

Analytics-based Capacity Planning and Profitability

Analysis for LTE and 3G Mobile Networks



Mobile operators worldwide are deploying LTE networks in order to cost effectively offer better data and voice services to their subscribers. Subscribers expect that these services will be as good as or better than ever before. Shareholders expect the lure of these services and the savings from the technology to rapidly increase profitability. This all has to happen seamlessly without impacting the current business.

Start right

Subscriber migration and uptake of LTE services will have a great impact on the network in the early months and years of LTE rollout. If a network is not configured and sized for the demand imposed upon it, resource shortages lead to congestion and unhappy subscribers. On the other hand, if a network is oversized, reduced profitability leads to unhappy shareholders. Accurate capacity analysis provides the happy medium.

Many operators have taken the approach of delegating capacity analysis to equipment vendors for the initial LTE deployment. The argument here is that early uptake will be small and capacity issues will only surface later. By that time, there will have been time to get the right systems in place to ensure a robust wide rollout.

However, subscriber uptake may happen faster than expected, network issues may arise that take time away from the anticipated preparation time for the future. To make sure that you will be ready to evolve your networks when required, it's important to get the right capacity analysis system in place as early as possible. You can't be too early.

The Challenges of LTE Network Rollout

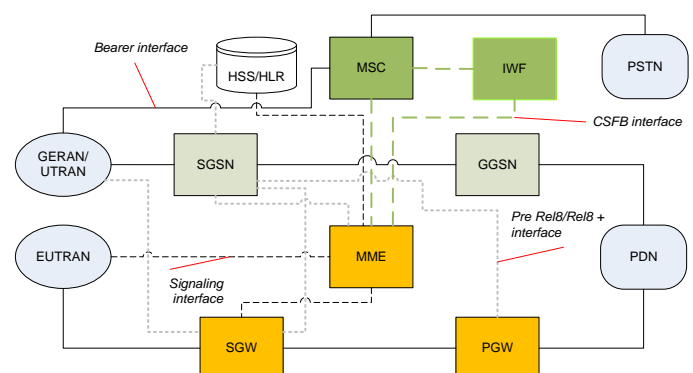
Commercial LTE network deployments are well underway. Only now are the operational aspects of the technology being understood. Some of the capacity and performance challenges introduced with LTE implementations include:

- Very different patterns of signaling traffic resulting from the much flatter network architecture and the richer QoS capabilities of LTE. Improperly sized signaling infrastructure leads to delays and unreliable device behavior.
- The complexity of providing voice services. From Circuit Switched Fall Back (CSFB) that allows a

simple first step migration path to the full IMS-based VoLTE architecture. Bearer and signaling traffic and LTE and 3G Circuit Switched network interactions have to be well understood and dimensioned just to provide voice service at parity with 2G/3G! New services such as RCS-e and High Definition voice compound the need for anticipating network behavior.

- The rate of subscriber migration from 3G to LTE will have a big impact on the optimal spending and deployment of equipment. The ability to undertake sensitivity analyses to assess the impact across the network is critical to managing this migration effect.
- To assist with migration network equipment manufacturers are supplying hardware that can provide the functions of multiple network elements in a single box. The choice of how to configure these elements across functions and network technologies has a massive impact on network spending. The complexity of this problem is increased with the need to assess these configurations across multiple vendors. Examples here include:
 - Consolidated gateway equipment such as control plane nodes (SGSN and MME) or data gateway nodes (SGW and PGW).
 - Single RAN server nodes such as baseband processing units for distributed remote radio heads for 3G and LTE. This architecture is common in high density, high capacity environments.

Simple spreadsheet modeling or market by market assessment of these types of problems puts a huge risk on the successful launch of LTE services. A better approach is needed.



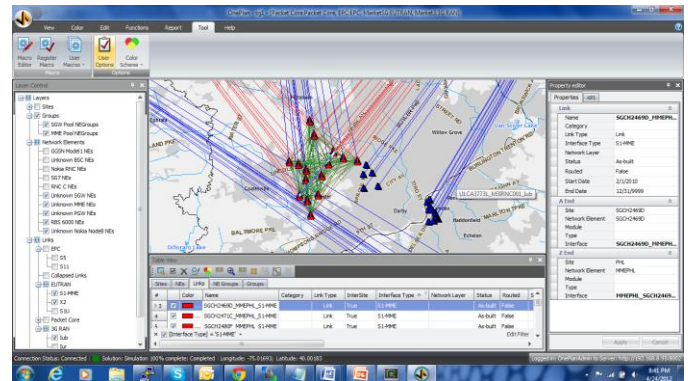
Schematic view of 2G/3G/LTE network

Analytics-Based Capacity Planning

VPIsystems provides an end to end network capacity analysis software environment called OnePlan that spans the fixed part of the RAN, Packet Core and Voice Cores for 2G/3G and LTE networks. Production proven by Tier 1 mobile operators for its 3G reoptimization, load balancing and capacity analysis features, OnePlan uses analytics to:

- Define a subscriber, device and service traffic model through the analysis of CDR and network performance data.
- Build a virtual network model by combining network technology configuration and topology with the actual behavior of network elements so as to accurately predict utilization for dimensioning and resource shortage predictions. A simple interface is provided to process network performance data into network element specific analytic models for utilization prediction based on the input of forecast traffic parameters. This is particularly important in the analysis and sizing of complex multi-function nodes such as combined SGSN/MME nodes or single RAN pooled nodes.
- Correlate data sources from the network, subscribers and plans to report on and identify key findings related to network profitability. Not only does this capability provide the means to find relationships between network capacity, bandwidth supplied and revenue, it allows for multi-dimensional drill-down network profitability analysis by geography, plan, device and subscriber profile.

improve overall planning and approval mechanisms. Network profitability analysis features mean that it's not only the network capacity and health that's being addressed but the business goals are covered too.



Screenshot of 3G and LTE RAN in OnePlan



Revenue Analytics and Profitability Reports in OnePlan

When combined with a scalable, robust data load environment, a set of proven network planning algorithms and a flexible, intuitive multi-user GIS-based interactive system, OnePlan provides a reliable way to assess your LTE network.

Faster, more Efficient and Accurate Analysis

With a single environment for network sensitivity analysis across network technologies, OnePlan provides a secure multi-analysis environment that allows teams to collaborate on numerous concurrent activities without confusion or corruption of data across projects. Process improvements are further enabled through auditing and configurable reporting to assist and

Ensure your subscribers enjoy the best of your LTE network – choose VPIsystems to help you understand and manage your transition to the next generation of LTE voice and data services. VPIsystems' operator proven products, implementation and consulting services can help you properly prepare and understand the risks and rewards of your LTE rollout.

Contact us at sales@vpisystems.com and get more information at <http://vpisystems.com>