

The User Centric Approach

The Business Case for a Service Provider
WiFi Network

August 2009



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A number of Mobile Communication Service Providers in the UK currently have no public or private enterprise WiFi service of their own. Where they offer such services to their end customers, such as part of their “mobile broadband” subscription package, they do so by buying service on a wholesale basis from other WiFi Service Providers. These networks were designed to accommodate email access and web browsing.

The introduction of the iPhone, Nokia N series and similar ‘media friendly’ devices to their subscribers, however, has significantly changed the dynamics of customer usage patterns and needs:

- (i) These devices, fitted as they are with WiFi as well as 3G connectivity, have encouraged a large number of the subscriber base to exploit the vastly superior performance of data downloading using WiFi rather than 3G connectivity. iPhone users for example, downloading music and video streams for subsequent viewing, have produced a dramatic increase in the traffic observed from appropriate locations on the WiFi services.
- (ii) In general the 3G user experience inevitably falls far short of the customer expectation set by lifestyle advertising in the Media and the arrival of media services like the BBC iPlayer. To some extent this has been ameliorated by the innovative use of smart connection clients which ensures that devices will use the most effective network available to it at any time. The user will associate with, and make use of, WiFi access when in range of a suitable Access Point, seamlessly – that is without requiring any manual intervention on the part of the user themselves.
- (iii) The 3G network owned by the service provider is becoming stressed in terms of ability to handle customer connection requirements at particular locations and times. In urban centres, for example, the arrival of a commuter train can mean that hundreds of devices are trying to authenticate with the network simultaneously. Some recent measurements in London have shown that as many as 90% of these may be unable to obtain the connectivity they require at first attempt. This represents potential loss of traffic and revenue, and customer dissatisfaction for the service provider. Similar overload situations frequently arise at sports and entertainment events as large numbers of users try to use the service simultaneously.

The data overload problem on the 3G network caused by the introduction of these devices cannot be solved simply by investing in more 3G capacity. The 3G network infrastructure required is very expensive to install and, in many instances, cannot carry the traffic load required because of the restricted availability of radio spectrum.

The existing public WiFi services do not fare much better. Access Point technology has made significant advances in the last few years and with the exception of the hospitality sector, has yet to be deployed in the public service space. Most public services have a limited authentication capability and limited backhaul capacity. These networks are not designed to support the massive numbers of devices roaming in and out of concentrated service areas demanding large downloads. It is time to build a new service.

The new service has to be as user friendly as the devices themselves. The service will need to complement the 3G Service. As well as providing the existing connection capability for travelling executives checking email, the service needs to be planned to divert a significant proportion of the data traffic, such as video and music streaming, from 3G to WiFi. This means building a data capability to meet high capacity requirements in certain stressed areas of the network. This would leave more capability on the 3G service able to provide a better quality of user experience for the voice traffic for which it was primarily designed, and provide the data service experience the user has come to expect.

In the long run this problem may have a solution from the introduction of a next generation mobile phone infrastructure – such as LTE. This is, however, at least two years away from public service introduction; itself requires massive capital investment on the part of the service providers, and could still suffer from some of the potential spectrum restriction and data overload problems as connectivity and usage requirements continue to grow. In practice, we believe there will be a long term need to blend long distance mobile service

access at limited bandwidth with short distance high bandwidth technologies in order to conserve handset power consumption.

This analysis points to a sudden, ongoing and quite rapidly expanding increase in demand for data from the service provider network and, therefore, a capacity issue which is only going to tighten as more devices emerge which are capable of data rich applications. The roadmap in the terminals industry shows that there will be an immediate expansion in the numbers of such devices offered by Mobile Network Operators (MNO), manufactured by Apple, Palm, Nokia, HTC, and others all have new devices to launch into the market in H2/09.

The move to data demand is the most significant shift in the MNO industry in the last 5 years which is likely to significantly reshape the structure of this mature market.

The Service Providers that will feel this pressure in advance of the rest of industry;

- have a large market share
- have launched the devices like the iPhone which drives data service usage
- have grown its market share using devices like the iPhone to drive this
- have restructured its demand towards data as a result

In order to maintain a strong position as the demand for data grows, a Service Provider needs to be able to expand its ability to quickly and flexibly offer data capacity in “hotspots” where its cellular network is expensive and overburdened. Service Providers can either allow poor capacity to limit its growth in terms of market share or they can use the challenges they face in the market to create a new competitive advantage by building a WiFi data off load network. The economics of such a network; low cost, flexible, scalable, will transform a Service Providers ability to offer data services in key geographies and demographics, such as commuters or major events and entertainment venues.

The Approach from Connection Services identifies the following opportunities for the Service Provider with respect to a dedicated WiFi network:

- 1) **Control:**
Expansion of data capacity can be provided at will and in a very selective way according to the shifting pattern of demand.
- 2) **Cost:**
The capacity added in terms of Capex (and Opex) per terabyte is orders of magnitude cheaper than 3G and even more cost effective than the uncertain (and thus expensive) technologies which will replace it. There is almost no R&D required to deploy a WiFi network alongside the existing 3G network.
- 3) **Consumer Proposition:**
The ability to offer a seamless data service across fixed (LLU) mobile (3G+) and WiFi (via CSL) is a very compelling proposition as a Service Provider in 2009-11 inevitably takes market share from other Providers and marginal mobile players.
- 4) **Competitive Dynamics:**
Deploying LTE will involve restructuring the telecoms industry towards a small number of MNOs, which will allow them to defray the costs of 4G rollout.
- 5) **Convergence and regulatory dynamics:**
OFCOM will promote the entry of VNOs into a net neutral environment. MNOs will thus need cheap data capacity and wholesaling WiFi provides interesting possibilities for the backbone mobile operators.

All this amounts to a proposition that:

- The Service Provider currently faces a significant opportunity to grow its customer base in both fixed and mobile networks since LLU and 4G will lead to a fixed mobile convergence, with a number of current

operators disappearing as competitive entities. There will thus be a larger market with fewer players, albeit with an increased presence of VNO entrants.

- Data is emerging as a key driver of market share and customer retention. The success seen by the leading Service Providers in the UK is likely to be imitated by competitors imminently.

Thus the ability to deploy increased capacity for data services cost effectively over the next 2 years in this gap between 3G and 4G is a key capability Service Providers need to invest in. WiFi appears to fit very well into the new competitive landscape.

The challenge for Service Providers is its lack of in house experience of providing services over a WiFi network of its own and thus it has a need to procure such a capability from a provider with a track record of providing Telco grade WiFi connectivity while, at the same time, not losing its ability to control the evolution of its own WiFi service and the manner in which it interoperates with the evolving 3G service.

The use of technology based on the GAN specification (Generic Access Network, formerly UMA) technology may be used to assist in unifying the service offering. The GAN standard enables any suitably equipped device to move seamlessly between the 3G network and any WiFi IP Access Point that it is pre-authorized for. GAN enables mobile voice and data traffic to be encapsulated within a secure IP tunnel at the handset. At the mobile core network, a GAN Controller is used to manage the interaction between the large numbers of IP devices and the 3G Network. The GAN Controller appears to the mobile core as a Base Station Controller.

Historically, GAN enabled devices have required an embedded GAN Client provided by the manufacturer of the device to the operator in addition to the WiFi radio. A large range of such devices are now available for example, most new RIM Blackberry handsets are GAN compatible as are several new 3G capable handsets from Sony Ericsson, LG and HTC (the HTC Touch3G). GAN is a mature technology deployed in a number of Tier 1 mobile operator networks in Europe and North America (for example, the France Telecom/Orange Unik service and the T-Mobile USA @Home service).

The issue for the Service Provider must be less about the hardware levels in the network and more about enabling WiFi capacity so that it provides the same quality of experience for users (and for the Service Provider) as the cellular network does, but is able to support the range of new services required. For instance, the provision of local and location based information services and simplified authentication processes, as well as roaming and enterprise estate-management services.

The service needs to be designed from the outset with excellence of user experience as the prime driver. This has implications for all layers of the supporting infrastructure from service platforms and management systems through network operations and the design of the RF infrastructure itself. This requires more than deep knowledge of the technology (which CSL has). It also requires experience of providing such services effectively over a number of years. CSL can authentically claim to be the leading provider of such service layer capabilities for WiFi connections: this is CSLs unique capability

In exploring how such a data off-load capability may be implemented the Service Provider will recognise that there are significant advantages from a cost and service quality control perspective in building such a capability of their own. This is in contrast to buying WiFi capacity on a wholesale basis since the existing networks available for wholesale have not been designed for the demanding user experience requirements which the subscriber devices in market today are now driving.

A network under the Service Providers control would give them the capability to respond to dynamically changing end user requirements and to introduce innovative services to exploit the emerging market.



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