



Playing the OPEX Game

The LTE operator that can lower its operational expenditures the most wins.

Mobile data consumption continues to post record growth among the world's operators as subscribers flock to smartphones, USB modems and laptop cards. The staggering growth is the driver for operators' swift deployment of Long Term Evolution (LTE). Operators must significantly increase wireless bandwidth to effectively push mobile broadband to the masses and increase profitability by lowering their cost per bit.

As attractive as this new frontier is, operators will find themselves challenged with rolling out and offering LTE services in a cost effective manner. Today, the cost to maintain a network accounts for approximately 20 percent of an operator's operational expense (OPEX), said Paul Steinberg, chief architect, wireless infrastructure, Motorola Home & Networks Mobility. "That price tag could increase in the new LTE world that calls for a flat, all-IP architecture that is fundamentally different from the circuit-switched networks in the 2G and 3G world.

"Operators are already managing their 2G and 3G networks while working to roll out a new network based on fundamentally different technologies: OFDM, MIMO and All IP

Flat architecture core,” Steinberg said. “For that reason, operators are taking a hard look at how to reduce their OPEX.”

So much so that the world’s operators and vendors have made a significant push within the LTE standards bodies to change the operations and maintenance paradigm. The Next Generation Mobile Networks (NGMN) Alliance and the Third Generation Partnership Project (3GPP) have standardized a set of capabilities known as Self-Organizing Networks (SON). According to Steinberg, these self-configuring, self-operating and self-optimizing capabilities will revolutionize the level of automation in operations and maintenance thereby helping to decrease associated OPEX.

As such, operators have the luxury of automating previously manual steps throughout the lifecycle of a network — from planning and deployment to optimization and operations — and therefore lowering the need for new operation and management resources that would be required to manage LTE on top of the 2G and 3G networks operators already maintain.

“Operators can get rid of the expensive mundane tasks,” Steinberg said. “Even the jobs of engineers become more valuable because they don’t have to focus on the day-to-day maintenance issues that contribute to cost. They can concentrate on ensuring better quality of service and connectivity. Their day-to-day approach and attention is on a higher function. Repetitive mundane tasks are the most prone to manual error, so SON will contribute to an immediate improvement in network quality.”

The promise for network deployment is significant, as SON promises to radically speed up deployment times and procedures. In a new SON-enabled environment, the evolved Node B (eNB), which is the base station transceiver in a LTE network, becomes plug-and-play enabled, eliminating the need for hardware provisioning, and inventory information is automatically recorded and updated.

In the 3G realm, thousands of cell sites are connected and optimized on a manual basis. Using SON, cell sites are automatically configured by computing the physical cell ID through communication with neighboring eNBs, determining neighboring signals and continually optimizing functions such as antenna tilt, power output and interference control.

The largest reduction of OPEX, however, is expected to occur in the area of network optimization. Network optimization must be performed over the life of the network as new equipment is continually added, Steinberg said.

In fact, OPEX-related costs tend to become a greater portion of the overall spending as the network matures. For 3G, operators are finding that network-related OPEX costs, averaged over the life of the network, are some 30 percent of the total costs

associated with the network. The costs are related to backhaul and network operations and maintenance. Continuing to invest in 3G networks to accommodate the expected dramatic growth in data traffic is an expensive proposition because once operators have exhausted their network capacity they will have to add more base stations (a time consuming and very costly endeavor), populate new sites with all required ancillaries, invest in more backhaul solutions and upgrade the core network to cope with the data demand and the plethora of new sites. The combination of LTE adding significant capacity to existing sites and SON, therefore, can provide valuable cost reductions, including automatic interference reduction, automatic handoff optimization, network updates, automatically rerouting of traffic if the power fails in certain cell sites and configuring backhaul.

“One of the biggest network savings is the ability to extract information from devices to allow operators to make network decisions, such as adjusting the power level people should be transmitting at or what the Quality of Service levels should be,” Steinberg said. “Historically, engineers have had to drive around and sift through that information manually. With SON, it’s all done on a proactive basis.”

These capabilities play into the needs of LTE, whose applications will require the most optimal network performance available, thus allowing operators to charge extra for QoS. For instance, an operator could provide more bandwidth for a short period of time to enable customers to view video in real time or better QoS for mission-critical applications such as mobile commerce.

According to Peter Jarich, research director with Current Analysis, the promise of automating many of these manually performed functions will be important network operating pieces going forward.

“Optimization is going to be critical,” Jarich said. “It will be the key to keeping CAPEX and OPEX down.”

This is especially important in the LTE world because operators want to derive the extra capacity and low cost per bit LTE promises as they target data-hungry consumers. Wireless industry experts don’t see any signs that the demand for mobile broadband services is slowing. Data-intensive services such as video streaming are growing exponentially on fixed broadband networks and are making their way to the mobile broadband realm as customers desire to access applications such as YouTube, Facebook and Flickr while on the go.

A report from Juniper Research concludes that revenues from LTE mobile broadband subscribers will exceed \$70 billion globally by 2014. But a challenge remains for mobile operators, noted report author Robert Wilcox.

“LTE will offer broadband speeds of up to 100mbit/s or more: this is at least five times faster than the best mobile broadband now and around 20 times faster than most people experience via fixed DSL. The challenge for mobile operators is how to make profits yet keep prices attractive enough for subscribers to sign up. It’s all about the business case.”

But SON isn’t simply about pushing a button to optimize functions in a network. Because the network is the lifeblood of their business, most operators are leery about giving up control of network functions. That’s why it’s important to provide operators with functions that enable them to initially review proposed changes before deploying them, thereby helping the operators build trust in the SON algorithms, Steinberg said.

“SON might initially be deployed in a circle of 100 cell sites, as operators become more comfortable they can continually add more capabilities,” Steinberg said. “The operator must be in control.”

In the end, operators that successfully deploy a reduced OPEX LTE solution will have a significant advantage over their competition.

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