

perception

getting a true measure of network quality

bench marking – a definition that matters

We often talk about bench marking of mobile networks-but do we all mean the same thing? Paul Carter, President of Global Wireless Solutions Inc, offers a definition.

"Just definitions either prevent or put an end to a dispute."

Nathaniel Emmons (1745 – 1840)

Many people talk about "bench marking" mobile networks. However in conversation with them, it is clear that different people often mean very different things when they use that term.

In my opinion,, "bench marking" should refer to the process of comparing one operator's network delivered quality against another or one operator's network performance against its own network quality in other markets or even its own "before and after" performance following a critical change, such as a network enhancement program. This "bench marking" is not a "nice to have" -- it is essential to the effective management of any mobile network. Just like regular audits are the standard to monitor and evaluate financial performance, bench marking should be the standard to measure the performance of the network itself.

But to provide a true benchmark, the process needs to meet certain rigorous criteria. The process must examine comparable key performance indicators (KPIs) for each operator

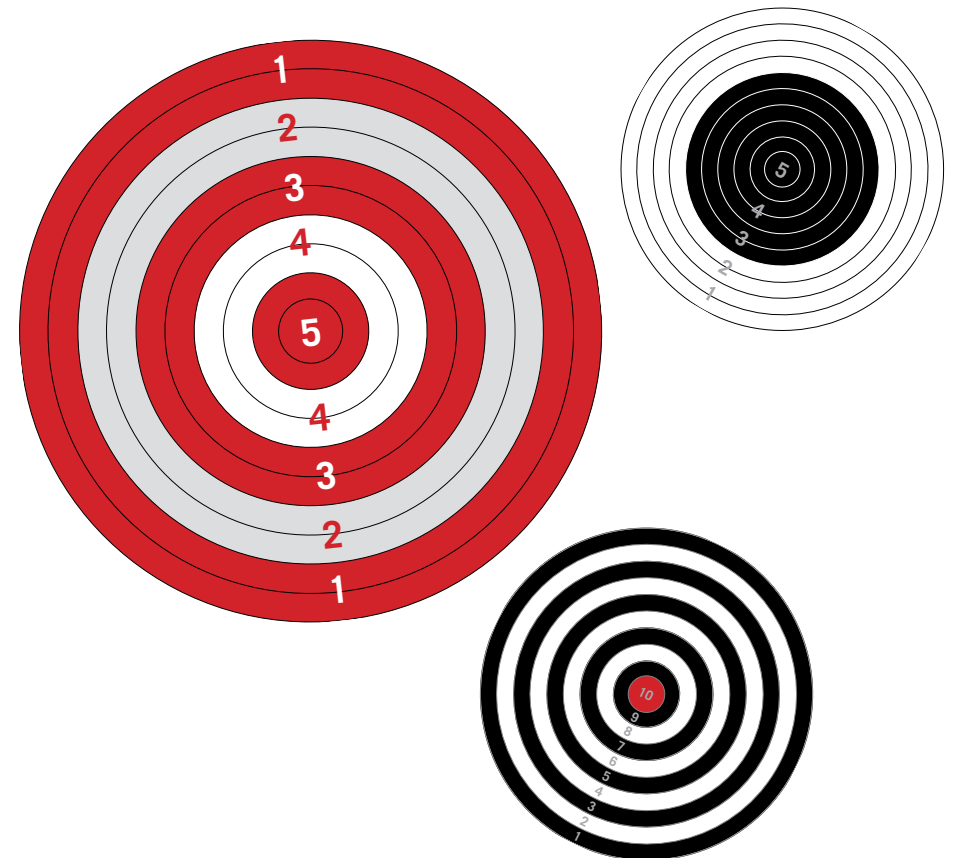
considered. You cannot measure one KPI for one operator and something else for another.

To deliver meaningful results, these KPIs must measure the variables that really matter. By this, I mean that they either really matter to the end user, or that they directly affect the economics of running the network. Important KPIs therefore include:

- Coverage
- Blocking
- Dropped call rates
- Clarity of call
- Data throughput rates
- Latency

Other engineering factors might be measured at the same time but, unless they directly affect the delivered service or the costs of the network, they should not be considered a primary part of the bench marking exercise.

However, this does not mean that other factors should not be collected. The collection of such engineering factors can greatly speed the exercise of correcting areas of poor performance and it makes great economic sense to collect them at the same time as the bench marking



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data. However, it is also worth pointing out that the collection and management of large quantities of engineering data is not inexpensive. Therefore to be practical, the collection of such data should only be made where it can deliver value e.g. in areas where the quality needs to be improved.

Because they are end-user centric, bench marking KPIs should also be technology independent and effectively constant. For example, they should allow both GSM and CDMA-based networks to be compared directly. They should also highlight the changes to user experience that result when new technology is rolled out.

Many of the KPIs are a function of simple math. Dropped call rates, for example, are simply the percentage of successfully initiated calls that terminate earlier than desired. Other KPIs however involve more complicated calculations, such as that for mean opinion scores (MOS). The MOS scale has been based on the (subjective) public's expectation of audio quality and varies from a value of 1.0 for bad, unintelligible speech to 5.0 for excellent audio quality. As differing voice codecs are deployed in different networks (deploying different radio access technologies), different MOS levels can be achieved. But the beauty of standardized MOS is that it provides a technology independent comparison for audio quality.

The bench marking process itself must be absolutely repeatable and technically consistent within itself. It must be robust enough to withstand legal scrutiny and, if necessary, counter competitive marketing claims. It cannot have any inherent bias. And, it should meet minimum ITU standards.

Additionally, it should be statistically valid, with enough measurements taken for statistical significance to be drawn from results. This means that enough measurements must be made to provide meaningful results for the KPI, evaluated across geography or time. Measurements also need to be repeated over time in sufficient locations to even out the effects of variations due to localized busy hours and other factors. The measurements of each network should therefore be taken at similar times of the day to avoid the skewing of results by such effects.

Finally, bench marking should not be a "one off" campaign because that would only provide a snapshot of a particular moment in time. Ideally, bench marking should be a regular activity, giving a true understanding of the trends that are at work and the effects of network improvements (such as adding new cell sites or optimizing existing sites). It also allows network operators to keep a watch on competitors (perhaps as they have increased numbers of subscribers or enhanced network capacity) and to respond

promptly to any new deployments that they might be making.

For me, only when all of the above criteria are met, should a network quality measurement exercise be referred to as bench marking"

