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Comments by Bertil Thorngren on

Francois Bar and Herman Galperin

## **Building the Wireless Internet Infrastructure: From Cordless Ethernet Archipelagos to Wireless Grids**

### O.Introduction

The authors address a scenario where wireless devices might be able to communicate more directly with each other, largely bypassing the existing cabled infrastructure for traffic exchange. The ultimate vision is that of a wireless grid in which users will self-organize to manage their own local networks and peer with others to create a distributed system capable of performing the task we associate with broadband internet services.

As their case in point the authors use the virulent spread of WiFi (802.11.x) technology. This is already a standard feature of most laptops, and also a common low-cost complement to wired broadband in homes and offices, providing an extra dimension of local mobility. The same solution can also be used in “ Hot Spots” provided by hotels and coffee shops as well as inside aircraft and trains. It is therefore reasonable to assume a rapidly growing worldwide impact. Perhaps the head start of the transition towards the “ ultimate vision” mentioned above?

As a precaution the authors also consider more conservative assumptions. Perhaps WiFi will simply continue to evolve within the established trajectory, namely as a convenient complement to broadband access that provides (strictly local) mobility and reduces the cost of cabling homes and offices? An indoor solution only, even if far more resourceful than a cable replacement like Blue-tooth etc.?

As their point of departure Bar and Galperin have chosen the rich literatur on “ large technical systems” dedicated to the study of the social dynamics, which has shaped the evolution of networked technologies such as the railroads, the telegraph, the telephone etc.As new technologies evolve within an environment already populated by old ones, it is critical to understand the historical patterns of accomodation and displacement between them.

In the end of their highly interesting analysis the authors seem to arrive at the conclusion that WiFi is now at a turning point with a momentum to potentially redraw the map, like cell phones have done by outnumbering wired voice telephony and like telephony networks once replaced the telegraph networks.

## 1.Discussion

### 1.1.The Pros:

It is quite possible to find support for the view that WiFi might be of exponentially growing importance as part of a longer-term wave towards nationwide Wireless Grids. Many of the incumbent operators of cell phone networks have obviously seen the “ Writing on the Wall”, even earlier in Europe and Asia in comparison to what is reported from the US. Among the cases in point are Telia in Sweden and Sonera in Finland ( now merged as TeliaSonera) who started large scale deployments already back in 99/00. More recently Swisscom has launched agresive WiFi deployment, like BT in the UK. DoCoMo and others in Japan have made similar moves. Not to speak of the recent Chinese initiative to introduce what they consider necessary amendments to 802.11 standards.

There are at least two positive reasons for cell net operators to move into combined offerings with WiFi as an integral part. ( Apart from any knee-jerk defensive reaction to protect the flanks.) A more positive argument is that the MHz available in the unlicensed bands (2.4 and 5 GHz) often outnumbers the capacity the cellnet operators so

painstakingly have fought for in auctions. More capacity might be badly needed should the much touted demand for Wireless Broadband eventually substantiate. Another and related argument is that cellnet operators actually do need WLANs to off-load any capacity-thirsty applications, which otherwise might threaten their very ability to deliver more basic and more profitable services. In case two-way 2 bit/s video over a cell network will ever be a large-scale success, it looks bound to be a "killer application" in the most negative sense. The possible revenues per MHz used decreases in proportion to speed, whereas the cost function is linear at best. There are no scale economics, comparable to those of fiber optics. From that perspective WiFi is not to be seen as a competing offer to 3G, but rather a critically needed relief. ( For more on this see : Thorngren,B (2003) "Profitable at Any Speed ").Forthcoming)

### 1.2. The Cons

As said, quite a strong case can be made for WiFi ( and its siblings) as an integral and important part of future network offerings. The established operators have not only the incentive but also the means to make this come true. They have a huge customer base, as well as already existing roaming and billing agreements, which can be modified to take care also of WLAN traffic. More often than not they also have control over high-capacity fiber networks for the longhaul. From their perspective it might well be " business as usual". Only a matter of yet another gradual technology shift from cell-networks to WiFi, supported by the likes of INTEL.

-However, such a scenario looks a far cry away from the vision of a "Wireless Grid" freed from its dependence on ( high capacity) wired backbone. It might well be possible to establish a new Hot Spot at a marginal cost, but access to high-speed backbone looks bound to be a crucial bottleneck. ( To create new local access points could be a matter of only 3 KUSD upfront. Whereas the rental for a T1 can be more of a cost burden already within a few months. DSL-connections are cheaper, but can only provide a fraction of the WiFi potential.

## 2. In conclusion

-A well conceived and well-written paper by any measure. That the paper focus on WiFi ( 802.11.x) only is quite defensible as WiFi is still unique with respect to its already achieved worldwide momentum.

However, Wi Fi ( alone) looks unable to provide any universal “ Wire less Grid”. Perhaps other solutions like WiMax /802.16 (able to bridge longer distances) can provide the missing link ? There is a plethora of other options like meshed networks and more intelligent antennas etc. which can help to move us closer to the vision of any device, any network.

To avoid any possible misunderstanding. The authors deserve credit for focusing on the broader policy implications, rather than specific technologies. (Perhaps 802.20 enabling “ true mobility” even for those moving at 300 kms/h has a point compared to plain vanilla 802.16 ? Not to speak of those advocating UWB, or different alphabet versions of 802.11 (WiFi). That said, it looks unavoidable that the authors have to address also this ( promising) meltpot for their next paper.

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