Kista - IT University Wireless Network.
Privacy in mobile internetworking?

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Abstract

Wireless internet access of the Kista - IT University (KTH) network began in October 1999 as a research project in the Telecommunication Systems Lab *(TSLab)* at the former Department of Teleinformatics (Sweden).

The main research objective was to study the possibility of adopting wireless access as part of the IT University network infrastructure and to evaluate the level of security required by networks of this kind.

Based on our previous experience running smaller scale wireless networks, a new innovative networking environment was conceived to offer Internet access for the two hundred students and researchers of the IT-University study programme. Each student or researcher uses an $IEEE$ $802.11b$ compliant PCMCIA card to get wireless connectivity using a set of access points available in three different buildings and common areas. Mobility is supported between the radio cells using link level handover or $MobileIP_{v4}$ to roam between IP networks.

The wireless access allows students to attend lectures with their laptops, take notes and see online documentation while their mail arrives in their laptop mailboxes.

The following paper presents our experience building this network at KTH, as well as our confrontation and investigation of a serious challenge that this open, mobile and wireless net "space" presents: location privacy. [1]

1 Background

KistaOpen [2] is a project umbrella for a number of different internetworking projects in the Kista borough in Stockholm, KistaOpen includes the *campus network* of KTH Kista, the *student dormitory network* "KistaIP", the *Sweden Silicon Valley Link network* "SSVL" that connects the KTH campus and the Stanford University campus in California (USA) and the *Internet exchange* "KistaIX".

In 1999, KTH formed a new school of Information Technology at its Campus in Kista also known as the IT-

University since some of the activities of the new school are organized in cooperation with the University of Stockholm and Karolinska Institute. In fall 2000, a new diploma engineering program in Information technology was launched. The admission in the year 2000 was 150 students and will in the year 2002 increase to 300 students so that the fully expanded program includes some 1500 students. The IT-University has decided to provide their students with a campus network beyond state of the art, including wireless access that supports roaming and a number of other novel services.

2 IT-University Wireless Network.

The Kista - IT University network [2] is divided into three functional networks called *Red, Yellow,* and *Green.* The *Red* network hosts the computer infrastructure of the administration and financial departments. The *Yellow* network is a class C subnet in which each student and teacher has an allocated IP_{v4} address. The *Green* (research) network is composed of different IP subnets in which IP mobility is supported via the $MobileIP_{v4}$ protocol.

The new Kista - IT University wireless network that will be released in the fall 2001 will provide wireless access to 500 students and teachers. The wireless network in its second release will include IP_{v6}, an open wireless access network and a Kerberos V-based security.

The IT University network, the premier vintage 2000, has turned out to be a very successful network from several aspects:

- **Mobility:** The IT-University wireless network provides Internet access with support for mobility to some 200 students and 50 teachers. Link level handover is available in the home network through a set of access points available in three buildings. When roaming to a foreign IP-network a set of foreign agents provide MobileIP-based connectivity.

- **Security:** We have managed to integrate MobileIP services in a conventional IEEE 802.11 distribution system providing high levels of security with low

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[1] This digest has been prepared for the INET2001 Conference. Stockholm.Sweden. June 2001 *(ID # U22 Use of the Internet Summit)*

maintenance. New network monitoring tools were deployed to detect intrusions and misuse.

- **Space Independence:** Abandoning workstation halls for laptops, lecture halls for more informal spaces, traditional laboratories for remote laboratories, offices and workplaces for meeting places will have a huge impact on how we perceive spaces.

3   Personally Identifiable Information in mobile internetworking

The protection of privacy in computer networks emerged as a research topic for the TeleSystems Laboratory at KTH in Sweden in mid-June 2000. Data protection and privacy is rapidly becoming one of the most important issues on the Internet today. More and more Internet sites are collecting personal information from users through forms, cookies, online registrations, or surveys than ever before.

New commercial services are springing up that can exploit the ability of mobile communication service providers to determine the geographic location of their users. The new wireless technologies offer mobility; at the same time they offer "location information" that is being used to provide new "location-aware services".

Our general goal is to study if it is possible to provide a mobile user with internet communication while simultaneously protecting personally identifiable information. More specifically: we are concerned with the privacy aspects of location information.

By *location privacy in mobile internetworking* we mean the capability of a mobile node to conceal geographical information from third parties while the user is on the move. We intend to address the privacy concerns that these technologies raise and explore different solutions.

3.1   The "storebror" Big Brother System.

The *Big Brother System* [6] was built when the Kista - IT University wireless network was being designed in October 2000. Initially designed as a networking tool to help us with the positioning of the wireless access points. Big brother is a monitoring system that detects the movements of the wireless users at the Kista IT-University.

Every 60 seconds `orwell.it.kth.se` updates the position of each of the mobile nodes. This position is stored in a private database in where personal data is protected by providing a *pseudonym* for each user in the network.

Use of the *"Storebror System"*, which is a well-known and trusted system for monitoring wireless positioning, raised lots of concerns among our academic community [3],[4]. Questions raised include: How and who should handle this kind information? Which technical and legal means needs to be deployed to protect personally identifiable information in mobile internetworking?

4   Conclusion

Our research aims to document possible options for managing personally identifiable information so that the wireless user can choose wether or not they want Big Brother to keep an eye on them.

ABOUT THE AUTHOR

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