Bringing down the cost of mobile data traffic: investing in new technologies and more spectrum

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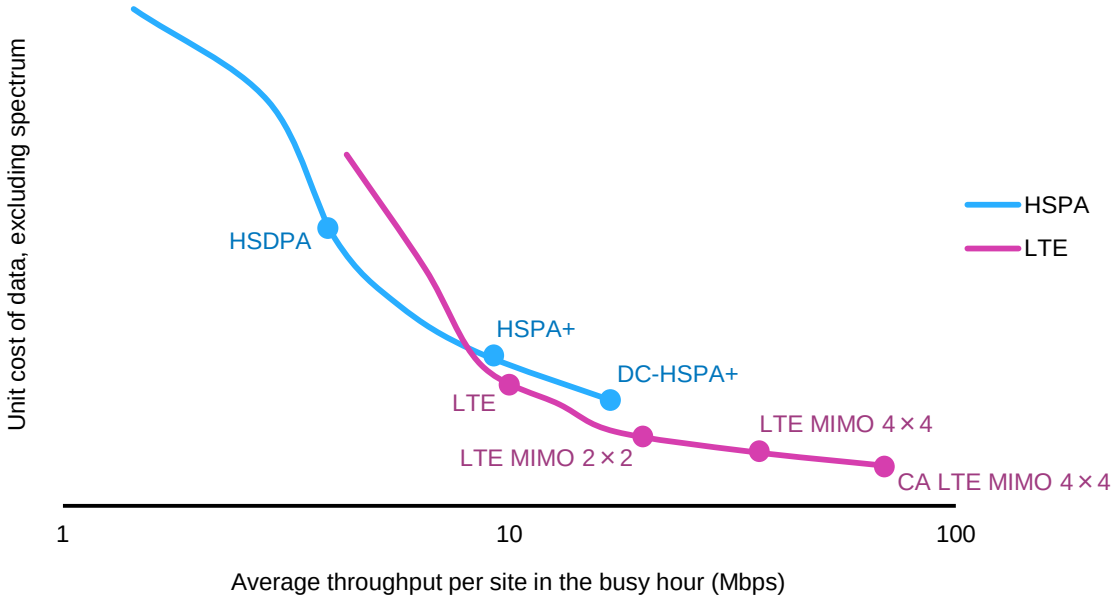
Mobile networks are becoming dominated by data traffic and projected annual growth rates of 30–70% will lead to five times – or more – data traffic worldwide by 2018.[1] To support this data growth, mobile network operators (MNOs) need to make decisions on medium-term network strategy, on radio and handset technologies, and on acquiring available spectrum allocations. Medium-term planning is the priority because the long term is too far away to predict – mobile data traffic growth, user profiles and applications are evolving rapidly already. In any case, the long term will be the emergence of 5G and the demise of any reliance on legacy circuit-switched voice revenue. This article addresses the insight that MNOs can use now when planning an approach to supporting faster mobile data services, choosing to invest potentially large sums in new spectrum, and offering lower – but profitable – mobile data prices to consumers.

Analysys Mason's cost-per-megabyte model highlights key decisions that operators can factor into their plans

As mobile data traffic grows and new technologies (such as HSPA+, LTE and MIMO) become widespread within user equipment, the unit cost per megabyte of traffic carried declines. We developed a cost model of a combined 2G/3G/4G network operator to illustrate this decline in the unit cost of data traffic, excluding the cost of spectrum (see *Figure* 1).

Figure 1: The unit cost of mobile data traffic [Source: Analysys Mason, 2013]



[1] See Analysys Mason's *Wireless network traffic worldwide: forecasts and analysis 2013–2018*, available at www.analysysmason.com/WNTF-2013.

We exclude the cost of spectrum in this calculation to add some clarity to the underlying situation. Many MNOs already own some HSPA spectrum (900MHz and/or 2100MHz), while others may have recently made a large cash outlay for LTE spectrum. Spectrum costs also vary significantly by country. However, mobile data megabytes can contribute to the recovery of spectrum investments and ongoing frequency charges, and these should be factored into operators' plans according to the local country costs and expectations.

We have used average throughput per site in the busy hour for the x-axis in this example. This is somewhat less than peak advertised speeds because of variations in user location, mobility, 'burstiness' of communications and so on. Alternatively, we could have used average throughput per active user in the busy hour (for example, 100kbps per user), which network operators often use as a key network quality indicator.

Our model illustrates several key points that mobile operators can use to plan mobile data network investments and service costing/pricing strategies, such as the following.

- Mobile data costs have declined rapidly because many 3G networks can support '3.5G' HSPA+.
- Investing in additional LTE technology is expensive in areas where the demand density is not yet high enough to support an additional mobile broadband overlay.
- Typical HSPA+ and LTE networks (which usually offer peak speeds of 20–60Mbps) deliver mobile data at a comparable total cost per megabyte (excluding spectrum costs).
- We estimate that 4G technologies will eventually outperform 3.5G services in terms of the cost per megabyte.

Operators face the challenge of balancing network evolution requirements and consumer perception of mobile data

'Speed-doubling' technologies such as dual-carrier/aggregation and MIMO will offer considerable increases in peak speed (and eventually average user speed) and further reductions in the unit cost of a megabyte of traffic during the next 5 years. However, operators will need to consider the requirements of these air interface choices – such as the levels of handset/terminal take-up, as well as base station, antenna and transmission upgrades – when formulating their medium-term plans.

However, these improvements will not materialise overnight, and the quality of service (that is, user experience) and the blended cost of data traffic will reflect the complex mix of technologies and speeds as networks develop. The cash outlay for additional spectrum and the requirements to make a return on spectrum investments add another layer of complexity to the evolving cost of data on HSPA and LTE networks.

MNOs also need to consider the consumers' perception of mobile data while wrestling with these network complexities. Buyers of mobile data are not particularly interested in the detailed network and air interface technologies. They focus primarily on the peak advertised speed and the price of gigabytes in the package. MNOs are likely to launch more speed-based offers as they build this underlying network evolution into the pricing of mobile data services[2], but it will be a challenge to price these services in a way that maximises the attractiveness of higher-speed technology.

Analysys Mason offers comprehensive advice to the mobile industry, including spectrum and investment planning, technology appraisal, network and service costing, and end-user pricing support. For more information, contact Ian Streule, ian.streule@analysysmason.com.

[2] Telenor's mobile broadband subscription offers in Norway are an example of this approach.

