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MOBILE TRAFFIC GROWTH + COST PRESSURES = NEW SOLUTIONS?

- **Mobile voice is still growing and broadband usage is exploding.** Mobile Broadband usage already up to 1.4Gbytes per month and >30% of all broadband in leading countries.
- **Data wave turns into a tsunami.** Consumers' usage is changing with on demand media taking a more prominent role in consumption.
- **Capacity & coverage crunch.** Current 3G/HSPA networks built for voice and low speed data are likely to be overwhelmed by data demand and will fail to meet customers wide area service needs.
- **Fragile business case for network build – cost per subscriber could increase 100%.** Using current techniques, network build would be costly and in many cases uneconomic in the long term as new investment in cells will be required to support rapidly increasing mobile broadband traffic demand.
- **New solutions come to the rescue.** Network sharing, femtocells, sophisticated tariffing and spectrum refarming all have a key role to play in bringing down network build costs and making network expansion economically feasible.
- **Scalable backhaul networks.** To remain cost competitive with mobile broadband, operators need to move to transport solutions that break the link between capacity and cost.
- **The distinction between fixed and mobile will blur.** Customers will buy a wide area mobility service but this may be delivered by a combination of fixed and mobile.
- **Embracing new ways will be key for cost effective growth.** Successful operators and suppliers will have already recognised the approaching capacity chasm and already be implementing new solutions and products to address the changing market.

Authors:

John Cullen
(+44) 7885 770559
John.cullen@neu-mobile.com
www.neu-mobile.com

Mark Keenan
(+44) 7802 354852
Mark.keenan@neu-mobile.com
Neu Mobile Limited

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Executive Summary

MOBILE TRAFFIC IS GROWING RAPIDLY

Mobile networks have enjoyed considerable growth since they first offered commercial services in the early 1980s.

We see a number of active trends that are liable to influence their growth moving forwards:

- Mobile traffic will continue to grow rapidly as consumers move from using fixed lines to using mobile devices both for voice and broadband internet access as:
 - flat rate voice and data bundles make usage of mobile more cost competitive and costs controllable.
 - consumers look to build their communication needs around their primary communication devices: their mobile phone and their smartphone, netbook or laptop.
- Fixed line penetration will continue to drop as customers optimise their costs around their mobile primary communications devices. The availability of both mobile voice and broadband solutions means that for many households, fixed is no longer required and is an expensive overhead.
- Internet service consumption is changing as consumers move from “Best Effort” web and email services to on demand, real time streaming services such as “You Tube” and BBC iPlayer. This is increasing traffic volumes dramatically and changing the consumer perception on what services need to be supported over broadband whether it is fixed or mobile.

For mobile operators, these trends will not only bring new revenue but also new issues:

CAPACITY ISSUES ARE EMERGING

- Capacity will become constrained driven by:
 - Mobile broadband adoption – more users equates to more traffic
 - The predominant use of mobile broadband is indoors – indoor traffic takes disproportionately more cell capacity than outdoor traffic.

FALLBACK TO GSM WILL STOP BEING ACCEPTABLE

- Coverage will become insufficient as customers expect higher data services to be available indoors and not just voice across the wide area network. 2G back up will cease to be an acceptable option.

STREAMING SERVICE WILL IMPACT NETWORK DIMENSIONING

- New on demand media services will require operators to change the way they design their networks or to change the mobile broadband service they sell. For operators to support good quality, on-demand media services would require them to dimension their mobile broadband networks like voice networks and not best effort data networks today.

NEW CAPACITY AND COVERAGE GROWTH EXPENSIVE

- Although some capacity is available on existing sites, further network expansion using traditional 2.1GHz 3G macrocell sites is likely to be costly as there would be a need to:

- Add new sites in urban and suburban areas for capacity reasons. Not only are new sites costly to build, they are now very difficult to find in most dense urban areas and some suburban areas.
- Add rural 3G sites. To provide equivalent nationwide coverage to 2G, a large number of additional 3G rural sites would be required in most countries.
- Increase costly backhaul capacity from 3G sites. The required backhaul capacity from cell sites is set to explode as HSPA capacity is upgraded. We estimate that leased line solutions will cease to be cost effective as cost tracks capacity and that many microwave solutions will be unable to cope with increases in capacity.

**COST PER SUBSCRIBER
COULD DOUBLE**

As a result of higher expenditure, the cost per subscriber of providing a mobile broadband service could increase by 100% if new ways to provide coverage and capacity are not found.

We however see that there are number of potential solutions for operators to deal with the issues that they face that they should consider implementing:

**MATCH COST TO USAGE IN
TARIFFS**

- Innovative tariffing and cost control – all operators should consider implementing tiered tariffs that link cost to overall consumption as soon as possible to protect the service quality of the majority and to link usage with network build costs. Operators should further consider implementing tariffs that charge differentially for different desired traffic profiles (e.g. streaming v best effort) as well as overall usage to further link consumption with network cost.

**SHARE NETWORKS TO
LOWER COSTS**

- Network sharing – to increase both indoor coverage and capacity, operators should pool and share their radio networks with other operators. The biggest service and cost gains can be obtained by fully sharing the Radio Access Network as we estimate this could increase the number of sites by up to 70% while providing 10-20% cost savings to each operator. We believe that the cost gains to be obtained by site sharing alone are marginal.

**USE 900MHZ FOR
IMPROVED COVERAGE AND
CAPACITY**

- Spectrum refarming – To provide nationwide coverage, improve indoor coverage and add additional capacity, operators should look to use spectrum at 900MHz and 1800MHz for 3G. This would require national regulatory approval.

**IMPLEMENT SCALABLE AND
COST EFFICIENT BACKHAUL**

- Next generation backhaul networks – To mitigate against the direct relationship between leased line capacity and cost, operators should consider building their own IP based backhaul networks built around a fibre core and metro network supplemented by IP microwave, DSL and leased ethernet for the “last mile” connectivity.

**USE FEMTOCELLS FOR SPOT
COVERAGE AND CAPACITY
ISSUES**

- Femtocells – Operators should look to deploy femtocells to provide targeted indoor coverage and capacity as this improves the service available to customers and will help to free up wide area capacity on the macrocellular network.

**WINNERS WILL ACT
DECISIVELY NOW**

We believe that those operators who will be winners in the market:

- Have a sustainable proposition, a roadmap to deliver it and understand the use of tariffing to control usage when needed.

- Already are aggressively implementing network sharing.
- Have in place a next generation network backhaul strategy and ideally either own or have a partnership with fixed network or cable operators.
- Have well advanced plans for femtocell deployments to address indoor coverage and capacity issues and have plans to lobby for “naked DSL” availability so as to allow for complete decoupling of the mobile service from fixed services.