

IN THIS ISSUE

**CTO ROUNDTABLE:
INFLUENCING THE FUTURE**

AHEAD OF THIS YEAR'S EVENT, WE HIGHLIGHT THE GOALS OF THIS ANNUAL MEETING **PAGE 2**

**INTERVIEW:
GSMA DIRECTOR-GENERAL**

MATS GRANRYD GIVES HIS THOUGHTS ON 5G, IOT AND THE UN'S SUSTAINABLE DEVELOPMENT GOALS **PAGE 6**

MBBF16

OFFICIAL SHOW PREVIEW

DAILY

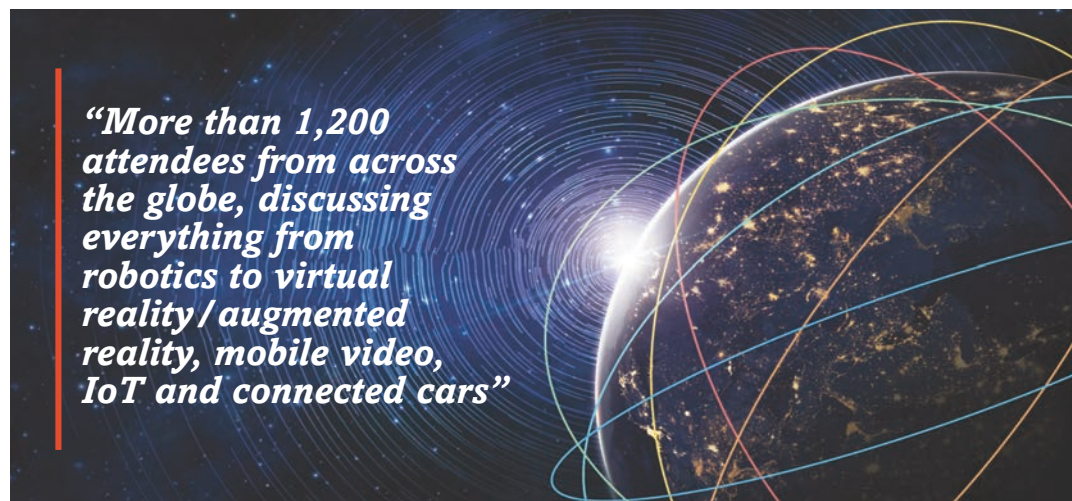
Global MBB Forum 2016 to define the future of mobile

Huawei's seventh annual Global Mobile Broadband Forum (MBBF) in Tokyo, bringing together operators, policy makers and industry leaders, is set to be bigger than ever, with the underlying theme centred on the future of mobile broadband and how it will shape the world we live in.

With more than 1,200 attendees from across the globe, discussing everything from robotics to virtual reality (VR)/augmented reality (AR), mobile video, IoT and connected cars, this event will not only look at the evolution of these technologies, but how their growth will be driven by mobile, and where the opportunities are across verticals.

As part of the two days, the discussions will centre heavily on mobile's impact in accelerating current and future economic development, how the growth of verticals will lead to increased cooperation, and learning how user experiences will improve in areas such as mobile entertainment, home connections, M2M and public security.

Underlining the importance of mobile broadband, representatives from the industry's biggest players, including Huawei, China Mobile, Softbank and GSMA, will be speaking, and offering views on a range of topics, including



cross industry collaboration, digital innovation, 5G and 4.5G development and cloud transformation.

Attendees will also be able to see some of the future innovations first hand, with 20 industry partners exhibiting the latest in mobile video, IoT, robotics and connected cars across 3,500 metres squared of exhibition space.

ROAD TO TOKYO

Huawei's MBBF event began back in 2010, with a major highlight coming from Oslo, Norway, and the launch of the world's first LTE network.

It has since evolved throughout the years to become bigger each time, with the theme shifting away from pure connectivity, to mobile's growing importance across different sectors.



Last year's event, held in Hong Kong, showcased the roads to mobile broadband through to 2020, and how innovations will contribute to the growing opportunities in a better connected world.

The wide ranging topics at this year's event held at the Makuhari Messe convention centre, Tokyo, and a focus not only on 2020, but to the future, is a testament to the continued evolution of the mobile industry.



CTO Roundtable: Influencing the future

Huawei's vision is to build a better connected world. Our most important partners to achieve this goal within an operator are the Chief Technology Officers (CTO).



“The perceived value of the CTO roundtable has increased continuously over the last few years and its output has provided a significant contribution and common voice to the industry, helping to speed up and influence standardisation and the entire mobile broadband industry.”

A couple of years ago Huawei started to organise a CTO Roundtable with the aim to provide a platform where CTOs can meet amongst their peers and with industry partners to share ideas, views on changes, trends and new technologies in the telecom industry.

Along with our industry partner GSMA, we extend this invitation on a twice-yearly basis to keep pace with the fast moving changes in our industry.

At each of the previous roundtables more than 30 executives from the world's leading operators and industry partners came together to discuss three hot topics for three hours.

During the last eight roundtables, more than 100 of the most influential CTOs have discussed over twenty-five of the industry's most important challenges.

CTOs exchange best practices, opportunities and thoughts, with the spirit to push the whole industry forward towards 5G and beyond.

However, just because 5G is one of the hottest topics discussed in the mobile industry and one of the key questions is how to prepare today's networks for 5G, we must not forget that current technologies will be around for many years. Therefore, in addition to future technologies and trends, the CTOs will focus on current and

near-term topics as well.

Prominent topics amongst CTOs include challenges such as how to maintain the competitive edge of existing networks, how technologies can best be used to maximize return on investment, what new business models allow us to capitalize on the Internet of Things (IoT) opportunity, or how to create value from existing data.

Some previously discussed topics, such as the need for an interim technology between LTE and 5G, or the importance of cellular IoT, have already become a reality and found their way to standardisation.

In fact, the perceived value of the CTO roundtable has increased continuously over the last few

years and its output has provided a significant contribution and common voice to the industry, helping to speed up and influence standardisation and the entire mobile broadband industry.

The CTO roundtable celebrates the vital role CTOs play in steering operators through the dramatic changes happening in telecoms and preparing them for the future. This year's invitation-only CTO roundtable will take place Wednesday 23 November from 3pm and include guests from the GSMA, HKT, PLDT, NTT Docomo, Telus and Telecom Italia.

The CTO roundtable club shows how, together, we will influence the future.

CloudRAN:

Opening the Mobile Cloud Era

The rise of the mobile Internet has unleashed new types of services carried on public mobile networks that would have once been regarded as impossible. These include HD video, virtual reality (VR), augmented reality (AR), driverless vehicles, real-time industrial control, ubiquitous access to high-speed cloud content anytime, Internet of Things services, and public safety services – all are confirmed as key future wireless network applications.

Diversified services, multiple technologies and new business models are the key driving force behind network architecture evolution.

Firstly, future mobile networks require an elastic network architecture to support multiple types of services that have differentiated requirements for network performance (speed, connectivity, and latency). AR services require Gbps-level bandwidth and ms-level latency to provide an excellent user experience, while meter reading requires kbps-level bandwidth and is insensitive to latency.

These two services have significantly divergent network requirements and require a flexible network architecture.

Secondly, future mobile networks require long-term co-existence of multiple radio access technologies (RATs). Network complexity will increase with concurrent RATs (3G, 4G, 5G, and Wi-Fi), additional frequency bands, various site types, and emerging heterogeneous networks. This requires a unified network architecture to support multiple RATs and provide a superior user experience.

Thirdly, future mobile networks require higher network efficiency. The increasing number of diversified services results in an unbalance of hotspots and MBB traffic, which adds further urgency to deploy an elastic network architecture to achieve higher profits.

Finally, future mobile networks must support rapid service provision. The rapid development

of over the top (OTT) services will lead to a considerable expansion in operators' business scope, beyond that of voice and data. Traditional telecom services will focus primarily toward customer, enterprise, and industrial information and entertainment services. During comprehensive digital transformation, operators must reduce network O&M costs, but also accelerate new on-demand service provision and flexible deployment to promote additional revenue growth through an agile and open network.

The imminent realization of an interconnected mobile world involves a network evolution from 4G to 5G and a complete reconstruction of operators' basic interconnection capability sparked by this new era of digital transformation. Maximizing mobile network value, building a future-oriented mobile access network, and addressing future challenges created by service innovation are top priorities to be tackled over the next two to three years.

RECONSTRUCTING THE RADIO NETWORK WITH CLOUD

With cloud-based hardware and software systems, CloudRAN enables operators to build a service-driven and user-centric elastic network that supports 4G and 5G connectivity, while embracing the diversity of future MBB services. CloudRAN acts as a platform that supports multiple services and technologies, increases network resource



utilization, and implements agile service release. Reengineering the architecture of the mobile network maintains the following four key benefits:

ON-DEMAND DEPLOYMENT OF NETWORK FUNCTIONS IN DIVERSE SERVICE SCENARIOS

CloudRAN's new network-layering standard shifts from NE-based to more function-based orientation. Resource management helps add a list of detailed functions to traditional vertically managed wireless architecture systems. These capabilities can be rapidly configured on demand to cater for growing service requirements. In principle, real-time components are in closer proximity to base stations, allowing for super-low latency and an acceleration in post-processing based on complex data calculations completed at the front end.

UNIFIED ARCHITECTURE PROMOTES HIGH NETWORK CONVERGENCE

CloudRAN utilizes multi-connectivity, control and user plane separation, and uplink and downlink decoupling methods to resolve network complexity caused by multiple RATs, network layers, and frequency bands on a multi-layered architecture, and to provide an optimal user experience. Multi-connectivity allows a single service to run on multiple RATs, including 4G, 4.5G, 5G, and Wi-Fi. Authorized and unauthorized spectrum resources will both provide access capabilities to maximize user speed.

HARDWARE RESOURCES POOLING ENHANCES NETWORK EFFICIENCY

Besides the inherent benefits derived from resource pooling of the entire network, CloudRAN increases the number of positive aspects by forming independent network resource pools achieved through hierarchical decoupling. Signaling and data functions of different services can then form independent resource pools to increase network resource efficiency.

For example, social gaming (such as Pokemon GO) may generate unexpected massive connections, which put big pressure on signaling processing. In this case, CloudRAN can form a resource pool for signaling processing to increase network resource utilization and address challenges derived by unpredictable signaling bursts.

OPEN PLATFORM IMPLEMENTS AGILE SERVICE RELEASE

On a new cloud-based architecture, base stations can more easily open network capabilities through valued data or interface (network optimization parameters, QoS information, and service APIs). OTT companies and vertical industries can then utilize this data and interface to perform an innovation of services. CloudRAN will decouple services to implement rapid single-service-based deployment and significantly shorten the expected time to market.

Mobile IoT will increase the value brought by CloudRAN, and operators will be better prepared and ready for the much anticipated arrival of a more connected mobile era.

Q & A



GTI

The Global TD-LTE Initiative (GTI) recently celebrated five years of success. Huawei's Global Mobile Broadband Forum Show Daily caught up with the initiative to reflect on its progress and hopes for the future.

WHAT WAS GTI'S MISSION WHEN IT WAS ESTABLISHED IN 2011? WHAT HAVE BEEN THE BIGGEST ACHIEVEMENTS? AND DID GTI ACHIEVE ITS INITIAL MISSION? ALSO, HOW DO GLOBAL INDUSTRY PLAYERS EVALUATE GTI'S SUCCESS?

GTI's mission when established in 2011 was to construct a robust ecosystem of TD-LTE technology, speed up the commercialization of TD-LTE, and promote the convergence of LTE TDD and FDD. The achievements of GTI are successfully building a global

end-to-end TD-LTE ecosystem, the successful global commercialization of TD-LTE, and the successful convergence of TDD/FDD and initiation of joint operation.

We definitely achieved the first stage mission. In fact, we exceeded expectations.

The global industry has witnessed GTI's success and, as GTI's chairman, I have received many positive comments from the industry.

During MWC 2016 in Barcelona, Mr. Mats Granryd, Director General of GSMA, presented an award to GTI recognizing the 5 year partnership between GTI and

GSMA. And he strongly recognized GTI's continuous work on TD-LTE and the convergence of LTE TDD/FDD.

Mr. Zhao Houlin, Secretary-General of ITU, commented: "GTI has made great achievements in driving the rapid and successful deployment of TD-LTE worldwide. I do believe that ITU and GTI will have more and more cooperation and drive a prosperous future for TD-LTE."

Mr. Sunil Bharti Mittal, Chairman of Bharti Airtel, told GTI: "There is no doubt that India is committed to TD-LTE, and Bharti is committed to GTI."

And Mr. Shin Jong-kyun, President of Samsung, said: "We



greatly appreciate GTI's strong support for TD-LTE development and fully respect its commitment and leadership in pursuing this new technology."

From a network vendor perspective, Mr. Rajeev Suri, CEO, Nokia, said: "We acknowledge GTI's support and help in developing the maturity of TD-LTE technology and look forward to many stakeholders sharing our passion for TD-LTE over the coming time"

What's more, last year GTI evaluated how to move on as we have accomplished our initial mission. Many industry executives told us that GTI cannot stop and TDD still needs GTI to move on towards 5G, which strongly strengthened our conviction to push 'GTI 2.0.'

GTI OFFICIALLY ENTERED INTO GTI 2.0 IN FEBRUARY 2016. WHAT'S THE NEW STRATEGY MISSION OF GTI? HOW WILL YOU ACHIEVE THE NEW STRATEGY MISSION?

The mission of GTI 2.0 is to continue TD-LTE Global Development via continuing to promote TD-LTE, continuing to enlarge the scale of converged TDD/FDD terminals and

"Compared with other global organizations, GTI is more focused on industrialization and trials. And GTI has rich experience in quickly pushing the development of the end-to-end ecosystem."

networks, and further promoting the development of TD-LTE enhanced technologies. We also want to propel 5G development and will do that by promoting and utilizing the advantages of TDD to facilitate 5G development, promoting 5G unified standards and the end-to-end ecosystem, and exploring 5G cross-industry market opportunities.

GTI has already become the most important global TDD platform, and we have a great industry base with 124 operator members and 111 partners.

"There is no doubt that India is committed to TD-LTE, and Bharti is committed to GTI."

Mr. Sunil Bharti Mittal, Chairman, Bharti Airtel

IN YOUR OPINION, WHAT KIND OF ROLE DOES GTI PLAY IN IMPROVING THE GLOBAL INFLUENCE OF CHINESE COMPANIES?

Chinese enterprises like operators and end-to-end vendors really contribute a lot to GTI's work. Without their contribution, we would not have GTI and we would not have TD-LTE today. This is obvious.

Meanwhile, GTI is the most important platform for Chinese companies. With the great success of TD-LTE globally, Chinese enterprises and Chinese telecommunication techniques have won global recognition. GTI provides a great international stage for Chinese enterprises to show their advanced TDD technologies and solutions, and to make them connected to global operators and the worldwide industry. During GTI's 5 year growth, Chinese enterprises captured the global mobile market with incredible speed; companies like Huawei, ZTE, and many terminal manufactures like Xiaomi, Oppo etc.

Furthermore, on the subject of TD-LTE development, Chinese enterprises will go further in the 5G era through GTI.

Q
&
A

Mats Granryd, Director General, GSMA

The head of the mobile industry association gives his thoughts on the development of 5G and the Internet of Things, while also speaking passionately about why mobile is so important to the United Nations' Sustainable Development Goals.

WHAT DO YOU SEE AS GSMA'S MAIN ROLE IN INFLUENCING NEW TECHNOLOGY AND 5G?

The GSMA is working for its members and with its partners to shape 5G. As the association representing the mobile industry, we will play a significant role in shaping the strategic, commercial and regulatory development of the 5G ecosystem. This will include areas such as the definition of roaming and interconnect in 5G, and the identification and alignment of suitable spectrum bands. Once a stable definition of 5G is reached, the GSMA will work with its members to identify and develop commercially viable 5G applications.

WHAT DO YOU CONSIDER TO BE THE MOST IMPORTANT FEATURE OF 5G?

Clearly there's a lot of excitement around 5G - it offers enormous potential for both consumers and

industry. In addition to being considerably faster than existing technologies, 5G holds the promise of applications with high social and economic value, leading to a 'hyper-connected society' in which mobile will play an ever more important role in people's lives. However, it's important to note that many of the 5G technical requirements already form part of the network innovations being undertaken by operators today. For example, technologies such as NFV, SDN, HetNets and Low Power, Low Throughput networks are being bundled under the title of 5G despite the fact that they are already being brought to market by vendors and deployed by operators. We need to continue to innovate and drive sustainable growth and service innovation that builds on current technologies such as 4G to enable new business opportunities in the near term, rather than being swept towards 5G deployment ahead of real demand.

HOW DOES GSMA PLAN TO INCREASE OPERATORS' INVOLVEMENT IN IOT?

The GSMA has a programme called Connected Living that is working with the industry to accelerate the potential of the IoT. We believe the IoT can be unlocked through industry collaboration, interoperability and the development of common standards that will help to avoid market fragmentation, accelerate adoption and encourage the IoT market to grow in a sustainable way. The GSMA is working closely with operators and ecosystem partners in three critical areas that are integral to the development of the IoT:

- **Interoperability and standardisation:** Without a common approach, the market will become fragmented and reliant on proprietary solutions. Common standards and interoperability are essential for a sustainable IoT.

- **Security:** We are working to get best practice security guidelines adopted so that machines can communicate via the mobile network in the most secure way.
- **Big Data:** The IoT already generates a huge amount of data that is largely retained in vertical silos. We are working to establish an IoT Big Data Ecosystem (BDE) to unlock the potential of this data. A common, collaborative and interoperable approach will help to usher in a new era of IoT solutions, helping the market to scale.

ARE “RIVAL” OFFERINGS TO LPWA THAT COMPETE WITH THE 3GPP-BACKED NB-IOT GOOD OR BAD FOR IOT?

We created the Mobile IoT Initiative to align the mobile industry behind three complementary Low Power, Wide Area (LPWA) technologies in licensed spectrum and fast-tracked their standardisation in 3GPP to accelerate adoption. Network operators are experienced and trusted providers of managed M2M solutions and are best placed to lead the development and commercial roll out of LPWA services that meet customer requirements. Solutions in licensed spectrum are scalable, reliable, secure and flexible and avoid unnecessary risks inherent with unlicensed offerings. We recommend that customers wait until licensed LPWA solutions are available in market to avoid risking an unlicensed solution that may negatively impact their business.

WITH LPWA TRIALS STILL UNDERWAY, HOW CAN OPERATORS ENSURE COMMERCIAL NB-IOT DEPLOYMENT BY NEXT YEAR?

We have already seen many pilots and pre-commercial deployments of Narrow Band Internet of Things networks (NB-IoT) this year, with China Unicom, China Telecom, Etisalat, Deutsche Telekom, KT and Vodafone announcing their plans for network deployments into 2017. In 2016, AT&T also announced a number of LTE-M

pilots with customers with commercial roll-outs expected soon. We would encourage operators to work with the GSMA’s Mobile IoT Initiative or the GSMA NB-IoT Forum to help accelerate the commercial adoption and deployment of NB-IoT technology.

WHY IS MOBILE SO IMPORTANT FOR THE UN’S SUSTAINABLE DEVELOPMENT GOALS?

Globally, nearly 4.8 billion men and women subscribe to a mobile service – almost two-thirds of the world’s population – and this is expected to reach 5.6 billion people in 2020. As an industry, we have an opportunity to leverage the mobile networks that we have built and the services we deliver to help achieve the United Nations’ Sustainable Development Goals (SDGs).

In February 2016, the mobile industry became the first sector to commit to the SDGs. In September, at the UN General Assembly week, we published the ‘2016 Mobile Industry Impact Report: Sustainable Development Goals’, which provides an assessment of the mobile industry’s current impact in achieving the SDGs and outlines future actions that will expand and strengthen that impact. This first-of-its-kind report also establishes a benchmark through which we will measure the industry’s progress in contributing to the SDGs by 2030, and serves as a blueprint for other industries as they commit to achieving the Goals.

This is an important opportunity ahead of us, and working together as an industry, with other sectors, governments and key stakeholders, I do believe we can make a real difference in people’s lives.

IN ADDITION TO THE 17 SDGS, WHAT OTHER APPLICATIONS CAN RAISE THE PROFILE OF THE UN’S GOALS?

In addition to publishing the Mobile Industry Impact Report, we have partnered with the United Nations and Project Everyone to develop and launch

the official ‘SDGs in Action’ mobile app, creating a community for industry, governments and individual citizens to work together in delivering the SDGs. Users can get details on each of the 17 Goals, including the associated SDG targets, as well as explanatory videos, case studies and data, and suggestions on how people can take action to help achieve them. The app also allows individuals to highlight the activities they are undertaking in support of the SDGs, and to invite their social networks to get involved as well.

The report and the app are just two examples of what we’re undertaking to put a spotlight on this important issue. The GSMA and our members, along with many others in the private and public sectors, are working to build visibility around these Global Goals. There’s not a single organisation that can do this alone – it is critical that we all work together in making this a reality by 2030.

WHAT DO OPERATORS AND TECH COMPANIES NEED TO DO TO BRIDGE THE DIGITAL DIVIDE?

Despite the strong progress we have made in connecting the unconnected, at the end of the decade, more than 40% of the world’s population will still lack internet access, with most of the excluded population living in rural areas. Digital inclusion can extend economic and social benefits to previously unconnected populations, fuelling a virtuous circle that reduces poverty, improves infrastructure and services, and further increases internet access and usage. The GSMA is working with the mobile ecosystem to address the four key challenges to increasing digital inclusion:

- Network coverage: expanding the commercially sustainable coverage of mobile broadband networks to underserved population groups (typically in rural or remote communities) by promoting infrastructure sharing, regulatory best practice and technical innovation.
- Affordability: addressing key issues such as mobile-specific taxation to help make internet

access more affordable, especially for “bottom of the pyramid” citizens.

- Digital skills and awareness: providing training to people so they understand the benefits and opportunities of being online and have the skills to use the mobile internet.
- Locally relevant content: encouraging and promoting the development of content and services that are relevant to underserved population groups.

HOW WILL GSMA APPROACH PRIVACY AND SECURITY ISSUES WHEN IT COMES TO DIGITAL AUTHENTICATION AS PART OF THE MOBILE CONNECT INITIATIVE?

The premise of Mobile Connect is that it offers consumers a single, trusted, mobile phone-based authentication solution. Fundamental to its uptake and effectiveness is that Mobile Connect must absolutely respect online privacy and enhance individual security by mitigating password vulnerability. The service securely authenticates users, granting them safe on-line access to mobile and digital services such as e-commerce, banking, health and e-government.

WHAT ARE YOU MOST EXCITED ABOUT AT THIS YEAR’S GLOBAL MBB FORUM?

Each year at Huawei’s Global MBB Forum, we see a lot of new products and technologies on display, and I’m looking forward to seeing the showcases highlighting how mobile is being used in new and exciting applications.

“We recommend that customers wait until licensed LPWA solutions are available in market to avoid risking an unlicensed solution that may negatively impact their business.”



Wagenia man fishing in the Congo River

**Tireless focus, for a moment
of strategic opportunity**



Focus · Persevere · Breakthrough

