

Keynote: Whereto are wireless technologies moving?

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Abstract

In most of the advanced ICT countries, the move towards wireless access is present: The number of mobile phones has exceeded the number of private fixed phones. Communication is directed towards a "person to person (P2P)" approach by using the mobile phone as the preferred device, both for SMS and voice. Users have extended their mobile phone capabilities by signing up for payment services, identification is on the way and remote control from the mobile phone is the next step.

Companies have introduced Wireless LAN solutions, and companies in some sectors have equipped their employees with "mobile phones only".

Suppliers support the trends to wireless access by integrated radios: WLAN in Laptops, Bluetooth in PDAs, Mobile Phones and consumer electronics.

The customer expects the same services and quite often the same service quality from the wireless network as from the fixed network. This expectation is supported by slogans from suppliers and provides, e.g. "Cable replacement" or "11 Mbit/s in WLAN". A critical analysis of the radio properties is often performed as a post-implementation-issue, after problems have occurred.

Radio is a scarce resource. Noise and interference from other radio sources or from e.g. multi-path propagation cause delay constraints, delay jitter, bit errors and frame errors. Bandwidth and throughput vary along time, as well as availability and reliability. Service interruptions will occur. While available information and computing capabilities increase according to Moore's law, the air interface capacity has not significantly increased since the introduction of GSM. All these aspects need to be further examined on the way towards the wireless world.

EURESCOM projects have analysed future systems, and have concluded that current protocols lack wireless support and that the public network has not sufficient capacity to support all Next Generation (NG) services. Current protocols like TCP lack capabilities of handling wireless communications; simulations show that TCP over e.g. IEEE 802.11 has a maximum user bandwidth of 40-50% of the system bandwidth. UMTS will have a cell capacity of typical 700 kbit/s/cell and will require interworking with other wireless access technologies. Interworking between WLAN/Bluetooth and UMTS/GSM for personalised services, and interworking between the broadcast (DAB/DVB) technologies and UMTS/GSM for public services.

Wireless access requires specific radio interfaces, depending on the application and the context of the user. The future wireless access will have to integrate the different technologies, and the private and the public network. It has to support the customer's vision of "It works, it is simple and it is personalised", and supports this vision with a seamless login, mobility management and advanced radio interfaces to provide higher bandwidth to the user.