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Realize the Revenue Potential of the Next Mobile Evolution

By *Peter Briscoe*

Long Term Evolution (LTE) is being driven by the ever-growing demand for mobile broadband and need by communications service providers (CSPs) to capitalize on and realize the potential of this revenue stream while balancing costs. The existing systems used today to plan and manage the service quality will need specific focus and improvement to achieve this end game. This article explores the main drivers for LTE as well as the impact on some of the technology and services that CSPs will face with the introduction of LTE. Finally we'll explore LTE's effects to the CSPs business processes and the systems used today within the operator.

Market and Commercial Drivers

Within the last six months the introduction of mobile Internet services by many of the wireless service providers has added a large level of traffic to the networks and, in most cases, means that more data traffic is transported than traditional voice traffic or messaging traffic over the network.

Various industry reports on world wide mobile trends show that global data usage will continue to grow year-over-year and in some markets reaching as high as triple digit growth in the near term.

A large majority of the current data use has been driven by new social network services including Facebook and Twitter. Some social groups (aged between16-25) are starting to use these services as the primary method of communication with their friends. Additional applications driving demand are

email (Blackberry and others) and location-based services (Google maps, Bing) that require data connections to obtain map information. The evolving applications and communication ecosystem with continue to demand more bandwidth usage over time.

With this increased demand, the existing network requires massive additional capacity. It is predicted that most networks require three times the existing data network capacity to meet current demand forecasts.

However the designs of these networks were originally focused on the transportation of voice services and, therefore, have not been designed to support this change in data traffic demands. The impact of this is that the radio interface limits the amount of data traffic within the current spectrum and the backhaul network restricts the level of data that can be transported from the cell sites.

If existing technologies were used to support the level of projected demand long-term, the amount of additional equipment both in the numbers of cell sites and backhaul network devices would make the service un-economical.

LTE technology aims to address this through the combination of simplifying the backhaul network, removing the need for complex and expensive control functions, and the use of cheaper transport technology (IP and Ethernet) that reduce the price per port for connections from the cell sites to the core.

Technology Impact of LTE

A major focus within the deployment of LTE technology is in the radio interface. LTE requires, in many cases, new equipment due to the mixed time and frequency multiplexing (Orthogonal Frequency Division Multiplexing) that is introduced. This new technology, in combination with signalling protocols, allows much more efficient use of cell capacity. In addition to the radio interface, LTE simplifies the access network by removing layers [Radio Network Controllers (RNC)] but at the same time increases the complexity of the enhanced NodeB by making it responsible for call handoffs between cells.

CSPs will need to extend their IP networks all the way to the cell site as these radio changes often times are isolated from the rest of the network. This will require a complex audit of every existing cell site location. This non-trivial process for

thousands of sites has already begun in most of the larger operators today and it is the first true step to the technology impact assessment of LTE.

The introduction of LTE will speed up any existing migration to IP technology within the core network, but will not cause a major restructuring of the core network, only an increase in capacity and the introduction of additional QoS policies are expected. The majority of the impact of LTE will be on the back haul network from the cell sites to the service gateways at the edge of the core network. In various situations the impact of the radio cell configuration will have a direct and immediate impact to the back haul network, and the dynamic nature of service changes will require a greater level of coordination between the radio and access networks.

Business Processes Impacting Operational Systems

The use of any new technology, including LTE, impacts every aspect of a CSPs business processes and IP in the access network in combination with new technologies will have the biggest impact in the planning and assurance processes.

Within the planning process, radio planning will need modification to support the potential volume and high frequency of optimization. The impact of Femtocells alongside LTE will require greater planning that will ultimately need to be an automated process to ensure timely network management. The current methods of drive-by radio monitoring will not scale to the number of cells and rate of change predicted.

The other main planning impact area is within the backhaul planning. There will be a greater need for any backhaul planning processes to be very closely linked to the radio planning process, as increases in cell capacity needs to be coordinated with backhaul capability. Therefore, changes in the planning groups to provide better cross network technology interoperability will need to be further introduced.

Even when using leased or rented backhaul delivery, bad planning can increase the price of services between 10-20% for facilities, as seen from some of our customer's experiences. Therefore, no matter what backhaul technology is used, ordering with lead times in mind will make a large overall impact.

The planning and assurance processes will impact the operational systems (OS) used within CSPs today. The majority of the changes within the radio planning processes will be supported by the existing platforms; however, these systems will require new algorithms and rules to support the new frequencies and limits of LTE technology. Backhaul planning platforms will also need upgrading to support IP configuration and QoS.

Interfaces directly between radio planning, logical demand and build out functions will be required to reduce errors in handover. This will require speeding up the planning cycle-time in support for new equipment rollout.

The introduction of policy platforms [such as Policy and Charging Rules Function (PCRF)] prior to LTE is expected as a method to make the transition for the user as smooth as possible. Hence, there will be the need to move from protocol based charging (used today) to more flexible dynamic charging model with location, time and service being used; for example to determine the rate for the service. This will require upgrades or replacement of the pre-paid and rating platforms used today.

Also the use of IP will require the extension of fault and performance tools from the core to the access network. Some of these tools will need to be enhanced to support the number and type of connections within the LTE network. The wide definition of a service will further increase the need for true Service Quality Management. This

shift will increase the need for trend and predictive functions to enable proactive early warning of service issues within a region prior to a full service impact occurring.

Conclusion

The biggest impact within the OS systems will be in the planning and service quality management areas. Planning will need greater integration between radio and backhaul systems and departments. The roll out of LTE to support the demand from Mobile Internet and reduce overall costs for operators will be a fine balancing act over the next five years. In meeting the demand for high-bandwidth, operators will need to use better processes and find common practices that reduce the costs of managing the roll out of the mobile backhaul network. Smart vendors continue to invest in consultancy, systems and partnerships to further simplify and maximize the return on investment operators will obtain from the deployment of LTE technologies.