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## The rise and rise of WiFi

We have recently been looking at WiFi more closely and expect to do more research as mobile broadband and LTE continue to enter the mass market. Although mobile operators initially resisted the idea of carrier WiFi and thought of it as a disruptive and threatening technology, current industry consent is that WiFi will play a much bigger role in the operator business in the years to come.

There are several areas where WiFi technology is being adapted or expanded for different segments than originally planned for. The following segments are elements of the WiFi world that are rapidly changing to address key operator concerns, primarily handling mobile data traffic more cost-effectively and providing a better user experience.

### White space WiFi

Although having recently peaked in interest, white space WiFi (or Super WiFi) has been in a few operators' wish list recently. Indeed, few operators are trialling Super WiFi in developing markets where they don't have access to 3G spectrum and where data connectivity is becoming a challenge. There are also several reasons why white space WiFi is interesting:

- Large amount of spectrum available – 100s of MHz
- Lower frequency spectrum, allowing better coverage
- Mature technology and established and economies of scale in WiFi will inadvertently make white space WiFi devices cheaper and easier to manufacture

WiFi is not the only technology aiming to harvest the potential on white space spectrum. [Neul](#) is developing white space technology (including network and device chipsets) for M2M applications. Neul claims that 99% of UK's land mass can be covered with a white space network for M2M applications which will cost as low as £50 million. A new industry forum named [Weightless S-SIG](#) has been formed to promote the evolution of the technology but it is still early days: Neul claims to have a chipset ready during 2013.

## Interworking between WiFi and mobile networks

This is perhaps the area with most activity in WiFi currently, with several companies and standardization bodies pushing for the integration of WiFi and cellular worlds; primarily to provide a straightforward user experience for end users.

There's also a debate whether there will be a need for a software client in the form of connection manager in end user devices, primarily smartphones. From a technology perspective, the ideal solution is to place a connection manager in the end user device, but device fragmentation and the difficulty of installing additional software at the handset manufacturing plant have been reasons for the failure of several previous technologies, including UMA. Nevertheless, both client-based and client-less solutions for bridging WiFi with mobile are now being deployed in the market.

### Client based

The most prominent example is of client-based managed WiFi offload is Kineto Wireless UMA (also referred to as [WiFi Calling by T-Mobile](#) and other operators). UMA is getting more traction in 2011 compared to previous years, primarily due to the success of Android and the easier integration of device-side software clients in Android. There are also other companies developing client-based WiFi products, including Notava, Alcatel-Lucent's Smart Loading and WeFi (all of these use different – and in some cases proprietary technologies).

With client based solutions, mobile operators can selectively choose what kinds of traffic to be routed to their core network and which is offloaded to Internet via the WiFi hotspot directly (Youtube and other streaming video traffic is particularly burdensome for the core network). However, operators are still largely undecided whether selective offload or further insight into subscriber analytics (when connected through WiFi) is worth the added cost and effort to implement client-based solutions. In any case, there is an increasing number of client-based WiFi offload services, including [AT&T's Smart WiFi](#) service (also on Android smartphones).

### Clientless technologies

This family of technologies includes a plethora of efforts coming from different parts of the ecosystem:

- I-WLAN: Network infrastructure vendors including Intellinet, NSN and Ericsson now offer gateways that integrate WiFi with the mobile core network, allowing operators to authenticate subscribers on WiFi networks and also enforce policies. However, these gateways do not allow service or application discrimination – meaning that all traffic goes through the core network or is offloaded to the Internet via local breakout. There is also activity on the device side, including WeFi and Greenpacket having launched client-based IWLAN products.

- Hotspot 2.0: An effort led by companies (including Cisco, Ruckus Wireless) and industry consortia (WBA, WiFi Alliance) to accelerate the convergence of cellular and WiFi environments. Based on IEEE 802.11u, Hotspot 2.0 includes extensions such as network advertising and discovery but still requires handset support. IEEE published the standard in May 2011 and several vendors have announced carrier grade WiFi products to be launched next year and still no announcements on device or smartphone support.

Although both telecoms (3GPP) and IT (IEEE) worlds are pushing for cellular-WiFi interworking, they are perhaps in direct competition. Time will tell about the success of each, but looking at previous operator success cases suggests that client less solutions will be pushed by the mobile world (I-WLAN) while the WiFi world will continue to promote 802.11u. However, a clear and powerful trend is Android – which is providing the sowing ground for innovation in several areas, including WiFi offload.

We will continue to look into the WiFi business case for mobile operators in more detail and will post more thorough analysis in the following weeks.

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