cloud-ready applications both in IT and telecom, telecom services are dependent on latency and availability and it hasn't been proven whether cloud computing is robust and reliable enough for the needs of the telecom business. In addition, security of cloud services and quality of service are critical success factors that have to be considered.

That said, while cloud computing may not be a mega trend within the telecommunications business today, its benefits make it a viable bet for the future. It can equip CSPs with the flexibility needed for rapid service innovation, so that they can introduce new services and meet evolving consumer needs; it can also help improve internal efficiencies, enabling operators to save costs and increase their profitability.

Need for the five nines

To understand the factors that make its adoption challenging, we need to take a closer look at the needs of subscribers and service providers, and the way that telecom systems have been built. Communications infrastructure has emerged as a lifeline for consumers and even economies, and telecom-grade systems are designed to support real-time applications where five-nine's (99.999 per cent) availability is a pre-requisite. That translates to a total downtime of just about five minutes in an entire year, an outage benchmark that Google would not even recognize in its service level agreement (SLA).

A CSP not having access to a subscriber's usage details for one hour can lead to chaos, with the business losing revenue and even precious customers. A practical example is prepaid charging, which needs to be 'always-on' as CSPs rely on real-time information about the credit status of the prepaid account while determining if they can allow calls, messages and other services. That's not all - imagine you as a subscriber not having access to a mobile service for one hour – and the discomfort this would create for you.

Huge potential for cloud computing in telecom

For CSPs, the promise of cost efficiencies, the ability to create differentiated revenue models and offer new services to customers indicate that cloud computing can help drive business

transformation within our industry, and is an idea whose time will come. However, the journey will not be easy and will require a close look at many aspects. Above all, the industry will need to invest in building a winning ecosystem.

Taking an outside-in approach

Rule number one is that customers should be in the driver's seat towards clouds. CSPs need to decide the best way to capitalize on the cloud computing opportunity. They need to leverage their knowledge of the network, customer needs and how the enterprise customer and their network and services need to integrate in an end-to-end process. The opportunity is huge. Verizon Communications in the USA has adopted a virtual approach to enterprise resource planning, consolidating hardware and other IT components, by implementing cloud computing for internal processes. The CSP has reduced operating costs by one-third and improved IT performance by 400 per cent.3 Taking this a step further, it could re-deploy these cost savings towards investments in affordable, high-value cloud services, to create new revenue streams for itself.

This is similar to what Australian CSP Telstra is doing with its T-suite service. With T-suite, Telstra's customers can access a range of applications such as email, collaboration and conferencing, data security, customer relationship management (CRM), financial and human resource management, as well as online storage with a software-as-a service (SaaS) model, for a monthly subscription fee.4 It works well for small business customers who can keep their IT costs down, paying only for what they use. Telstra and its software business partners, in turn, have a new revenue model, with vast business potential.

Realizing the value within – one step at a time

By migrating applications to the cloud, operators can reduce staff training costs, reduce management burdens, and focus more on their core business operations. For most operators, the internal transition will begin with non real-time telecom systems that are quite similar to IT systems. Most applications such as CRM, service and content delivery, management systems, many departmental systems, and value added services (VAS) fall within this category. For example, offline billing / invoice generation for post-paid customers is ideal for starters, and also nourishes billing vendor competition.

Telecom operators can also expose their assets as a service in a secure and trusted manner to their business partners. Telecom has been subject to server multiplication to support the increasing quantity of voice related applications.5 While legacy telecom infrastructure may not be migrated easily, some telecom hardware is already moving to standardized IT hardware and there, one can start to leverage virtualization and cloud computing. As the strict definitions of IT and telecom gradually fade, there will be fewer differences, making the switch to cloud computing easier over time.

Real-time applications on the other hand will move to the cloud only when technology evolves to guarantee high reliability and availability – which means there are few and minimal time gaps that disrupt service delivery. Standards set by the telecommunications industry have set the latency or time gap allowed for charging on carrier-grade networks at 150 milliseconds. The fact is that today, this cannot be achieved by the best virtualization middleware. Telecom subscriber data management systems and gateways are similar examples. Technology evolution is naturally fast and in a few years time, the situation is likely to be very different.

Choosing the right model

Once the decision on what needs to be moved to the cloud is made, CSPs need to consider what kind of cloud services would make most sense. There are several options that can be considered – private, public or hybrid clouds. Personally, I believe that private clouds are ideal for CSPs. A private cloud is a CSP's internal computing architecture that supplies cloud-based or hosted services to their customers and business partners. Private clouds offer the benefits of virtualization without the inherent risks – loss of control over data stored in the cloud, security, service availability and overall control over performance, as it is managed by the organization it serves. In the foreseeable future many telecom applications will move to private clouds, like previously mentioned VAS servers, reporting and management systems, and service delivery, just to mention a few.

Public clouds like those offered by service providers such as Amazon, Microsoft Azure and Google are more suitable for non time-critical applications such as CRM, web, email and remote meetings. These services are generally available to the masses and charged per-use or delivered free – such as Google Docs. Users of these services typically cannot expect the same standards of quality of service and security as those who use private cloud services. The benefits of public clouds include higher economies of scale and a rich ecosystem of third party offerings. On the other hand, they have different standards for reliability and their SLAs on outages may not meet enterprise needs.

Finally, there's the hybrid cloud concept, which is a few years away, but is expected to be the way ahead. A hybrid cloud environment will see the co-existence of multiple internal or external service providers, where non-critical information will reside with a public cloud service, while mission-critical applications will be hosted on the operator's internal or private cloud.

Disciplined implementation

To live up to its promise, cloud computing for telecom will need to be implemented in a controlled and planned manner. Examples from the past indicate that public clouds and disaggregated value networks may lead to problems. In the USA, a device backup service was provided from the cloud, without a correctly planned end-to-end SLA chain, and due to this many people lost their device data. Such end-to-end SLAs are an opportunity for quality focused CSPs. There are also technology factors such as understanding what applications are available for the cloud or what model should be implemented, to consider. Finally, a concept like cloud computing raises several policy issues, which existing regulations do not cover. Customers will expect protection of privacy, data security, reliability of service and clearly defined liabilities in case of disruptions of cloud services, all of which will need revisions in IT and telecom regulations.6

Given the potential impact of cloud computing on the telecom industry, communication service providers should explore cloud computing but with a clear roadmap in mind. It would be prudent for them to simplify their architecture and application landscape and decide what needs to be moved to the cloud, before they invest in the technology so they get it right. So when my customers ask me, "Should I move to the cloud?" my response usually is, "Yes, it is time to start the journey." ●

1 http://www.vodafone.com/start/media_relations/news/group_press_releases/2009/pcbackup.html
2 http://www.itwire.com/component/content/article/132-virtualisation/25982-orange-business-services-launches-cloud-computing-service
3 http://www.lightreading.com/document.asp?doc_id=185578
4 http://www.telstrabusiness.com/business/portal/online/site/productsservices/tsuiteapplications.11003
5 http://www.ucstrategies.com/unified-communications-strategies-views/cloud-computing-for-telecom-why-now.aspx
6 http://www.umiacs.umd.edu/~jimmylin/publications/Jaeger_etal_2008.pdf

Why CSPs should embrace the cloud

by Gordon Rawling, Senior Marketing Director, EMEA Business Development, Oracle Communications

The hype surrounding 'cloud computing' has steadily increased, but corporate customers on the whole have yet to be convinced of its merits. Communication service providers have much to gain from cloud computing through the generation of new untapped revenue streams. However, the business issues surrounding the cloud and its relevance for communication service providers raise many questions that still need answering.

Gordon Rawling is Senior Marketing Director for the EMEA region at Oracle Communications. Prior to Oracle Mr Rawling worked for Amdocs where he was instrumental in the development of the company's Integrated Customer Management vision.

Gordon Rawling has more than 17 years of experience in IT service delivery and marketing.

The last few years have seen some radical changes occur for communication service providers (CSPs), both in terms of technology deployments and business approaches. For many CSPs, cloud computing represents the next leap forward in delivering new and innovative services to business customers, and presents an opportunity to generate new revenue streams. However, there are still many unanswered questions from businesses about how the cloud will service their needs.

Cloud classification: telling a cumulus from a nimbus

Cloud computing encompasses a number of different enterprise deployment models including: the public, private and hybrid clouds. The definitions of cloud are massively complex, and the industry as a whole has come to no real agreement; so for the purpose of this article the terms have been defined as follows:

- Private cloud: An in-house cloud deployed by an enterprise to service a certain number of people behind a firewall;
- Public cloud: Available to the general public or a large industry group, and owned by an organisation selling cloud services; and
- Hybrid cloud: A cloud computing environment in which an organisation provides and manages some resources in-house and has others provided externally.

Before deciding which model to implement, businesses need to audit and understand their IT infrastructure requirements to ensure they make an informed and correct decision.

How CSPs can generate revenue from the cloud

For CSPs, the cloud represents a great opportunity to open up new revenue streams. Getting business end-users to operate though the cloud will greatly increase their network traffic and transport revenues.

CSPs provide the connection fabric that links to the 'cloud' element of cloud computing. It is this capability that puts them in a unique position to take advantage of the cloud, and sets them apart from other cloud vendors.

The first two revenue generating opportunities open to CSPs are derived from the same function. By selling networking capabilities as a service to enterprises, CSPs can charge for a given level of connection quality to a cloud provider. Similarly, CSPs can also charge cloud-based providers for delivering agreed levels of network service quality.

The third revenue generating stream is more complicated; however the return on investment is much greater. This involves CSPs becoming providers of the cloud themselves, offering customers IT resources directly. Verizon and Orange Business Services are both examples of global operators who have recently launched their own cloud offerings to businesses.

Private versus public clouds

On paper, the cloud is the ultimate in hardware consolidation for the enterprise, meaning a private cloud can seem quite appealing to a customer. Many people are arguing that CSPs have been too slow to respond to market demand for cloud services, and this has prompted businesses to ask

what the benefits of public clouds are against establishing private cloud capability.
Each model has its own benefits, with the public cloud providing lower upfront costs and enhanced economies of scale, compared to the private cloud offering greater control over security, compliance and quality of service. Ultimately however, the capital expenditure (CapEx) associated with deploying a private cloud would effectively eliminate any potential cost savings it might deliver through elasticity of service and economies of scale.

The power of the public cloud

Economies of scale, elasticity and low cost of ownership are among some of the benefits presented to businesses by public clouds. However, there are also some more practical benefits provided by the public cloud in terms of the physical cost of storage that should not be underestimated.

Real estate and utility costs, such as electricity and air conditioning can be very expensive. By supplying storage services to customers en masse, public cloud providers can take advantage of the cost savings in utilities expenditure through economies of scale.

The CSP-powered cloud

For CSPs to truly capitalise on the opportunity presented by cloud computing, they need to become cloud providers themselves. Given the history CSPs have in service innovation, their public cloud offerings have the potential to significantly increase the value of their networks and generate new revenue streams. As CSPs begin advancing their cloud technology endeavours, they will undoubtedly evolve and incorporate next generation technologies and services. This means that CSP-powered clouds will not only outperform, but overshadow traditional cloud vendor providers who will find it tough to match their level of network innovation and connectivity.

Both the public and private cloud models provided by third parties could still generate revenue for CSPs. However the level of revenue will be restricted, with a risk of simply fulfilling a dumb-pipe function, providing the connectivity between enterprises and cloud providers. There will be an ability to up-sell new innovative services, but CSPs will be missing out on the true revenue generating potential that offering their own IT infrastructures to power customers' clouds could generate.

Customer concerns with the cloud

Although the cloud is very appealing and the cost savings generated significant, there are a number of customer concerns CSPs need to understand and address before businesses will trust them enough to hand over control of some or all of their IT. The main concerns are around governance, security and regulation.

Governance

It is essential to understand that when using the cloud, customers become part of a distributed environment. This means that certain applications will be moved off the business's architecture and on to the cloud. This can cause latency as millions of users vie to use thousands of services. If not governed correctly, this can affect the quality of service delivered to the customer.

As a result, controls need to be enforced to protect the quality of service for authorised users. By managing the number of users accessing certain services, service level agreements can be met. Furthermore, using access controls to establish authorisation levels, records can be kept of who has accessed what data and when.

Security

Security is a prime concern as information and intellectual property are the lifeblood of all businesses. Security is one of the largest barriers to uptake of the cloud, as well as one of the largest drivers for those willing to make the move to the cloud to go for the private model. The reason being because they lack trust in public cloud providers, where security is essentially in the hands of an external organisation. For example, some business are concerned that in the case a segment of cloud storage becomes re-allocated to a new client, previously deleted information might be restored. Businesses want reassurances from CSPs and other cloud vendors that measures are in place to ensure this will not be an issue before they commit.

However, by outsourcing to a managed public cloud business customers can actually see security benefits from having experts managing their security 24/7. This is a significant advantage for customers who might not be able to afford to do this for themselves, and for companies whose IT departments may not have the capacity.

Regulation

Regulation is another important area of concern where CSPs must act to reassure potential customers. Depending on the business, this will affect the compliance measures required from cloud providers. Every CSP needs to ensure it is able to address all local compliance issues, but again CSPs are in the ideal position to offer this because of similar issues faced with mobile networks and existing services.

The advantage of a CSP powered cloud for enterprise

As well as providing new revenue streams for CSPs, the CSP powered cloud will also benefit customers. The CSPs' track record for innovation over the last ten years is showing no signs of letting up. If anything, due to increased market competition, it is gaining momentum.

CSP powered public clouds will benefit from service innovation upgrades at source, capable of automatically being rolled out in real time to benefit customers. Not only will customers benefit from the speed of delivery of new services and products, but they will also shift great CapEx costs across to operating expenditure (OpEx); receiving a predictable monthly bill for services.

Businesses that opt for private clouds, however, will not benefit from these incremental upgrades, at least not without incurring significant upgrade costs. Similarly, those who are serviced by traditional cloud providers will not be able to benefit from the innovative heritage of CSPs.

Conclusion

Hype surrounding the cloud is at its peak, and the advantages for CSPs of becoming cloud providers to business customers are compelling. Cloud computing can provide customers with greater elasticity, deliver economies of scale, and provide access to enhanced network and service capabilities, previously not possible.

For CSPs to take full advantage of the cloud however, they need to be able to provision their own managed services through it. Although the cloud offers an exciting new opportunity for CSPs, it is important to remember that deployment is not about chasing a technical dream, but delivering a quantifiable business benefit for customers. This should go a long way to fulfilling the requirements when overcoming businesses' concerns about the cloud, and adding to the CSPs' revenue streams. ●

Cloud computing - you might be missing the point

by Ric Telford, Vice President, IBM Cloud Services

Cloud computing has the potential to completely transform and connect entire industries. The cloud computing model goes far beyond the business benefits of energy efficiency, cost cutting and scalability – it has the potential to revive today's antiquated global technology infrastructure. Cloud computing could be the missing link that provides a deeper intelligence in the systems and processes of our business and institutional infrastructures – enabling goods to be produced, distributed and recycled, and services to be delivered to consumers in new, exciting ways.

Ric Telford is Vice President of IBM Cloud Services. His professional business career highlights 26 years of product and service development experience. During his tenure at IBM, Mr Telford has played a number of key roles in various software and service initiatives, including Autonomic Computing, IT Infrastructure Services, and IT Optimization Services.

A new approach is needed to revive the global technology infrastructure. The broken processes and industries that stunt progress and plague our modern interactions with governments, banks, doctors, etc, are not only annoying and time consuming, but cost society billions of dollars a year. And in the case of healthcare, it can be the difference between life and death.

Up until now, there's been a missing link needed to make this transformation possible. Certainly cloud computing isn't a new concept; rather it's an evolving computing model that can be an enabling force behind a smarter, more connected world. By now, we've all heard about the benefits of cloud computing – its potential to dramatically lower computing costs and its ability to help companies 'go green' by virtualizing resources and maximizing system use while freeing up IT staff to focus on important projects.

While the apparent benefits of cloud computing have drummed up a lot of buzz around cloud computing, the model goes far beyond the business benefits of energy efficiency, cost cutting and scalability.

People are getting excited, but perhaps not for the right reasons. The truth is that cloud computing has the potential to completely transform and link entire industries. It could act as the means to connect millions of end-user devices, sensors and storage to powerful back-end systems that can make sense of all this information in seconds. Every industry would be different if infrastructures were more connected.

While this may sound like an exaggeration, it's not. Cloud computing could be exactly what we need: it's networked, backed by extremely powerful systems, highly elastic,

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"The health of our financial institutions is another industry that could be greatly impacted by cloud computing. In 2008, a shocking number of banks across the world failed, some were acquired and many were nationalized. "

instantly available over the Internet and should be grounded in open standards so clouds can talk to each other. As analyst firm Gartner noted in its 'Predictions 2009: Emerging Tech Markets' report: "cloud computing represents the fusion of very real trends such as global-class architecture, web platforms, massively scalable processing and the Internet." These trends point to cloud computing's potential to provide a deeper intelligence in the systems and processes of our business and institutional infrastructures – enabling goods to be produced, distributed and recycled; oil to be located and drilled quickly and efficiently; and services to be delivered to consumers in new, exciting ways.

Consider the amount of connectivity and power that is needed to support the millions of people who check their bank accounts one, two, even multiple times a day, using their mobile phones. Not only do wireless networks need a more advanced global communications system, but the processes and strength behind delivering these services need to be retooled in order for the global infrastructure to continue to function properly.

Or, think about the vast array of personal technologies – handheld phones, office computers, cameras, music players – and the fact that the interconnectivity of these elements requires an ever-increasing amount of computing power, intelligent networks and lock-down security. As consumers, we expect these devices to be always available and always connected, and the information contained in these devices needs to be 100 per cent accurate. Think about how frustrating it is when the connection is lost on your cellphone or navigation system.

In this new era of wireless handhelds, we're all easily hooked on devices and other technology that make shopping and decision-making easier.

Imagine scanning a product's barcode with a cellphone and instantly finding out where the product was made and if it works as well as advertised. This type of instant connectivity and access to information not only gives retailers a competitive edge, but also gives shoppers immense satisfaction. Consumers are demanding that anyone they deal with reinvent the ways they interact with each other and share information. Cloud computing gives retailers the ability to create an integrated environment for consumers both in-store and online, as everything, everywhere needs to work in-sync.

This link could also create a national healthcare system that actually works for patients, hospitals, doctors and insurance companies alike. From diagnosis and drug discovery, to insurer's and employer's pockets, the next-generation of computing – cloud computing – enables a system that is truly connected, resilient and secure. The power and scalability of cloud will allow researchers to test new algorithms and analytics to enable a deeper, more intelligent analysis of a person's health, from diagnosis to providing treatment in a matter of days rather than weeks or months.
Electronic health records stored in the cloud could prevent an estimated 100,000 deaths a year from medical error. Imagine being able to share medical images and charts between specialists, maybe even create a family tree so doctors can more accurately treat your symptoms, and then automatically gain approval from your insurance company for a certain treatment.

The health of our financial institutions is another industry that could be greatly impacted by cloud computing. In 2008, a shocking number of banks across the world failed, some were acquired and many were nationalized. The post-mortem analysis shows that cost, complexity and risk, and transparency are factors that must be addressed differently in the future – and much of this boils down to technology. Banks have systems in their data centres that can't 'talk' to each other, let alone understand what's happening in another bank across the industry. Cloud computing could give banks the real-time risk analysis, back-office automation and secure data processing that is needed.

"Evolving from technologies like grid computing, utility computing, and software as a service, cloud represents a new, efficient, and highly flexible supply chain for IT. "

Sure, there are sceptics scratching their heads in confusion over the term 'cloud' who pass it off as marketing hype. But in a challenging economic environment screaming for change, the fact remains that businesses, big and small, are looking to cloud computing as a way to cut costs and decrease their footprint on the environment.

Small companies are saying 'goodbye' to the servers and wires in their back offices and turning to large firms who are, in turn, selling services in the cloud. When you think about it, roughly 85 per cent of most business processes are easily replicable and non-critical – things that need to be done to keep the business running, but aren't making you any money. As a result, elements like email, enterprise resource planning systems and the like will move to the cloud first.

Cloud computing addresses the IT expense equation in a new way. First, it significantly lowers up-front capital expenses associated with getting an IT project off the ground by allowing companies to only pay for what they use. Even more enticing, cloud dramatically lowers operating expenses over time by increasing standardization and automation.

Evolving from technologies like grid computing, utility computing, and software as a service, cloud represents a new, efficient, and highly flexible supply chain for IT. And yes, cloud computing also enables data centres to use less energy, fewer physical machines, less hands on management, and still be more connected.

But more important than all that, this emerging model of computing is compelling entire industries to rethink their IT, and even their business models. Cloud could enable trillions of operations and intelligent things to work together in a world that is not only seeing an explosive growth in information overload, but one that simply does not have the bandwidth or capability to power the relentless, ever-expanding network of information, businesses, governments and processes. Now that is a reason to get excited about cloud. ●

UMTS femtocell solutions - The need for standards adoption

by Jonathan Morgan, Service Provider Solutions Marketing, Cisco Systems

In order to address coverage and capacity requirements in the home, enterprise and hotspot markets, mobile operators need to expand service offerings over multiple new access networks. Femtocell technologies are a promising solution but are currently suffering from a lack of standardized deployments in the industry. Only truly standard multi-vendor plug-n-play femtocell solutions can lower the total cost of ownership, enable new services and provide a seamless evolution to LTE and IMS.

Jonathan Morgan is Senior Manager of service provider product marketing for Cisco Systems. Mr Morgan was previously Vice President of Product Marketing for Tatara Systems, Director of Product Management for Appian Communications and has also held numerous management positions at Fujitsu Network Communications.

Jonathan Morgan holds a BSEE from Washington University in St. Louis and an MSEE from Rutgers University.

Mobile operators realize the importance of expanding service offerings to address the home, enterprise and hotspot markets. This requires operators to expand service offerings over multiple new access networks, including providing access over unsecured, un-trusted networks – primarily existing fixed networks such as broadband DSL, fiber to the home, or cable broadband networks – using technologies such as femtocells.

Currently, femtocell rollouts tend to focus around issues associated with the femtocell access point such as price points, power and security requirements. Operators have also been pressed for time to get initial femtocell network trials and deployments completed quickly. This has led to a lack of network focus in the vendor community and a lack of standardized deployments in the industry.

With this consideration, there are many questions around the network to think about:

- Do UMTS femtocell network solutions work with any femtocell access point (are they standard)?
- How can operators minimize the number of platforms needed to support multi-access technologies and new demands for different femtocell service deployments?
- How does a standardized femtocell solution not only meet network needs, but provide an attractive business case to the subscriber? and;
- How does the UMTS femtocell solution evolve to LTE or integrate with IMS?

Is it standard?

The Iuh interface between the femtocell, known as the Home Node B (HNB), and the Home Node B Gateway (HNB-GW) has been standardized in 3GPP Release 8. The HNB-GW interworks circuit switch signaling and bearer to standard Mobile Switching Centers (MSCs) using the IuCS interface, interworks packet switch signaling and bearer to standard Serving GPRS Support Nodes (SGSNs) using the IuPS interface, and provides a Security Gateway function.

An open interface implementation between a core network and the access network is critical to enabling a low cost, multi-vendor femtocell environment. Standardization allows operators to deploy femtocell and network equipment in a multi-vendor environment, thereby

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The first demonstration of a standard femtocell to HNB-GW occurred in June 2009 at the Femtocells World Summit in London. It was an example of how a true standard multi-vendor plug-n-play femtocell rollout can lower the total cost of ownership with limited impact to the mobile device and the core network.

Home Node B consumer

Femtocells (called the Home Node-B in 3GPP standards) are low-power access points that operate in licensed spectrum and provide dedicated mobile coverage, capacity, and potentially new services in the home. Consumer femtocells utilize Internet broadband (xDSL, cable, FTTH) connecting to the mobile operator's core via generic IP access networks. To provide secure transactions between the HNB and the core network the HNB establishes an IPSec tunnel to a Security Gateway (SeGW), is discovered and authenticated by the management system, and establishes the circuit switch (CS) and packet switch (PS) sessions to the HNB-GW using the standard Iuh interface. A consumer femtocell typically supports 4-6 mobile sessions simultaneously and may provide local IP access for mobile data sessions.

Home Node B enterprise

The femtocell benefits of dedicated radio, lower cost deployment, zero touch and small form factor have expanded beyond consumer applications into the enterprise. Enterprise applications of femtocells are rapidly developing in the market place. Femtocells eliminate previous cost prohibitive barriers to deploying dedicated radio capacity to a large segment of small and medium businesses as well as large enterprises. However, unique deployment requirements will have to be met to enable this emerging segment of the femtocell market. An enterprise femtocell typically supports 16 or more mobile sessions and may provide local IP access, IP LAN services and IPX integration. Enterprise femtocell deployments may require multi-service capabilities such as Session Initiation Protocol (SIP) routing, IP Multimedia Subsystem (IMS) interworking, and advanced IP routing and security.

Security gateway

A security gateway provides a high performance, intelligent secure communications gateway which enables subscribers' seamless access as they roam between external trusted networks and un-trusted networks, such as femtocells. The security gateway terminates and manages IPSec IKEv2 tunnels from the femtocell, provides authentication for the femtocell, and directs traffic to the HNB management system and HNB-GW.
Home Node-B gateway (HNB-GW)

The HNB-GW terminates the 3GPP standard Iuh protocol, aggregates large number of femtocell Iuh interfaces, and routes user sessions to the core network. The HNB-GW interworks circuit switch signaling and bearer to standard MSCs using the IuCS interface, and interworks packet switch signaling and bearer to standard SGSNs using the IuPS interface. Both IP and ATM transport for circuit switch (CS) and packet switch (PS) sessions can be supported simultaneously on the platform.

Home Node B management

The HNB management system utilizes a standard TR-069 architecture. The management system performs functions such as location verification, auto-configuration of the femtocell, core network element assignment (HNB-GW, SeGW), and remote management and control.

Simplicity is key

Many of the pre-standard femtocell solutions required multiple platforms (often from different vendors) to terminate and aggregate femtocells. This can be costly, with multiple hops and is complicated to manage.

By integrating the femtocell aggregation functions, the security gateway function and potentially other packet core elements (why not the SGSN or GGSN?) into a single flexible, scalable, and highly available platform, the capital and operating expenses of the network will be lowered drastically (Figure 3).

Monetization

With the mobile broadband tidal wave, bandwidth is rising faster than revenue. Operators are looking for as many options as possible to create new revenue streams and lower both the CapEx and OpEx. The same intelligence and policy control capabilities being deployed with macro networks must be deployed for standardized femtocell networks to provide resource management, service personalization, and new revenue creation. With a femtocell being under licensed spectrum, the operator has the opportunity to 'own' the home market and offer new services, including:

- Specialized call tariffs and call features, e.g., multi-ring across mobile and home devices;
- Unlimited data services, and/or tiered data services; and
- New home based intelligent services, examples include:
  - Control of intelligent home environment;
  - Receive MMS from security camera when door bell rings;
  - Notification through SMS when children arrive home;
  - Presence and location services.

Evolution to LTE and IMS

While in 2G and 3G technologies femtocells are a more recent addition to the standards, LTE standardization took into account femtocell architectures from day one. Many operators are considering small cells as part of their initial LTE rollouts to maximize coverage. The 3G network solutions, such as the HNB-GW, must be upgradeable to support seamless evolution from 3G to 4G, including simultaneous support for both 3G and 4G. The same holds true for IMS – the long term architecture for 3GPP. The network solution must support a seamless path to IMS.

Conclusions

Mobile operators are looking to expand service offerings to address the home, enterprise, and hotspot markets including femtocells. The industry must commit to open standards to allow operators to meet business and market objectives as well as enable the widespread adoption of femtocells. When planning rollouts, a true standard multi-vendor plug-n-play femtocell solution can lower the total cost of ownership, enable new services and provide a seamless evolution to LTE and IMS. ●

Smart offload for smartphones

by Steve Shaw, Vice President, Corporate Marketing, Kineto Wireless

The popularity of smartphones has resulted in a surge in mobile data traffic. Mobile operators now need additional offload solutions to handle coverage and capacity demands. Although many mobile operators are already using Wi-Fi for offload, the initial solutions are often rather simplistic. Smart Wi-Fi offload solutions now available can improve indoor coverage and capacity, and enhance the user experience through a comprehensive service offload strategy.

Steve Shaw is Vice President of Corporate Marketing at Kineto Wireless. Prior to joining Kineto, he worked as the Marketing Director of net.com and the Director of Market Development for Jetstream Communications. Mr Shaw began his career with Dialogic, eventually becoming the director of Dialogic's CBF product line.

Steve Shaw holds a bachelor's degree in computer science from the University of Southern California.

A smartphone revolution is upon the mobile industry. Consumers are drawn to smartphones due to their ability to access the Internet whilst on the move and at the touch of a fingertip. As a result, mobile networks are rapidly becoming saturated with a flood of mobile data. In order to cope with these demands on the network, operators need to find innovative ways to offload data, over and above the methodologies currently being deployed.

Wi-Fi is one technology that is already utilised by operators for basic offload by simply routing web traffic to the Internet. However, due to the limitations of current offload technology, this approach does not maximise the full potential of Wi-Fi.

Smart Wi-Fi offload is a step change in offloading, offering a full complement of premium mobile data services, along with voice and SMS, whilst taking advantage of the cost and performance gains from IP.

The smartphone revolution

Smartphones are the current phones of choice for consumers, making the Internet mobile and delivering on the promise of putting real time information in the consumer's pocket. Today's subscribers demand superior GSM mobile coverage. In addition, they expect high-speed access to mobile Internet services commensurate with their fixed broadband services at home and at the office. Yet the impact of meeting these requirements for mobile network providers has become overwhelming.

One industry insider stated that smartphone users on his network consume 50 times more data bandwidth than traditional mobile phone users. AT&T in the USA, which has fully embraced the iconic iPhone, has faced the full brunt of the smartphone success. John Donovan, AT&T's CTO, recently stated that since the iPhone launch "… mobile data traffic has grown nearly 5,000% in three years …"

This is the tip of the iceberg. RBC Capital Markets estimated that in 2009 smartphones accounted for just under 15 per cent of total handsets shipped. Yet by 2014, this figure will be more than 52 per cent, a staggering 804 million units. The effect of the bandwidth consumption of these smartphones on mobile networks will be staggering.

Speaking at a recent conference, Paul Jacobs, the CEO of Qualcomm, made a convincing case that the only way to support the projected data demands of the mobile industry is for networks to become far denser.

Wi-Fi: A smart choice for offload

Wi-Fi technology is an unqualified success and can already be found in a wide array of consumer electronic products. Mobile phones, and in particular mobile smartphones, have been one of the fastest growing segments of consumer products to embrace Wi-Fi. In-Stat projects that 20 per cent of the worldwide Wi-Fi chipset

shipments in 2010 will be to mobile phones and smartphones.

Wi-Fi has a significant advantage as a technology for cellular offload because it operates at a frequency independent of mobile networks. Thus the proliferation of access points in the home does not interfere with the outdoor macro network.

In addition WiFi is already widely deployed within consumers' homes and offices. According to a recent European Commission study of EU households, more than 50 per cent of homes with broadband access already have Wi-Fi installed.

Mobile operators have begun to embrace Wi-Fi for offload; however it is often rather simplistic. When a smartphone is connected to a Wi-Fi access point, it automatically routes web traffic to the Internet, without sending data over the cellular network. Whilst this does immediately relieve traffic from the network, it doesn't enable the operator to get the full benefit of a complete Wi-Fi solution.

First, by utilising Wi-Fi for Internet traffic only, an operator is not able to take advantage of Wi-Fi to improve cellular coverage indoors. Subscribers receive five bars of Wi-Fi coverage for web services but receive the 'usual' coverage from the macro network. There are instances where web services may perform better than the operator's own services indoors. This is especially troubling if the user can't make a mobile call, yet receives a clear Wi-Fi signal to place a VoIP call with Skype.

Secondly, operators can't use Wi-Fi to stream their own premium data/video or TV services to subscribers indoors. This is because basic Wi-Fi offload does not support a secure mechanism for authenticating and authorising a mobile device to access mobile services (premium data, video, audio, voice …) over the Internet.

Finally, using a basic Wi-Fi offload approach requires both the cellular radio and Wi-Fi radio to be powered simultaneously. The result is what's known as a Wi-Fi 'battery tax'. Two radios operating simultaneously drain the battery faster than one, yet both radios are required (Wi-Fi for Internet offload, GSM/3G for cellular) to provide a complete solution. This results in a disincentive for consumers to utilise Wi-Fi and impacts the full benefit mobile operators can achieve with Wi-Fi.

Smarter Wi-Fi offload

To overcome the limitations of basic Wi-Fi offload, a new 'Smart Wi-Fi Offload' solution has been developed that runs on the leading smartphone operating systems, including Android, iPhone, Symbian and Windows Mobile. Now mobile operators can take full advantage of the inherent benefits of Wi-Fi in order to execute a comprehensive service offload strategy – increasing network capacity and improving coverage.

With a smart offload solution, mobile operators can offload all (or selected) mobile services from the macro network, including premium data applications like TV or streaming audio, as well as voice and SMS. Operators may choose to begin with basic internet offload, then add mobile TV or audio, and add voice and SMS to offload all mobile services to Wi-Fi.

For subscribers, the solution works with the Wi-Fi access points already deployed in the home or office. The smartphone receives a strong signal from the Wi-Fi access point indoors, providing crystal clear voice calls over IP and high-speed data access, instead of struggling to deliver services to poor-coverage areas from the macro network. This enables subscribers to download an application that improves their mobile service experience at home, in the office, or even when travelling abroad.

Perhaps most importantly, the smart Wi-Fi offload solution overcomes the Wi-Fi battery tax so common in basic Wi-Fi offload approaches. With basic offload, both the WiFi and GSM or 3G radio on the phone need to remain powered, causing an added power drain as a result of both radios being on and active simultaneously.

The smart Wi-Fi offload solution addresses this issue by streaming all mobile services, particularly voice and SMS, over the Wi-Fi radio. It maintains a secure, managed connection to the mobile voice network over Wi-Fi. In this way, smartphones can place and receive calls over Wi-Fi, and GSM/3G is not needed for voice communications. When the Wi-Fi connection is active, the cellular radio is placed into a hibernation state so that there is just one radio drawing power.

The approach relies on a 3GPP Generic Access Network Controller, or GAN-C, located in the mobile operator's core network. The GAN-C connects to the operator's existing circuit (Mobile Switching Centre – MSC) and packet (Serving GPRS Support Node – SGSN) infrastructure to ensure the delivery of the complete range of mobile services and applications. This provides a secure, managed connection, including SIM-based authentication, over the Internet to smartphones connected over Wi-Fi. The system also provides AAA-based service authorisation to ensure the right users get access to appropriate services based on a range of criteria, including location.

Conclusion

The smartphone revolution has arrived. Consumers are drawn to smartphones because they deliver the mobile Internet at the touch of a fingertip. Mobile networks are quickly becoming saturated with the flood of mobile data, and operators need smart offload solutions to quickly address exponential consumer demand. It's creating new and bigger challenges for mobile operators.

Wi-Fi is the ideal technology to help operators increase overall network capacity and improve the user experience. The new Smart Wi-Fi offload solution helps operators address the challenge of saturated networks in a simple and efficient manner, so mobile data services are not a privilege reserved to a small number of handset users, but a growing numbers of subscribers can be part of the smartphone revolution. ●

How to stay secure in the wild west of cloud offerings

by Ville Laurikari, Vice President R&D, SSH Communications

Confidential data is increasingly being stored and maintained by companies specializing in cloud services. But are these companies trustworthy? The cloud comes with its risks and, as with all IT outsourcing, recognizing and managing those risks is paramount. Identifying reputable cloud service providers and learning how to deal with them in a way that ensures the security of services as well as your data has to be a priority.

Ville Laurikari is Vice President, R&D, of SSH Communications Security Corp. Prior to his current role, Mr Laurikari has served in numerous engineering management and software development positions at SSH and other software companies.

Ville Laurikari holds an MSc in Computer Science from Helsinki University of Technology.

Companies are busy outsourcing non-core functions to cloud services. Yours is probably too. But how can you tell which services are trustworthy and which aren't? By the end of this article, you'll know what the typical risks are and the signs to look out for when searching for a reputable stable service provider.

Economies of scale mean that cloud services are usually much cheaper than producing a similar service in house. A recent Gartner report predicts that by 2012, 20 per cent of businesses will own no IT assets. Companies' confidential data will be increasingly stored and maintained by other companies specializing in cloud services.

We are in the midst of a gold rush to the cloud and mobile. And where there's a gold rush, there's a wild west. Where there's a wild west, there's someone selling rat on a skewer (free ketchup!) and, quite possibly, snake oil. You want to avoid the snake oil.

Cloud service provider companies, by the way, make very attractive targets for hackers and industrial espionage. Imagine gaining access to all the data of Salesforce.com. That would be worth a lot of money to someone. A large service provider with many customers has particularly high requirements for security.

Trends

It's called 'the cloud', and it may be 'in your mobile', but in practice the security technology is the same as before. The cloud infrastructure still runs on computers which have CPUs and hard disks, network connections, operating systems and secure data connections that primarily rely on open standards such as SSH, SSL and X.509 PKI.

Besides the security technologies, the cloud model itself isn't brand new, either. In the 1960s, before the advent of the personal computer, the timesharing mainframe model was the norm.

Despite these similarities with the past, the cloud isn't a backward step. It's a natural evolution from the desktop-centric world where each machine has potentially a different set of software. Users have significant ability to install software that can basically 'break' their computer.

When we take away some of this power from the user, the end result is a system which is less prone to breakdown but still able to provide the users with the services

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they need. The Apple iPad and iPhone are paving the way in this direction. The devices have been criticized for being too closed: all applications installed on these devices have to be pre-approved by Apple. But the reality is that most users don't really want the freedom to tinker. All they want is a device which does what they need.

In the end, IT security always boils down to trust. The cloud is no different in this respect. You already have to trust your CPU manufacturer, your Internet service provider, and your operating system and software vendors. When you start using a cloud service, you are extending the circle of trust to the company providing the service.

Risks

As with any IT outsourcing, the cloud comes with its risks. While the monetary cost of these risks may be hard to quantify, they still should be considered alongside the other financial incentives for outsourcing.

There have been many instances where a service provider's systems fail, data is lost, and there are no backups. It sounds amazing, but it's true. The lesson is that, for the most critical data, you should not trust solely on your service provider's backups. Your company must take responsibility for critical data itself.

Data held hostage You may be perfectly happy with a service provider today. But can you trust you will be happy also next year? In three years? The provider might decide to raise prices enough to start making a real difference on your company's bottom line. You should be able to get your most critical data out of the service provider's system in some form.

Confidentiality Let's face it. Given that everyone and their uncle Sven from Norway is setting up their own business selling cloud services, there is a growing number of providers out there who simply don't know the first thing about security. They will commit the most elementary mistakes and your passwords and data may be available to anyone. Usually choosing a larger established player who has been around for a few years is a better choice than going with Uncle Sven's SaaS Shop.

Hostile insiders When you send your data to a cloud service provider, you may be radically extending the trusted circle of people who have access to that data. Do you know how many people have access at the service provider? Does the provider keep audit trails? Can you see them on request?

Complexity Cloud services are increasingly interconnected through various application programming interfaces. Your confidential data may go through multiple service providers with the click of a mouse (or even no clicks at all). Do you know, exactly, where your data resides and which companies have access to it?

Legislation In many countries, data stored online has less privacy protection under the law, compared with the case where your company keeps the data only on its own computers. This may or may not be relevant to your business or you personally.

Help

Reading the above, you have probably by now spilled coffee on your lap at least twice with the sudden realization that you haven't really thought about some of the cloud risks at all. Fear not, what follows are some pointers to help you figure out how to spot a reputable cloud service provider, and how to make sure you don't end up with the short end of the stick when things go pear-shaped.

Stability Large companies tend to stay around for longer than smaller ones. The same goes for profitable companies. Before building your business processes around a cloud service, you would do well to take a look at the service provider's key financial indicators to gauge whether their business is fundamentally healthy or if they are going the way of the dodo before you can say 'hybrid parallel cloud application platform infrastructure'.

Data liberation It is a possibility that, despite your best efforts, the cloud service you're betting on goes belly-up in the future. If this ever happens, you want to get your data back. Depending on the level of your paranoia, you may want to get your data back regularly for safekeeping just in case the belly-upping happens fast enough that there is no-one to give you your data back anymore. In order for you to get your data back, the cloud service must make your data available for download.

Google, in fact, has an entire dedicated engineering team whose sole goal is to make it easier for users to move data in and out of Google products. This team is called the Data Liberation Front. From the Data Liberation Front web page (http://www.dataliberation.org):

"...we always encourage people to ask these three questions before starting to use a product that will store their data:

1. Can I get my data out at all?
2. How much is it going to cost to get my data out?; and
3. How much of my time is it going to take to get my data out?

The ideal answers to these questions are:

1. Yes.
2. Nothing more than I'm already paying.
3. As little as possible "

Data liberation eliminates many concerns regarding cloud services. I hope it will one day be as commonplace as backing up, but until then, you may want to check how to get your data out before implementing a new cloud based service in your company.

Terms of service As with any contract, you should have a lawyer go through the terms of service, so to make sure that liabilities are appropriately disclosed and shared.

You also want to make sure that the level of service is unambiguously defined. Also make sure that the contract defines appropriate financial incentives for the service provider to react swiftly to service outages as well as proactively develop a more reliable service.

Ask If you have any questions regarding the security of a service, and documentation provided to you isn't helping, you can always ask. If the company cannot provide satisfactory answers, you should assume that they may not have the issue covered.

Hopefully, this little list of risks and checklist of solutions will be helpful to you the next time you go shopping in the clouds. Just remember, it's still a bit of a wild wild west, so be careful out there.

The virtual reality of the cloud

by Roger Baskerville, VP of Sales for EMEA, Vizioncore

Server virtualisation hosts various virtual machines and appliances in one place and delivers huge potential for consolidation and cost-savings, both in terms of IT assets and energy consumption. But all this new power is accompanied by a fresh set of responsibilities and associated risks for those not managing it appropriately. Properly managed, virtualisation enables viable service level agreements and improves performance for end users. The same factors apply to the cloud – but on a larger scale.

Roger Baskerville is VP of Sales, EMEA at Vizioncore. Mr Baskerville joined Vizioncore in November 2008 from Citrix Systems where he was Regional Director for Server Virtualisation in Northern Europe following their acquisition of XenSource, where he was Sales Director EMEA.

Once upon a time, IT was simple. Each worker would sit at their own personal computer with all their data stored securely in one physical place. If a new worker joined, you bought another machine and that was that. But then virtualisation came along and changed everything.

At its core, virtualisation, like the cloud, is all about abstraction. By severing the direct link between user experience and hardware, the computer becomes more personal than ever, gaining an independent existence that makes it available whenever and wherever you need it.

But to understand where virtualisation and its relationship with the cloud stand today, it's worth first undertaking a quick trip through its history and considering the advantages and lessons learned so far.

Consolidation

What became quickly apparent when server virtualisation was in its infancy was the potential for cost-savings and consolidation. By hosting various virtual machines and appliances in one place, the potential extra efficiency from making redundancies is enormous and immediately gratifying. It's a natural evolution, simple to explain and justify to anyone within the organisation.

While 20:1 server consolidation ratios are common, some organisations reach 40:1 or even higher. When you consider the low end, a 20:1 consolidation ratio means that now one server does the work previously done by 20. The organisation no longer has to power, cool and maintain 19 servers, which represents a 95 per cent reduction. You can potentially hit the high end of consolidation by making virtual machines as compact as possible, which lets more of them share a single virtual host.

New solutions can automatically shrink the size of virtual machines (VM), using techniques such as de-duplication, compression, realignment and defragmentation. With reductions of VMs ranging from 30 to as high as 80 per cent of their original size, anyone can see the potential impact for conserving storage resources.

The ability to resize VMs not only enables more VMs to share a single host, but also reduces the IT assets and energy required to backup, store and transfer virtual images. When you consider that IT equipment accounts for approximately nine per cent of all energy consumed by businesses, and data centres use up to 1000 times more power than equivalent office space, the potential savings here is something that every organisation needs to reckon with. Servers alone account for 0.6 per cent of all power consumed in the USA (1.2 per cent if power for cooling systems is included), according to a study by Stanford University researchers.

Flexibility

Alongside this, firms recognised the unprecedented flexibility enabled by the technology. The ability to make virtual machines appear or disappear on demand in whatever configuration necessary was another immediately seductive aspect of the offering.

Having to deploy a new server for each new application made IT departments slower to react to business needs as each physical machine would have to be budgeted for, purchased and set up on the network. A 'virtual-first' approach means organisations will look to run any new application in a

VM, unless a standalone physical machine is absolutely required.

Pooled resources

With so many physical servers in the average data centre, one significant problem was the difficulty of knowing what was going on. Virtual infrastructures treat the entire environment as a large pool of resources and administrators can see exactly what is going on across the entire resource pool. Administrators can have top-down views of the infrastructure, as well as getting alerts and reports on potential hardware problems, virtual machine performance and host machine performance.

The insight into IT performance which virtualisation management tools give allows organisations to be far more proactive. Management tools allow IT departments to make much more informed decisions on where to focus expenditure and resources by providing a level of detail on the performance of the overall infrastructure far greater than that available in the physical world.

However, as is so often the case, all this new power brought with it a whole new set of responsibilities and associated risks for those not managing it as the new paradigm demanded. As a result, we're entering a new phase of the virtualisation story and, because the two are so inextricably entwined, turning the page on a new chapter for the cloud.

Server sprawl

As discussed previously, the ability to make a new virtual machine out of nothing is a formidable power. However, there's still no technology that can put physical hardware out of the picture completely – sooner or later, it comes back to a game of resources and efficiency.

As a result, virtual server sprawl has emerged as one of the predominant threats to those that move to a virtual infrastructure. Very quickly, the temptation of being able to provision VMs on a whim can lead to an explosion in their creation. It's not uncommon for a large enterprise to end up with hundreds of unused machines sitting idle. Even in this state, such machines can be surprisingly demanding in terms of resources, consuming memory, disk space and data protection time and resources.

Furthermore, this introduces a point of vulnerability in the fact that virtual machines sitting inactive cannot receive security updates; leaving them in a position of relative threat should they be reactivated again.

Left unchecked, virtual server sprawl can end up putting an organisation in a position where all efficiency improvements brought around by the move to virtualisation are completely negated. However, an astute administration equipped with the right tools increasingly has little to fear from this threat.

Backup 2.0

Virtualisation is also changing the way organisations tackle tasks such as backup, recovery and replication. Physical backup solutions have focused solely on the data stored on a server. As far as recovering lost data goes, this is a fairly reliable method, but in a virtual environment the possibilities go much further.

When backing up VMs, the entire server environment, including operating system, application and data can be copied. Gone are the days when a failure meant sourcing new hardware and rebuilding the machine from the ground up; restoring a VM is as simple as restoring a file onto a new host machine.

This offers a very cost effective way of tackling business continuity and disaster recovery. Virtual machines can be stored off site and then moved very quickly back into the production environment should any problem occur.

As with any kind of backup, organisations should have the correct strategy in place to ensure that virtual machines are backed up regularly enough to guarantee that the backup is usable and relevant to the business.

SLAs

Virtualisation makes disaster recovery and business continuity available to any organisation and this new-found technological ability suddenly means that service level agreements (SLAs) become viable. IT departments now have a platform which gives them the flexibility to deliver an optimised infrastructure and take a proactive approach to managing services, rather than engaging in the levels of fire-fighting which were previously commonplace.

Furthermore, virtualisation delivers a better level of performance to end users, so suddenly SLAs aren't just about uptime but can also factor in performance. Virtual infrastructures treat computing resources as one large pool, meaning that if an application has a large spike in activity then more resources can be made available to it.

Rules can be built in to guarantee levels of resources to particular applications. Suddenly, IT departments can take end-user feedback and performance metrics and optimise the infrastructure with this in mind.

The cloud

In many ways, the cloud faces all these factors on a larger scale. Definitions vary simply because it can be deployed in so many ways but what's important about the cloud is that layer of abstraction. Services are created dynamically as and when needed from resources that may span various data centres. This is generally achieved via a combination of virtual servers, networks and storage.

But functions like backup remain critical and old habits must die hard. As an example, adoption of technologies that base data protection on images rather than file systems is a key shift in the thinking required that pays dividends in the new structure.

Success in creating or making the most of cloud infrastructure requires the clued-in to draw on their experiences in virtualisation and apply their knowledge to the larger canvas with a touch of imagination.

The 'magic' of cloud, if there is any, is the way in which all resources are now dynamic and can be provisioned on-the-fly in response to real-time fluctuations in user demand and processing requirements. In this context, better tuned monitoring tools become essential – because they can trigger real-time re-provisioning of every type of resource.

And so, this radical new world of virtual, abstract computing requires one key priority; accurate, effective management. This has always been a concern but now that we move toward a new age of computing, it presents itself more and more as the single most valuable way to harness and optimise the coming power.

This will be the key to seeing what cloud computing, and indeed all virtual computing, can really do.

Virtualization 2.0: A required paradigm shift

by Pete Malcolm, CEO, Abiquo

Virtualization has not realized its early promise. A paradigm shift is now required to get cloud strategy off the ground and to enable cloud management to be truly effective in organizations. Virtualization 2.0 provides this by: separating physical infrastructure and the virtual world; delegating authority for creating virtual machines; and allocating provisioning according to centralized policy. Virtualization 2.0 will change the way IT manages the physical and virtual worlds.

Pete Malcolm is the CEO of Abiquo and joined the cloud management solution provider in 2009. Mr Malcolm is a serial entrepreneur and technologist and was the founder and CTO of Orchestria Corporation, Benchmark Capital Europe's first Entrepreneur in Residence, and Senior VP of Business Management with CA Inc.

Pete Malcolm is the inventor of more than 150 granted and pending software patents.

Tantalized by visions of a cloud nirvana ahead promising improved efficiency and better machine utilization, IT organizations have spent the last 10 years virtualizing servers. In some ways, virtualization has been a victim of its own success, but it has not realized its early promise and has created more, not less, pressure on IT.

The world has changed dramatically since server virtualization first emerged. The number of applications companies are running today has increased at least ten-fold. However, the way IT infrastructure is organized to manage all machines – physical and virtual – has remained the same. The result has been chaos, with the IT infrastructure department struggling with the huge increase of applications because they are solely responsible for the provisioning of all physical and virtual machines. They simply are overloaded and are spending the majority of their time on the tedious task of provisioning machines, physical or virtual, while their customers are shouting at them about new applications they need now.

Organizations have lost their agility due to this overload – exacerbated by the belt tightening of recent years – so when a user wants an application that requires a new machine to be provisioned, they have to get in line and endure a wait that may take weeks. Virtualization was supposed to solve this, but the provisioning of virtual machines takes this long now due to the demand and the lack of additional IT resources. It makes it impossible to do a short-term project, as the need for the project may have passed before the machine to address it can be provisioned.

Complicating this further is the inefficient resource utilization created by the disconnect between IT, who must control all provisioning, and the actual application users. The IT infrastructure people responsible for provisioning the machine for a particular application have no direct knowledge of the application. They only provide the resource that is consumed by that group. If the project requiring an application ends, IT isn't

automatically notified that the machine can be decommissioned. Instead, the machine will just sit there consuming resources.

It is becoming increasingly clear that a paradigm shift is needed for cloud management to be truly effective in organizations. The three cornerstones of this paradigm shift – what we are calling 'virtualization 2.0' – are:

(1) Separating physical resources from the virtualized servers and applications consuming them;

(2) Delegating authority for creating and managing virtual data centres to the application groups closer to the users; and

(3) Deploying virtual servers and applications among available physical resources according to a centralized policy from IT based on the functional, data security, compliance, cost and load balancing requirements of the organization.

Separating physical infrastructure and the virtual world by a 'resource cloud'

The current strict division between the consumers of IT resources and the owners/controllers of the physical and virtual resources does not make sense in this super-charged application environment. IT cannot expand at the rate required to control all provisioning. Plus, IT infrastructure people are the wrong ones to control this provisioning as they don't have the direct knowledge of the applications. Virtualization 2.0 would make it possible for IT to retain the control it needs to have over physical infrastructure without having to provision all virtual machines to give users access to the physical resource. In a virtualization 2.0 world, IT's role would be much different than today. IT would maintain the physical infrastructure and control the provisioning of resources to a 'resource cloud'.

Delegating authority for creating virtual machines

To provide computing resources, IT would create a virtual enterprise, appoint an administrator and set limits on the resources the enterprise can consume. IT can then, in complete safety, delegate provisioning of virtual data centres, servers, storage and networking to the virtual enterprise administrators who can manage their own environments, and even further delegate provisioning and management tasks to others they appoint.

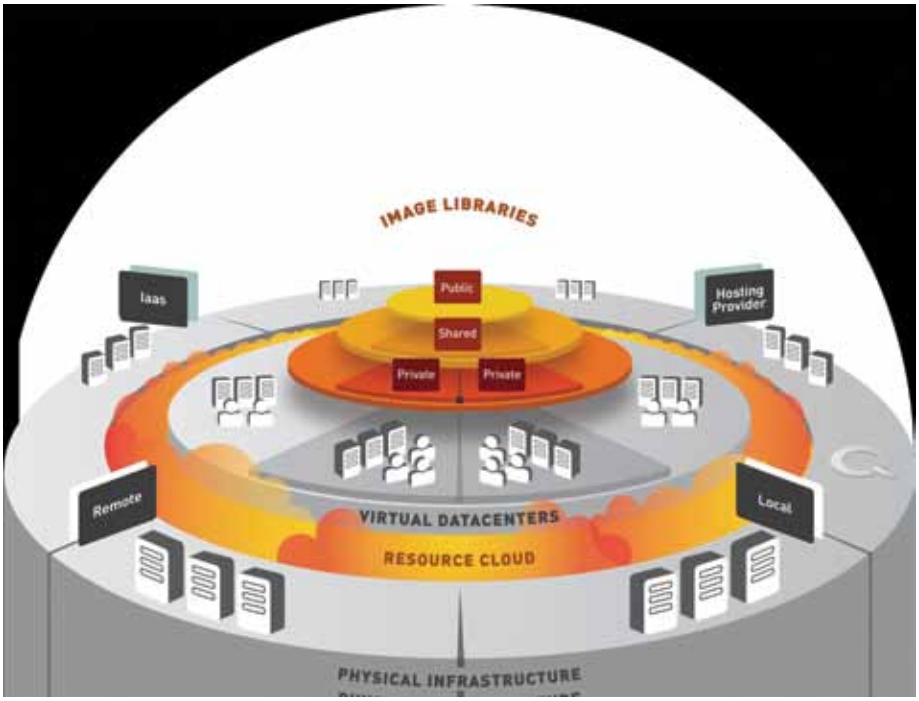
This delegation of provisioning, with IT resource limits and controls, would greatly increase the agility and efficiency of the organization. Virtual machines could be deployed much more rapidly. This would allow for temporary projects and even 'what-if' scenarios to be completed because the long waits of the past for provisioning would be eliminated. Because the virtual enterprises are aware they have enforced resource limits, they would be motivated to decommission their virtual machines when application projects were completed rather than let the machines sit there unused. This way the resource would be made available for another project or, at least, the virtual enterprise could reduce the charges to their department for IT resources.

Allocating provisioning according to centralized policy

With virtualization 2.0, an automated provisioning system is established to increase the utilization of available resources, greatly improving efficiencies. The IT infrastructure group could determine at the CIO level how it wants to allocate and load balance both virtual and physical resources. As long as the provisioning is done according to policy, it doesn't matter where the physical resource ends up being located.

Benefits for IT and the organization

For the last 30 years, the IT infrastructure group has borne full responsibility for provisioning all machines, physical and virtual. If provisioning of virtual machines instead can be delegated to application groups in a safe way, with set policies and procedures, IT can focus on service levels and capacity planning so its customers on the other side of the 'resource cloud' have what they need. Unshackled from their former state of disconnected drudgery of provisioning, IT can focus on what is more important to its customers and can serve them better. At the end of the day, the secret to making cloud computing truly effective has nothing to do with the use of private versus public cloud, which is much too much the focus of discussion about cloud computing today. The real key to achieving the promise of cloud computing depends on virtualization 2.0, which means changing the way IT is managing the physical and virtual worlds to be more in line with the current needs and demands of its internal customers today. From our perspective, the shift to virtualization 2.0 cannot come soon enough. ●



Defining the business value of cloud computing

by Larry Beck, Senior Director, Cloud Strategy, Avanade

Cloud computing is widely recognized as a viable way to reduce capital expenditures and operational costs. But the hype around cloud computing has created often unrealistic expectations about what cloud computing can deliver; promising that return on investment will rise, costs will contract and revenues will improve. Companies should approach the cloud through considerations of business value, starting with a clear plan, sound analysis and proven methodologies and practices.

Larry Beck is a Senior Director of Cloud Computing Strategy at Avanade. He also serves as the Technology Director for the Accenture and Avanade Solutions Showcase at Microsoft.

Larry Beck has more than 25 years of IT consulting and leadership experience and has authored several papers on enterprise integration, service-oriented architectures and cloud computing.

The emergence of cloud computing makes it seem like the sky's the limit when it comes to using new technologies to improve how business is done. Cloud computing offers creative ways for companies to address how they utilize IT, which in turn frees up resources and money to focus on what matters most – their core business objectives. According to a recent survey commissioned by Avanade, most IT decision-makers widely recognize cloud computing as a viable way to reduce capital expenditures and operational costs. Such a response shows that businesses see that the technical capabilities offered by the cloud can help lower costs and make them more nimble. Cloud-based systems immediately open options for access to new and cost-effective ways to address company goals and objectives. For example:

- Being able to get services up and running quickly;
- Lower upfront deployment costs;
- Ease of access;
- Pay for software solutions you need, when you need them; and
- Access to automatically updated software and security.

However, the hype around cloud computing has helped create some unrealistic expectations about what cloud computing can deliver – making almost unbelievable promises that return on investment will rise, costs will contract and revenue will improve. Trying to grasp just what the cloud represents for each business can be challenging.

The key is to bring clarity to the complexity around cloud computing. Companies need to know what cloud computing is, what it does and what it offers. Cloud computing is an umbrella term that encompasses many types of services, including software-as-a-service. The definition of cloud varies depending on the company and the vendor. Organizations should consider the possible challenges and risks as part of pursuing a cloud computing strategy.

Adoption considerations

The cloud need not be an all or nothing proposition. Companies can find a position

"With cloud computing, the burden of creating, developing and sustaining the entire infrastructure unilaterally gets lifted from the company that may be shouldering it unnecessarily. However, in spite of all the potential benefits of cloud computing, risks do exist."

on the spectrum from control to economies of scale where they will feel most comfortable. Every company must decide if cloud computing will serve its needs. In order to do that, they must evaluate the potential business value it offers and the challenges it involves. What's most important to them? Is it costs? Control? Scale?

With cloud, companies need to determine which applications they must own and control, and which ones require less control, making them prime targets for moving to the cloud. For example, consider contract manufacturing. Some companies manufacture products that are commodities. They require minimal research and development and involve little proprietary knowledge. One product operates in much the same way as any other. So, outsourcing to a contract manufacturer involves low risk where there might be one or more competitors on nearby manufacturing lines. But, a pharmaceutical company, which has highly sensitive intellectual property (IP), faces tremendous risk with outsourcing. The difference here is how much control a company requires over its IP that truly differentiates itself from the competition.

With cloud computing, the burden of creating, developing and sustaining the entire infrastructure unilaterally gets lifted from the company that may be shouldering it unnecessarily. However, in spite of all the potential benefits of cloud computing, risks do exist.

Questions about how such services are used, who has access to those services and how to protect individuals and, in certain situations, personal data need to be addressed. There are measures that can be implemented that will mitigate those concerns, such as proper migration, effective integration and appropriate security policies.

"Companies that effectively use cloud computing services will find themselves accomplishing certain goals more quickly. They will also be able to adapt to business opportunities more effectively. "

But for most companies, these processes and mandates aren't anything new. The issues companies face when using technologies on-premise become the same issues when hosted off-premise. While there are varying opinions on cloud security, there are a growing number of voices suggesting that security in the cloud may in fact be better than the security most companies provide internally. Why?

For one, top tier cloud service providers, who focus on delivering a technology capability as a service over the Internet, place a high priority on security. They know the challenges associated with handling information in the cloud. They recognize what technologies, processes and policy management requirements offer the most protection. Plus, their own reputation and business survival demands high attention to security.

A roadmap for cloud computing

Companies interested in adopting cloud computing need an understanding of the cloud-ready services available to them. Here are some steps to consider:

1. *Have a clearly defined strategy*. IT becomes a more effective partner to the organization if executives devise a clear strategy that improves the business process, relationships and services for the company. Then IT can seek out the services accessed in the cloud that will support the strategy;

2. *Investigate costs*. Evaluate costs associated with internal IT versus the cost of cloud services to help determine what should be owned and managed internally, and what could be cloud ready;

3. *Build a roadmap*. With a clear strategy in place and an end goal determined, identify the direction your company needs to take to get there. Assess the products and platforms you need to support and build upon your IT vision;

4. *Prepare a migration path*. Migration and integration of legacy systems may require additional resources. If outside support is required, consider partnering with a firm experienced in technology migration. Find repeatable best practices, methodologies, highly developed assessment and deployment resources, plus dedicated specialists. All this will help speed and simplify implementation at a lower cost;

5. *Choose credible partners or vendors*. They should have proven processes to support an organization's needs. It's equally important to identify companies with a track record of on-premise solutions. Those companies should also have a clear cloud vision, strategy and offerings that demonstrate stability and long-term viability. If personal data is put into the cloud, legal requirements for transferring, storing and using data must be addressed carefully in advance. These requirements vary from jurisdiction to jurisdiction; and

6. *Pursue a pilot*. Start with a custom application that leverages the instant scale, high compute or bandwidth intensive capabilities of cloud computing.

Any decision to begin using cloud computing requires forethought, planning and preparation. The more a business knows what it wants to do, the more likely it will be able to make the changes necessary to accomplish its goals. There are clear business benefits that can be derived from cloud computing. But, getting to the cloud and realizing the benefits of cloud computing is not a given. The journey to cloud is an evolution that will occur over time. Companies should start today with a clear plan, sound analysis and proven methodologies and practices.

Companies that effectively use cloud computing services will find themselves accomplishing certain goals more quickly. They will also be able to adapt to business opportunities more effectively. Using cloud-based systems can also lower costs, especially compared to buying, installing, configuring, upgrading and maintaining these tools and services on premises by themselves. ●

Evaluating the needs and requirements for successful cloud services

by Kent Erickson, Vice President, Product Management, Zenoss Inc.

Cloud services provide a flexible IT infrastructure that can support peak business computing requirements. They can level the playing field for all businesses. But there are concerns, ranging from lack of service level agreements in the public cloud to release failures and security in the private cloud. Strategic planning that identifies projects that are well-suited for cloud computing can help to determine the critical requirements for success.

Kent Erickson is Vice President of Product Management at Zenoss, Inc. He previously ran product management for Operations Manager at Mission Critical Software and AppManager at NetIQ.

Kent Erickson received Master's and Bachelor's degrees in Mathematical Sciences from Rice University, Houston, Texas, USA.

For many IT organizations, the ability to respond quickly to their customers' changing needs sounds more like a pipe dream than a reality. The truth is most companies simply don't have the budgets or resources to meet requirements for short-term, temporary access to significant amounts of computing capacity. But cloud computing is changing all that.

Cloud services are levelling the playing field for all businesses. By providing an extremely flexible IT infrastructure where users can request the specific computing environment they need and gain immediate access to resources, all businesses now have the ability to meet their business' unique peak computing demands, and release these resources when they no longer need them. Cloud computing is changing the capital cost structure of supporting peak business computing requirements by not having to maintain or own the infrastructure all the time.

The evolving enterprise

Whether we're ready or not, enterprises are evolving in front of our very eyes. Users are proactively bringing up servers in the cloud, and as a result, enterprises are beginning to explore how they can make better use of the cloud to bootstrap projects faster and test concepts. This is also presenting companies with new options for ownership and the ability to gain more IT capacity at lower cost.

While there are many ways to describe the cloud, simply put, it is computers running on the Internet. That said, there are a couple of things to keep in mind when defining what the cloud is, whether we're talking about a private or public cloud.

First, the public cloud is the original version. It's where the whole cloud terminology came from. A good example is Amazon's Elastic Cloud Compute (EC2): a cloud available over the Internet to which access can be purchased with a credit card.

The private cloud is a more recent development. At this point, not everyone is comfortable with public cloud services. In fact, many organizations are very keen to continue managing and running services behind the firewall, something that probably isn't going to change anytime soon.

Operating concerns

Keeping in mind that the cloud is an operations innovation in how IT is deployed and managed, we must remember that it's still relatively new. While operations teams are in the best position to help organizations

make the most of cloud computing, many companies have yet to embrace it, and still have concerns around both the public and private cloud.

For a start, there are questions concerning the purchasing process for the public cloud. There are often no service level agreements and a limited choice of computing environments. Among other aspects is the fact that the public cloud doesn't provide the things we all take for granted such as backup, security, monitoring, unified authentication and administrative access.

While the private cloud may be a bit more complicated because of the technical requirements we've come to expect from the enterprise, there are similar concerns around release failures, security, configuration management, bridging old and new infrastructures, and monitoring sloppy infrastructures that are a result of releasing changes too fast.

How cloud computing makes organizations better

So what's the value of cloud computing? How does it make an organization better? If it's just about delivering Intel as a service and spinning servers up or down really fast, how is the value measured? It can be measured in many ways, but mostly it comes down to the ability to provide reliable, on-demand access to computers at affordable prices. For example, retail companies can easily add enough IT capacity to meet the needs of customers during holiday shopping periods.

The cloud can also turn IT infrastructure from a fixed cost to a variable cost. For example, if a company needs 1,000 computers for a week, with cloud computing they can get 1,000 computers for a week for $10,000 and then they're gone. Whereas, buying 1,000 computers can cost upwards of US$10 million, along with provisioning, managing, running, testing, and locating them. Providing on-demand access to computers then releasing them when they are no longer needed makes things possible that weren't financially feasible before.

Critical requirements for success

As new technologies and practices come into play, there are many kinks that still need to be worked out. Instead of applying cloud computing across the board, it's wiser to plan strategic projects that are well-suited for cloud computing. Companies that have successfully used the cloud as their operations framework have learned a thing or two about what's required for success.

- Start out small. Cloud computing is, after all, a new bucket of technologies and practices. There are new things to figure out with new computing technologies. So, instead of applying it across the board, it's better to start out small. Build on your successes and learn best practices to identify the best cloud technology to prioritize which workloads are the most appropriate.

- Unify IT disciplines. Virtualization in clouds drives the need to unify IT disciplines in the organization. Like most innovations in IT, cloud computing does not mean that there's less skill or less discipline. Companies that use cloud as an operations framework understand that in order to be effective and get the most out of it, cloud management requires more discipline and skills than ever to deliver an overall better experience.

- Elastic provisioning. A company that offers limited time promotions requires flexible capacity to meet their business needs. In order to ratchet up and down very quickly, adding IT capacity when demand is high and delivering great response time requires elastic provisioning to successfully pull it off. Then, when the promotion ends, they can ratchet back down so they aren't paying for the servers, making it very affordable to do such promotions.

- Homogeneous environment. In order to manage an environment successfully, you need to know all the devices that are there. This gets more complicated and difficult when an IT team is using multiple tools for specific technologies. The best way to effectively manage an environment is to look for tools that work with the environments together or create a more homogeneous environment.

- Pragmatic approach. In terms of monitoring and automation, there are a wide range of different cloud technologies to choose from. But, thinking about the pragmatism of operations rather than tools is a really smart way to go. A pragmatic approach that supports ability, agility and affordability provides the three components that are critical to successful cloud services, which is the ability to: 1) manage and monitor all applications and servers, 2) quickly respond to customer demands, and 3) ratchet capacity up or down when needed to keep costs down.

Why bother with cloud?

We continue to hear all sorts of arguments for cloud computing. Most of them boil down to: it's better, cheaper, faster and easier. As with any new technology, the promise is greater than the initial payback. While there are truths behind the claims, it all comes down to the benefits a service provides.

Let's start with cost. Maybe an organization doesn't actually need to own the infrastructure all of the time. Consider a retail company that does the bulk of its business at Christmas. Do they really want to buy a bunch of servers in March and keep them idle until the end of the year just to use them for a month to generate profits? Clearly, you want to generate profits but whether you want to incur that capital expenditure is a really good question; this situation is probably something that you should consider for the cloud. This is applicable to any company with seasonal or business driven spikes in computing demand.

Second, looking at workloads and doing some workload triage is really important. It may well be that some workloads are very appropriate for the cloud at low cost, while others are not.

And what about flexibility and getting things done quickly? That's one of the key advantages of the cloud. Almost everyone focuses on self-service delivery. It's a big deal. With Amazon EC2 today, you can sign on to your Amazon shopping account, add a web server, drop some content on it and have a business functioning in an hour. That's the kind of value proposition the cloud provides.

But the benefits of the cloud are not just about cost reduction. They are about enhancing IT capacity, improving management, and creating new opportunities to push into new revenue streams such as data and analytics. All this helps us to better understand our customers and our supply chain and can result in more revenue at the end of the day. The cloud can play that role.

Conclusion

With IT environments changing faster than the individuals who are running them, it's becoming more difficult to provide reliable services when demands are high. Cloud services give companies the agility they need to deliver extremely responsive, on-demand IT more effectively and cheaper than has previously been the case. As a result, companies are turning those pipe dreams into reality.

Top things you should consider when selecting a cloud application

by Tom Fisher, Vice President Cloud Computing, SuccessFactors

The cloud can be ideal for business applications. Not only can the overall total cost of ownership be dramatically less than a comparable on-premise solution but the cloud can also free up management resources to focus on specific business challenges. However, close attention needs to be paid to security considerations and best practices in application design. Key success factors when selecting cloud service providers include regular innovation cycles, the availability of integrated solutions and the presence of relevant technical expertise.

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Mr Fisher has also worked as a senior executive in technology strategy, business development and M&A for a variety of software and technology companies including Gateway, IBM, KnowledgeWare, Exactium and Seer Technologies.

Tom Fisher graduated summa cum laude from the University of North Carolina – Charlotte.

The cloud is the ideal place for business applications. Vertically integrated suppliers of cloud applications enable the business executive and the chief information officer (CIO) to get major business capability and benefit in record time, at a low cost. There are no infrastructure set up costs, no software expenditures up front and no major expenditure on professional services.

Cost savings include the elimination of the dreaded capital expenditure request typically required when installing an on-premise solution. The overall total cost of ownership for the cloud is dramatically less than a comparable on-premise solution. Cost reductions are reflected in both the 'up-front' costs typically found in an on-premise solution (buying the software, buying the hardware, getting the network infrastructure in place, adding systems management monitoring to the application, adding staff to manage the application in production, etc.) and the ongoing costs of the application – the cloud application's annual subscription cost is often dramatically less than the annual maintenance cost of an on-premise solution.

The dramatically improved process of releasing software in the cloud and the improved patch management makes for higher service levels for functional delivery, as well as the standard metrics of uptime and availability which are usually more in line with customer expectations. Applications, delivered via the cloud, have other benefits including freeing up one of management's most capable technical resources, the CIO, to focus on specific business challenges rather than building core competencies in isolated applications that have long been built and delivered by industry organizations.

Security continues to be a major consideration

During the due diligence of a cloud provisioned application or a cloud infrastructure provider the CIO and their team should concentrate on security considerations. However, as many CIOs have found, the infrastructure, tools and technologies that are leveraged by cloud application providers are very similar to the environments they manage already. This has the net effect of increasing the overall comfort level of the operations teams when they allocate cloud resources for their own environments.

Don't let that be the end of security due diligence though – you need to focus on the built-in application security. It is important to ensure that customers are protected from a range of new challenges introduced by the complexity associated with the wide variety of roles and permissions typically found in any business application. In the cloud these enhanced roles may allow a user to perform tasks that could endanger the data contained within the application.

Make sure that the application you select is truly designed for the cloud

Cloud applications should be built on a common architecture platform built around multi-tenancy. However, just like everything in IT there are best practices even in emerging technology areas such as the cloud.

Key considerations for enterprise cloud application buyers include the ability for customers to work within a standard data schema, but still have considerable flexibility to add or extend application functionality without the risk of losing or overlaying critical data.

Innovate or die!

In the cloud the cost of switching is far less than in the on-premise world. The reality is that switching is always hard – there are new user interfaces to be learned and different use cases that need to be defined and supported. However, the notion of moving from one application to a competitor changes the nature of our business and enforces the 'innovate or die' mindset. If you don't innovate, regularly, you will lose your customer base in the cloud. The successful provider of cloud applications will understand this well and adhere to this brave new world. Releasing software, on a regular basis, that provides the greatest business benefit with the least amount of impact to customers is a key to success.

Integrated/organically developed software suites are much better in the cloud

A crucial consideration for the CIO or the business person is the requirement for an integrated solution. Too often, in the cloud, the assumption is that a 'best of breed' approach will work. The reality is that the 'best of breed' approach has limitations – the integration required between applications can quickly put you back into the business of buying lots of different applications. You should look for a provider that delivers much of the application themselves – including components you may not be considering for several years out. This insures that you will be able to grow the software with you as you decide.

And don't forget about the people! The cloud is relatively new and depends heavily on the availability of technical expertise to make the experience as rich and as risk free as possible. It's critically important to make sure that, when considering a cloud provider or enterprise cloud application, you ensure that the team driving your requirements has the depth to be able to meet your needs. ●

Cloud computing: Future directions and management implications

by Richard Davies, VP & Managing Director and Doug Neal, Research Fellow - Executive Programme, CSC's Leading Edge Forum

Cloud computing is a rapidly changing information technology – but it is not alone. It is part of an accelerating wave of change impacting business and society. The world is becoming virtual and businesses are increasingly being defined by information and how it flows. IT is steadily becoming more integral to business and the cloud will not only facilitate and accelerate this integration but will also both enable and support fundamental changes in the nature of the management model. The cloud is emerging as a rapid and powerful platform for innovation and experimentation that just about every company can afford.

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Doug Neal received a BA from Haverford College, conducted special studies at the Ruhr University, and has an ABD from the University of Michigan.

The IT industry is often accused of over-promising and under-delivering. While there are many days when this may seem true, looking back over time the opposite is more the case. The extent of IT-enabled business change has been greater than most people could have imagined and we believe the pace of IT enabled innovation will continue to accelerate.

One reason for this belief is the rapid rise of cloud computing. The cloud is changing computing economics, often eliminating the need for fixed, capital investment, and enabling a more agile and variable customer environment. But each generation of computing tends to be defined by the new types of activity it enables. While the cloud is enabling many new uses, two broad but closely related classes of activity seem the most significant: social networking and unstructured information.

For most of its history, computer applications have typically worked with structured information – database records, transaction processing, financial information and so on. As this structured work matures, the industry focus is shifting toward more unstructured information and relationships – such as cross-functional teams, personal networks, text messages, content management and customer co-creation. All of these areas will be facilitated by cloud computing's emphasis on ubiquity, connectivity, standards and borderless information flows. Over time, the importance of applying technology to these unstructured domains and social interactions will rival, and perhaps even surpass, traditional data systems.

Cloud computing is not the only information technology that is rapidly changing, and should not be evaluated in isolation. It is part of a 'bow wave' of change that includes consumerization, virtualization, mobility, social networking, end user devices and even the environmental movement. The pace of technical, business and societal change is accelerating.

As companies develop and refine their strategies, we encourage the adoption of a holistic view that cuts across the core technologies listed above and systematically thinks through their impact on the six key business areas shown: customers, products/services, competitors, partner/joint ventures, business operations and employees. Dramatic changes in each area are likely. Consider the following:

- Customer sales, service, communications and brand strength are increasingly determined online;
- IT can radically reshape many product and service offerings;
- New competitors can emerge from any geography and expand at unprecedented speed;
- Partnering can now be managed globally and across your entire value chain
- Technology is significantly lowering the costs of many business operations; and.
- Employees are becoming increasingly double-deep, integrating their particular job skills with the relevant IT know-how in an increasingly self-service manner.

The last of these may have the greatest impact on the traditional enterprise IT function, which will need to shift from being a provider of IT to an enabler of IT within the firm. It is a huge cultural change that many IT groups and professionals will struggle with.

There was a time not so long ago when you could reach out and touch your friends, your team, your information, and even your servers. Physical proximity was very comforting, but it is now the exception, not the rule. As we move to a world of virtual computers, virtual offices, virtual teams, virtual realities and even virtual companies, we will increasingly come to recognize that the virtual is becoming what's 'real'. It is the buildings, travel and physical operation centres that are becoming increasingly unnatural and unnecessary. Businesses are being increasingly defined by information and how it flows. Cloud computing will only further this trend.

While cloud computing implies significant changes in the how and where of information processing, we disagree with those who say that company data centres hosted on company premises will cease to exist. Legal, regulatory and compliance issues alone are enough to ensure that this will be unlikely in the foreseeable future. Availability, concerns about becoming too dependent upon the Internet, and the sheer scale of transition are additional barriers. What we envision is a staged migration and ultimately a role inversion:

Stage 1 – Use the cloud to augment IT strategy. Apply the cloud to research, development and testing environments – leave production alone. Use the cloud to improve agility, reduce opportunity costs, and speed up time to market and time to creation of value.

Stage 2 – Integrate the cloud with IT operations. Use the cloud for disaster recovery. Develop applications that can be deployed as services in the public cloud. Move applications that are processing-intensive for short bursts (such as large statistical analysis tasks) to the cloud. Consider ways to decompose data for optimal internal and external storage.

Stage 3 – Reverse the roles of the data centre and the cloud. Move most computation and end-user computing to the public cloud. Optimally store data, decomposed along legal, regulatory, compliance and performance lines. Make your data centre the disaster recovery site.

The impact of cloud computing on IT energy consumption and green IT is also interesting. If more computing is done in the cloud, internal IT capacity and power consumption will be lower than if it has to be kept ready for the occasional peak load. Additionally, most of the mega data centres that have been built by Google, Microsoft, Amazon and others are relatively new and were designed with power availability, peak load management and energy efficiency in mind. This could emerge as an important factor if corporate energy consumption becomes a prominent political or regulatory issue.

Of course, the real importance of any new information technology is measured not by how it changes data centres or IT management, but by what effect it has on the overall management of the business. The role of IT is shifting from doing things to or for employees to one of creating platforms and enabling employees to do it themselves. These 'double deep' employees will increasingly become the source of value creation within a business. IT is steadily becoming more integral to the business, and the cloud will facilitate and accelerate this integration in several important ways.

From a financial point of view, cloud computing doesn't just move IT from a capital to a variable cost model – it helps shift the entire business that way. In many firms, IT accounts for as much as half of capital spending, a figure that has always bothered business leaders and can now begin to shrink significantly. Buildings and facilities are typically the next biggest component of capital cost, and, by making businesses more virtual, cloud computing can help reduce these investments as well. The net effect is that business costs will become substantially more variable, and this will have a significant impact on both agility and resiliency.

Organizationally, the traditional separation of business and IT that was characteristic of the mainframe and even the early Internet eras is now giving way to an environment led by tightly integrated business/IT teams where discussions about who is in the business and who is in IT become increasingly meaningless. Additionally, when combined with social networking technologies, the cloud will help make what we today think of as informal, undocumented social networks much more visible, influential and manageable. Over time, personal, business and customer networks may challenge and even surpass the formal organizational hierarchy as the principal structures of the modern firm.

One of the big philosophical questions that topics such as cloud computing inevitably raise is: how much does this really matter? Isn't this just another management challenge that business leaders need to address? After all, while technology has changed many aspects of doing business and requires many new skills, how much has it really changed the basic ways that organizations actually behave and make decisions?

Fundamental changes in the nature of the management model are indeed happening. As business theorists have noted for many years, much of the structure of the modern firm is based on traditional communications and transaction costs, but since technology is radically reshaping both areas, it is only natural that significant organizational changes will follow. Expect to see many more social and democratic systems and experiments – for example, techniques such as prediction markets, which place more value in the aggregated knowledge of employees than in a central forecasting group. Cloud computing will both enable and support such initiatives and will be inseparable from whatever new management paradigms emerge.

Early cloud vendors initially focused on consumers, small and medium sized businesses, and start-ups rather than enterprises, since enterprises are a niche market compared to consumers. However, recent strong interest by governments in the UK, USA, Canada, Holland and Japan has created a niche large enough to get the attention of the large cloud vendors. These vendors will make improvements in their cloud offerings in their pursuit of the government market that will also be attractive to enterprises.

In looking at some of the key lessons we have drawn from the early cloud adopters, we are struck by the balance between direct cost savings, and improved speed and agility. These benefits provide a strong foundation for future cloud expansion, especially given the many blue-chip companies increasingly pursuing this path. Moreover, we believe it is impossible to separate these developments from the current global economic downturn and today's heightened business uncertainties. We know from the past that recessions and their resulting cost pressures tend to make business and IT leaders more willing to pursue new computing alternatives, and that is clearly the case today. As IT budgets are slashed, perceptions of what is possible and acceptable naturally change, especially when order-of-magnitude gains are involved.

Despite the recession, the need for companies to innovate and compete globally is not going away, and firms will continue to pursue advanced business/IT capabilities to maintain or improve their current market position. The cloud may be the latest hot button term in the tech sector, but its proven advantages of being a rapid and powerful platform for innovation and experimentation that just about every company can afford are just being realized. The IT industry will undoubtedly make its mark by introducing this technology to clients and making the transition as seamless as possible; however, the companies that choose to innovate with the cloud will ultimately become the determining factor in its success. ●

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