WHITEPAPER

M2M service providers and LTE: new revenue opportunities

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November 2013

UBX-13004668

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Executive Summary

Service providers around the world are spending billions of dollars rolling out new LTE infrastructure. Over 20 operators worldwide have already deployed LTE services including T-Mobile, China Mobile, AT&T, NTT DoCoMo, Sprint, Telstra, Vodafone and Telefonica. Although new 4G-enabled mobile phones and tablets are driving the adoption of LTE, new billable services in the M2M sector are already following. This whitepaper examines 12 emerging business models for LTE based applications and services.

Service providers around the world are spending billions of dollars rolling out new LTE infrastructure. Over 20 operators worldwide have already deployed LTE services including T-Mobile, China Mobile, AT&T, NTT DoCoMo, Sprint, Telstra, Vodafone and Telefonica. Although new 4G-enabled mobile phones and tablets are driving the adoption of LTE, new billable services in the M2M sector are already following.

History is set to repeat itself as operators will be continuously forced to reduce their prices for voice (already considered a commodity, not even requiring 4G speeds), and internet/video services. They will soon look for new revenue streams to capitalize on and amortize their huge investments in LTE network infrastructure. M2M data services will help fill the gap.

Some interesting new business models will, and are already appearing in different application categories, some for service providers alone, some in conjunction with a hardware or application service provider partner.

Fig. 1: LTE broadband car infotainment system

Car information and entertainment systems

Vehicle-mounted LTE routers will enable high-speed downlink of up to 100 Mbit/s (LTE category 3) to the car. This is enough to support 5 parallel high-definition TV channels, and more than enough to support the more typical mix of video, voice, internet access and social media applications used by passengers.

Used in conjunction with the vehicle navigation system, content will also be pushed to the vehicle depending on where it is, for example video-rich information about services or points of interest nearby.

It is only a matter of time before every vehicle is equipped with either a vehicle-mounted LTE router or mobile phone adapter which turns a 4G phone into a mobile WiFi hotspot.

Business Model:
Operator revenue based on vehicle LTE services will be based on a well-known models used for mobile phones: traffic based, flat rate, local or wide-area roaming, plus subscription to services such as digital tour guide and on-demand TV content.

Fig. 2: LTE will make remote security and surveillance a globalized mainstream business

Remote security systems

LTE will enable the cost-effective placement of streaming video cameras in covert and hard-to-reach areas. LTE will make it economically feasible to remotely monitor warehouses, retail outlets, unmanned utility stations, factories, healthcare facilities, airports, prisons, schools, hotels, sports facilities and residential property.

Indeed, the humans (or robots) keeping watch over these locations can be located thousands of kilometers away, making security surveillance an outsourceable service, similar to how remote call centers developed alongside low-cost long-distance telephony.

Business model:
Operators will be able to bill for security services based on equipment installation, equipment provisioning and leasing, management software, hours per day used (for example, only after shop closing times, or only when motion detected), and cloud-based storage of video streams.

Fig. 3: Paper, mechanical, and static LED signage, billboards and advertisements will become a thing of the past

Digital signage

LTE will make the transmission of large multimedia files cost-effective. Current paper- based signage and advertisements that require frequent manual updating with glue and paper will be replaced by rich graphical and video displays that can be updated or rotated automatically over-the-air.

Business model:
Operators will develop revenue streams that include the LTE data service bundled with equipment/signage provisioning and leasing, bandwidth usage, and advertisement revenues based on location, and time of day displayed (peak vs. light traffic, freeway vs. residential streets, length of time displayed, etc.).

Fig. 4: LTE connectivity combined with cloud computing will allow businesses to migrate away from urban centers

Cloud storage and hosted applications

LTE will allow the quick storage and retrieval of terabytes of data, even from remote areas where there is no high-speed fixed line connection. This will allow businesses to operate far from cities or fixed line access points. The ramification of wireless broadband connectivity far outside of urban centers means enterprises can set up video-linked offices, warehouses, tech support and call centers far away from cities where land and office space is significantly cheaper.

Business model:
Operators can charge for cloud storage, hosted applications, access licenses and bandwidth usage.

Fig. 5: Mobile LTE routers can be quickly deployed to disaster areas to quickly re-establish network connectivity

Backup network during natural disasters

Increasing frequency of natural disasters including earthquakes, tsunamis and hurricanes have demonstrated how vulnerable landline networks can be. Reliance on physical connections and the power grid mean both data and voice connectivity can be down for many days after a disaster, precisely the time when network communications are mission critical.

Mobile LTE routers quickly deployed to disaster regions can quickly re-establish network connectivity within hours, allowing a high-speed wireless backup network to be online as quickly as possible.

Business model:
Operators can charge local government agencies for network setup, provisioning, storage, bandwidth, hosted applications, emergency technical personnel, and network takedown.

Fig. 6: LTE-to-WiFi routers will replace cable and ADSL last mile connections

LTE last-mile connections

Current residential broadband internet connections, both Cable and ADSL, require a physical connection to the home. As the price for LTE connectivity drops, a wireless 4G connection directly to an WiFi router will replace the wired connections, decreasing costs, eliminating installation and service calls ("truck roll"), and lowering the costs of connections to new residential buildings where a single LTE to WiFi router could provide service to hundreds of residential units.

Business model:
Similar to current ADSL/cable subscriptions with reduced installation, equipment and technical support costs.

Fig. 7: The doctor makes "virtual" house calls again, thanks to LTE

Telehealth services

As healthcare costs soar and the doctor-to-patient ratio increases, LTE will help lower healthcare costs by providing remote care via a high-quality video link. Instead of sick or elderly patients having to travel to the doctor's office, a telehealth terminal at home can provide instant access to a doctor or healthcare professional. An example of this model is Verizon's (USA) new suite of digital health care products focused on treating and preventing chronic conditions such as diabetes and heart disease. The system, which is being deployed in America, connects patients, glucose and blood pressure sensors with primary care givers over LTE-enabled mobile phones or tablets.

Business model:
Telecom operators have the opportunity to develop business with private practices, hospitals, or assisted living organizations similar to mobile phone services including equipment rental, network usage, monitor queries, as well as fixed-location or roaming capabilities.

Fig. 8: LTE will accelerate personal identification and authorization by enabling high-speed facial recognition

Homeland security

Although there are significant privacy issues to be resolved, governments are increasingly spending on security, particularly in the USA, and at security checkpoints at airports, events and borders around the world. The need to quickly identify and authorize individuals is increasing.

LTE will enable facial recognition not only at places of entry and exit, but over large areas where cameras can pan across hundreds of faces moving in a crowd. Facial recognition requires quick capture and access to enormous amounts of data, information that can be captured, delivered and updated wirelessly via LTE.

Business model:
This is an opportunity for service providers to sign contracts with government and private security agencies to deliver the underlying LTE connectivity, lease equipment as well as host services, provide access control and secure storage.

Fig. 9: LTE will catalyze new ways for people to interact with each other and experience the world

LTE location-based services

LTE connectivity combined with satellite-based (or other) global positioning systems will give operators the ability to offer new types of services. Some examples include:

- Enhanced shopping and tourism
  Vision is our primary sense, accounting for more than 80% of all information we receive about the world. Video-rich LTE services will therefore improve many services with position-relevant content that enhances the mobile shopping and tourism experience.

- Multimedia navigation
  Beyond a virtual thumbtack and a red route drawn on a map, LTE will allow users to see and interact with destinations before they actually arrive, and preview landmarks along the way.

- New social media applications
  Video interaction combined with location information will enable new forms of social media such as proximity dating, as well as catalyzing and enhancing social movements, demonstrations, political rallies, and sporting events.

Business model:
All these services can be hosted on any LTE-enable mobile device, giving operators the ability to provide traditional telecom services in addition to charging for enhanced features such as location-relevant videos, historical information, information about friends, family (and possible new friends) in the vicinity of the user.

Fig. 10: Multimedia-enabled vending machines with product promotion and social media capabilities

Vending machines

Vending machines are a global business that will generate over 190 Billion dollars in revenue by 2015 according to Global Industry Analysts. Already connected via wireless networks to report when a refill is necessary, or simply to report where the machine is located (exact vending machine location is often forgotten!) or report tampering, LTE will bring video-rich multimedia advertisement and social media possibilities to vending machine displays. Coca-Cola has experimented with this concept in 2011 by installing network-connected vending machines around the world allowing customers thousands of kilometers apart to interact with each other, and even "buy a coke" for a stranger in another country.

Business model:
LTE service provider charges either flatrate for a video pipe, or collects revenues made on products sold while specific videos were played, or product providers pay to have their promotional videos played on the machine.

Fig. 11: Dangerous tasks at high-altitude will be taken over by LTE video-enabled drones

Aerial surveying

Unmanned aerial drones are increasingly replacing helicopters for tasks that are too expensive or dangerous for human operators. Applications include surveying, utilities and building inspection, mapping, traffic and crowd monitoring, aerial photography, search and rescue. Mounted with an LTE connected camera, drones can be leased by service providers or their partners for both professional, private, and emergency services applications.

Business model:
Equipment leasing, video hosting service, LTE video pipe, operator training.

Fig. 12: Time critical applications such as traffic flow optimization will capitalize on LTE's guaranteed low latency

Time critical systems

LTE's low-latency, typically around 10 ms, is especially attractive for time-critical applications such as industrial, traffic control (vehicle-to-infrastructure communications), (potentially) collision avoidance (vehicle-to-vehicle communications) and financial systems where split-second reaction times are crucial for industrial robots, traffic flow control and automated financial transactions.

Business model:
LTE provides this high quality of service demanded by time critical applications. LTE provides clearly defined Class and Quality of Service levels guaranteeing minimum bandwidth, bit error rate, and latency. These attributes could not be guaranteed in the past with 3G or 2G "best-effort" IP networks, making them unsuitable, and un-billable, for time critical applications.

This is a premium LTE service that network operators can new revenues from.

Figure 13: u-blox' TOBY-L1 4G LTE module series

u-blox' LTE vision

LTE will establish high-speed, low-latency wireless internet access as a universal utility, available everywhere, on any device. In combination with IP version 6, a practically limitless number of machines will be connected to the network using a common protocol. This will have a tremendous impact on how and where humans communicate, as well as on human-to-machine, and machine-to-machine communications. With the carrier infrastructure in place, all that is necessary is a small modem and antenna to enable applications such as those described above.

At u-blox we are anticipating a rich variety of connected devices, each with specific requirements, as well as the need to be remotely upgraded once deployed in the field. That is why u-blox has adopted a "Software-Defined Modem" (SDM) approach to LTE modem design. SDM allows u-blox to develop, optimize and test LTE modem designs in software, eliminating lengthy and iterative fabrication cycles. It also enables u-blox to quickly add multi-mode functionality to the modem, for example LTE functionality in combination with global positioning or short-range radio.

Looking into the future, u-blox' vision of modem design is the ability to remotely re-configure a modem to adapt to new network environments that change with both time and geographic area. As many devices, for instance vehicles, have very long lifetimes (typically 10 years or longer), SDM will enable a modem to remotely upgrade or alter its configuration to remain compatible with evolving network technologies such as GSM, UMTS, LTE, CDMA, WiMAX, TV whitespace as well as regional variants of each standard.

TOBY LTE module series

u-blox' first LTE module family, TOBY-L1, is a range of compact, cost-optimized LTE data modems targeted at many of the embedded wireless M2M applications outlined previously.

Features:

- LTE-only LGA module in a very small form-factor: 24.8 x 35.6 x 2.8 mm
- LTE Cat. 3, 100 Mb/s download, 50 MB/s upload
- Easy migration from u-blox UMTS, CDMA and GSM modules (footprint compatibility)
- Variants for Verizon (USA) & European operators
- Extended temperature range: –40 to +85°C
- Manufactured in ISO/TS 16949 certified production sites

Upcoming generations of u-blox LTE modules will be based on the company's long-term strategy: to quickly adapt to changing connectivity requirements in industrial, automotive and consumer applications based on in-house intellectual property, while maintaining form-factor continuity.

About u-blox

Swiss-based u-blox (SIX:UBXN) is the global leader in positioning and wireless semiconductors for the consumer, industrial and automotive markets. Our solutions enable people, vehicles and machines to locate their exact position and wirelessly communicate via voice, text or video.

With a broad portfolio of chips, modules and software solutions, u-blox is uniquely positioned to enable OEMs to develop innovative personal, professional and M2M solutions quickly and cost-effectively. With headquarters in Thalwil, Switzerland, u-blox is globally present with offices in Europe, Asia-Pacific and the USA. (www.u-blox.com)

Published by u-blox AG, November, 2013

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