High-Quality Prioritised Services over Wireless Home Area Network

The latest advancements of wireless technologies and in particular the proposed and emerging standards from the IEEE 802.11 family enable the usage of wireless solutions for distribution of services in residential homes. Advantages such as flexibility of viewer location, mobility, cost and convenience of deployment are determining a shift of the regular home-owner interest from wired towards wireless solutions. This trend enables building of a Wireless Home Area Network (WHAN) that can be used to inter-connect home computers, home theatres, laptops, mobile phones and other home devices and support the distribution of various services, including video and voice, to users anywhere within the house, anytime and to various devices. Figure 1 presents a WHAN-based solution for the in-house distribution of services. It involves an intelligent Access Point that acts as a local server and provides services to remote client devices over WHAN.

As the number of supported services grows and some of them such as the multimedia-based ones have high bandwidth requirements, the limited WHAN network capacity is put under pressure. Moreover there are other performance issues when transmitting data over wireless networks such as low delivery rates (e.g. theoretically up to 11 Mbps for IEEE 802.11b and up to 54 Mbps for IEEE 802.11g although only half that in practice) and high error rates due to media characteristics, contention, signal attenuation with distance, signal interference, etc. Therefore variations in quality of service are expected in time and in loaded network conditions some may trigger users' dissatisfaction.

In order to increase the overall quality of services delivered over WHAN, a novel adaptive approach based on user-assigned priorities is being investigated. The adaptive solution relies on the fact that a controlled reduction in quality is preferred to the severe effect random loss and extremely variable or large delays have on these services. The prioritised adaptive scheme involves temporary decreases in the transmitted quality of some lower priority streams if they use shared resources inefficiently, allowing higher priority streams to take advantage of the resources available. This solution not only that makes the whole system benefit in terms of overall quality of service, but also enables the users to select those services and/or devices they are more interested in to avail from higher priority and consequently better quality in difficult delivery conditions.

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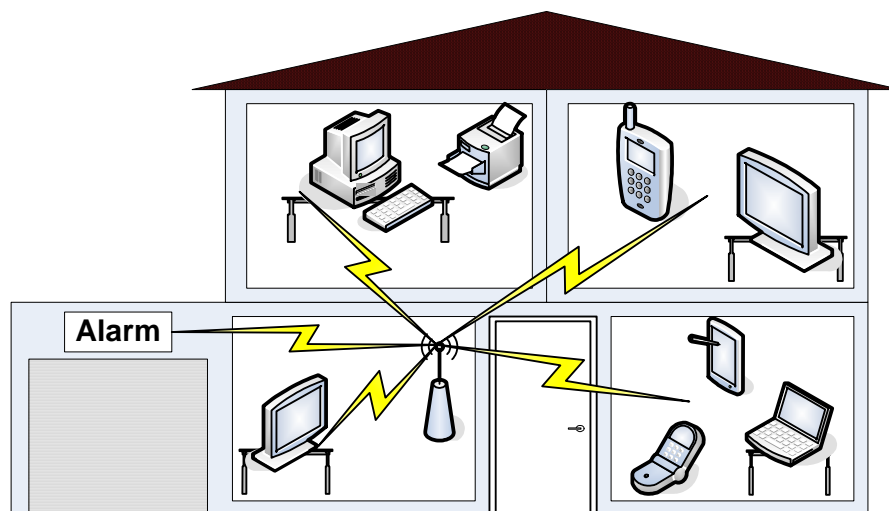

Figure 1. Service Distribution over Wireless Home Area Network (WHAN)