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Cloud computing is emerging as the enabling technology for modern enterprises. Africa has the benefit of low reliance on legacy systems, so can we expect cloud computing to develop more innovatively and on a faster scale there than in other markets?

## We ask our panel of experts who they think will profit from the cloud in Africa and which services are poised to develop and expand?

**Across Africa, mobile broadband and computing are feeding off each other in a virtuous cycle: the rollout of broadband technology is spurring the adoption of cloud solutions and the adoption of cloud computing is stimulating growth in mobile broadband bandwidth.**

And as you start delivering computing services to lots of people, they figure out new applications that can be used on that platform and they're able to solve problems in ways that have never been thought of before. The result - new revenue streams and business models for the big telcos who can profit almost immediately from the switch to cloud computing. But expanding multinationals and large corporates, and even medium-sized companies, can gain from both 'renting' IT infrastructure and reducing time to market. Similarly governments could slash IT expenditure and enable citizen-centric service delivery.

To capitalize on cloud now, you have to combine the flexibility of public cloud with the data control and resilience of private cloud. Hybrid or shared-services cloud models offer this win-win. With the recent launch of IBM's SmartCloud Enterprise Solutions and IBM's SmartCloud Datacentre in Johannesburg, businesses across Africa can have access to the scale and flexibility of hybrid cloud on a utility model with all the security parameters we use for our own business.
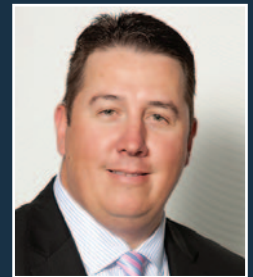
**Werner Lindermann**
*IBM Sub-Saharan Africa*
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**In theory, Africa's lack of legacy IT infrastructure should enable cloud computing to be adopted at a far greater pace than in those regions with more established IT infrastructure in place.**

However, the ultimate key to this success will be network access, and this may also be a stumbling block in the move to the cloud.

Effective cloud computing is dependent on access to reliable and reasonably high-speed networks - currently, many areas in Africa do not have this available. Most commentators would say that it is unlikely that fixed-network rollout will become the standard access method in Africa - the expectation is rather that the mobile operators will scale their networks to deliver adequate quality of data service at a reasonable cost.

The key to enabling African businesses to realise the full potential of cloud computing is therefore close cooperation between cloud, fixed and mobile operators.

Information Communication Technology (ICT) is a major factor in economic growth, which means that more developing countries will pursue policies that open up their country to mobile, internet, and broadband penetration. Africa has seen significant growth in mobile technology. Three broadband submarine fibre-optic cables promise to bring increased connectivity, capacity and bandwidth to the region.

The ten largest internet using populations on the African continent - Nigeria, South Africa, Sudan, Kenya, Uganda, Zimbabwe, Ghana, Cote d'Ivoire, Senegal and Zambia - are obvious targets for cloud computing market share and growth potential. Rwanda is added as number 11 due to its government focus on ICTs as a driver of economic growth. As to the cloud's potential in the developing world, the first observation is that cloud computing reduces infrastructure costs and levels the playing field for small and medium-sized enterprises. Unlike client-based computing, which requires installation and configuration of software and update with each new release, as well as revisions of other programs with every update, software on the cloud would be easier to install, maintain and update. This benefit is especially important for the rural users who have less IT training.

For development agencies such as the World Bank, and the International Telecommunications Union, it was inevitable that the functions of cloud computing would be applied towards ICT development. These functions are usually listed as e-education, e-health, e-governance and telecommuting. These areas of interest are functions that governments and aid agencies can devote projects and resources to in order to improve a target socio-economic statistic, thus creating other areas of growth potential. However, these areas are still in their infancy stage, just like cloud computing as a whole in Africa.

**Raymond Deftereos**
*Gijima*
*Chief Client Officer for Commercial Business*

**Alex Laverty**
*The African File Founder*

*(www.theafricanfile.com) and also an African Technology Master Scholar, USA*

**To grasp where profits exist for cloud computing on the African continent, understanding of the basic and more advanced indicators for cloud readiness needs to be gained. Thus a search for the most cloud-ready sectors of the economy on the continent means determining which set of indicators relate to the service's success. Basic indicators that will push or pull sectors towards cloud computing are the business climate in the country, the level of mobile phone penetration and broadband accessibility.**

The business climate could push adoption of the cloud if there is a high difficulty in setting up or maintaining a traditional brick and mortar business. The ability to work around obstacles by moving to e-commerce would be an attractive solution to those entrepreneurs in countries that have high levels of corruption or bureaucracy. This indicator encompasses the Ease of Doing Business Index from the World Bank, as well as the Bank's Start Up Time indicator and Transparency Internationals' Corruption Perception Index. This push factor is relevant to foreign businesses that may see e-commerce as a profitable alternative to dealing with the bureaucracy involved in creating a physical presence in the store.

The level of mobile penetration will often decide how profitable it is for a company to offer services on the cloud for consumers. Examining an e-commerce solution such as M-PESA in Kenya shows that Safaricom had a large base of potential mobile banking users because of the high level of mobile penetration. Additionally, any e-health service or e-education offering will rely on significant users of mobile telephony in order to be profitable. Businesses should not assume that their value-added services to mobile telephony will be the cause of increased adoption. Discovering if the market has the right convergence of factors, including literacy, health expenditure per capita and energy infrastructure, will be as critical as looking at mobile penetration rates.

Finally, with many cloud services requiring large amounts of data to be exchange between the terminal device and the cloud, those countries offering cheap broadband access will be most attractive for those solutions. Conversely, if a cloud services business can offer access to their services with low amounts of data usage such as RIM's data compression technology, they can succeed in markets with less developed broadband infrastructure. Near-term profits for Internet Service Providers and private companies will likely occur in those countries that are able to quickly turn the increased bandwidth gained from undersea cables into lower prices for consumers.

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**Chris Ward**
*Business Cloud News*
*Editor*

If Cloud Computing can deliver on its promise of low-cost, flexible IT, then the African cloud market could be set to explode in 2012 and beyond. That's been our verdict since we started research into the continent's cloud industry earlier this year, in conjunction with an event we're running in Johannesburg next year – the Cloud Computing World Forum Africa.

One of the major barriers to market expansion is broadband availability, which is fundamental to being able to deliver software as a service (SaaS), and public cloud storage - two of the biggest advantages of cloud computing adoption. However, recent figures have reported major increases in broadband subscription across the continent and, perhaps just as vital, a 61% increase in mobile subscriptions. One in five handsets now sold is a smartphone – a key device for utilising cloud computing and making African businesses mobile and globally connected.

We expect SMEs to be the biggest beneficiaries from increased cloud availability. As with other emerging global markets, the pay-as-you-go opportunities cloud computing offers will give small businesses throughout Africa the chance to blossom, and dip in and out of IT as and when their budgets and expansion plans allow.

And while all of this is, of course, dependent on having the right IT infrastructure in place to ensure those businesses get the cloud computing options they need – it's interesting to see a number of big North American, European and Asian IT providers taking an interest in developing their cloud computing presence throughout Africa this year. They'll have some serious challenges to overcome, but will ultimately enhance Africa's IT potential by building cloud infrastructure across the continent, and could get a huge slice of a potential $25bn payout as a result – that's if the IT industry booms in Africa to the tune of one global analyst's 2012 prediction.

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Cloud computing is already beginning to transform how many businesses in Africa operate, whilst uptake of smartphones and tablet devices is increasing consumer use of the cloud to access a rapidly expanding mix of applications in social media, entertainment and many others areas.

A symbiotic relationship exists between cloud computing and bandwidth - each supporting growth of the other. Cost-effective access to reliable, high-capacity bandwidth is vital to the evolution of cloud computing in Africa, which is itself a driver for the continuing deployment and activation of terrestrial and submarine fibre-optic network capacity.

The biggest potential beneficiaries of the emergence of cloud computing are the telcos and ISPs selling connectivity and services to consumers. As Africa's carriers' carrier, WIOCC is ideally placed to observe the changing bandwidth requirements of such organisations. We see our customers' capacity demands growing at a tremendous rate, much of it driven by smartphone uptake and increasing mobile broadband usage as connectivity improves and costs come down.

Businesses of all sizes and operating in many sectors are also beginning to take advantage of the opportunities offered by the cloud - including mobility, increased flexibility and scalability, and the ability to move capex to opex. SMEs in particular are attracted by the ability to take advantage of cloud-based IT solutions quickly and economically. Meanwhile software developers in Africa have found a whole new environment where businesses and individuals can access their applications, games and solutions.

Development of the cloud services market in Africa depends heavily upon continued service provider investment in network infrastructure to maintain reliable, high-quality service. WIOCC's ability to deliver cost-effective, reliable, high-bandwidth international connectivity to carriers in Africa, marks it out as another beneficiary of the cloud.

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