6WINIT

IPv6 Wireless Internet IniTiative – 6WINIT

Abstract:

The 6WINIT project investigated the problems in introducing a range of IPv6-enabled applications over an IPv6-enabled wireless Internet. It covered the areas of end-stations, routers, gateways, generic technologies and applications – with specific emphasis on following the IPv6-related standards emerging in the IETF. Thus Mobile IP, Road Warrior technology, Quality of Service, agent technology, interworking across WLAN, GPRS and UMTS, and security were of particular concern. Generic applications investigated included conferencing, voice over IP, video streaming, location-based services and home environments. There was specific emphasis on clinical applications, where secure mobile access was demonstrated to clinical data and radiographic images, and emergency treatment from ambulances for Accident & Emergency. Most of the work was in the context of Wireless LANs, since the access to and functionality of GPRS were very limited and the access to UMTS test facilities was provided only at the project end; nevertheless, experiments were carried out both with GPRS and UMTS test facilities.

Objectives:

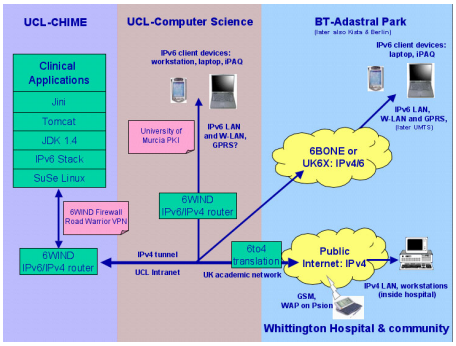
The principal objective of the 6WINIT project was to validate the introduction of a new mobile wireless Internet in Europe - based on a combination of the new Internet Protocol version 6 (IPv6) and the new wireless protocols used in WLAN, GPRS and UMTS/3GPP networks.

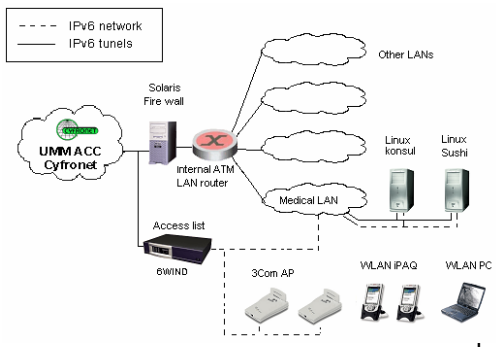
Technical Approach:

The basic network components used in the project were a combination of IPv6 and wireless networks. The project provided an insight into the problems in deploying real applications in the emerging IPv6-enabled wireless-enabled Internet; WLAN, GPRS and a UMTS test cell were used as wireless networks. We carried through complete systems pilots, and identified what components are inadequate in the applications, network facilities, major components and middleware. The project concentrated on mobile and wireless aspects of the system, but it also linked into the existing IPv6 wired infrastructures provided under the 6NET and Euro6IX projects. The technical approach was to take applications from other activities, which were expected to gain from the mobile IPv6 environment. These applications, which were mainly selected from the clinical health care, multimedia conferencing and streaming, in- and outdoors navigation and home control domains, were ported to work over IPv6. This way we ensured that all the requisite technology was available to allow them to work in a wireless-enabled IPv6 environment. Consequently we were also working on IPv6-enabled components: routers, relays, hand-helds, IPv4 to IPv6 transition mechanisms and other software components required by the applications. Because of the limited capability of the GPRS network, some of the traffic had to be run, in that case, in IPv6/IPv4 encapsulation.

Testbed:

The project developed a number of testbeds in different clinical environments. Two of these are shown below:





University College London/Centre of Health Informatics Testbed UMM/ John Paul II Hospital Testbed

All the testbeds were tied together by the IPv6 WAN developed by the 6NET/GEANT project.

Experiments:

We carried out many experiments with GPRS, UMTS and WLAN networks – together with the appropriate applications. For example our work with GPRS showed that the latency was both much too long for interactive conferencing, had much too much short-term variation in its value, and much too low a bandwidth. Other experiments showed that it was possible to use PDAs with the wireless connectivity for getting reasonable resolution of cardiac images. Another showed that in our hospital settings, the WLAN radiation had no discernable impact on the clinical instrumentation – though some of the instrumentation had occasional impact on the WLAN operation (e.g. during MMR scans or anti-coagulator action). We also investigated the precision we could obtain on location sensing indoors, using WLAN technology, and on the rate of hand-offs achievable with the WLAN. Finally we showed that one could have fast multi-access hand-over between the UMTS test-cell and WLAN.

Applications:

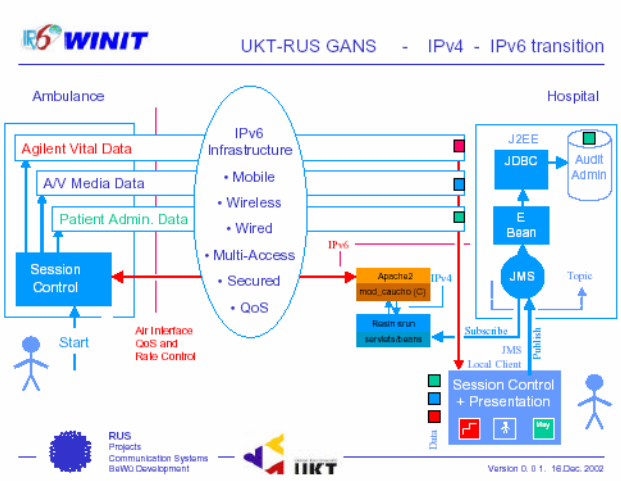
A wide variety of IPv6-enabled applications were pursued – infrastructure (e.g. Mobile IP, Road Warrior, etc), generic (e.g. Voice over IPv6, Media streaming, Secure remote control of the home environment, etc) and clinical (e.g. Access to clinical data bases, consultation with moving ambulances, etc).

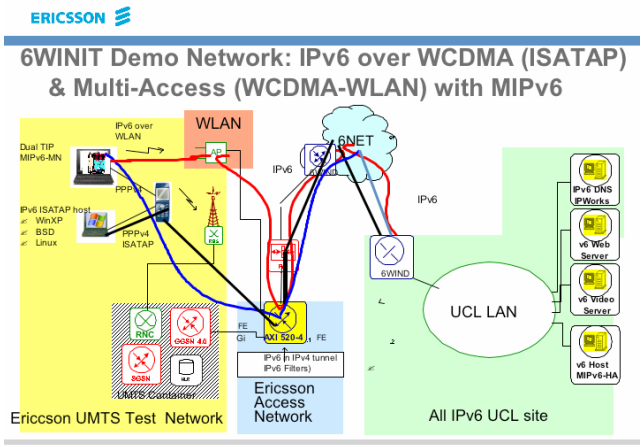
Results:

Our results are fully reported on the 6winit web store http://www.6winit.org/. However a significant number of components and features are expected to be developed further – often in a commercial setting (e.g. The Guardian Angel System, Router components for mobile IP, High-quality streaming, etc).

Innovation:

Many of these results are highly innovative. An example of the integration of many of the results together are illustrated in a demonstration given in the final review.





A simulated ambulance professionals communicate via a mobile terminal, capable of providing voice, video and data on body parameters from a patient like electro-cardiograms and blood pressure, communicate via both a UMTS test cell and a wireless LAN with other professionals in a simulated hospital. The communication uses Mobile IP and simultaneous multi-access, with secured data transmission based on a Public Key Infrastructure.

Contribution to Standards:

During course of this work there were many contributions to the standards for Mobile IP, simultaneous multi-access, IP security, SIP, multimedia transport and IPv6/IPv4 transition. Almost all these contributions were made to the Internet Engineering Task Force.

Success stories:

As a result of this work, an excellent set of IPv6-enabled components and applications became available both to show that IPv6 was becoming a viable technology, and that wireless-based IPv6 applications could be built. Specifics of the results are being incorporated into the products of the 6WINIT partners; examples are the router components. Others are being used to be the core of new business ventures; an example is the GANS system. Yet others are being used to persuade the regulatory authorities to allow the systems to be used in the hospital environment with real patients; an example is the database access system. Of particular importance is that the wealth of IPv6 applications developed are an important input to two large IPv6 deployment projects 6NET and Euro6IX, and have provided important inputs to many new projects.
The applications developed in the project (6VOICE, GANS, streaming etc) are being used in multiple follow-on projects for further features.

Project name:
6WINIT - IPv6 Wireless Internet IniTiative

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Project type:
RTD

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01/01/2001

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Total effort in person-months:
550

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TED	DK
Telscom	CH
TZI	DE
UCL	UK
UKT	DE
UMM	PL
UoS	UK
VTT	FI

Keywords:
IPv6, wireless, applications, testbeds and mobile.

Collaboration with other EC funded projects:

6INIT
6LINK
6NET
ANDROID
NGNI
WINE

IST - Research Networking - Research on Networks – IPv6