

Andres Arjona Topics

1. WLAN Roaming Study and its implications to voice services

The price of access points and WLAN cards has decreased considerably in the past years. Partly for this reason, many users have decided to install their own in their facilities. Several companies have provided VoIP solutions (e.g. Vonage) for home use for quite some time. However, software applications such as Skype have become extremely popular at a much faster pace. Current WLAN access points support multiple users within the same cell. However, seamless roaming is still a problem for most deployments. In addition to this, WLAN can also be used as an access for other voice networks such as IMS or cellular. For this reason, there is a possibility that WLAN is used for access to different voice services in different networks other than the Internet.

The focus of this topic would be to make a short study on handovers in WLAN, research for roaming measurements found in articles or journals, and then make conclusions focusing on voice services. Voice is constrained very much by delays. Therefore, interesting cases and measurements are those that have been made with data being transferred at the same time the voice calls were made.

If the student has the possibility, he could even set a couple access points and measure delays and roaming times between a couple access points under simple different scenarios while running a VoIP service such as Skype, Google talk, AOL, Yahoo, etc.

1. access points transferring data simultaneously with QoS enabled
2. access points transferring data simultaneously without QoS enabled

Test setup could consist basically on placing the access points with minimum power far enough so they allow to roam from one to another. I am almost sure a single user can handle several voice connections with different applications running at the same time. This would allow to simulate several voice calls made with community VoIP services simultaneously with only two computers. Forcing the transmission rates in the access point can support different conditions. These type of studies are not widely available and are of very good value nowadays.

Student Background

A student able and willing to perform such tests would be best suited for the topic.

Starting point

IEEE explore
802.11r specifications

2. Mobile Cellular Services comparison by region.

As cellular networks evolve mobile devices are able to handle new services. However, the services used differ greatly depending on the region. Particularly in Asia (Japan, Korea, China), the service usage differs much from that in Europe or the United States. The focus of this topic is to find out what kind of services are provided in different areas of the world and compare them as a matter of users and perhaps

pricing models. For example, in Asia flat data rate models are common and many data services are much more popular than in other parts of the world. Contrastingly, in the United States rates are usually tied to the operator (e.g. Yahoo messenger costs 10 cents per message). While in Europe data services are still not so widely used. This topic has many ways to be approached and it would be up to the student what items it includes in the topic. What it is important is that a broader view is given regarding service usage and availability.

Student Background

A student that speaks an Asian language (Japanese, Korean or Chinese) or that has been involved with mobile data services could have an advantage.

Starting point

Most of the information regarding the services is available through local operators' webpages. For example

NTT Docomo
AT&T
DNA
Elisa
Vodafone
TIM, etc.

The available usage statistics will require research from the student.

3. An evaluation of different broadband wireless technologies and solutions.

How different they are in the sense of design, modulation, and advantages and disadvantages the technologies provide. Currently, there are a couple proprietary and two open standards. For this reason many details of the individual technologies may not be available. However, with proper curiosity different aspects that are not tied to the specific details of the technology can be compared. This could be for example, in terms of spectrum used and its business advantages for different geographical locations.

Student background

An understanding of signal processing could be an advantage to understand the technologies faster.

Starting point

802.16 standard (fixed WiMAX)
802.11e standard (mobile WiMAX)
<http://www.ipwireless.com/>
www.Flaron.com
