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A smart future with AI, IQ, and the cloud

As shapers of the future, millennials are taking leadership roles across the world as activists, politicians, entrepreneurs, and much more.

Disruptive innovation from this demographic often comes from low-key, even crazy ideas. Struggling to make rent in San Francisco, Airbnb co-founder Brian Chesky stumbled across his value proposition almost by accident. With co-founder Joe Gebbia, Chesky decided to inflate air mattresses and rent out his apartment to local conference attendees, spawning a company that now lists 1.7 million homes in 34,000 cities worldwide.

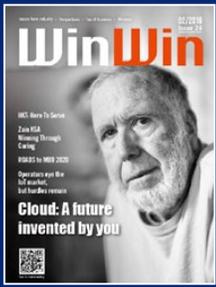
Fueled by mobile Internet, the nascent Sharing Economy has inspired new innovative business models. Connection ubiquity coupled with IoT will transform physical things into information units that generate and process data at a local level. A predicted two-thirds of information will be transmitted within one kilometer by 2020.

At the 2015 Huawei Cloud Congress, noted futurist Kevin Kelly stated that the convergence of three AI-driven factors will coalesce the cloud over the next 20 years: data, bandwidth, and intelligence. By 2020, 50 percent of apps will be on clouds, with killer apps centering on IQ and AI. Both IQ and AI will be buyable as basic services, much like electricity is now.

Clouds will repurpose all physical products into services. They will boom because they are cheap, quick, and easy to create, and also unaffected by local markets. Combining AI and traditional services will give rise to a new X + AI model that exists in a more agile and organic world. Efficient, intelligent, and cloud-based will be bywords for how people obtain services, with resources better distributed and scheduled.

Our future selves will spend most of our time on clouds, with AI infusing everything with intelligence. A better connected, smarter, safer, and more efficient life is coming into being.

Sally Gao, Editor-in-Chief



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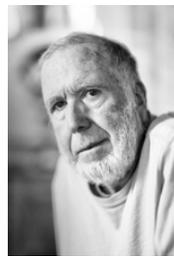
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Kevin Kelly believes the future will bring IQ as a service under the following formula: $X + AI = \text{Service}$. When this happens, people will be able to buy as much AI as they want, and more buyers will mean smarter AI. Moreover, AI won't be generated by startups - it will be served on the cloud.

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Zain KSA has identified three pillars in its transformation plan: operations, regulation, and capital structure. The company will continue to invest in improving its network performance and providing a qualitative customer experience, especially with mobile video.

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Ryan Ding, President of Huawei's Products and Solutions, claims VoLTE is superior to HD Voice, and far more spectrally efficient than traditional 2G/3G voice services. He believes that a new experience-driven era is coming and that Huawei must continue working with its customers and industry partners.

19 Operators eye the IoT market, but hurdles remain



Ken Hu, Huawei Rotating CEO, asserts that the industry must quickly develop unified IoT standards to drive cross-industry development. A consensus is building among operators on narrowband Internet of Things (NB-IoT), which is seen in the increasing deployment of LPWA networks.

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Cloud

A future
invented by you



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This is a composite of the comments made by noted futurist Kevin Kelly at the Huawei Cloud Congress, both in his keynote speech and in an interview with WinWin. Kelly covers the drivers of cloud; how it's disrupting business models; how it will result in ubiquitous AI; and how you're not late to the cloud party at all – you're early.

By Kevin Kelly

A shared ubiquity

The cloud will be a place that most of us will spend most of the day, but we won't even know that there is a cloud unless it turns off. It will be like air – something that we live in, but don't really pay too much attention to unless it's gone. That ubiquity has never really been present before, because it's a shared ubiquity.

Cloud's three drivers

The cloud is possible because of the convergence of three factors that are accelerating very rapidly – data, bandwidth, and intelligence.

Data

Data is the one thing that we're making more of than anything else. Expanding at the rate of 66 percent, it's literally an explosion. If we measure the surface area of all storage manufactured on this planet, it's actually increasing at the rate of an explosion. We are at the level of exabytes, yottabytes, zetabytes – actually, we're running out of terms. We don't even have a sense of the scale at which this is happening. We have no idea how to manufacture or manipulate data at this rate. I'd say there's a tremendous opportunity in this new mega scale for information and data science. Anything that can be measured will be measured, and anything that can be tracked will be

tracked. My prediction is that there's a massive opportunity in these sensors as they get smaller and we begin to track everything. No matter what your business is these days, you're in the data business. This is how the cloud happens.

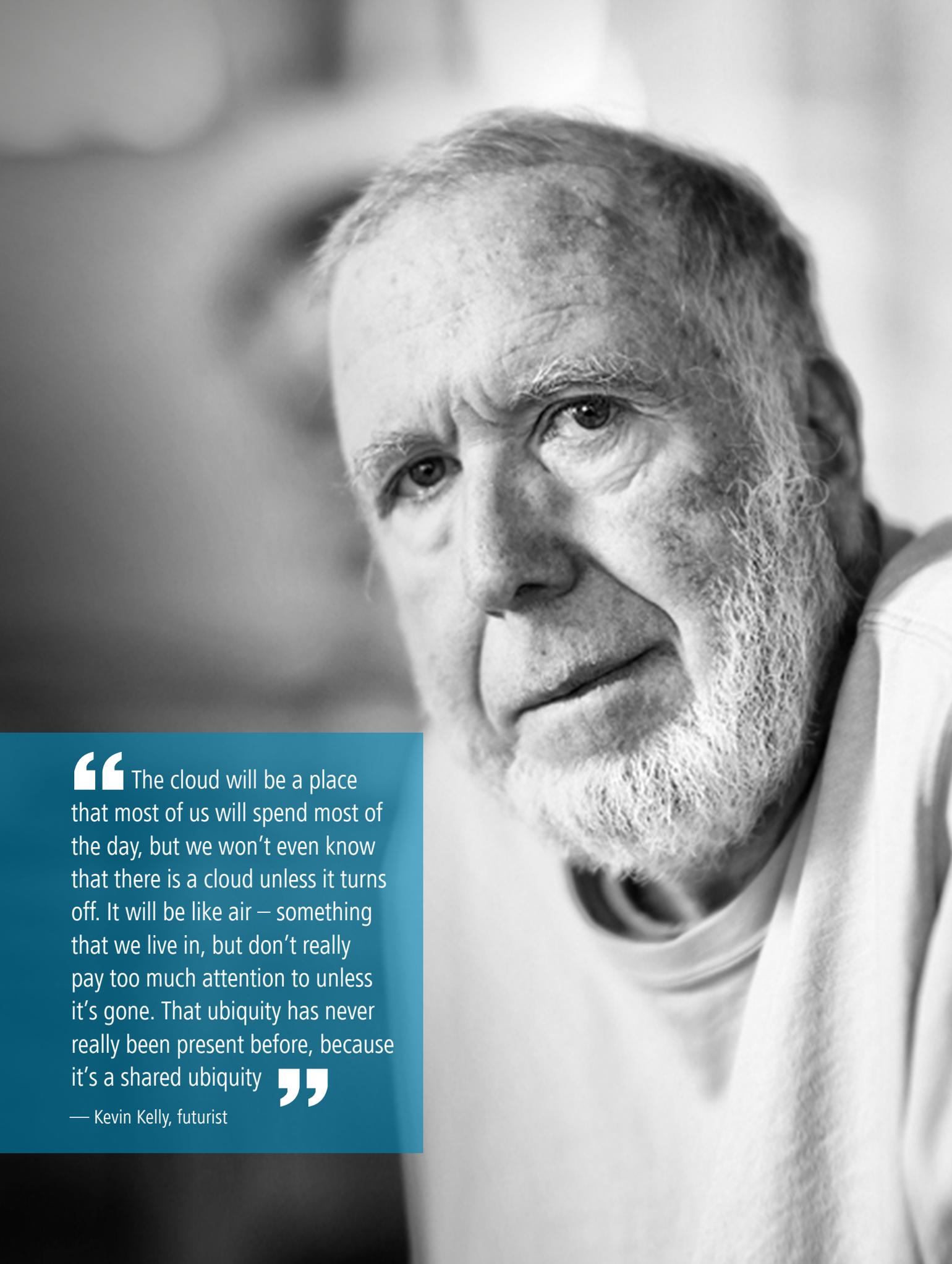
Bandwidth

Bandwidth is expanding rapidly as well, but the important thing is that it's going wireless. My prediction is that in a couple of years the total amount of traffic over wireless will exceed the total traffic over wires. Bandwidth is reaching everywhere, even cars, which will become our new offices. Therefore the total amount of bandwidth going to cars will exceed the main bandwidth going to your home. Bandwidth is the secret ingredient – as it expands, so does the cloud.

Intelligence

The third factor is intelligence – AI. I think this is the most important one. There are little bits of AI embedded into computers and robots, but the AI that I think will be most important will come from the cloud. The robots will even get their AI from the cloud.

Right now, the companies producing the best AI are not selling it as a service. Google, Baidu, Microsoft, and Facebook actually have very large cloud-based AI, but they are private clouds. I think within four years we'll see companies like Amazon offer IQ and AI as a cloud service in the same way that you would offer web services or web hosting. It will be for data crunching, image recognition, things like that.



““ The cloud will be a place that most of us will spend most of the day, but we won't even know that there is a cloud unless it turns off. It will be like air – something that we live in, but don't really pay too much attention to unless it's gone. That ubiquity has never really been present before, because it's a shared ubiquity ””

— Kevin Kelly, futurist

“

All are served on the cloud – it's IQ as a service. You're going to just plug it in, and purchase as much IQ as you want. The more people that use AI, the smarter it will get.

”

We don't really realize how fast AI is increasing these days. AI is better than most doctors at diagnosing x-rays, better than most legal experts at looking at evidence, better than pilots, who only really fly their craft for about eight minutes a flight.

In the last couple of years, AI has really, really taken off. Baidu, Google and Microsoft operate AI that is able to take a photograph, look at it, and tell exactly what's in it. Google taught AI how to learn, how to play video games, and how to play strategically. And then they taught it how to learn how to play, which is a very profound difference. These AIs are getting very smart very fast. All are served on the cloud – it's IQ as a service. You're going to just plug it in, and purchase as much IQ as you want. The more people that use AI, the smarter it will get. The smarter it gets, the more people will use it.

AI is the killer app. I think that people will want to be on the cloud because it's selling and giving smartness. Even more importantly, AI is necessary for the cloud and its huge data to make any sense. So AI is necessary to make it work on the cloud, and then the main product of the cloud is AI. So it's at both ends. I think that AI is so important that it'll be the main driver for the next 20 years.

X + AI = Service

We can take X, whatever it is, and try to imagine how you make it a service on the cloud. And that's going to be the real agenda in these coming decades. Is there anything that can't be turned into a service? Probably only a few things. There are about 9,000 different cloud-based services trying things like food as a service, furniture as a service, and toys as a service. They're trying everything. Most will probably fail, but some will work.

The next 10,000 startups will be taking something and

adding AI to it and making it smarter. That's the formula, and all this AI is not being generated by the startups, it's served on the cloud. I don't think that physical things will go away; it's just that the business model of how you get them will change because the value will often be in their smartness, in their customization, and in their suitability to your home or environment. We're going to do the same things with physical objects as we do with software. All hardware will behave as if it were software. Take a furnace, and you make it really smart, and it starts to obey the same principles as software. All these things are moving to the cloud. I would suggest that 50 percent of apps, even in the next five years, are going to be cloud-based.

The cloud offers so many new advantages. It's built for scaling – scalability, low capital, instant startups, easy prototyping, location independence, and device independence. Your phone, laptop, tablet, even a big theater, will all be looking into the same cloud, and they're shared because there's an ecosystem. And the scope and scale of this is much larger than just having our phones connected. It makes our environment very adaptable and much more organic, more like an ecosystem than a machine. Ecosystem is a good word, because it's like a biological entity, creating a better image for adding all these physical things to the cloud. We have something that resembles a rainforest more than a clock.

Mesh networking

The structure that we normally think of for a cloud is a device, and information that goes up to the cloud and comes back down. At the center of this is a big data farm, and there's equipment by Huawei and others powering this. But in fact, there's an alternative structure.



The next 10,000 startups will be taking something and adding AI to it and making it smarter. That's the formula, and all this AI is not being generated by the startups, it's served on the cloud.



The one I want to suggest is a mesh – a mesh version of the cloud. With mesh, communications happen peer to peer. So your phone, instead of going to the cell tower, is actually going from phone to phone, peer to peer. The idea is that you have the communication in the cloud happening at the edges. You have different kinds of things communicating directly with each other – a phone talking to a satellite, a satellite talking to a tractor, a tractor talking to a moisture sensor, with all these things operating in a completely distributed way. This whole thing is what we call the Internet of things (IoT), and it's a different way of doing things, a way we actually don't really know how to do yet. But I think this is the way we're going to go, and I would suggest that by 2025, 50 percent of cloud computing is going to happen at the edges, not on server farms.

Distributed everything

It's very hard to imagine this cloud that distributes services, because how do we do something like distributed security? How can you do security if you don't have somewhere that stores passwords safely? How do you do security if there's no firewall? Everything is just on the edge. How do we do identity in a distributed way if there is no place that's guarding a password? How do you do identity if there's no central agency to say that this is validated and this is not? How do you do authority if there's no central guardian? It seems impossible, but in fact we have already an example in Bitcoin, the peer-to-peer currency where security is guaranteed not by a bank, but by the distributed accounting of the technology behind the core block chain. A block chain is a very clever way to distribute in a cloud manner, because the security, authority, and identity of individuals do not reside in any

one place. That's why a lot of Silicon Valley startups and Wall Street are now investing a lot of money into block chain technology. It's an example of how we can do a distributed service on the cloud. Healthcare, education, and making predictions and forecasts are all things that could be done in a very different way on the cloud, in a way we don't actually know how to do yet, which is why it's a great opportunity.

Truly global society

So, we have one very, very large planetary cloud, which basically presents lots of challenges for nations, states, corporations and individuals. How do we run this, because we don't have experience at this level? In fact, the cloud is expanding so fast that it's going to exceed even the total computational resources of all humans on this planet very soon. So the future is arriving very fast.

You're not late

It's very often difficult to believe the future. If I was to go back and talk to someone 20 years ago about what we have today, they would find it very difficult to believe. Wikipedia? Impossible. I think we have to believe in the impossible more often. We have to kind of loosen our minds up a little bit. The other thing that we know about the future is that we're just at the beginning – day one of this cloud. I can be pretty sure that the greatest products of the next 20 years have not been invented yet. In 20 years, we'll be talking about things that don't exist today. And so that means that you get to invent those greatest products. And that means that you're not late. 

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“ I like to use the analogy of Zain KSA being like a ‘boutique hotel’ that personally takes good care of its guests. To remain competitive in the long term, Zain KSA needs to fully embrace the digital revolution. ”

— Hassan Kabbani, CEO of Zain KSA

Zain KSA

Winning Through Caring



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In Q3 2015, Zain KSA (Kingdom of Saudi Arabia) saw a 15 percent quarterly increase in EBITDA, totaling 441 million Saudi Arabian riyals (US\$109 million), with over 2.8 million new customers joining the quality 4G network in the same quarter. Hassan Kabbani, CEO of Zain KSA, recently shared his company's transformation plan for sustaining this impressive growth, and strengthening its market position.

By Linda Xu



A transformation plan

WinWin: With intense competition in key markets resulting in lower margins, what steps has Zain KSA taken to protect its heavy investment?

Hassan Kabbani: Zain KSA identified three pillars of its transformation plan covering the operational, regulatory, and capital structures of the business. We then assigned smaller teams to identify sub-plans within each of these three pillars by investing in the development of Zain network performance and providing a qualitative customer experience. As a result of talking to consumers, analyzing the market, and assessing our strengths and weaknesses, we found that consumers perceive

that we care more about them, which they really value. We're not the biggest operator, but we consider ourselves to be closest to our customers. Therefore, we developed our Winning Through Caring strategy, aiming for incremental, daily improvements on processes that make life easier, simpler and more enjoyable for our internal and external customers.

From the operational point of view, previously we needed to spend 12 to 18 months just fixing the basic problems. Around 250 of our retail shops were uninviting and poorly merchandised, so we completely refreshed the look and feel of our brand, and rolled out a new shop concept across our estate. In line with our Winning Through Caring strategy, we introduced more kiosks and smaller stores, breaking the common market trend of mega-flagship stores.

Although we were the first mobile operator in the MENA region to commercially launch 4G LTE services in 2011, we fell behind in deployment. Our board faced a particularly tough decision, given the company's very challenging financial circumstances. We needed to expand the capacity and coverage of the network to keep pace with the ever-increasing demand that Zain was experiencing. Therefore, we launched our Reload Project, worth US\$1.5 billion, to improve the customer experience offered by our network. We also invested in several new innovative product offerings that leveraged our advanced 4G LTE network. These offerings were tailored to the increasing consumer demands for mobile video and data, especially amongst the Kingdom's youth.

From the regulatory perspective, the mobile termination rate (MTR) in Saudi Arabia had not changed since 2008, and was very high by international standards. Following the Communications and IT Commission's (CITC's) decision to reduce Saudi Arabia's wholesale MTRs by 40 percent to 0.15 Saudi Arabian riyals in February 2015, Zain was the first operator to announce a 45 percent reduction in call charges to 0.19 Saudi Arabian riyals per min across all networks. In a few weeks, we saw our market share and gross profitability start to increase.

A digital kingdom

WinWin: Saudi Arabia's digital consumption is robust. How are you coping?

Kabbani: In 2015, Zain KSA enjoyed 15 percent growth in subscribers and a 350 percent increase in data services. Saudi Arabia is one of the most digitally connected societies in the world. There are more YouTube views per capita in Saudi Arabia each day than in any other country. We have focused on ensuring that our customers receive the best mobile streaming video experience, which is key to our mission statement. We have also embedded this cultural understanding of Saudi Arabian society into the design of our packages. For example, our popular Shabab package is designed exclusively for young people, and provides them with one source that meets their communication needs for a weekly or monthly fixed rate. The package will offer subscribers a weekly bundle of 100 call minutes to all local networks and 1 GB Internet, including unlimited YouTube browsing, for 30 Saudi Arabian riyals (about US\$8). It also offers a bundle of 500 call minutes on all local networks and 5 GB Internet, including unlimited YouTube browsing, for a rate of 110 Saudi Arabian riyals, which is usable within one month.

We also increased retail presence and our distribution

network, making it easier for customers to acquire our services. We've redesigned our device approach as well to offer greater variety and innovative technologies like Mi-Fi and Car-Fi through all our channels. Finally, we've worked with ecosystem partners such as Huawei's Waktu [which means "My time", and is a dedicated entertainment portal]. This makes it easier for our customers to acquire content such as games, music, ringback tones, and video.

Sustaining momentum

WinWin: Saudi Arabia's telecom market is very competitive. What's your long-term goal and overall strategy to maintain sustainable development?

Kabbani: I like to use the analogy of Zain KSA being like a "boutique hotel" that personally takes good care of its guests, rather than a factory-like experience. To remain competitive in the long term, Zain KSA needs to fully embrace the digital revolution. We are currently undergoing digital transformation, and we recognize this evolution means changing our business model. In Saudi Arabia, just like elsewhere in the world, we face the challenge of keeping customers spending as they transition their usage from voice to data services. Consumers appreciate that the services our industry provides are essential to them; they also understand that we are not Facebook or WhatsApp, but they expect to interact with us as though we are part of the digital ecosystem, not just a connectivity provider.

WinWin: What are your expectations for Huawei, as a strategic partner, to help realize such ambitious goals?

Kabbani: We place great importance on the agility and reliability of our ecosystem partners such as Huawei. Our customers are now using our network infrastructure for social networking through OTT services from which we receive no direct revenues. We need to ensure that we maintain the same level of revenue as we migrate customers from paying for voice services towards paying for data connectivity services. Huawei is in a unique position to help operators successfully achieve this type of migration. Huawei has already offered a host of leading solutions throughout its access network, core network, and operational side. We are also working closely with Huawei to introduce new features and solutions such as carrier aggregation, smart policy control and charging, policy and charging rules function, content delivery platform, and LTE MIMO. As CEO of Zain KSA, I greatly value the collaborative nature of the relationship between Zain KSA and Huawei. [www.zain.com.sa](#)

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UNITEL

Making Angola an ICT hub



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Considerable investment in national infrastructure, particularly telecom infrastructure, is helping to power a national economic revival in Angola. UNITEL, the nation's largest mobile operator, is leading the way through innovative and affordable products and services, strong engagement with the community, and ambitions to become an ICT hub in the region. CEO Tony Dolton shares the details.

By Linda Xu



Land and sea

WinWin: As the largest mobile operator in Angola, what efforts have UNITEL made to upgrade its communications infrastructure?

Tony Dolton: Our focus today is to continue the expansion of our overall network coverage across the country to provide data everywhere and increase the coverage of our LTE network. Currently, we have sites across all provinces, and we're continuing to expand both our coverage and technology, including building a national fiber network across the country. Nine thousand kilometers of fiber have already been deployed with

the intention of supporting not just our own mobile network, but also the national infrastructure. We will invest more than €1.5 billion (US\$1.9 billion) to install and expand an optical network for connecting all Angola's provinces to cover all areas that are currently starved of this sort of technology, or rely on slower, more expensive, and often less reliable technologies such as satellite for these services.

We're also deploying extensive metropolitan fiber networks in the capitals of the major provinces. These networks will provide high-quality, high-speed broadband and Internet connectivity for future customers and, in particular, for businesses and government.

As for expanding LTE, we currently cover around 60

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As for expanding LTE, we currently cover around 60 percent to 70 percent Angola’s capital Luanda with LTE, but we’re planning to reach 100 percent coverage by the end of the year.

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percent to 70 percent of Angola’s capital Luanda with LTE, but we’re planning to reach 100 percent coverage by the end of the year. We have also recently completed successful trials of LTE-A technology, and witnessed phenomenal speeds. Due to the limited affordable LTE-A devices in the market, we’re not currently planning a full rollout of LTE-A just yet. We have a vision of “beyond the borders of Angola”, and see the potential of becoming the hub for ICT in Southwest Africa, given the right levels of investment in the right areas.

WinWin: Can you elaborate more on this plan?

Dolton: Angola is well placed geographically and geopolitically to become an ICT hub. It can capitalize on both the existing submarine cable connectivity, but also on planned future investments, in particular with the development of the South Atlantic Cable System (SACS), also known as the Angola-Brazil Cable deployed by Angola Cables [a company jointly owned by UNITEL and the other telecom companies of Angola]. SACS will link Luanda with Fortaleza in northern Brazil, with a leg connecting to the Brazilian archipelago of Fernando de Noronha and to Miami in the US.

The 3,800-mile SACS will be the first transatlantic system in the southern hemisphere to link Africa directly to South America, offering an alternative to Africa’s links with the rest of the world and giving the continent a tremendous technical and commercial opportunity. SACS will improve latency times and result in a significant capacity boost that will offer a real alternative to Africa for broadband connectivity. Angola is ideally placed to drive this project forward. We see UNITEL’s role to provide connectivity to adjacent countries so they also will have access to this fantastic new African resource. It is with this in mind that we’re turning our attention towards how we can develop our ICT business and what services we can offer to the wider African continent.

Tapping verticals

WinWin: The oil and gas sector is vital to the Angolan economy. What are the corresponding ICT infrastructure needs and how does UNITEL fit in?

Dolton: The oil industry is a huge user of ICT technologies. In general, apart from connectivity services, oil multinationals use in-house resources both abroad and locally. Many of their IT-intensive activities are often carried out offshore, mainly because there is a belief that Angola does not have the capacity or capability to deliver these critical services. There is an opportunity for companies such as UNITEL to develop its skills, capability, and capacity to offer multinational companies an alternative approach. Is Angola ready and able to fulfil the needs of the oil industry today? Probably not. But that’s part of our ambition. We’re already providing what I would call the most basic services – highly reliable and high-quality connectivity. As long as we can deliver what we promise, we have then taken the first step towards building trust and will have the opportunity to move onto more complex services. We’re currently discussing with many businesses, including oil companies, what they would like us to do next. From there we will develop our strategies and plans to align with their requirements.

Besides the oil industry there are many other businesses, such as banking and financial services, that have a desperate need for a trusted partner that can provide ICT services to support their business. Our plan is to invest heavily in developing our capabilities in both technology and people to help grow this sector, and part of that is to build a new tier-3 data center (DC) targeted at providing new DC-focused customer services.

WinWin: According to Huawei research, the

financial sector is the most proactive embracer of ICT. In fact, 71 percent of enterprises we surveyed indicate that ICT investment growth will exceed 5 percent in the next two years. How is UNITEL serving Angola's financial sector?

Dolton: A few years ago, we were a minor provider of connectivity services to banks. Now, we provide them with highly reliable redundant services connected through our national fiber backbone. At the moment, there is very little in the way of e-commerce inside Angola. We are looking to see how we can leverage our own technology, retail, and distribution infrastructure to help grow this important sector. In Angola, the majority of our customers are prepaid subscribers, so we currently sell services through prepaid systems. The challenge is to work out how can we encourage our customers to accept e-commerce as a way to do business. I believe that UNITEL has a unique opportunity in Angola, given our distribution network and retail presence, to make a major contribution to the growth of this type of business.

Accessibility to all

WinWin: Compared with other African countries such as Kenya and Nigeria, Angola has a relatively low Internet penetration at around 26 percent. What are the hindrances in promoting Internet services in Angola and are there any solutions?

Dolton: The low level of Internet penetration could be due to three main factors: the technological challenge of connecting people to the network, the relative cost of delivering services, and the availability of good quality smart phones with local content that can help grow usage.

On the technical side, Angola suffers the same challenges as other countries in the continent like power reliability, fuel distribution, maintenance of sites in remote areas, and the cost of satellite transmission from base stations. In addition, Angola is a very large country with a relatively small and quite dispersed population. So when connecting isolated and difficult-to-reach communities, the engineering team often has to build sites that are miles away from normal infrastructure, which adds to the cost of running the site and supporting commercial distribution.

The cost of delivering services has been a major focus for UNITEL over the past couple of years. The deployment of the national fiber backbone has allowed us to significantly reduce the price of data for our customers so that we're



now one of the most cost effective service providers on the continent. In addition, we've brought to market some very affordable, quality 3G smart phones, and introduced new local content services that are relevant to people's lives. We've focused on selling value, not volume. As an example we've provided free unlimited access to the Wikipedia mobile website for all customers with a data enabled phone via a partnership with the Wikimedia Foundation under the Wikipedia Zero banner. We also enabled similar Facebook Zero services as well. Recently, we launched a music streaming service that's very similar to Apple music. This service allows customers to play local artists, who are grossly unrepresented internationally, as well as international artists. Customers who subscribe to this service don't have to pay for downloads, just the service. We've signed contracts with as many of the local artists as we can.

We also believe that UNITEL has a part to play in providing better services to the health and education sectors. We're working with a local team on how we can provide free Portuguese educational material for everyone and high-speed connectivity to our universities through the fiber network. As for health, we're working closely with the Ministry of Health and WHO to see what we can do to help provide health education and support. Can we use our distribution network to assist in the provision of drugs? How can we help medical experts deliver all they need to deliver in a more efficient way?

This is an exciting area where we have committed new resources and investment to make some of these ideas become reality. [www](#)

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Telenor: Internetization in India



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Telenor India serves some 46 million 2G customers. 2014 saw the Norwegian giant announce Internet for All as one of its long-term strategic goals, the sentiment of which was mirrored in 2015 by the Indian government's Digital India initiative. Telenor India CEO Vivek Sood shared the details about what Telenor is doing to help bring its customers online – an agenda that focuses on demand as much as supply.

By Linda Xu

Affordability is crucial

WinWin: What are the barriers to Internet access in India, and what is Telenor doing to alleviate them?

Vivek Sood: The Internet has experienced exponential growth in the Indian market, especially due to the increased affordability of smartphones. We position ourselves as a mass market operator in India. The Indian telecom market is in transition, and Telenor sees the increasing need for its customers to connect at an affordable price. Telenor's Internet strategy is in line with its operating model of being best at the basics, with affordable pricing for the mass market. In India, the biggest constraint has been that consumers either don't see the Internet as being particularly relevant, or they don't know how to use the Internet. So our focus on technology would be driving applications and services that are relevant for the mass market, and also ensuring that we actually provide the ability to easily use the Internet.

With Facebook and WhatsApp becoming a basic need

for most customers, it was natural for Telenor to offer these services on its platform. Telenor is taking the lead in service-based, good-quality offerings, while maintaining the brand proposition of Sabse Sasta [Hindi for "cheapest"]. In India, consumers are rather price-conscious, so service affordability will be a key driver of growth. Sabse Sasta Facebook and Sabse Sasta WhatsApp give subscribers unlimited access to these services at one fixed charge for a period ranging from one hour to one month. With just a one-time charge, subscribers can use Facebook and WhatsApp for the duration of the period without worrying about volume.

Transformation is a must

WinWin: With a 4G LTE launch expected later this year, what is Telenor doing to Internetize its services?

Sood: Actually we're at the forefront of 4G evolution. In the mass market, consumers aren't interested in calling up every time they have a problem. They are interested

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For India's all-inclusive growth, the most important thing is to ensure last-mile connection in remote villages. The last-mile connection will never be fiber or direct connection. It will always be mobile.

— Vivek Sood, Telenor India CEO

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in using services more efficiently. What we'll be driving is high-level self-help customer services based on the web. People can find the services themselves on digital platforms. We need to have a backend platform to facilitate the self-help process.

For call centers, we plan to reduce dependency on agents and develop more utilities towards the digital side. We're also building our retail position by having our own shops. We have over 1,500 shops, which we plan to increase to over 2,000. Our consumers will come into shops not only for service but also for the experience to really learn about new technology and how to use applications on the Internet.

We see that 4G terminal prices are coming down sharply. They will still be more expensive in India, because 3G is the more evolved technology here. We're working with various partners, including Huawei, to customize terminals based on real consumer needs. We may have to do some bundling or subsidization.

We will also cooperate with Huawei to revamp our network capacity and efficiency as part of the Parivartan Project. Parivartan means transformation. We want to transform ourselves to be ready for the future, be scalable, and more efficient. However, the network alone can't sort out a transformation agenda. It has to be supported with an IT agenda as well. Our focus has been on the BSS front. We've been looking at cloud technology and making our CRM system more agile and simple to use.

Digital India

WinWin: What are Telenor's thoughts on the Digital India initiative as a whole?

Sood: Telenor is in favor of the Digital India strategy. For India's all-inclusive growth, the most important thing

is to ensure last-mile connection in remote villages. We believe that the last-mile connection will never be fiber or direct connection. It will always be mobile. The Internet user base has grown by 40 percent over the last year. Of these users, around 50 percent accessed the Internet through mobile only. This represents huge potential for Telenor to penetrate the mass market with mobile Internet services and build on our ambition of Internet for All. We are also getting actively engaged in developing mobile apps in the areas of finance, health, and education.

WinWin: The digital literacy rate is relatively low in India. What steps are Telenor taking to bridge this gap?

Sood: As I said earlier, the relevance of services is extremely important. Before you get to the relevance of services, you need to educate people as to why and how they should use the Internet. We just launched our Grahak Shiksha Kendras' (GSKs), or customer education hubs, across six telecom circles in April. The GSKs will act as awareness centers where existing and potential customers can walk in to get information relating to Telenor's voice and Internet services. We have developed an in-house curriculum to train customer relationship executives in the awareness initiative at these stores. We're also conducting workshops to propagate the benefits of Internet usage and best practices to adopt safe Internet and avoid transactions that are not intended. We've converted 200 retail stores across six operational circles into GSKs in the first half of 2015 and another 300 GSKs are expected by year's end. [www](#)

Editor: Jason jason.patterson@huawei.com

The new mindset

Getting it right with a user-oriented operations model

The status of operations is determined by mindset. We've become used to a network-centric approach that places networks before operations and relegates operations to a support function.

Today's environment, however, is very different, especially with the disruptive operating models of ISPs. It is advisable to draw on the experience of the Internet and revisit the operations model of the telecom industry. I want to offer my thoughts on three topics: one, a new perspective on operations; two, a different way of thinking about transforming operations and restructuring IT; and, three, the relationship between infrastructure evolution

and transforming operations. In a nutshell, I believe a shift in mindset is needed for the telecom industry to create a new operations model based on user experience.

My first observation involves a new perspective on operations. We need to start from the end user, and then decide which model can deliver the right user experience.

The term "user experience" has two elements: obtaining services and using services. Making calls, texting, and browsing the web are part of the service usage experience for users. In reality user experience is so much more, because it includes the experience received when obtaining services. How do we find and buy services? How are transactions done? What are the after-sales services like?





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Telecom has been a lively industry over the past three years. We've heard many new terms, and discussed many things. SDN, NFV, cloud data center, 4.5G, 5G, and ultra-broadband have all emerged as buzzwords. However, it's a shame that operations have not enjoyed the same fashionable status as networks. Why is this?

By Eric Xu, Huawei Rotating CEO



The answers to these questions are sometimes more important than the service itself. Clumsy transactions and lengthy provisioning may scare users away from services. To me this might be our single biggest gap compared to OTT players.

What, then, will the future experience of obtaining services be like? We summarize it as ROADS, which is the initialism of Real-time, On-demand, All online, DIY, and Social. ROADS fully captures the consumption behavior of the generation that's grown up with the Internet over the past twenty years. They are the digital natives that shape the future. In fact, they are the future.

If we look at the telecom operations model from

the perspective of consumer behavior and desired user experience, we find that a major transition is required for the IT system, specifically the OSS and BSS, where it shifts from an internal support system to a production system. This new system turns telecom operators' networks, services, content, and other assets into compelling product and service offerings that users can easily access and use. More importantly, it's much more than simply changing the IT system. In essence, it's an operations transformation process that starts with user experience and harmonizes organizations, processes, IT, and infrastructure.

My second observation concerns a different way of thinking about operations transformation and IT





Over the next decade, virtualized, cloud, and ultimately software-defined architecture will take shape. This is the broad consensus in the industry after years of discussion. It's also the foundation for transforming operations.



restructuring. The design principles, operating models, and technology architecture applied by Internet companies are required to shape how the telecom industry transforms.

First, operational focus must evolve from how users experience networks to how they experience services. User experience today is primarily defined and measured through network KPIs like bandwidth, latency, call drop rate, and call completion rate. This is right, but it's not enough. Operators need to go further to organize operations around service experience KPIs.

But it's not just about services – it's also how services are found, purchased, and used, as well as how after-sales services are offered. It has to be an end-to-end experience. After all, users don't perceive network metrics. What's relevant to them are the metrics that measure the services they actually use like voice, video, leased line, VPN, or cloud services, and metrics that measure the experience of how these services are used, for example, service provisioning in minutes.

Second, the operations model will need to be built on real-time, autonomous systems rather than manual systems. Large Internet companies tend to be much more efficient than telecom companies because they employ much smaller operations teams to serve many data centers, servers, and users. The key to efficiency is the underlying design principle. The telecom mindset is maintenance oriented – telecom operators only feel assured by human intervention and control. Being real-time and autonomous is the Internet approach where services are easily scalable and provisioned in minutes, and where faults get isolated and self-heal.

Internet systems look quite simple, but they are

technically complex. This means there has to be a fundamental shift in the telecom operations model where systems become autonomous. To do that, network autonomy is needed with new IT systems at the front end and new network control systems at the back end. The traditional EMS and OSS should be simplified into monitoring and alarm systems, while service provisioning, scaling, fault isolation, and recovery have to be automated.

Third, IT systems will move from closed architecture to cloud-based Internet architecture. With new positioning for telecom IT systems – from internal support to external services – technical architecture will be fundamentally different. There might only be a few thousand internal users, but the number of external users will be in the order of hundreds of millions. In light of these new requirements, traditional scale-up architecture is insufficient in areas such as openness, ease of use, and scalability. A scale-out, cloud-based Internet architecture is the only way to support a massive number of users, which is a natural development driven by changing user needs and technological advancements.

Therefore operations transformation and IT restructuring need to be shaped with a different and more advanced design philosophy. With the new approach, system, and technology architecture, the result will be very different.

The third point is about the relationship between infrastructure evolution and operations transformation, which are highly interdependent. The software-defined infrastructure of the future will set the stage for operations transformation, but also present new challenges.

Over the past ten years, network architecture has



Through software-defined development, network equipment will no longer integrate hardware and software, and cloud data centers will become the foundation of the network. As a result, network deployment will be implemented layer by layer, not node by node.



evolved toward All-IP. Over the next decade, virtualized, cloud, and ultimately software-defined architecture will take shape. This is the broad consensus in the industry after years of discussion. It's also the foundation for transforming operations. Many problems can be perceived as operational issues from the perspectives of user behavior and experience, but the fundamental challenge lies with infrastructure. Today telecom operators cannot provide on-line services on demand and in real time. The bottleneck is infrastructure, not the operations system. This is because infrastructure is not as automated and intelligent as it needs to be. Therefore, the new developments we see today, such as SDN, NFV, and cloud IT infrastructure, require new things from telecom operations. They are also the key building blocks for automated and intelligent operations. Without automated, cloud, and scalable infrastructure, operators cannot deliver a ROADS experience.

With software-defined architecture, cloud data centers are becoming the foundation of telecom networks. It's also changing the way networks are deployed from node by node to layer by layer. These developments create unprecedented challenges on the ecosystem and operations model.

Through software-defined development, network equipment will no longer integrate hardware and software, and cloud data centers will become the foundation of the network. As a result, network deployment will be implemented layer by layer, not node by node.

This is a big change for the industry. The first impact is on the industry chain. It's hard to bring products from different domains and different vendors together to form a system that can be delivered and beautifully operated. The

industry chain will also develop differently. It will be built upon the ecosystem, and no longer driven by standard bodies.

The second impact is on operations. As the network moves to the cloud, SDN, and NFV, the maintenance of hardware infrastructure will be separated from service deployment and provisioning. This is because everything will be software-defined and cloud-based.

Hardware/software decoupling will make it very difficult for issue demarcation and location. In particular, network complexity is growing because software problems are sometimes caused by hardware. As a result, orchestration between hardware and software is needed. These are the changes that the operations system will have to adapt to.

Therefore, evolving infrastructure and transforming operations systems must go hand in hand, and be systematically planned and implemented based on user experience.

Such broad changes and developments are easier said than done, because many issues still need to be solved. For example, how do we define KPIs for user experience? How do we design the target architecture of the future? How can we build unified IT infrastructure? How do we move forward from today? What is the strategy and pace for evolution? How can suppliers and operators better collaborate? And, most difficult of all, how do we free ourselves from our decades-old mindset and establish the right corporate culture and organization to support future models?

To answer these questions, a mindset shift is necessary, and user experience must be at the core of shaping the way we think and act. www.huawei.com

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The move to an HD world



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Mobile operators are locked in a battle with Over-The-Top (OTT) players to provide voice and video services. Concern is mounting that OTTs are generating revenue by using cellular networks as dumb pipes.

By Justin Springham, *Mobile World Live*

A school of thought exists that suggests mobile operators can differentiate themselves from OTT rivals based on user experience and quality of service. When it comes to mobile services, HD voice and video applications are the main battleground.

“Since the invention of movies 100 years ago, sight and sound is the killer app,” said Erik Moreno, EVP of Business Development for TIME, earlier this month at Huawei’s Global Mobile Broadband Forum in Hong Kong.

Ryan Ding, President of Huawei’s Products and Solutions Division, agreed: “We gather 94 percent of information from the eye or ear. If we can provide best-quality voice and video, we will have the best possible services.”

To reach this level of performance, Ding believes operators must up their game. “User experience will determine operators’ incomes. If we provide a good experience with voice, we can mitigate the decline in voice revenues. If we provide a good video experience, we can stimulate data traffic. We need to move from a network-centric model to experience-centric.”

HD voice

Huawei’s Ding claimed that OTT voice quality from the likes of Skype and WhatsApp currently exceeds “normal” operator voice quality under good wireless conditions, creating a “fierce challenge” for operators. There are 1.8 billion subscriptions to OTT voice services, twice the size of the world’s largest mobile operator: “If we do nothing then customers will vote with their feet,” he warned.

For Ding, the solution is Voice-over LTE (VoLTE) services.

He claims it is superior in quality to HD Voice, and far more spectrally efficient than traditional 2G/3G voice services. Citing data from South Korean operator LG U+, Ding said the deployment of VoLTE increases call times by a factor of three, resulting in improved quality of service metrics.

Such data is supported by comments from Alex Arena, Group Managing Director of Hong Kong’s largest mobile operator HKT, which launched the country’s first VoLTE network in May 2014. “The biggest change is that VoLTE users are always on LTE so they can enjoy high quality voice, video and other data services simultaneously,” he explained. “This greatly improves the LTE user experience. Since users have migrated to VoLTE, the load on legacy 2G and 3G networks has greatly decreased.”

“Apart from improving voice services, VoLTE also boosts the data experience of users indirectly by retaining their data connections on a 4G layer during calls instead of falling back on 3G as if in Circuit-Switched FallBack. As such, VoLTE comprehensively improves customer experience.” Arena also holds that, “As VoLTE adoption increases with the greater penetration of compatible devices, the load on legacy 2G and 3G networks will decrease as VoLTE users are kept on 4G at all times. This enables HKT to focus on LTE network development, and continue refarming legacy spectrum into LTE in the future.”

According to the GSMA, more than 35 operators worldwide have already commercially launched VoLTE services. Meanwhile the Global mobile Suppliers Association claims that a total of 111 operators are investing in VoLTE.

One of those investors is China Mobile, the world’s largest operator. Dr Fan Yunjun, Chairman and CEO of China Mobile International, revealed at Huawei’s event that it will support VoLTE services in 100 cities by the end of 2015, following its first launch in August in Hangzhou.



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We believe a new experience-driven era is coming. We want to work with customers and industry partners so end users can experience high-definition voice and video anywhere.

– Ryan Ding, President of Huawei's Products and Solutions

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HD video

While voice was once regarded as the core service of mobile operators, video is now dominating the industry. According to Cisco's latest Visual Networking Index, video accounted for 55 percent of total mobile data traffic in 2014, which will rise to 72 percent by 2019.

“Generation Z will rather watch video on their mobile devices than any other platform, and that's going to be a paradigm shift,” commented TIME's Erik Moreno. “Video is the killer app.”

“Video is the best thing that has ever happened to mobile networks,” according to Ovum Principal Analyst Dimitris Mavrakis. “What other service can be used by any smartphone and can justify subscriptions with very large data allowances? There are very few, if any, services that can claim this.”

Huawei's Ryan Ding proclaimed video to be “the new voice” in his presentation at the event, but also outlined the challenges that operators face, especially in the area of high-definition video. Ding cited an OpenWave Mobility study that claimed a third of subscribers expressed a strong view that video buffering is simply unacceptable, with video delivery by operators lagging behind the latest handset technology.

To date, there has been no industry-wide standard for measuring user experience of video services, and this is something Huawei is looking to rectify. Ding talked of a new measure of video experience called U-vMOS, ranking the quality from 5 (excellent) to 1 (very poor). Huawei is promoting U-vMOS as an SDK, supported by Windows, Android, iOS, and Linux.

“Huawei's vMOS score is a step in the right direction,” said Ovum's Mavrakis. “[It is focused on] trying to understand end user experience that is tied with KPIs that

users directly perceive: video quality, video stalling and buffering delay.”

Over time, it is expected that demand for HD services will explode. After all, as technology develops and the cost of HD screens decreases, the resolution of smartphones is getting higher. According to a survey conducted by Huawei mLAB on newly delivered smartphones during the first half of 2015, the resolution of 77 percent of smartphones was higher than 720p, and flagship models from every device manufacturer now support 1080p. LTE networks supporting 3 to 5 Mb/s downlink can support a “favorable” 720p video service experience.

Looking ahead, the report claims that a 2K video experience “will be the target of mobile networks and become the mainstream.” The standard 2K resolution of mobile phones is four times higher than 720p, equal to 2560×1140 pixels. Currently there are around 40 types of 2K mobile phones, and it is expected that more than 10 percent of new devices shipped next year will support 2K.

Dual HD 4.0

Ryan Ding calls Huawei's voice and video efforts “Dual HD 4.0”, reflecting a minimum ranking of 4 (Good) on the Voice MOS and Video MOS metric. “We hope that the whole industry can work together to provide dual HD 4.0. This will become the most important competitive differentiator in the future,” he stated.

“We believe a new experience-driven era is coming,” concluded Huawei's Ding. “We want to work with customers and industry partners so end users can experience high-definition voice and video anywhere.” 

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NB-IoT requires some holistic thinking in how components are used. It must be possible to embed them in the device at very low cost.

– Luke Ibbetson, Vodafone’s Group R&D Director

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Operators eye the IoT market, but hurdles remain



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The Internet of Things (IoT) market is expanding so rapidly that making sensible forecasts is a huge challenge. Gartner said that it expects 6.4 billion connected devices to be in use next year, up 30 percent from this year, with the number reaching 20.8 billion by 2020.

By Joseph Waring, *Mobile World Live*

Gartner predicts that IoT services spending will grow 22 percent to US\$235 billion in 2016. It says services will be dominated by the professional category, with businesses using external providers to design, install, and operate IoT systems, but connectivity services through communications service providers and consumer services will grow at a faster pace.

With growth accelerating, Huawei Rotating CEO Ken Hu said last week at the company’s Mobile Broadband Forum in Hong Kong that mobile operators need to take immediate steps to capture a share of the IoT market, which is attracting competition from vertical industries.

While operators have a unique advantage in terms of accessibility, he said, many other technologies like Zigbee, Bluetooth and in-building Wi-Fi are developing rapidly

and will generate competition in the IoT market.

Hu insisted that the industry has to quickly develop unified IoT standards to drive cross-industry development.

Luke Ibbetson, Vodafone’s group R&D director, agreed, pointing out that 80 percent to 90 percent of IoT devices are now connected by low-power indoor systems, with cellular handling the remainder.

He warned that, going forward, mobile networks are in danger of serving no more than 10 percent to 15 percent of that market. He sees the emergence of a middle ground that combines the best aspects of the very low-cost, short-range technologies with the ability to cover an entire country.

Ibbetson was referring to the low-power wide-area (LPWA) space, which is an opportunity that many feel is purpose-fit for mobile operators. “Yet today we are under

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In the IoT era, operators need to expand their focus from managing technology to managing the whole ecosystem.

– Ken Hu, Huawei Rotating CEO

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tremendous pressure because right now we don't have a solution that is the right shape to serve customers," he said.

He stressed that this isn't some future looking prediction. "This is happening today, and Vodafone has to turn away profitable customers because it can't deliver the right solutions. This is a real call to arms."

The move to NB-IoT

A consensus is building among operators around narrowband Internet of Things (NB-IoT), the emerging technology for deployment of LPWA networks using licensed operator spectrum, in-band, guard band, and stand-alone deployments. The technology is designed to provide coverage in hard-to-reach places, supporting a massive number of low throughput, ultra-low cost devices, with low device power consumption.

More than a dozen telecom firms recently held a preparatory event, chaired by Vodafone, to lay the foundations for a new industry forum aimed at accelerating the ecosystem around NB-IoT. The members are China Mobile, China Unicom, Ericsson, Etisalat, GSMA, GTI, Huawei, Intel, LG Uplus, Nokia, Qualcomm, Telecom Italia, Telefonica, and Vodafone.

The six operator members also announced their support to set up six NB-IoT open labs worldwide, which will focus on new service innovation, industry development, interoperability tests, and product compliance certification for NB-IoT.

Customer pilots using pre-NB-IoT technology are already underway. In Europe, Deutsche Telekom and Vodafone, for example, have already taken action and set up pre-NB-IoT trials using existing base stations. Pre-

commercial deployment is expected during the second half of 2016, with commercial rollout beginning in early 2017.

Vodafone's Ibbetson said he is confident in the convergence of 3GPP standards, but believes the process to be slow and frustrating. "It's essential NB-IoT emerges as a single standard by March. And we need to make quick decisions on which bands to use."

Huawei hopes the standards are confirmed soon so the industry can start large-scale IoT deployment. "Huawei feels the technical aspects are ready, so we can't wait any longer to embrace the opportunities in this field," Hu said.

NB-IoT addresses the four main challenges of LPWA: long battery life (more than ten years), low cost (less than US\$5 per module), highly scalable (up to 100,000 per cell) and an extended range (including underground).

"If we don't enable the ecosystem with something that has the ability to scale down to US\$3 or US\$2, with the right volume, then we will fail to address the market," Ibbetson said. "It requires some holistic thinking in how the component parts are used. They have to be able to be embedded in the device at a very low cost."

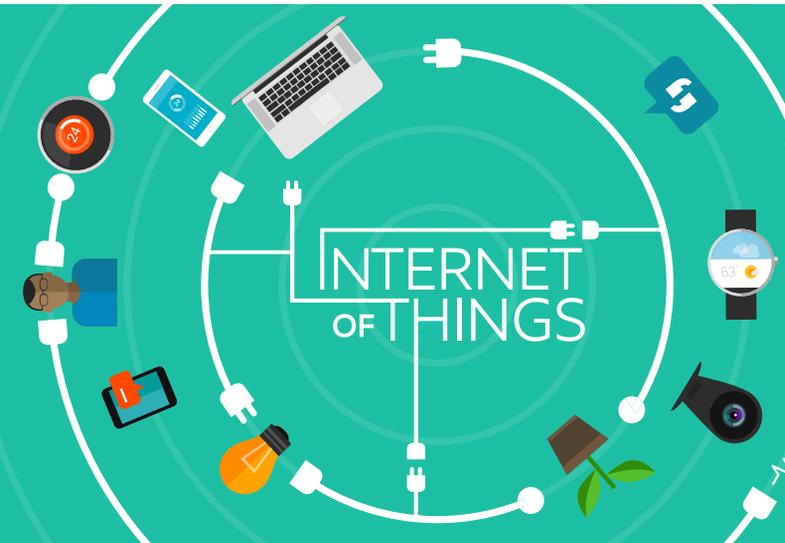
The focus needs to remain on low bit rates for applications like low-cost sensors, actuators, and location tracking, and not on high bit rate use cases such as 4K video. "We're looking for a solution that fits the market at the right cost. We need to keep it simple. It's easy to get carried away with the technology," he said.

Huawei's Hu also believes the cost has to be less than US\$5 for a communication module to stimulate large-scale development. "But if it falls below US\$1, it will lead to explosive growth."

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The IoT market will be more fragmented than the mobile market because of the large number of use cases, applications, and business models. Operators need to expand their focus from managing technology to managing the whole ecosystem.

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Beyond the hype

Most analysts agree that IoT has moved out of its infancy into the rapid development phase, because all the core technologies – connectively, cloud-based services, big data analytics and low-cost sensors – are now in place.

Each CIO must have an IoT strategy or they’ll find themselves behind the competition, said David Sovie, Accenture’s high-tech and electronics lead for Asia Pacific. Wei Sun, IoT global strategic initiative leader at IBM Research, noted that every one of its major customers across all sectors is exploring IoT products and services.

More and more industries are jumping on board to improve efficiency, cater to customers better, and trim operating costs. For example, Bosch, a maker of everything from auto parts and household appliances to security systems, has quietly connected much of its product line and is benefiting directly from the rise in mobile connectivity, particularly in the connected car sector.

In the healthcare segment, Philips has developed e-care applications, including a patch for patients with chronic illnesses, that use sensors to collect and send data in real time to a cloud-based platform where it can be monitored and acted upon by medical professions.

Alberto Prado, VP and head of digital accelerator at Philips, noted that interoperability between devices and systems will be key to the rise of data driven healthcare. “As the industry moves to a more collaborative care model, the future of healthcare is one that is integrated and proactive.”

To prepare for this huge IoT opportunity, Huawei’s Hu said, the industry needs to push not only technical innovation, but also business model innovation and cross-industry collaboration. The IoT market will be more fragmented than the mobile market because of the large number of use cases, applications, and business models.

“It will rely on collaboration across the whole ecosystem from different stakeholders. In the IoT era operators need to expand their focus from managing technology to managing the whole ecosystem,” he said.

“The industry is standing at a critical juncture and needs to act now to open this new blue ocean opportunity.” 

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BUILDING A BETTER CONNECTED WORLD



ROADS to MBB 2020



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A sustained, industry-wide effort is spurring the mobile communications industry to change the world for the better at an ever-increasing pace. To orient operators to the future, Huawei's MBB 2020 vision defines network capabilities in terms of customer experience.

By David Wang, President of Huawei Wireless Network

Advanced mainstream mobile devices enable data access anytime and anywhere so that people can better arrange the time fragments that make up modern life and work.

Today, mobile devices are the first screen people use at work and play, and mobile video is what they're choosing to watch. The skyrocketing data levels accompanying this trend require carriers to change how they develop their networks. The focus now needs to be on providing a video experience that's acceptable for users while making

networks the enabler of the intelligent mobile cloud. At the same time, the cellular IoT market is set to become a major revenue source for mobile operators in the next few years.

In response to these trends, Huawei has proposed its MBB 2020 vision, with the following aims: connect the unconnected with 6.7 billion MBB connections, drive up service experience with 1 Gbps access speeds, and deliver ubiquitous networks that realize a fully connected world with 1 billion connections in cellular IoT.





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Operators should regard experience as the core and networks as the foundation of the MBB 2020 vision. They must be prepared to adapt to changes in the industry, aggregate and integrate with vertical industries, and create new MBB ecosystems.

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However, achieving these goals will ask much more of spectrum resources, site planning for base stations, air interface technology, and architecture.

Experience and networks: The core of MBB

Huawei believes that operators should regard experience as the core and networks as the foundation of the MBB

2020 vision. They must be prepared to adapt to changes in the industry, aggregate and integrate with vertical industries, and create new MBB ecosystems.

Experience 2020

Networks must give customers a great experience if operators hope for basic competitiveness. Right now, the connection experience of service use and access is more important than the basic network experience of coverage and speed. To respond to this change, network infrastructure requires more resources and technological support.

Network 2020: networks as the foundation

- 500 MHz of new spectrum

ITU predicts that mobile broadband will hit gigabit speeds by 2020, changing traffic models and increasing demand for new spectrum. At the WRC-15 conference, Huawei urged governments to reach a consensus on releasing 500 MHz of spectrum for the telecom industry in three sub 6 GHz bands: UHF, L-band, and C-band. These are respectively used for wide coverage, mobile, and high-capacity scenarios.

Because spectrum resources will remain limited, the industry needs new technologies to improve air interface spectral efficiency. To satisfy user requirements, 4G wireless air interface technology must be upgraded to 4.5G, after which new 5G air interface technology can be introduced. 4.5G includes air interface technologies such as 256-QAM, M-MIMO, LAA, NB-IoT, and Massive CA, which are likely to give operators the upper hand before official 5G deployment.



- **Five million new base station sites**

Huawei has found that base stations sites are very unevenly distributed around the world, with a clear paucity in Latin America, Asia, and Africa. We predict that a further 5 million new sites will be needed to provide sufficient capacity to meet the MBB 2020 vision.

Huawei is developing solutions to continually improve base station site integration by reducing volume, enhancing efficiency, and lowering power consumption. This will allow faster base station deployment and eliminate system restrictions to quickly meet business needs.

- **Network evolution: architecture first**

In some ways network architecture is more important than planning air interfaces and base station sites. Why? Because architecture determines the direction of digital transformation and service development. Huawei hopes to help the entire industry deploy services with greater agility, and thus increase operating efficiency.

Network architecture evolution should begin with the cloudification of currently independent systems before moving on to service-oriented, end-to-end sliced networks. This evolution will help operators quickly adapt to service launches, and enable them to collaborate with OTT providers through agility slicing.

Huawei can help operators quickly implement end-to-end slicing for different services to meet different latency, speed, connectivity, and management requirements.

- **Eco 2020: co-constructing a new ecosystem**

Spanning consumers, operators, and infrastructure network providers, today's MBB ecosystem is consumer-centric. IoT will soon shape it into a vertical, consumer- and market-centric ecosystem that includes integrated solution providers. Although operators have advantages in network security, proximity to customers, coverage, QoS, and QoE, they must invest in IoT to remain competitive.

Low power wide area

It's also worth noting that the LPWA (Low Power Wide Area) market is full of opportunities. Currently, LPWA lacks standards and a blueprint for using technology to construct networks. The industry has proposed NB-IoT specifications that are more suited to mobile operators. These specs have advantages in terms of constructing traditional cellular hybrid networks, using carriers' licensed spectrums,

increasing coverage, providing more connections, and implanting architecture more easily. These benefits lower costs for end-to-end construction, and meet business needs better than the current models for using unlicensed spectrum.

Huawei continues to urge the industry – including operators, platform providers, chip makers, and service providers – to join forces at this critical juncture and work together on building the new ecosystem.

4.5G can unlock MBB 2020

Huawei understands future trends. It knows customer needs and sees the challenges ahead. These challenges will not be easy to solve. 4.5G will serve as the bridge allowing step-by-step network improvements, adapting to changes in the environment, and achieving the magnificent vision of MBB 2020. 3GPP has determined that 4.5G standards will be named 4.5G LTE-Advanced Pro, and has started the process of standardization.

Huawei's 4.5G solutions are Giga Mobile, Connection+, and Experience 4.0. Giga Mobile comprises high-capacity, high-speed solutions designed to hit peak speeds of 1 Gbps during initial network construction, which will later become the average speed. Because the roles of chip capacity and indoor coverage are vital, Huawei is working with Qualcomm to launch a 600 Mbps chip before starting on a 1 Gbps chip. Huawei's LampSite solution solves indoor coverage problems, and is already widely deployed in current networks.

With Experience 4.0, Huawei provides HD voice and HD video solutions for voice MOS 4.0 and video vMOS 4.0. Huawei has successfully researched VoLTEplus and vMOS, both of which now provide powerful support for Experience 4.0.

Connection+ marked Huawei out as the first in the industry to launch a LPWA-based technology solution, which it then evolved into the 3GPP-approved NB-IoT. To achieve economies of scale, Huawei hopes to drive NB-IoT standardization as a matter of priority alongside mainstream standards, preferably for early 2016. Huawei also aims to lower NB-IoT costs to within US\$5 million through large-scale commercial adoption so as to deploy cellular IoT on a large scale.

The MBB 2020 strategy is the first step on the path to achieving the MBB 2020 vision. Huawei will use 4.5G as a solid bridge to the next stage and to overcome the various obstacles that exist as it strives to realize the MBB 2020 vision of a Better Connected World. [www.huawei.com](#)

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Defining the mobile broadband vision for 2020

4.5G ROADS to MBB 2020

Consumers around the world are getting used to quick mobile Internet connections, putting operators under greater pressure to provide ubiquitous 4G coverage coupled with a fantastic user experience.

According to GSMA Intelligence, a total of 422 operators in 143 countries had launched LTE networks by mid 2015. At that time, the number of LTE users had hit 755 million, which is projected to surpass 1 billion by the end of the year and reach 3.6 billion in 2020.

But the rapid uptake of LTE services has created new challenges as well as opportunities for operators as they roll out and upgrade their mobile broadband (MBB) networks.

Worldwide data usage is on track to expand by more than 60 percent over last year, and monthly data traffic is forecast to increase tenfold by 2020. To keep up with the soaring demand, an increasing number of operators are already looking to deploy LTE-Advanced. As of 31 July, 131 operators in 60 countries had plans to invest in LTE-A, according to GSA statistics. That's 30 percent of all operators with LTE networks.

In addition, it's no secret that traditional revenue sources, such as voice and SMS, are in decline and operators are struggling to find new revenue streams. Monetizing data continues to be one of the most significant obstacles they face.

To tackle this key theme and help develop a long-term industry vision for MBB connectivity and innovation, Huawei is once again organizing the 2015 Global Mobile Broadband Forum (MBBF).

The event, which runs from November 2 to 5 at the Asia-World Expo in Hong Kong, is expected to attract over 1,000 operators, regulators, industry partners, and media from around the world.

"Transformation does not happen behind closed doors," said Qiu Heng, President of Huawei's Wireless Network Marketing Operations. "If you want other industries to use the network, you need to meet their real needs. Our communication with other industries is still at an early stage, and we aim to meet with them as well as operators at this forum to explore future possibilities together."

One area of discussion, Qiu said, will revolve around operators' ability to develop new sources of revenue from the IoT sector, as well as Huawei's efforts to develop a wider ecosystem to create opportunities in related industries.

The two-day conference features more than 20 external speakers from operators such as HKT, SoftBank, Telefonica and Vodafone, as well as Bosch, CNN, Google, Phillips, Visa and TIME.

Huawei's Rotating CEO and Deputy Chairman Ken Hu will kick off the forum with a presentation themed Building a Better Connected World. He will be followed by HKT group executive director Alex Arena, who will talk about the need for speed before 5G. GSMA acting director general and CTO Alex Sinclair will speak about global spectrum considerations.

Huawei is expected to make a number of announcements during the event, including a 1 Gbps demo from HKT, Hong Kong's largest operator, and a joint GSMA-Huawei white paper on the benefits of C-band spectrum for MBB.

This is Huawei's sixth annual MBBF conference and will showcase the latest MBB trends covering 4.5G applications, 5G innovation, narrowband Internet of Things (NB-IoT) and the MBB network evolution in a 2,000-square meter demo area. This year's forum will also feature the MBB experience tour, where attendees will have the chance to see HKT's 1 Gbps service in action.

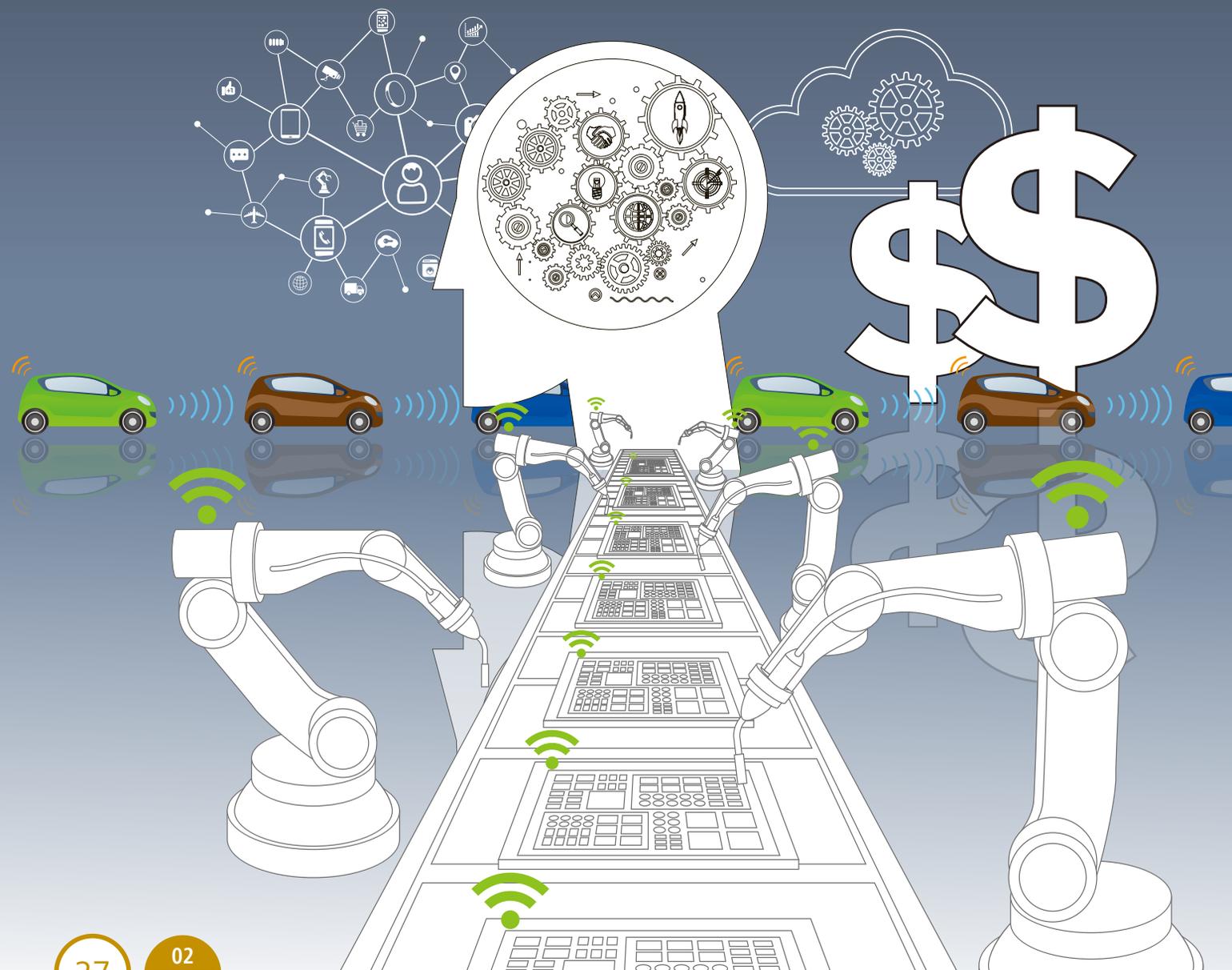
Thinking big with cognitive computing



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McKinsey & Company predict that the six major technology sectors will be worth US\$10 trillion by 2025. Notably, the industries framing the big six – mobile Internet, knowledge task automation, the Internet of Things, cloud technology, advanced robotics, and autonomous vehicles – all rely heavily on cognitive computing.

By Xue Xijun and Yan Zheng





Cognitive computing is the CNS of these revolutionary technologies and products, forming the key component to perceive people, things, events, and the environment.



The current state of play

Cognitive computing is the CNS of the nascent crop of six revolutionary technologies and products, forming the key component to perceive people, things, events, and the environment.

Imbued with the ability to simulate human intelligence and efficiently process fuzzy data and problems, cognitive computing is also essential for data analysis and decision-making. Specifically, cognitive systems are information systems that contain the cognitive hallmarks of learning, inferring, deducing, and computing.

Research in cognitive computing has gone through several waves of ups and downs in both momentum and progress. Enormous achievements in fields such as databases and expert systems, for example, have been counterbalanced by stutters in machine translation and natural language processing. Since entering the 21st century, big data and high-performance computing have driven cognitive computing into an exciting period marked by the commercial use of Deep Learning in speech-recognition, image, and video.

Many companies, including Google, IBM, Facebook, Microsoft, and Baidu, have been active in the cognitive computing sector, leading a commercial upsurge in the field and the rapid emergence of related technologies. Based on Deep Learning, machines' cognitive abilities have grown to be on par with humans in areas such as facial recognition and image classification, and are in fact more accurate than the human eye. Equally, the Watson system was designed under IBM's DeepQA project to answer questions from the quiz show Jeopardy, and defeated two former winners in 2011.

Brain-inspired computing that uses a mass system of integrated circuits to simulate the behavior of neurons is

marching towards commercialization, with Qualcomm already planning to use the Zeroth neural network chip to improve its mobile phone processors.

A series of exciting advancements in current research and applications for cognitive computing has been accompanied by a gradual upward trend in investment in R&D by ICT companies. Huawei stands out as one of the few companies to develop cognitive computing plans based on both the Von Neumann and brain-inspired architectures. Huawei plans to coordinate its resources in various areas including communications, network topology, computing, and storage to underpin the public Huawei cognitive cloud platform, Huawei REN.

Huawei REN

Huawei believes that sustained technical evolution will create new types of business models, which will see the influence of cognitive computing on the commercial sector continue to grow. Sustained commercial development is also expanding in application scope and technical improvements, and cultivating an open and progressive ecosystem. Huawei REN is committed to promoting the evolution and development of cognitive computing in four areas: cloud-pipe-device synergy with layered intelligence, cognitive computing as a service, heterogeneous coordination, and brain-inspired intelligence.

Cloud-pipe-device with layered intelligence

Layered intelligence is displayed on end devices through perception and action, on network transmission through planning, and on the cloud through learning and evolution. It is a naturally selected state of intelligence that humans have attained after 200,000 years of

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High refinement and granularity denote the ability to perceive spatial and temporal differences in client needs. Personalization provides layered services that target client needs and problem-areas by embedding cognitive computing as a service.

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evolution, with the central nervous system providing a particularly good example.

Cognitive learning on a coordinated cloud-pipe-device platform may be unlike human learning in form, but it's similar in spirit. Memory and cognition are obtained from the cloud, while perception, interaction, and action control are coordinated on the device. For example, in video analysis-type applications, the end device is responsible for needs perception, initial cognitive analysis, and transmitting the initial analytical results to the cloud. The network transmits data, develops an understanding of the type of service being handled, and provides an analytical forecast. The cloud uses a cognitive model and algorithms to analyze the video and return the results to the end device for visual display. In this example, the device, pipe and cloud perform cognition and processing on video analysis applications from different angles and layers to achieve coordinated, layered intelligence.

Layered intelligence will bring several benefits. Elements of service control and decision making will shift down to the end device and intelligent network gateway. Both will accelerate decisions and, respectively, reduce the sudden shock that perceptual information creates on access networks and the shock that traffic causes on operators' backbone networks.

Moreover, a cloud with strong computing and storage abilities enables deep-level research and analysis on perceptual data and information from across large spans of time. It can also discover associations between information from different dimensions. Combined, these capabilities produce the most accurate results for decisions based on analysis and forecasts from a systemic perspective. It also allows information exchange and decisions to be adjusted based on the intelligent units distributed throughout the device and pipe.

Cognitive computing as a service

Although still in its infancy, the idea of cognitive computing as a service has already gained traction in the cloud computing market. For example, machine translation as a cloud service can translate cell phone apps into specified languages. In the future, service-based cognitive computing will form an important development direction for cognitive technology and business models, and evolve in a more refined, granular, and personalized direction.

High refinement and granularity denote the ability to perceive spatial and temporal differences in client needs. Personalization provides layered services that target client needs and problem-areas by embedding cognitive computing as a service in end equipment, devices, and sensors. These are interconnected, and can perceive client needs anywhere and anytime to provide the information and services clients may need.

A look at intelligent cloud e-assistant services for online businesses reveals clear differences between the requirements that different types of online businesses have on customer service e-assistants. For example, an online business for fresh produce might mention its need for a cloud e-assistant to Huawei REN. Huawei REN would first perceive the unique features of services corresponding to fresh produce, and then provide these features online via a cloud e-assistant with full knowledge about food, nutrition, and health. The e-assistant could then provide personalized advice and automated customer services for the online business client. Huawei REN is able to dynamically receive user feedback in line with the client's consumption records, and continue to improve the personalization and accuracy of the service.

Cognitive computing as a service allows applications



After almost 20 years, cognitive computing is finally growing – we hope that all major ICT companies and research organizations are passionate about jointly driving the cognitive computing era towards prosperity.



to offer a superior service experience based on cognitive computing technology.

Heterogeneous coordination

Cognitive systems form truly heterogeneous computing environments by virtue of components such as CPUs, GPUs, FPGAs, DSPs, and neuron processors, each with their own algorithms and tasks; for example, CPUs are adept at logical operations and GPUs are adept at numerical operations. Cognitive systems can automatically perceive the properties of higher-level applications based upon a priori knowledge and historical data. They can fully adapt applications and computing components, and use appropriate components for different use scenarios. Current heterogeneous cognitive systems focus on developing cognitive algorithms, meaning that software engineers use heterogeneous computing components to accelerate the speed of specified algorithms. The future will see an increasing number of cognitive algorithms based on heterogeneous system design.

Heterogeneous computing is highly efficient, requires little energy, and is especially useful for cognitive computing where demands on computing resources are high. Heterogeneous coordination can assist the technical evolution of converged software and hardware, and create new paths to realize device-pipe-cloud coordinated intelligence.

Brain-inspired intelligence

As the study of neuroscience has progressed, more researchers are beginning to understand that cognitive computing can and needs to obtain its inspiration from

neuroscience to help develop new theories and methods, and improve machines' cognitive understanding of big data. An approach both domestic and international members of academia increasingly agree upon is the use of Turing machines to solve left brain problems, and brain-inspired computing to solve right brain problems. Cognitive computing requires the left and right sides of the brain to be integrated.

China's Brain Plan is active in three major areas: moving past Von Neumann's computing principle and model; making breakthroughs in the form of new components that evolve computing theory from mathematical models to physical models; and large scale, real-time systems that model biological brains. Brain-inspired intelligence has the potential to revolutionize cognitive computing and create a new paradigm of autonomous cognition.

A prosperity generator

Cognitive computing systems enjoy extremely broad business prospects, market value, and application scenarios, for example, smart devices, smart homes, smart robots, autonomous vehicles, SMEs, information centers, and intelligent office automation. They can also be used for financial analysis and gene analysis, and in the data centers of large enterprises to enable functions such as information retrieval, targeted ad pushes, mobile medicine, smart transportation, and smart power grids. After almost 20 years, cognitive computing is finally growing – we hope that all major ICT companies and research organizations are passionate about jointly driving the cognitive computing era towards prosperity. 

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GitHub

Getting down with the API economy



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The API economy has arrived on the back of web-enabled software for business processes. GitHub – the world’s largest code host – uses APIs to great effect for its 11 million developers. The company’s co-founder, Scott Chacon, spoke to us about what the API economy is, how it transforms business models, and why you should care.

By Kyra Mi

A look at the past

Application programming interfaces (APIs) hardly hit the ground running in 2000 when the concept was unleashed on an indifferent world. Partly to blame was the rather technical and dry definition of APIs as a set of routines, protocols, and tools for building software applications.

At the recent Huawei Developers Congress, GitHub’s Scott Chacon offered a definition of the API economy that’s more in line with the collaborative world of 2015: “[It’s an] ecosystem built up around systems that talk directly to each other through automated means.”

After a slow start, APIs began to emerge with some muscle as life started getting more social and mobile. The API news hub ProgrammableWeb reports that the number of open (publicly available) APIs jumped from just over 100 in 2005 to 10,000 by September 2013.

Today the number stands at 14,193 – and that’s just the tip of the iceberg. There are ten times more private APIs (for internal developers) and semi-private APIs (for partners) than there are public APIs. And it’s all about sharing: “GitHub is the largest code host because we focus very hard on making it easy to share, on making it easy to have open source code,” says Chacon. In this nascent era of the Internet of Things (IoT), more things are using APIs to override the underlying complexity of interconnecting with each other.

With a rich financial future lighting up the horizon, APIs are here to stay and multiply. Research analysts Mind Commerce predict that the carrier API market will grow 26 percent annually, with global revenues hitting US\$167.5 billion by 2020.

Amazon CEO and founder Jeff Bezos anticipated the importance of APIs to business over a decade ago. As part of a series of other conditions in a company-wide memo around 2002, he threatened to give employees the chop if they failed to declare data and functionality through APIs: “Anyone who doesn’t do this will be fired. Thank you; have a nice day!” Describing the aftermath, tech website apievangelist.com notes that: “Everyone got to work and, over the next couple of years, Amazon transformed itself internally into a service-oriented architecture (SOA), learning a tremendous amount along the way.”

Now, with more businesses following suit, the API economy was born.

Growing a new ecosystem

According to Chacon, “If you have closed systems, then there’s no real way to connect them. If you have systems and services that provide very discreet things, then any company can go in and not have to re-implement all those different things. They can simply combine them all.”

In a nutshell, the API economy flips the model from closed and secretive to open and transparent. When companies invest in their APIs, they are clearly communicating to potential partners how they can work together, which leads to better services for customers.

1+1=3

Chacon believes we will see two types of players in this new ecosystem: those who provide services running at the core level, and those who build on that level to provide more accessible interfaces. “The major players in

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In the connected era, it's not about what you can do on your own; it's about how you can intelligently pool the services offered by other suppliers and arrange them as a new value-added proposition.

– Scott Chacon, GitHub's co-founder

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the economy, at the ground level, would be companies like Huawei, Amazon, and Google. They provide the infrastructure services, servers, load balancers, and data bases. On top of that would be companies aggregating those and making more user friendly ways of using them.”

Regardless of which category an enterprise falls into, the API economy will inevitably change the way it runs its business. In Chacon's opinion, “API economy transforms business models by making companies focus on providing discreet [or unique] services.” This represents a paradigm shift from the past: “Instead of buying a whole platform like ten or twenty years ago, if you use Huawei or Amazon Web Services (AWS) now, you will only probably be using four or five out of the hundreds of services they provide. But everybody will use a different four or five.” So how will this transform business models? “Every company has to think about what core value [it] might be providing,” says Chacon. To some extent, this liberates companies by making them focus on their best idea or core competency.

Rather than re-inventing the wheel for common capabilities, businesses can combine the best solutions the industry has to offer, which in turn extends their services and adds value for end users.

With high-end taxi services as its core competency, Silicon Valley darling Uber is the perfect example. It weaves its magic by piecing together a composite of APIs from different companies like Google Maps, Braintree payments, SendGrid e-mails, Twilio texts, and Checkr background checks. Using these APIs as building blocks, Uber has been able to drive down costs, shorten the development cycle, and accelerate time to market.

In August, 2014, Uber launched its API, allowing other businesses to embed Uber into their apps. By opening

up its data assets and resources, Uber has synthesized an external R&D lab, reached new partners and customers, and established new revenue streams.

Why you should care?

The API economy is here, and it's here to stay. In the connected era, it's not about what you can do on your own; it's about how you can smartly pool the services offered by other suppliers and arrange them as a new value-added proposition. It's also about how you can share your assets through APIs, let other businesses build on your platform, and build a sharing ecosystem for mutual success.

“Software is the raw ingredient of innovation,” states Chacon. “An API-driven economy increases speed, enables better partnerships, and delivers better experiences for customers. The only risk is in not participating.”

Making developers smile

Chacon is positive about how GitHub and Huawei can work together, “GitHub knows a lot about the software development world... [but] we don't know China well. Huawei obviously does. If there were some way for us to work together, we can say, ‘Here's how to make 11 million developers happy’, and Huawei can say, ‘Here's how to make Chinese developers happy’, which is something very difficult for American companies to do. It's definitely something that we'd love to be involved in.”

So don't sit there over-thinking it – jump on the API economy train and start exploring what API can do for you. [www](#)

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Reaching 4 billion

The sustainable business of closing the digital divide



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According to the UN's 2015 Millennium Development Goals Report, "Mobile-cellular and Internet penetration rates have grown strongly, but the digital divide between the rich and the poor is growing." Like the UN, Huawei recognizes the urgent need to reduce the expanding digital divide between those who benefit from online access and those who don't.

By Adam Lane

In its White Paper, *Digital Enablement: Bridging the Digital Divide to Connect People and Society*, Huawei shows that profit-driven business models for connecting people are more effective than traditional models that give away services for free. Although finding a viable business model is not easy, particularly one that works for rural or lower income populations, several successful cases already exist.

Connecting more people has tremendous benefits for society as a whole. Equally as importantly, it creates successful and sustainable outcomes for carriers, ICT enterprises, governments, and other industries. The current state of play with the existing digital divide, therefore, offers a mix of problems and opportunities.

So, what exactly are the problems? After all, the quantity of networks, Internet connections, and affordable smartphones is on the rise. Today, more than 87 percent of the world's population is within range of a mobile signal, with 55 percent able to access 3G networks. But, that still leaves an estimated 1 billion people without telecommunications, and an additional 3 billion without broadband. For them, the divide is deepening because they miss out on all the benefits broadband provides.

The technology paradox

One problem is the dichotomy of what happens when a new technology enters the global arena. As a force for good, technology has the extraordinary power to enable people, transform communities, and

propel social development and economic growth. Better connections, sensors, devices, data, video, and analytics create more productive agriculture, healthier individuals, stronger economies, thriving ecosystems, and efficient transport.

However, technology also has the potential to create a massive digital divide almost overnight, separating the connected and unconnected, and those who lack the skills to exploit being connected. With the advent of IoT, a new divide caused by a connected world of things will only serve to accentuate the gap between the haves and have nots.

Running parallel to the problems are rich opportunities for sustainable business. For carriers, connectivity packaged with the right solution can build trust, attract new users, and increase revenue from value-added services. Of course, we should not kid ourselves into thinking that the 4 billion offline are the most profitable market segment. However, we should still recognize the size of this untapped market and its huge potential for bringing in revenue, particularly in the medium-term. With up to 20 percent of people offline, developed countries also present a major business opportunity.

In the developing world, though, it's not just about providing connectivity; it's also about the services that the unconnected are so desperate to consume, often more keenly than their wealthier counterparts. Most unconnected people are poorly educated and have access to very limited health information. Few job opportunities exist and productivity tends to be low, especially in the agriculture sector. Many lack bank accounts or insurance,



and often pay more than the wealthy connected for basic services like water, healthcare or energy when they're available. Despite low disposable incomes, the unconnected are highly likely to consume affordable services that they need.

The UN believes that only when the digital divide is closed can the “transformative power of ICT and the data revolution be harnessed to deliver sustainable development for all.” However, ICT on its own isn't the silver bullet that can bring down inequality. What it can do, though, is provide solutions at much lower cost, greater scale, and higher efficiency than traditional alternatives.

Solutions that use ICT make new business models possible, which in turn can stimulate new collaboration modes between the ICT industry, governments, and other private sector companies. Yet, serving this large market profitably by providing digital enablement solutions requires new ways of thinking. Huawei suggests that this can happen in two main ways.

One: Rethinking how connectivity is funded

A service is clearly unsustainable unless it provides services that are valuable enough for someone to pay for. Typical digital enablement programs rely on a charitable model that fails to cover operating costs. To build in sustainability, organizations must adopt a more commercial, profit-driven model that works in tandem

with development outcomes. Several methods can help this happen.

The first involves monetizing organizational assets like networks, distribution channels, and data alongside consumer-specific assets such as relationships and trust. In Kenya, Safaricom partnered with Britam and Changamka to jointly launch the micro health-insurance product, Linda Jamii, in July 2014, offering affordable and sorely needed health insurance for families. Currently, only 3 percent of Kenyans have insurance, which are mainly employer-based policies, leaving 38.8 million without cover. Safaricom's trusted brand ensures effective marketing campaigns, while its technological capabilities help deliver and manage the product. Ultimately, Linda Jamii helps prevent sick people from being pushed further into poverty.

The second method is to find new funders such as consumer goods producers, banks, online content providers, and governments. For example, the Audrey Pack in Nigeria provides free samples for expectant and new moms to try before they buy, bringing mothers into the fold of the mobile health information service. So far, Audrey packs have been distributed to over 170,000 women in Nigeria and incentivized a million women to receive regular health information on their mobile phones. Designed to reduce maternal and child mortality in Africa, the Audrey Pack initiative, including communication costs, is funded by the marketing budgets of private enterprises like Cussons Baby, Kenya Airways, and GSK.

The third method is to accept payment in installments or adopt revenue-sharing, commission, cross-subsidy or

DIGITAL ENABLEMENT:

Bridging the Digital Divide to Connect People and Society

THE DIGITAL DIVIDE IS GETTING
NARROWER



87%+ within range of mobile signal

THE WORLD'S POPULATION



55% 3G networks

BUT IT IS ALSO GETTING
DEEPER



UP TO **1 BILLION**
unconnected to
telecommunications



AND ANOTHER **3 BILLION**
unconnected to
broadband internet

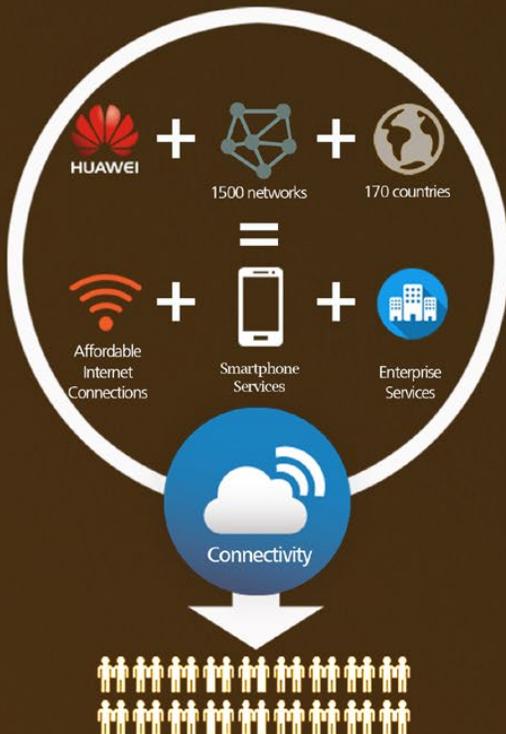
(Source: ITU and GSMA estimates)

1 IN 3 vs **8 IN 10**

online in emerging
economies

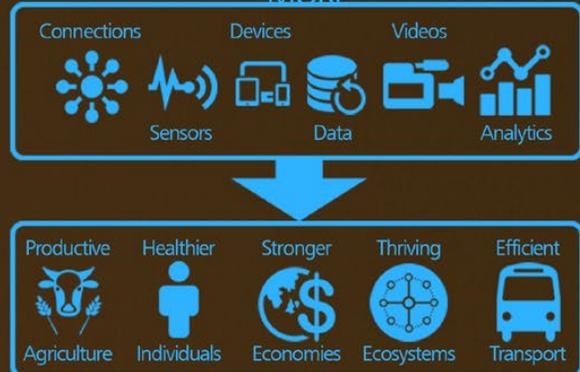
online in developed
economies

Powerful new technologies have the potential to create unprecedented digital divides almost overnight which will create even greater separation between those with and without access or the skills to exploit them.



Huawei contributed to connecting 30% of the world's population

MORE



freemium models. Bridge Africa runs this type of model in Cameroon: Field staff go door-to-door and show locals how and why they should get online. Project costs are covered by selling MTN broadband packages and devices.

A fourth method involves finding faster routes to scale-up business activities by distributing or selling products through agent networks, franchises, mobile network operators, charities or strategic partnerships in other sectors. Telenor Pakistan, for example, enables agents to provide farming information and accurate prices for farmers. They work within existing social infrastructures to operate on a large scale and reach the last mile so they can more effectively help farmers who face connectivity and literacy issues.

Although unconnected populations are often poor, digital enablement solutions should not necessarily aim to provide services free of charge. The above examples are sustainable because they focus on creating services that are valuable enough for a beneficiary to pay for. In addition, the payment amount is affordable and the payment methods viable.

Creating the feedback loop

Ideally, the consumer should pay something, even if the amount is small. This creates the feedback loop. Services are forced to show they are worth paying for, which boosts quality. In addition, they receive the feedback they need to keep improving what they're offering. This, in turn, means more people want to use the service. Focusing on providing something worth paying for forces companies to anticipate market demand and develop solutions that people need.

If consumers are unable to pay, they should still invest something to show they value the service, whether it's time, desire, commitment, movement or a behavioral change. If a government or third party beneficiary funds the service, they need to be backed by a model that creates value. This ensures that services can be funded through a fee-for-service model rather than as a grant.

Two: Rethinking how third parties benefit from connectivity

Connectivity can reduce costs, prevent problems, and create value in other ways. Recognizing this value – which is sometimes not-so-obvious – is the key to unlocking new funding, partnerships, and business models.

If connectivity enables e-voting, for example, the increase in efficiency can save governments time and money by removing the need to send paper ballots to inaccessible populations in remote areas and count votes by hand. Enabling more payments to take place digitally could also bring new forms of tax revenue and uncover new data, which is especially valuable in countries where both are sparse.

Connectivity can also improve public health. For example, it can raise vaccination rates by sending e-reminders, and then monitoring progress by linking vaccinations with electronic medical records. Digital systems could prove invaluable at helping prevent deadly outbreaks and reducing treatment costs. Micro Clinic Technologies runs a complete ICT solution for rural clinics in Kenya that ensures access to safe, affordable medicines. It applies an affordable pay-as-you-go plan that increases clinics' revenues by between 40 percent and 70 percent. Rolling out this type of system nationwide could save US\$200 million in essential drugs that expire each year, and save the five days that health workers waste each month manually inputting data for government reports.

Everything begins with an "E"

The tremendous growth of mobile money services in the developing world for previously unbanked populations has all kinds of benefits. E-payments, for example, ensure that whole amounts are paid on-time, minimizing fraud and transaction costs. They also result in the better delivery of public services: studies show that teachers are more likely to turn up for work if they are paid in full, on-time. The knock-on effect of this is that students receive a better education.

Third-party benefits are intrinsically linked to consumer benefits. When all stakeholders focus on creating value, the whole ecosystem benefits because the chances of creating ongoing revenue streams and a sustainable business model are much higher.

Huawei's White Paper, Digital Enablement: Bridging the Digital Divide to Connect People and Society, sets out 19 recommendations and two tools to help enterprises develop sustainable business models and rethink value propositions to find new sources of revenue. As a growth market involving billions of people, the time has arrived for carriers to start connecting the unconnected. [www](#)

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Video takes the role of LTE star



Scan for mobile reading

Voice was the undisputed traffic heavyweight in the early days of mobile broadband, dominating mobile networks worldwide. The launch of the iPhone in 2007 coupled with the public's blossoming love affair with data services changed all this with unprecedented speed. Video has emerged as the decisive victor. So, what does this mean for operators?

By Marcelo Rego

Changing consumer tastes and the rise of apps have culminated in the rapid and sudden demise of voice services. By 2008, non-voice traffic was commanding 25 percent of all traffic. A year later, mobile data traffic had surpassed mobile voice, taking its place on the throne as the new king of traffic. One particular type of data traffic was attracting the gaze of operators: video.

Since then, video has cemented itself as the leading type of traffic on mobile networks. Cisco predicts that it will account for 75 percent of all traffic by 2019. Such a massive upsurge will place very specific and stringent requirements on networks, especially when it comes to bandwidth and latency.

Operators have two options: One, upgrade and streamline their networks to minimize transmission costs per Gigabyte and maximize profitability. Under this basically mandatory option, operators benefit from increased data traffic but don't profit from content per se. Two, directly profit from content by bundling video with other products. As a supplement to the first option, this strategy derives revenue from video sales, higher ARPU, and lower churn.

A killer app stalked by operators

History shows that operators hunt for a killer app when there's a shift in wireless tech. After investing millions in a new network, they need to find a marketable application to entice users over to the new standard. Otherwise, there's no real reason for the average consumer to ditch the old

technology if it does the job well enough.

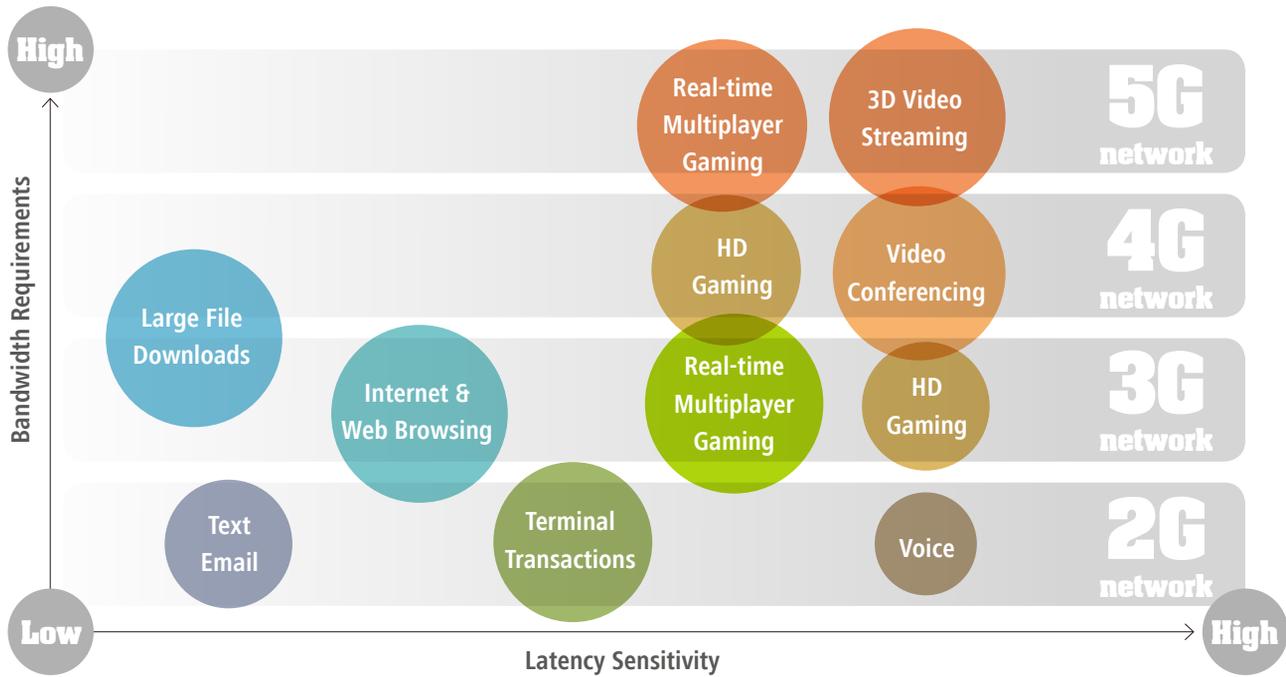
Ubiquitous mobile voice was arguably the killer app in 2G. In the 3G era, it became data connectivity. Although operators were throwing marketing money at video calls, the iPhone and rise of smartphone apps changed the game. Initially a novelty, apps quickly created demand for high-speed connectivity 24/7, soon becoming a necessity for users both at work and play.

From the standpoint of user perception, LTE's speed and latency advantages are negligible when compared to the most advanced HSPA networks, especially for the basic applications most people use the Internet for: emails, online surfing, social media, streaming music, and VoIP calls.

The UK Regulator Ofcom reports that, "The average time taken to load a standard web page took 0.78 seconds on 4G; 1.06 seconds on 3G." Such a small increase in speed doesn't matter much to someone who's reading a few pages of news on their commute to work, and that's why LTE hasn't really changed user behavior.

After surveying consumers on price, network access ability, connection reliability, speed, and overall service, Ofcom found that, "There were no significant differences between satisfaction levels between 4G and non-4G mobile users for any of the aspects of mobile services questioned." Unsurprisingly, the regulator concluded: "Most users do the same things using 4G that they do on 3G." For users, then, there's little incentive to switch to LTE if their usage habits are not changing in a way that require LTE's advantages.

To encourage the leap to LTE, operators must ensure that users embrace video, the only area where LTE tangibly



outshines 3G.

Persuading users to watch more videos means persuading them to use more data. Independent research shows that most applications consume more data on LTE than 3G, because app software optimizes itself to take advantage of higher available bandwidth.

In practice, this means video streaming consumes three to ten times more traffic than a music streaming app like Pandora, which uses just 8.7 MB in six minutes. In contrast, Netflix draws 79.6 MB on LTE in the same time on the default setting of best-quality. This is also far greater than the social behemoth Facebook, with EE Calculator reporting that, “Heavy Facebook usage with 1,000 updates consumes 500 MB per month,” excluding video streaming.

Unsurprisingly, the current go-to market strategy of many operators is to push customers into watching more video, obviously on tiered plans that charge more for higher data use rather than on unlimited data plans.

Two heads are better

When a business wants customers to try new products or services, it usually provides free or heavily discounted samples. Mobile operators have done so in the past with some success. For example, Sweden’s TeliaSonera and Spotify partnered up in late 2009 to offer Spotify Premium for up to three months for free. Ovum analyst Neha Dharia noted that the offer “reduced churn [so] TeliaSonera rolled out the deal across Scandinavia”. Moreover, the International Federation of the Phonographic Industry reported in 2011 that “around 25

percent of its [TeliaSonera’s] paying subscribers came from the partnership”.

Equally, Orange France has realized the benefits of teaming up with streaming music service Deezer, observing that, “Customers with an active Deezer connection are twice less likely to terminate their Origami offer.”

These successes bode well for operators when it comes to future partnerships and offers. There are two main categories of offers based on how operators source content.

The first comprises mobile operators that opt for a loose partnership with a video-content provider – both retain their identities, and it’s clear who’s providing what. Examples include Vodafone UK and Sky Sports Mobile, and Sweden’s Tele2 and HBO Nordic.

In Vodafone’s case, the company’s 4Q 2013 report shows that 4G customers consumed 2.1 times more data even when they hadn’t subscribed to a bundle. For music and video packages offering content from Sky and Spotify, Vodafone’s 4G subscribers generated 2.4 and 2.7 times more data respectively than 3G subscribers on the same bundle.

A closer look at Tele2 Sweden and HBO Nordic

Also operating under the first type of partnership, Tele2 and HBO Nordic’s team effort ran from April 3, 2014 to November 30, 2014.

Kicked-off by a massive marketing campaign that was most likely financed by both companies, the partners

equally promoted the offer; specifically, the type of content provided by HBO Nordic and the HBO content which Tele2 customers on higher-data packages could enjoy for free for six months.

The basis of the partnership was sound: In late 2013, market research by Tele2 found that 45 percent of all Swedish 4G subscribers paid for mobile streaming services, considerably higher than the national average of 32 percent. In turn, HBO Nordic was a new entrant in the streaming market with a strong proposition: Its hit TV shows would be shown in Sweden 24 hours after their release in the US.

At the end of the 6-month free offer, Tele2 began billing customers around US\$10 per month for unlimited use if they didn't opt out of their subscription, the same price HBO Nordic's asks for the package online.

Tele2's 2014 annual report – the only publicly available statistics on the partnership – gives some insight into the offer's success. A notable rise in traffic from Q1 2014 to Q3 2014 increased revenue from 1.7 billion Swedish krona (US\$197.5 million) in Q1 to 1.86 billion krona in Q3. CEO Mats Granryd referenced the offer when praising the performance of Tele2's Swedish subsidiary at the company's Q3 2014 conference: "Tele2 Sweden gave the group's best result, showing other units the way forward with a profitable data-orientation."

The fact that this was a time-limited offer implies a simple business model where both companies benefited from an opportunistic win-win. Tele2, for example, aimed to migrate or acquire subscribers by showcasing LTE's capabilities with free videos. According to Granryd, the strategy was successful: "Tele2 Sweden's service revenues from end-users grew by 6 percent, a result of the increased use of mobile data...for individual customers the strong demand for mobile data resulted in an increased sale of postpaid plans with higher data allowances."

In turn, HBO Nordic aimed to gain traction in this highly competitive market. Presumably, HBO gave Tele2 a billing commission for those who continued their HBO subscriptions after the free trial period ended. Although, there aren't any corroborating statistics to prove to what extent the offer benefited HBO, the American player managed to establish itself as one of the three biggest players in the Swedish video-streaming market, paving the way for the launch of HBO GO back in the US home market.

White labeling and the second partnership model

A smaller, but interesting twist on the previous category is made up of operators who choose to white-label their movie offers with a third party. As far as individual consumers are aware, the content comes exclusively from the operator.

The UK's EE (EE Film), Virgin Media (Virgin Media TV and Virgin Media Online Movies), and Channel 4 (Film4oD) all run this model. With free apps for Android and iOS, EE film delivers a one-stop shop for UK residents. It offers movie reviews, personal recommendations, and a video rental portal that provides downloads as purchases and streamed content as rentals. EE subscribers can download one free movie a week and, until the end of December 2014, enjoyed zero-rating for streaming movies whereby data consumption was free of charge.

The second type of partnership involves converged operators that own video content based on a large TV subscription base. Depending on specific packages, they offer a number of channels and premium content for free. Verizon and AT&T in the US and NTT Docomo and KDDI in Japan provide the best examples of this approach.

Vodafone's acquisitions in 2014 suggest that the Vodafone group is shifting from the first to second category. However, this indicates operational restructuring rather than a strategic move that's aiming to increase LTE uptake.

What does it all mean?

Video is to LTE what voice was to 2G. Operators are now bundling video content and enticing users to switch to LTE and embrace new, data-intensive behaviors. Converged operators that own video content can easily attract customers with special video subscriptions. Others, especially mobile-only operators, benefit from partnering with high-profile content owners or white-labeling.

In 2014, most operators that launched LTE have used such schemes, and early evidence indicates that they have been successful.

Huawei has helped operators around the world design and implement an optimal video-strategy for accelerating consumers' transition to LTE. This type of strategy considers user needs in tandem with operators' capabilities, desired market position, and network evolution plans.

It also recognizes video as the new star of the show. 

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Connected cities

From science fiction to science fact



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The world's cities are becoming better connected, and therefore smarter. Technologists reckon that as innovation gathers pace many of the problems created in today's cities will be solved by tomorrow's cities.

Republished from BBC

The idea of a smart city where everything is connected and everything works, is no longer the stuff of science fiction. The foundations for tomorrow's world are being laid today, and the emerging picture looks both familiar and unknowingly strange.

It is familiar because, contrary to our abstract impression of future living, the city of tomorrow is the city of today, with the same streets and neighbourhoods, based essentially

on the same technologies. It is strange because it will go further than we can presently know, or even imagine.

"It's like the difference between dirty water and clean water," says Jonathan Reichental, chief information officer for the US city of Palo Alto, the home of Silicon Valley. "Cities will look and behave very differently a decade from now; much more so than we anticipate."

Indeed, smarter cities cannot come quickly enough. As environmental polluters, economic hothouses, and cultural melting pots, the world's fortunes are made in its



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The rise of open-source software and cloud computing has enabled proprietary infrastructure to be virtualized and scalable, reducing the risk for public services and increasing innovation within the private sector.

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cities. To a greater extent, its defining challenges – climate change, poverty, inequality – must also be solved in them. And solutions must be found against the tide.

More than half the global population of more than 7 billion now lives in cities; a proportion the United Nations expects to jump to two-thirds, or 2.5 billion people, by 2050. Basic civic resources will be stretched, even as cities are required to reorganize themselves to head off global catastrophes. It is a formidable task, but one that technologists believe is surmountable.

“Ours is an urban world, now and forever,” says Reichental. “We didn’t build cities with that in mind, and we’re badly prepared, but have the technology now to transform how we manage and experience cities.”

Technological foundations

At root, a smart city is a connected city. In recent years, urban spaces have been threaded with fiber optic cable; wireless broadband, smartphones, and sensors have become increasingly affordable; and the Internet of Things (IoT) has emerged, connecting machines and making them intelligent.

In parallel, the rise of open-source software and cloud computing has enabled proprietary infrastructure to be virtualized and scalable, reducing the risks involved in public services and increasing innovation within the private sector. Buoyed by massive amounts of virtualized processing power, this inter-connected web of ‘things’ is generating reams of information, or big data.

Huawei, a leading technology provider in this space, estimates that the number of IoT devices installed, connected, and autonomously managed will reach 100 billion by 2025, up from around 5 billion today. Its recent Global Connectivity Index suggests that a 20 percent increase in spending on information and communications technologies can precipitate a 1 percent jump in GDP.

The coming-of-age of broadband, and related functions such as cloud computing and big data, has also ushered in a new era for smart cities.

“Real-time information, gleaned from connected devices on communications networks, has created a more dense landscape and revealed the interplay between city functions in more profound detail,” says Eric Woods, analyst at Navigant Research.

Digital society is no longer an experimental outlier, and there has been a shift away from conceptual projects like Masdar City in the United Arab Emirates and Songdo in South Korea, green-field initiatives that pre-date the 2009 financial crash. “They’re fascinating, but they’re isolated from the mainstream,” says Woods.

Organic development

Today, the development of smart cities is an organic process, taking place behind old neighbourhood facades.

“The process is going on in a natural way,” says Professor Carlo Ratti, director of the Senseable City Lab at Massachusetts Institute of Technology (MIT). “It’s very difficult to create a border between what is experimental and what is effective.”

Even so, momentum is clearly sign-posted. Governments are working to unlock investment in smart city developments. Singapore is about to embark on an ambitious Smart Nation effort. Amsterdam has just invested €60 million in a new innovation center for Advanced Metropolitan Solutions. During a period of fiscal constraint, the European Union has earmarked €15 billion as part of its Horizon 2020 framework.

In Europe, in Mannheim, the power grid doubles as a broadband power line system, and injects intelligence into everyday appliances, so they automatically power up when energy is plentiful and prices are cheap, and power down when supply is short and prices are high.



Connectivity has actually made cities even more vital. The flow of ideas and the rate of innovation between people and machines in cities will spiral upwards as connectivity continues to be set down.



In the US, the Electric Power Board of Chattanooga in Tennessee has constructed a highly automated smart grid that self-heals. Its network of 1,200 smart switches identifies outages and re-routes supply accordingly. Disruptions have reduced by 50 percent to 60 percent since 2012; their cost to the local economy has reduced by US\$50 million per year.

Perhaps most futuristic of all, driverless cars appear within reach of consumers, with automated buses to be trialed in Japan next year and Apple tipped to enter the automotive fray by 2020.

Meanwhile, Ratti reckons the concept of smart urban space informs the current generation of start-ups in the US, citing services such as taxi app Uber and lettings app Airbnb, which allow users to set up independently as both service provider and consumer, and applications such as Nest's intelligent thermostat and Apple's HomeKit, which put users in remote control of their home appliances.

"Similar approaches promise to revolutionise most aspects of urban life, from commuting to energy consumption to personal health," says Ratti.

Rapid trajectory

But it's early days. For Reichental, the course is clear, but the pistol has only just been fired. "There are some terrific things, but they're disconnected. The challenge is to connect the pieces together as a cohesive citywide initiative," he says.

Woods agrees: "Right now, there's a mixture of partial improvements and demonstration projects. Different cities are at different stages; we have a kind of mosaic picture."

The technology industry has certain major challenges to solve, especially around such thorny issues as data security and standards. But the biggest issue for smart cities is the cultural element.

"Politicians aren't used to this idea of technology as the

center of the universe; most don't get it. New York gets it and San Francisco gets it. But a few hundred enlightened cities is barely a percentage when you consider there are 19,000 cities in America alone," says Reichental.

At the same time, the trajectory is good, he says. "If you want to gauge innovation, you have to follow the money, and we're seeing real interest from the private sector for the first time. It means there's demand."

This point about innovation is important, and ultimately most hopeful. Communication begets innovation. The primary function of cities remains as trading places and meeting places, and as forums for discussion and ideas. Built where the river flowed in and the railway rolled in, they continue to revolve around their channels of communication and trade.

These channels are now digital. Despite making the world smaller and making physical places less significant, connectivity has actually made cities even more vital. The flow of ideas and the rate of innovation between people and machines in cities will spiral upwards as connectivity continues to be set down.

Alex Pentland is the Toshiba professor of media, arts and sciences at MIT. His theory of 'social physics' posits, simply, that people are at their most innovative when they are connected, collaborating on original ideas, and when the "wisdom of the crowd" rises above the "madness" of it.

Big data analytics, he suggests, can allow us to map the flow of ideas across digital infrastructure, and create organizations and governments that are cooperative, productive, and creative.

"The breadcrumbs we leave behind give us information with which we can really learn about ourselves. And that is the revolution that will really save us," says Pentland. "These breadcrumbs, this big data, is so detailed and so numerous that we can start to write equations that begin to describe accurately how ideas move from person to person and how behaviors change in a way that is not just qualitative but predictive, and the basis to develop new social structures." 

HKT

Here To Serve



Scan for mobile reading

Customer experience management (CEM) is something operators often think of strictly in terms of CSAT and churn, but HKT is actually leveraging Huawei's SmartCare CEM solution to expand its business range, boosting revenue streams where there were little-to-none before.

By Jason Patterson

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Hong Kong Telecom (HKT), part of the broader PCCW group, is about as far ahead of the telecom curve as it gets. Their LTE-A network is record-breaking. They offer Gbps speeds to the home. Their service lineup is quad-play, and then some. And for the past four years, Huawei has been their customer experience management (CEM) partner, as they look to narrow the gap between their customer service and technical prowess. Gains have been impressive.

Speed is a need

According to HKT, one of their primary motivators for its focus on network speed is Hong Kong's status as a financial hub. High-frequency trading, on the order of 3,000 plus trades per second, is an integral element of global finance (estimates have stated that 60 percent to 73 percent of US equity is moved through such trades). According to Bloomberg, trading firms are known to pay to have their servers placed in the same data center as the relevant stock exchange the shares are trading on, shaving an infinitesimal yet vital amount off of the elapsed time. Every little bit helps, and HKT is committed to keeping Hong Kong up to speed.

But what if there's an outage?

In a high-stress environment like Hong Kong, outages are going to bring outrage, and HKT is employing a variety of methods to avoid them – some high-tech, some just clever.

In August 2013, HKT added Huawei's

SmartCare CEM solution to the mix, which has the capability to detect latent issues before they develop into full-blown problems, before complaints come in. And what's more, SmartCare CEM can make proactive suggestions. For instance, if large numbers of HKT VIP users frequently gather at the Hong Kong Yacht Club, SmartCare CEM might suggest boosting the coverage there.

In another example, one of the primary reasons why indoor coverage can be spotty is because a telco field survey is typically a one-time event that may not be able to encompass all the key areas onsite (such as the CEO's office). HKT has responded by providing sample SIM cards to business clients whose performance they can monitor around a building throughout the day using SmartCare CEM. This provides much richer data about traffic patterns, allowing coverage to be greatly improved exactly where it's needed. Do these methods work? HKT has seen a 47 percent reduction in VIP complaints for 3G service, and a 34 percent reduction for 4G. In addition, from 2012 to 2014, HKT has had no significant outages on their network, making them the only physical operator in Hong Kong that can make that claim.

"We'll get back to you shortly"

If you're a customer with a complaint, this is a phrase you don't want to hear. It means that you're going to have to wait for an indefinite length of time, with no resolution in sight. Telcos don't like having to say this either. According to HKT, 60 percent of their customer enquiries relate to billing, and if customers have an unresolved billing issue (a

“Network reliability and troubleshooting gains make HKT more attractive as an MOCN/MVNO partner, while the volume of data that SmartCare CEM gathers makes it more attractive as a roaming partner.”

common headache with enterprise customers, whose bills may be thousands of pages long), they'll often decide to not pay until things are settled.

With SmartCare CEM, customer service responders have access to far more information than they had before, enabling them to not only identify more problems themselves, but resolve them as well. This has helped drive 30 percent reductions in billing inquiry transfer (asking someone else for help) rates for commercial customers, and a 60 percent reduction in overall processing time, with the bulk of that reduction accounted for by a decrease in mean-time-to-demarcation (MTTD) from three hours to thirty minutes – an 80 percent reduction. With these improvements in place, far more enquiries are resolved on the same day. And with customer service staff far more in control of the resolution process than they were before, HKT is now able to hand out prizes for the best examples – a strong motivator for all involved to solve customer problems swiftly and smoothly.

Improved bottom line

HKT's customer service success is not anecdotal. Mobile post-paid churn has dropped from the double-digits to less than 2 percent over the past few years, with customer satisfaction (CSAT) scores seeing 10 percent to 11 percent gains in 2013 and 2014. Moreover, HKT was able to implement a 20 percent increase in SIM pricing for its basic 5 GB package during the same time period, with only a very modest blip in terms of churn that was quickly smoothed over. This no doubt contributed to the 20 percent ARPU boost that the operator saw from 2012 to 2014.

HKT is also leveraging its CEM efforts to open up new revenue streams. For instance, those aforementioned network reliability and

troubleshooting gains make the operator more attractive as an MOCN/MVNO partner, while the volume of data that SmartCare CEM gathers makes it more attractive as a roaming partner. According to HKT, the latter is achieved because the operator is able to provide more precise information to other operators as to how many of its users and VIPs roam on HKT's network.

This improved data gathering also enables better service of enterprise customers. Unlike a consumer complaint, an enterprise complaint may only revolve around a trouble-prone location, with no information provided regarding which users are experiencing trouble or what phones they carry. But with SmartCare CEM, HKT can know these things without being told, on a per-service per-user (PSPU) basis – very handy. SmartCare CEM also makes network exposure a more profitable proposition, as OTT campaigns can be better managed thanks to the SLAs that can now be guaranteed.

The numbers look good

With CEM, HKT is able to more convincingly position itself as Hong Kong's premium operator. When asked why, HKT was refreshingly absent of flowery language. According to the operator, the rest of the organization exists to support marketing, with the data that SmartCare CEM supplies a big part of that. The solution also helps breakdown the silos, as data can now more freely flow across the company. This figures into future plans, as the operator plans to ramp up its Big Data efforts across the company. What does this add up to? A doubling of share price over the last few years, for one, as HKT is now able to deliver the sort of premium service expected of a premium brand, and this is reflected in its motto – Here to Serve. 

Etisalat Misr

Climbing the pyramid of success with U900



Scan for mobile reading

The UMTS 900 network (U900) is the invisible engine that powers networking in today's Egypt. Whether it's a business exec calling up an Uber cab in Cairo or a tourist updating Facebook with a selfie by Tutankhamen's tomb, they have the U900 to thank for shortening distances between people and making work and play a whole lot easier.

By Zhang Yu and Yue Xiaopin

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“Coupled with a simple refarming solution, Etisalat Misr deployed GSM 1800 to improve G1800 coverage, meet GSM KPIs, and guarantee basic voice services.”

Hieroglyphs, pyramids, the Sphinx, mummification...Egypt has truly given the world a treasure trove of historic and cultural gems. Every year 15 million tourists descend on the nation of nearly 90 million to explore its secrets. Figureheads of Osiris guiding boats down the Nile and the mysteries of Pharaohs' tombs are ripe for sharing with people back home. Those lucky 15 million travelers, of course, post their exotic Egyptian travel experiences on social media across mobile networks.

Mobile broadband goes crazy

As a pillar industry, Egypt's thriving tourist trade also benefits other industries. Mobile communications are booming, with mobile phone and smart device penetration at 115 percent and 20 percent respectively. Social media applications pervade work and life, with the young taking to social media such as Facebook, Twitter, and Skype like true digital natives.

Mobile broadband (MBB) consumption in Egypt is surging, with 2015 already on track for a 40 percent jump in MBB users over 2014, while traffic growth is soaring at 120 percent per year. But, MBB networks are struggling to take up the slack and deliver the low latency and high bandwidth that users want.

Egypt's mobile carriers increased to three when Emirati subsidiary Etisalat Misr stepped into play

in 2007 after acquiring the nation's third mobile operator license. The relative latecomer began by building the nation's first 3G network, but it wasn't long before the competition began heating up. Carriers started aggressively vying for a piece of the action, offering lower rates and accelerating MBB network construction.

Since then, Etisalat Misr's network traffic has doubled every year, heaping considerable pressure on network capacity, which is expected to continue in 2016. Moreover, compounding the scarcity of spectrum resources assigned for 2G, Etisalat Misr holds limited spectrum for MBB.

The carrier faced two major questions: How could it quickly build MBB network capacity and improve coverage? How could it reallocate existing spectrum resources?

U900 saves the day

Etisalat Misr decided to build a UMTS 900 network in the 900MHz band and retire its GSM 900 network. To enhance user experience of MBB, Etisalat Misr's CTO Khalid Murshed believes the carrier must "use existing experience as the basis for network construction and developing strong 3G services." Coupled with a simple refarming solution, Etisalat Misr deployed GSM 1800 (G1800) to improve G1800 coverage, meet GSM KPIs, and guarantee basic voice services.

Better coverage meant that 2G network performance and capacity would not be affected



once the G900 was retired. In turn, the simple refarming solution could quickly and precisely identify network areas with capacity limitations and enable accurate plans for U900 site locations.

The solution offered network capacity growth as quickly and inexpensively as possible. Etisalat Misr used value analysis, network assessment planning, and performance impact estimations to develop accurate traffic migration plans and capacity enhancement solutions, and retain the same bearing and performance capacity on the GSM network after refarming.

The carrier formulated planning solutions for new site construction and coverage enhancements to resolve GSM network coverage problems post-U900 deployment.

Etisalat Misr first deployed the U900 network in economically active areas with international companies and fast traffic growth.

To formulate measures for quickly handling any problems that arised, Etisalat Misr and Huawei jointly set up an MBB team. As well as developing a viable delivery model and follow-up project plan, the team created a series of capacity standards and criteria. After rapid verification, these were used to design methods for follow-up network planning.

Making life better with MBB

The U900 network has met the pressing need for higher bandwidth in west Cairo

to accommodate the surge in data services. Subscribers immediately noticed the improved user experience, with MBB user traffic increasing by up to 25 percent and the time needed to open web page times greatly reduced. According to Etisalat Misr, this “has improved web page loading speeds and user experience, making shopping much more enjoyable in malls in west Cairo”.

Etisalat Misr found through traffic-bearing modeling that its legacy 2G network was carrying a relatively high proportion of 3G user traffic due to insufficient coverage, with up to 50 percent of 2G network traffic generated on 3G terminals. The new U900, however, enabled the 3G network to bear 3G user traffic.

Improved network coverage delivered a better user experience, with speed increasing by as much as 40 percent from 2.1 Mbps to 3 Mbps.

“Etisalat Group has always worked with vendors with the best technology. We have collaborated with Huawei for the last 15 years and will continue to do so in future,” says Etisalat Misr CTO Khalid Murshed. “We will continue to deploy U900 networks and enhance G1800 network coverage while we prepare for LTE network deployment.”

Murshed believes that the U900 has helped Etisalat Misr provide the best MBB experience for users and empowered its development strategy. It will no doubt be a decisive factor for commercial success and pave the way for a fruitful long-term partnership with Huawei. [www](#)

Big alliance for small cells in Indonesia



Scan for mobile reading

The world's first Small Cell Industry Alliance came into being in Indonesia on September 16, 2015. Marking an industry milestone, this government-led alliance will integrate industry resources, develop corresponding standards, and boost progress by crowdsourcing.

By Wang Haidan

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“Ovum reports that small cells represent the best solution for mobile digital development, especially where equipment rooms are scarce and network congestion is common during busy hours.”

A world first

With a population of nearly 257 million, Indonesia is the fourth most populated place on earth. It's also a relatively young nation, with 70 percent of Indonesians yet to celebrate their 34th birthday. This youthful demographic provides strong impetus for the country's rapid ICT development, which in turn creates jobs and improves people's lives.

Increased smartphone ubiquity has doubled Indonesia's mobile data traffic over the past two years, heaping pressure on carriers. They urgently need broader and faster network pipes to offer more services, offload huge data traffic volumes, and support the construction of digital cities.

Mobile digital cities require ubiquitous network coverage and a high-speed mobile data experience, the path to which is a complex marriage of challenge and opportunity. This is especially true for hotspot areas such as sports stadiums, airports, train stations, and CBDs.

Ovum reports that small cells represent the best solution for mobile digital development, especially where equipment rooms are scarce and network congestion is common during busy hours. Power friendly and easy to deploy, the diminutive size of small cells belies their large capacity. For carriers, they are the best way to improve network coverage, boost capacity, and enhance user experience.

Deployment, however, is no cakewalk. First, few policies and regulations for small cells exist.

Indoor coverage in large buildings, for example, is complicated by a lack of infrastructure. It is also difficult to obtain either the licenses or space for site construction. The second, and arguably most serious challenge, involves balancing the gains and losses of both shop owners and carriers when it comes to small cell deployment. Third, the industry is inhibited by a lack of industry standards. The key to sustainable development in the small cell industry rests with formulating MBB standards that are based on user experience, regulating the development of small cell technologies, and guiding investment.

To respond to these challenges, the Ministry of Information and Communications of Indonesia (MICI) proposed the Small Cell Alliance. As a leading ICT solutions provider and active player in Indonesia, Huawei took a founding role in the alliance – the first of its kind in the world. Other stakeholders include MICI, the National Telecommunications Standard Institute of Indonesia, and various ICT industry organizations. The Small Cell Alliance has also attracted more than 70 member companies and organizations, including Telkomsel, Telkom, XL, Ericsson, Alcatel Lucent, Mastel, and a slew of property management companies, real estate developers, universities, and media and consulting firms.

MICI hopes that the alliance will integrate resources across the industry chain and contribute to the success of the small cell industry and its players. Dr. Muhammad Budi Setiawan, MICI deputy minister, outlined the importance of mobile communications to Indonesians and the

“Every 1 percent increase in the home broadband penetration rate will lower unemployment by 8.6 percent.”

national economy: “Every 1 percent increase in the home broadband penetration rate will lower unemployment by 8.6 percent.”

The Indonesian Small Cell Industry Alliance is highly regarded by local regulatory authorities, with the Indonesian government aiming to regulate the industry and pave the way for mobile broadband deployment. Planned policies include reserving pipes and cabling resources for small cells.

Standardizing indoor MBB

The Indonesian Small Cell Industry Alliance is committed to creating indoor MBB standards, and developing and promoting an authoritative certification system.

In turn, carriers must upgrade their indoor coverage systems. From 2G to 3G to LTE, indoor coverage has long hampered mobile communications, despite its importance for monetizing traffic and optimizing user experience. For example, 70 percent of voice and 90 percent of data services occur indoors, and 80 percent of high-value customers work indoors. Although the indoor coverage area is just 20 percent of the total wireless coverage area, it generates 80 percent of earnings for carriers.

Indoor traffic hotspots cluster in places like transportation hubs, shopping malls, stadiums, and office buildings. Different traffic hotspots bear different service characteristics, while shop owners have varied service requirements. Silea Polono,

director of the digital marketing dept of the Jakarta International Expo Center, explained the scope of the center’s activities: “Our expo center hosts an average of 200 large-scale events every year, including exhibitions, music festivals, and holiday celebrations. These events involve online processes such as registering admissions, locating venues, introducing exhibits, making online transactions, and sharing.” To meet the needs of the expo center, Polono concluded that, “We urgently need an intelligent indoor mobile solution to enhance the communication experience for visitors.”

The industry alliance will explore how to benefit shop owners through the coordinated deployment of multiple indoor solutions such as indoor macro cells, distributed antenna systems (DAS), and LampSite solutions. The alliance is also responsible for identifying traffic hotspots to help local business owners improve customer experience and encourage carriers and business owners to upgrade their network infrastructure.

Powering up with partners

The deployment of small cells solves the problem of indoor coverage and creates new business models. Members of a small cell industry alliance can include governments, carriers, ICT vendors, property owners, and media companies. An alliance enables all parties to succeed by working together and sharing resources, which boosts the development of the small cell industry as a whole.



There are already successful examples of site cooperation in China. An intelligent streetlamp solution started life as a crowdsourcing scheme developed by China Mobile, electric power, an ad company, and Huawei. The scheme involves equipping each streetlamp with an LED light, small cell, and LCD touch screen. In Shanghai the transformation of more than 30,000 streetlamps indicates that small cell crowdsourcing is highly useful, and that small cells can help build smart cities. Huawei has also collaborated with the world's biggest outdoor advertiser, JCDecaux, to run nearly 1,000 small cells on billboards for Vodafone.

Small cell solutions have also been applied in the enterprise market. In March 2015, Baidu teamed up with China Unicom, Huawei, and Easyhome to build smart shopping malls. To provide an indoor map service for Easyhome shops, Baidu Maps shows the location of each, and ranks them on popularity. It also displays new product ads and special offers. Based on Huawei's Service Anchor platform, the app also performs indoor headcounts and big data analysis, serving both Internet companies and app developers.

Su Guangfu, Director of Baidu's LBS Commercial Cooperation Dept, spoke on the benefits of the partnership: "Baidu Maps is exploring the international market. The powerful combination of Baidu, operators, and Huawei applies our respective strengths. Exploring large-scale, high-value, and high-traffic indoor scenarios allows us to upgrade our indoor location-based service (LBS), provide a wide range of indoor

coverage services and big data services, and optimize user experience."

Using advanced tech the Huawei way

Establishing the world's first Small Cell Industry Alliance marks a milestone for the industry. The alliance will help integrate industry resources, formulate industry standards, boost the small cell industry in Indonesia by crowdsourcing, and inspire further alliances across the globe.

Multiple Indonesian carriers have already deployed innovative small cell solutions from Huawei, including LampSite and AtomCell, furthering mobile broadband construction in Indonesia and also the National Broadband Strategy.

Zhou Yuefeng, President of Huawei's Small Cell Product Line, believes that, "The rapid development of the mobile broadband market poses tremendous challenges as well as huge opportunities." According to Zhou, the potential is huge: "The market space for small and micro cells is growing. Huawei estimates that the market will be worth US\$20 billion over the next five years, which will require tens of millions of small and micro cells. Micro cells will become a new engine that drives the wireless market's future growth."

In collaboration with industry partners across the globe, Huawei is ensuring that the small cell industry continues to make a big noise. [www.huawei.com](#)

Banking on success with Telenor Serbia



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Telenor Serbia came into being on July 31, 2006 following the purchase of Mobi 063 by Norway's Telenor Group for €1.513 billion. With 3.2 million current subscribers, Telenor Serbia leads the big three local carriers in terms of market share, serving nearly half the nation's population of 7.16 million.

By Gary Maidment

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“What we want to do is make banking about simplicity and the customer journey – we offer one click less for everything.”

— Ingeborg Øfsthus, CTO, Telenor Serbia



WinWin: Although you're clearly an operator, you entered the banking space last year. Can you tell us more about that?

Ingeborg Øfsthus: Well, we're very proud of this. Telenor Banka is the fastest growing bank in the CEE region, with more than 100,000 customers opening current accounts with us in just one year. In Serbia – and in the region – that's an amazing number.

WinWin: How have you positioned Telenor Banka?

Øfsthus: Well, we're an online bank that enables people to complete daily transactions. Usually people think about queues and paperwork, but we wanted to think totally differently; we wanted to revolutionize that. Now, we really are a mobile-first bank that gives time back to people. Our customers can bank on the go on their mobiles, which has proven to be tremendously popular so far. We don't run any branches, so if there's a need for a signature or something similar, people can have the paperwork sent to their home or visit one of our telco outlets.

WinWin: Are the services you offer like a traditional bank's?

Øfsthus: We're actually a full-fledged consumer bank. We've evolved in steps, and we're already handling transactions. Our A-vista savings product,

for example, is a great offering that lets any customer pay in to their savings account at any time, and freely transfer money between their savings and current accounts. This sort of flexibility means our customers have their money available at all times.

We've also introduced the first online credit line in Serbia, which is unique in the market. Since we focus on customer experience, we've made getting credit simple, and that's how we add value for our customers.

However, we're not planning to offer mortgages or big loans.

Easy does it

WinWin: What's Telenor Serbia doing differently from other operators in the banking space?

Øfsthus: Like any other bank, we have a full product portfolio that includes a debit current account, savings account, and credit line.

If we look at the Asian market, the majority of people are under-banked in that they don't have an account. In Europe the retail banking market is saturated in many countries. For example, with a population of just over 7 million, 29 banks cover the corporate and retail segment in Serbia. As a new entrant, we meet a need for online and mobile

services that was previously under-served. In Serbia, Internet penetration exceeds 60 percent, and more than 50 percent of the population uses Facebook. However, only 6 percent of Serbs use online banking.

What we want to do is make banking about simplicity and the customer journey - we offer one-click less for everything. We're very proud of the fact that online and mobile banking are increasingly used by customers in Serbia, and that they're choosing us as a reliable partner for everyday banking.

WinWin: Have you leaned on Telenor's experience in other markets or consulted your colleagues in other countries?

Øfsthus: We most certainly have. Telenor Pakistan has been very active in this space, and the Telenor Group offers financial services in Pakistan with Easypaisa for money transfers. Telenor Group has a presence with different models of financial services in all the markets it operates in.

Mobile ambitions

WinWin: Okay, so let's talk about mobile. What does the Serbian mobile market look like at the moment?

Øfsthus: There are three major operators active in Serbia, so competition is pretty fierce. I'm happy to say that we've got the highest market share in terms of revenue. At the moment, we're focusing on constantly improving network quality to keep us in the top spot.

We're currently rolling out a large-scale and ambitious project that aims to cover the whole of Serbia with 3G Internet by the end of Q1 2016. In about five months, we'll have covered 99 percent of the population and equalized data and voice coverage. This will differentiate us as the sole operator to have this capability.

In parallel with that, we're working on optimizing our network by joining forces with customers. Based on their feedback, we're identifying places for improving it. The novelty is that our engineers are the ones who are talking to customers, giving us valuable first-hand feedback and really putting the customer at the heart of everything we do.

WinWin: Is it still early days for 4G in Serbia?

Øfsthus: Yes, I think that's fair to say. Basically all three operators launched 4G at the start of Q2 2015, which is relatively late. However, this means we can draw from global experience and also from Telenor group.

Even so, it's happening now and it's happening fast. We have customers who are very tech savvy, and they're fully on board with the opportunities mobile data offers.

During 2015 we covered the biggest cities in Serbia, and with the new spectrum we've acquired, we can continue to expand 4G extensively. We're probably one or two years behind Western Europe, but the development pattern is the same.

WinWin: What would push 4G forward in Serbia?

Øfsthus: Three main things: The first – technology neutrality – is already in place, which has enabled us to launch LTE. We just bought lower spectrum frequency, which will allow us to roll out LTE in rural areas.

Second, less than 10 percent of handsets in Serbia are LTE-enabled, which is pretty low. So we need to think about how we offer data services to customers and how we can raise penetration. Also, Serbs don't change handsets as often as other people in Western Europe, so that needs to be worked on, too. The so-called second life of phones is very common in Serbia; for example, children often hand their phones on to older family members, meaning less frequent phone swaps.

Third, we need to address resistance to use, because many of our customers don't use data yet. They either think they don't need it or they're price-sensitive. So, there's a big need to educate customers.

WinWin: What market are you aiming at with the Internet for All campaign?

Øfsthus: It's suitable for any market Telenor is in, and definitely for Serbia. It's about giving connectivity to everyone so they become part of the global community. There are many opportunities that being connected opens up: getting information, creating jobs, and so on. We can also see the link between mobile data usage and how well society is doing.

So what I would say is that we want to reach out to all our customers and help them to use this connectivity to make life better. That's a good reason to go to work every morning. [uuu](#)

Building a dream cloud ecosystem with

CNBMT



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China National Building Materials Technologies (CNBMT) is a high-tech subsidiary of China National Building Materials Group. Specializing in IT, CNBMT first stepped into the cloud computing arena at the end of 2014. Wang Qiaochen, the company's IT Business Group VP, believes that the upstream and downstream ends of the cloud computing ecosystem will become mature when the market experiences explosive growth.

By **Chen Yuhong**

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“An SLA is crucial for cloud services to engender trust, while a strong price-performance ratio is vital for the market to prosper.”

— Wang Qiaochen, CNBMT's IT Business Group VP

Just not mature enough

According to Wang, a mature cloud computing supply chain consists of a complementary relationship between users and the ecosystem, which is the key to stimulating enormous market growth. However, he contends that “customers lack sufficient technical understanding about cloud computing. They're also unprepared for the changes to business models and other areas that cloud computing will bring.” Many people still view cloud computing and virtualization as interchangeable, but virtualization simply pools IT resources – it's not nearly as flexible or agile as the cloud.

When it comes to cloud computing, especially public clouds, customers care most about data security. “Would you place your money in a safe at home or in the bank?” asks Wang. “If you have high demands for security on the public cloud, which security precautions do you take with your own home or data center? In truth, most companies would say none.” This is why he believes that users today lack a sufficient technical understanding of cloud computing.

Business models are another area where Wang decries a lack of preparedness: “The reason cloud computing has become so popular so quickly is that it revolutionizes business models. Previously users had to purchase physical IT resources to serve as fixed assets for building onsite IT infrastructure.

They now simply subscribe to the IT services they need.” He feels that the choice of either a private cloud or public cloud still requires a revolution in approval and management processes compared to onsite systems. If customers don't think it through clearly, they will have a difficult time using the cloud properly. In Wang's words, “They're not ready to move to a cloud service model because they are not yet mature.”

Additionally, certain issues with the technical and service guarantees delivered by cloud service vendors indicate that these enterprise types also lack maturity. An SLA is crucial for cloud services to engender trust, while a strong price-performance ratio is vital for the market to prosper.

Maturity will come from customer acceptance, providing that cloud service vendors endeavor to deliver high-quality services. In turn, customers must do their part and be proactive in providing feedback and pressure when necessary.

Opening the ecosystem up to success

Global digitalization is transforming IT systems from support systems into production systems. Moreover, mature cloud computing technology has moved IT systems toward the cloud, and defined a major new trend in corporate IT construction that influences enterprises' core competitiveness. Individual cloud vendors cannot meet demand



alone, and must learn how to build sustainable partnerships that can create an open ecosystem.

Several roles are already well-defined in the cloud computing ecosystem: IaaS and PaaS vendors such as Huawei provide cloud infrastructure or platform services. Cloud service partners serve as cloud integrators, delivering personalized services such as consulting, migration, and provision based on the offerings of different cloud IaaS and PaaS vendors. SaaS developers and SaaS vendors develop cloud-based software for different kinds of customers.

In addition to the above roles, Wang defines a new role in cloud computing: the cloud distributor. They exist to recruit, enable, and connect cloud service partners, and help traditional IT partners become cloud partners.

“Cloud computing has made everyone feel the urgent need to transform and innovate,” says Wang. “Many companies from traditional industries need to reposition themselves in the new cloud ecosystem, whereas new industries and new positionings create new requirements for skills and operating models.”

Wang aims for CNBMT to serve as a bridge for sharing cloud computing capabilities and technologies, including the ability to design and implement cloud data centers and cloud computing technologies. He foresees integrated capabilities that cross product lines based on cloud computing plans alongside the ability of users to run their own private or public clouds. Wang has identified a few preconditions for cloud

distributors: “First, they need to have an excellent command of these capabilities themselves. Then they need to share them with their tier-two partners. This will empower tier-two partners to make smoother transitions [to the cloud].”

The second role is “to consolidate tier two partners’ abilities, and then jointly create solutions based on individual customers’ needs”. Although cloud vendors provide relatively standardized products and services, customers have individual needs that do not change. Cloud distributors can focus on providing standardized IaaS and PaaS service solutions for partners. Tier-two partners and independent software vendors (ISVs) can focus on the personalized demands of customers, and distributors can help them construct total solutions for customers without worrying too much about cloud infrastructure and the technical aspects of platforms.

The final role of a cloud distributor is to replicate successes in vertical industries in different regions. In the cloud era, the function of finance and logistics will not be as important as the role of traditional IT hardware distributors, and cloud distributors will strengthen service ability. Traditional distributors should invest more heavily in enabling cloud services and accumulating experience. Then, cloud distributors will help tier-two partners transform, and work with cloud vendors to increase their market share.

To develop the cloud ecosystem and garner success for all stakeholders, Wang pinpoints the nature of a true ecosystem: “Why do we call

“The effective and flexible use of resources is a key factor in building a prosperous cloud computing ecosystem. CNBMT hopes to construct a platform that cloudifies, connects, and effectively allocates resources.”

this an ecosystem instead of simply tier-one partners or tier two partners? Because they rely on each other for survival, and their net-like, non-centralized connections and relationships form an extremely complex system.” The capabilities and clients targeted by each player in the ecosystem are different, with each player holding its own resources. “From this we can conclude that the effective and flexible use of resources is a key factor in building a prosperous cloud computing ecosystem,” says Wang. “To achieve this vision, CNBMT hopes to construct a platform that cloudifies, connects, and effectively allocates the resources of partners and manufacturers.”

Transitioning services to the cloud

According to Wang, CNBMT has extensively researched digital transformation: “First, we looked at the organizational structure of human resources by establishing a cloud computing technical team,” which he says reflects the huge difference between traditional IT teams and cloud computing teams: “When CNBMT was involved in traditional distribution, technical personnel focused more on the pre-sale, sale, and post-sale of products, that is, they focused on the product itself. However, cloud computing teams focus on designing and implementing system architectures, which has higher requirements.” Due to the fact that cloud service-based sales create many new requirements on operation support systems in the background

and the processes that provide traditional distribution services, Wang states that the “[Cloud computing] team uses technical measures to increase the company’s capabilities at platform operations.”

Second, he asserts that, “We must first use the cloud. CNBMT’s information system architectures are transitioning towards cloud computing in everything from design to use, and so it can use its own practical experience as a template to show to users and partners.”

In 2014 CNBMT jointly established a solutions center with Huawei, which Wang believes will help the company solidify its positioning and maintain its momentum in the cloud ecosystem. “It’s important that platform-level cross-product cloud computing solutions do not stop, as they often seem to do at the PowerPoint stage. They need to proceed to the design and implementation stages,” says Wang. “We’ll establish a sound foundation for ourselves at the center. Our client-based personalized services and solutions with partners will be based at this center.” He is confident that the center will prove to be an effective training ground for partners, display the results of collaboration to end users, and help promote partners’ solutions.

Wang recognizes that most users have questions about how to make cloud solutions viable, a fact that CNMBT will convey at the group level. He pledges to use the subsidiary’s experience to show how easy it is to go cloud, and thus encourage the group’s cloud transformation. As Wang says, “The benefits we provide with the cloud really are things of beauty.” [www](#)

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