



Optimisation: From drive testing to critical business intelligence

A new approach to optimisation promises to enhance service quality, reduce expenditure, and drive network efficiencies.

So successful has the industry been in signing up subscribers that the saturation point has been achieved in many mature markets. The resulting competition to retain and attract new subscribers has catalysed a fierce tariff-led battle with voice, once the industry cash cow, becoming a commodity. As well as aggressive promotions, service providers are responding to enhanced competition by searching for higher economies of scale, reducing operating overheads, achieving a high level of network efficiency, and improving service quality.

While much progress has been made in driving network efficiencies, Dr Marten Scheffer, Director of Value Added Services, Motorola Networks and Enterprise business, argues that the industry's approach to network optimisation must improve. Explaining why traditional drive test optimisation techniques should be "parked-up" he moves on to show how more analytical forms of performance measurement are critical to make the most of network resources, efficiently launch new services, and extend customer loyalty.

An outmoded approach

When reviewing the progress made over the last 15 years, the industry can take a collective bow. From the first analogue voice calls, we've

moved rapidly to a point where subscribers are travelling with extremely powerful digital multifunction entertainment and communications devices. In fact, telecoms can justifiably claim to be one of the world's most important and innovative industries.

But in a market that's so advanced, it's incongruous that a vital operations area, assessing service performance, is based on dated techniques. The process—driving through coverage areas and using handsets connected to PCs to review service quality—hasn't fundamentally changed in a decade. By not keeping pace with infrastructure developments and commercial demands, it's preventing service providers from fully optimising the performance and efficiency of their networks.

Limitations of Drive Testing

Although drive test assessments provide an indication of network performance, there are three key problems with the process. First, and perhaps most important, is that it's not representative of subscriber behaviour; as much as 70 to 80 per cent of all calls are made indoors—services that cannot be assessed. Second, the techniques and processes applied in evaluating call quality are time and labour intensive. So it's not easy to take the volume of measurements required to ensure statistical validity. Driving to test an area and then going back to the same place to review system changes also creates a significant overhead at a time when service providers need to reduce costs. And third, the approach is cyclical and piecemeal: Solving problems in one network locality can trigger problems elsewhere.

In short, a new take on network analysis is required.

Commercial imperatives

Given the resource and competitive pressures faced by the industry, performance analysis and optimisation should be updated to fulfil a range of business and technical criteria. Highlights include:

A thorough view: Data collection and analysis should consider the entire network area to be optimised; monitoring all subscriber traffic both indoor as well as outdoor to realistically assess subscriber behaviour. It must also be completely multi-vendor to enable one methodology to be applied across all infrastructure vendors within an operator's network.

Cost efficiency: New measurement strategies should reduce the steep overheads associated with traditional tools and methodologies.

Agility: Speed to market is critical; statistically relevant data needs to be captured quickly and accurately to support fast "time to performance" changes.

Detail: The metrics provided by the evaluation system should be far more detailed—delivering the intelligence to make informed decisions about how to enhance capacities, ease the introduction of new services, reduce dropped calls, and deliver overall network advances that enhance market perceptions of service quality.

Shared resources: We believe that many more companies will move to reduce operating costs by sharing network resources such as RAN systems; it's critical therefore that complete optimisation analysis can be applied to combined network resources. This requirement is a key feature of our optimisation solutions which can be applied to securely isolate and measure the performance of individual services running across the same infrastructure.

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These issues have directed the development of a new approach to optimisation. It's based around raw mobile measurement report data (MMR) in 2G systems and raw Radio Resource control data (RRC) in 3G systems. This is the information generated by the army of testers at the disposal of service providers: end users.

Measurement report data: Measurement report data is created by subscriber handsets—it's used and then discarded by the network as customers interact with services. But by applying a service overlay that we call Multi-Vendor Intelligent Optimisation Solution, the information can be retained, processed, and sliced and diced in intricate detail. The technology provides a single "driverless" multi-vendor assessment tool for the entire network, which automatically collects data to provide a more advanced yet cost-efficient monitoring tool. It's also based on real traffic—not average or aggregated data—supplying an independent and accurate picture of service. Monitoring reports and remedial actions can be generated for all network types with particular market interest focused around 2G and 3G.

2G optimisation: Applying user-generated data, 2G optimisation systems provide a number of key advantages. Highlights include:

- Identifying unused or unnecessary neighbours and, more importantly, the need for missing valid neighbours that ought to be added to the network.
- Quantifying overlapping coverage (which naturally occurs with an increase in subscriber density) to recommend antenna changes. In extreme cases, Intelligent Optimisation can indicate that a site should be removed—a clear benefit to those controlling operating expenditure!

- The intelligence to base RF coverage on actual user requirements as opposed to over-specifying the footprint needed to service a particular area.

Applying user-generated information similarly enhances the measurement of UMTS networks.

3G performance analysis—highlights

- **Exact user metrics:** Raw measurement data can be geo-coded, enabling an automated approach to optimizing antenna configurations in terms of height, azimuth, beamwidth and tilts; controlling overlapping coverage is the key to increased UMTS capacity and link quality.
- **Power performance:** By collating and post-processing measurement reports, it's possible to assess power utilisation in great detail. By using this analysis to fine-tune base station output, the performance of factors such as network interference to subscriber battery life can be improved.
- **Optimising infrastructure:** Call failure and troubleshooting analysis are currently made difficult in UMTS systems through limited OSS counter and drill mechanisms; the exact nature of faults can be hard to trace. Analysis available from measurement reports overcomes this problem by providing a greater level of intelligence to illuminate enhancements that will ensure existing systems operate at utmost efficiency.
- **Improving RF performance:** With a precise record of interference caused by overlapping coverage also provided by user-generated measurement reports, service providers can execute system modifications to improve optimisation and capacity planning.

From prediction to fact

Network optimisation is critical to the success of service providers' businesses. But it's a requirement—in terms of creating new approaches to improve data performance analysis—that has been overlooked in the quest to enhance core networks, applications, and services. It's an oversight that has ensured that drive testing, which is both costly and relies on aggregated projections, remains the dominant form of network analysis; until now.

Customer-generated measurement report data sheds an intense light on performance; it provides the facts to make optimisation decisions for the complete network in one cycle. This generates a number of efficiencies. For example, with improved base data, system changes rarely need to be re-engineered.

Planning efficiencies are complemented by efficiencies in the network. Based on user analysis, systems can be refined to run at the maximum efficiency to handle customer demands. Service quality can also be improved by quickly removing glitches (coverage holes, interference, and regions with poor signal quality).

Knowledge is power

The adage that knowledge is power certainly applies with user-generated measurement reports. The intelligence can be applied to drive maximum return from existing assets, enhance operational efficiencies, create an excellent user experience, and smooth the introduction of new services. It's an important breakthrough in the quest to rebuild margins by enhancing returns from capital expenditure while reducing operating costs. ■