



Information Society  
Technologies



<b>Title:</b>  <b>Deliverable D2.5 Demonstration Scenarios</b>	<b>Document Version:</b>  1.6
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<b>Project Number:</b> IST-2001-38200	<b>Project Acronym:</b> Eurov6	<b>Project Title:</b> The European IPv6 Showcase
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<b>Contractual Delivery Date:</b> 30/06/2003	<b>Actual Delivery Date:</b> 30/08/2003	<b>Deliverable Type* - Security**:</b> R – PU
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\* Type: P - Prototype, R - Report, D - Demonstrator, O - Other

\*\* Security Class: PU- Public, PP – Restricted to other programme participants (including the Commission), RE – Restricted to a group defined by the consortium (including the Commission), CO – Confidential, only for members of the consortium (including the Commission)

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<b>Abstract:</b>  This document describes the improved scenarios with all network components and applications acquired from the sponsors, projects and bought from commercial off the shelves components and services. These scenarios will be available for demonstration in the second year of the project.  The improved scenarios will include enhancements on devices, multimedia and peer-to-peer applications, Home Portals, IPv6 on Cars, GPRS, RAS, AAA, DHCPv6, etc.
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<b>Keywords:</b>  Eurov6 Fix Showcase, Eurov6 Nomadic Showcase, IPv6 Applications, IPv6 Devices, IPv6 Services.
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# Revision History

The following table describes the main changes done in the document since it was created.

Revision	Date	Description	Author (Organization)
v1.0	26/06/2003	Document creation	César Olvera (Consulintel)
v1.1	10/07/2003	Content updated	César Olvera (Consulintel)
v1.2	05/08/2003	Integrate Contributions	César Olvera (Consulintel)
v1.3	14/08/2003	Minor corrections and Content updated	Miguel Ángel Díaz (Consulintel) César Olvera (Consulintel)
v1.4	26/08/2003	Content updated	César Olvera (Consulintel)
v1.5	28/08/2003	Editorial corrections	Marcin Michalak (Telscom)
v1.6	29/08/2003	Content Review	César Olvera (Consulintel)
v1.7	30/08/2003	Final Review	Jordi Palet (Consulintel)

# Executive Summary

The main objective of Eurov6 project is to show the usage of IPv6 products and services and their impact to anybody at anytime.

This deliverable describes the improved scenarios with all network components and applications acquired from the sponsors, projects and bought from commercial off the shelves components and services. These scenarios will be available for demonstration in the second year of the project.

The scenarios will include enhancements on devices and application for video/audio streaming, games, peer-to-peer file sharing, Home Portals, IPv6 on Cars, GPRS, RAS, AAA, DHCPv6, etc.

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# 1. INTRODUCTION

The main objective of Eurov6 is to show the usage of IPv6 products and services and their impact to anybody at anytime. Realizing this objective will include:

- Bringing together vendors and sponsors to demonstrate and test their devices, applications and systems.
- Showing various users applications based on IPv6 products and services, permanently at in the Fix Showcases (Basel, Brussels and Madrid), which can be visited physically or accessed remotely through telematic means.
- Organizing temporally Nomadic Showcases at different locations and/or significant telecommunication industry events.

The aim of this D2.5 document is to describe the improved scenarios with all network components and applications acquired from the sponsors, projects and bought from commercial off the shelves components and services. These scenarios will be available for demonstration in both Fixed and Nomadic showcases during the second year of Eurov6 project.

As was described in Eurov6 D2.3 (Fix showroom) and Eurov6 D2.4 (Nomadic showroom) there exist a number of devices, applications and services already installed and used in the different Eurov6 showrooms. In the following sections (devices, applications and services) there is an abstract on the current items available in the different showrooms, and then there is a brief description of newer items that will be tested, integrated and demonstrated during the second year.

Several of the newer items will be shown for the first time within Eurov6 during the next Nomadic Showcase event that will be organized in Brussels from 22<sup>nd</sup> September 2003 in parallel with an International Workshop on IPv6 Testing, Certification and Market Acceptance and with the 4<sup>th</sup> ETSI IPv6 Plugtests. All these events will take place at Hotel Le Plaza in central Brussels. For this Nomadic Showroom is remarkable the participation of 6WIND, Acunia, Alcatel, BELNET, Ingeneo, Juniper, MBDS, Mobistar, Panasonic, PSA/Citroën and Xybernaut.

As it is been usual within Eurov6, the new IPv6 items for the second year will try to show the “state of the art” in the IPv6 field in the different areas such as Home automation, Security and surveillance, Gaming, Audio, Video, P2P, GRID, VPN, AAA, Hot Spot Services, Wearable devices, Sports, Health and Public Safety, and so on. There are under way numerous contacts with vendors, operators, institutions, etc. in order to obtain more products, services and applications.

## 2. DEVICES

As was already described in D2.3 and D2.4, there exist a number of devices already installed and used in Eurov6 in both kinds of showrooms. These devices include:

- Host (Desktop, Laptop and Handheld PCs running different distributions and versions of Linux, FreeBSD, and Windows with IPv6 support).
- Routers (6WIND, Cisco and Hitachi for Unicast; FreeBSD for Multicast).
- Mobile Devices (Pocket PCs, Mobile telephones and Access Points with GPRS, Bluetooth, IrDA and Wireless LAN).
- PLC Devices: HE (Head-End) and CPE (Customer Premises Equipment).

Using these as base, the improved scenarios will integrate for demonstration in the second year of the project new items as:

- 6WIND: Continues the demonstrated IPv6 features including: Autoconfiguration, Transition mechanisms, IP Security, VPN and QoS.
- Acunia: Telematics services communicating over IPv6. Acunia is developing an IPv6 version of their CarCube product to be embedded in a vehicle, <http://www.acunia.com>.
- Alcatel: IPv6 features over the Alcatel A7770 OBX core router.
- Ingeio: Wearable computing solutions especially developed for industrial applications, <http://www.ingeneo.net>.
- Juniper: IPv6 features over a dual stack router.
- Mobistar: IPv6 services. Mobistar is configuring its APN to support IPv6.
- Panasonic: IPv6 features in products like IP cameras.
- PSA/Citroën and MBDS: Wireless information services, based on Wireless LAN and GPRS networks, available from the car, <http://mbds-fr.org>.
- Xybernaut: Wearable computer technology, hardware and related software, <http://www.xybernaut.com>.
- VTT Home networking devices: X10 Home automation systems.
- Home electronics systems from IntelliHome and Smarthome, in synergy with the NGN-LAB project.

In addition, there are under way further contacts with several Japanese and US companies and organizations for their potential participation in the project.

Finally, it is important to remark that Eurov6 aims to show the new devices that are being integrated into networked world. The inclusion of specific devices will depend on the current availability for the Eurov6 showrooms, from manufacturers, sponsors, etc. Here are some examples of such kind of devices:

- Security, surveillance, gas/fire detection, alarm systems.
- Electrical appliances such as lamps, fans, toys, etc.
- Cameras, telephone, TV; video player/recorder (video and audio devices in general), Games consoles.
- Microwave oven, coffee maker, freezer, etc.
- Vending machines.
- Pet care.

### 3. APPLICATIONS

In the same case as devices section explained above, there exist a number of applications already installed and used in Eurov6 in both kinds of showrooms. The applications currently in use are listed below:

- HTTP Client and Server.
- FTP Client and Server.
- SSH (PuTTY on Windows 2000 and OpenSSH on Linux).
- Mail Transport agent (Sylpheed).
- ISABEL Multimedia Videoconference.
- Multicast Videoconference tools (RAT, VIC and SDR).
- VoIP with SIP.
- VoIP with H.323.
- VideoLAN.
- The Darwin Streaming Server (DSS).
- MPEG4IP.
- Windows Media Services and Media Encoder 9 Series on Windows 2003.
- Windows Media Player 9 Series on Windows 2000 and XP.
- Media Player on Linux.
- Tetrisnet.
- “Quake” Game Client for Windows.
- On-line Instant Messaging tool.
- Three Degrees - Peer to Peer Application on Windows XP.
- Home network environment.
  - Appliances control.
  - Security monitoring.
  - Audio/Video control.
  - Monitoring (child care, animals movement, disabled persons, etc.).

Since these, the improved scenarios will be integrated for demonstration in the second year of the project as a set of new applications described in the following sub-sections.

#### 3.1 Mplayer for Linux

Mplayer is the Linux equivalent application to Windows Media Player. It can be downloaded from <http://www.mplayerhq.hu/homepage/design6/dload.html> and after applying the proper patch it supports IPv6. It allows to play audio and video streams on Linux platforms and it is compatible with the Windows Media Server Series 9.

#### 3.2 Gnomemeeting for Linux

Gnomemeeting is a VoIP application based on H.323 protocol allowing video conferencing also. Its code is available from <http://gnomemeeting.org> and it has been developed on Linux. The



latest release supports IPv6 and although the application has not reached yet the final version, it is stable enough for having it in a test-bed scenario.

### 3.3 Zinf Audio Player

Freeamp, now called Zinf, is a simple but powerful audio player for Linux and Windows systems. It supports MP3, Ogg/Vorbis, WAV and Audio CD playback, SHOUTcast/Icecast HTTP streaming, RTP streaming. Linux and Windows binaries and source code are available on <http://www.ipv6.polito.it/multimedia/freeamp-v6.htm>.

This audio player has been tested with BTtexact IPv6 Radio located at <http://radio.ipv6.btexact.com:8000>.

### 3.4 Three Degrees

Three Degrees application works exclusively with IPv6 (<http://www.threedegrees.com>) on Windows XP. This is the new kind of peer-to-peer application that runs only with IPv6 and would fail in networks built with NAT and Firewalls. Three Degrees connects people in small groups and they can share several kinds of files. The Eurov6 showrooms had this application included in its demonstrations and newer releases will be included soon.

### 3.5 46Bouncer

This application translates IPv4 packets to IPv6 packets and vice versa, then it can be viewed as a proxy between IPv4 and IPv6 networks. It is available from <http://netgroup-serv.polito.it/46Bouncer> and it is developed for Windows 2000, Linux (2.4 kernel) and FreeBSD 4.3+. This application can be used for doing connections (HTTP, SSH, Telnet, ...) between only IPv4 hosts and only IPv6 hosts.

### 3.6 PortForwarder with IPv6 Support

PortForwarder application can be considered also a proxy between IPv4 and IPv6 networks. Here the difference is the way that the connection is made. This application takes in advantage of the port forwarding function of the SSH protocol. In this way, an IPv6 host willing to connect to a service located at an only IPv4 hosts sends connection requests to the proxy IPv6 host that forwards such requests to the IPv4 host through a secure SSH connection. The application is developed for Windows 2000 (SP1 or newer) and Windows XP and can be found at <http://win6.jp/PortForwarder>.

### 3.7 Home Portals

VTT in Finland has a Home portal, <http://homeportal.ipv6.willab.fi>, to enable:

- Connection to an IPv6 Webcam.
- Switch on and off the lamp, TV, Video recorder.

In this way, using Windows Media Player 9 Series, which supports IPv6, the visitor to Eurov6 showrooms can remotely visit the VTT Home portal.

Hence, a similar home portal application is locally available in the Basel showroom, <http://www.eurov6.com>, and Brussels showroom has ordered home network devices and will establish a similar home portal.

### 3.8 IPv6 Cars

Eurov6 reached two agreements related to IPv6 usage in cars. The first agreement, with Acunia company (<http://www.acunia.com>), aims to develop a native IPv6 version of their CarCube product, that should be demonstrated (embedded in a car - VW or Audi) at the Brussels September events. Applications include off-board navigation, e-mail and traffic information using access to different services through GPRS/Internet, coupled with GPS positioning.

The second agreement, with PSA/Citroën and MBDS (<http://mbds-fr.org>), aims to integrate IPv6 with Wireless LAN and GPRS permitting to passengers experiment wireless services on a PDA developed by MBDS (with Steria) on the Microsoft prototyping .NET platform: live TV (Pier-Net.TV, HP), multimedia information in real time (AFP Multimedia), geo-dependant commercials (NavTech, Opteway), 3L Interactive and D-Link settled the Wireless LAN infrastructure. This car will be also demonstrated during the Brussels September events.

These may very well considered as the first native IPv6 cars in Europe.

### 3.9 IPv6 over GPRS

Several demonstrations of IPv6 applications over GPRS networks are under way. Mobistar is configuring its APN to support IPv6. Demonstrations planned will show a laptop/PDA running basic IPv6 services like ping6 and ifconfig6 through a GPRS phone using the infrastructure provided by Mobistar. An IPv6 over IPv4 tunnel is built between ULB and Mobistar's GGSN to test IPv6 applications. IPv6 was tested on the live network and needs further support from their hardware supplier.

### 3.10 Windows Mobile 2003

The new Windows Mobile 2003 software for Pocket PC includes several enhancements and new features, the most noticeable changes are in the areas of communications and multimedia:

- Enhanced Connection Manager user interface.
- Zero Configuration connections.
- Always-on Bluetooth discoverability and use of Bluetooth modems.
- Wireless LAN support.
- IPSec/L2TP.
- Support for Multiple VPNs.
- IPv6 support.
- 128-bit encryption strength for Crypto API.
- Windows Media Player 9 Series for the Pocket PC 2003.
- New version of Pocket Internet Explorer (pIE).
- New Pocket PC Phone Edition 2003 Features (GSM/GPRS and CDMA/CDMA1xRTT voice/data networks).

The goal is to integrate Windows Mobile 2003 within different Eurov6 demonstrations as Web browsing, file transfer, audio/video streams, network access, security, etc.

### **3.11 Business Applications**

Enhancement of demonstrations with applications like 6VOICE (VoIPv6), audio and video conferencing, streaming, Web services, and so on as examples of Business Applications with IPv6.

### **3.12 Security Applications**

Eurov6 project has received and installed the 6WIND gate router as a sponsoring which is now operational in the showcase with VPN scenario for demonstrating security features.

In addition of all those applications there exist another actions under way:

- Investigations and collection of data from possible application sponsors (Microsoft, VTT and Japanese companies).
- Promotion of the cooperation agreement with China, Korea and India.
- Contacts with several Japanese and US organizations for their participation in the project.

## 4. SERVICES

This section enlists the currently network services already available in the different showrooms and then gives a brief description of newer network services that will support the demonstrations running in the showrooms during the second year.

### 4.1 Network Services

In addition of Network Services already in used in Eurov6:

- Mobility.
- Multicast.
- Security/VPN.
- PKI.
- Basic QoS.
- DNS.

The improved scenarios will integrate new services as described in the following sections.

#### 4.1.1 AAA on IPv6

Authentication, Authorization and Accounting (AAA) is a common service applied when a user needs to be identified before accessing the network services. AAA provides not only identification facilities but also accounting tools for billing issues. RADIUS is a well-known example of AAA system which has several implementations on Linux and commercial products. Although AAA has been used for long time from now, this is not true for IPv6 networks because of their recent deployment. However, this is changing thanks to efforts made within other IST projects, like Euro6IX, where an AAA implementation for Linux with IPv6 support has been developed using as base the Freeradius implementation. Such IPv6 support allows not only communication through IPv6 packets but also new Attribute Value Pairs that are defined on RFC 3162, "RADIUS and IPv6", and they are related to IPv6 parameters.

Madrid showroom has installed such IPv6 RADIUS server, which can be found at 2001:618:10:2a03:204:acff:fe77:b83d.

#### 4.1.2 DHCPv6

The most common autoconfiguration mechanism used by IPv6 is stateless autoconfiguration, which consists of Router Advertisement messages sent by routers. However, this is not enough in some environments where hosts must have a global IPv6 address fixed for accessing to services located at such hosts. Even if DNS information cannot be manually configured on the hosts, the stateless mechanism must be completed. An alternative is the use of stateful autoconfiguration mechanism based on DHCPv6. It allows both dynamic and static address assignment, DNS information deliveries and prefix delegation mechanism for router autoconfiguration.

Although DHCPv6 is still on the draft stage, (no RFC is issued yet when this writing) the work of the IETF work-group is very advanced and no many changes are foreseen for the final RFC version. There is an implementation of DHCPv6 for both client and server, which can be

downloaded from <http://sourceforge.net/projects/dhcpv6>. It is developed for Linux, and Madrid showroom has successfully installed such application on its demo room for stateful autoconfiguration and prefix delegation mechanism. This service will enforce new demonstrations for the second year.

### 4.1.3 IPsec VPN

Further deployments for VPNs are underway. IPsec VPN over IPv6 between Brussels and Basel will be soon setup and tested.

## 4.2 Network infrastructure

This section describes the network infrastructure already available in the different showrooms and then gives a brief description of newer network infrastructure that will support the demonstrations running in the Eurov6 showrooms during the second year.

### 4.2.1 Network Connectivity

The Eurov6 project interconnects three operative showrooms in Brussels (University of Brussels), Basel (Telscom) and Madrid (Consulintel) via native IPv6 or tunneled IPv6 links. Connectivity is extended worldwide via Euro6IX, GÉANT and 6Bone, and multicast links to the M6Bone multicast project. This connectivity infrastructure allows distributing demonstrations among Fixed and Nomadic showrooms and other remote sites.

There are not foreseen major changes in this connectivity rather than the needed links for the future Nomadic showroom demonstrations.

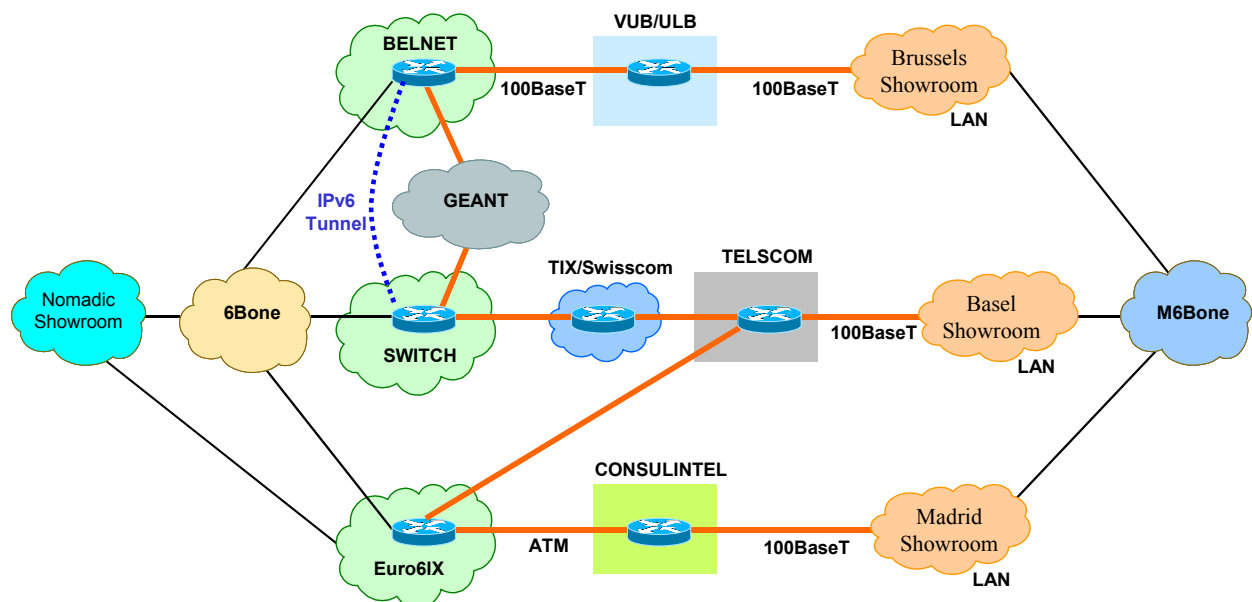


Figure 4-1: Eurov6 Showrooms Interconnection

### 4.2.2 Wireless Access

The Wireless access infrastructure is already deployed and used in the different Eurov6 showcases, including:

- Bluetooth.

- IrDA.
- WLAN.
- GPRS.

Hence, the major change for the improved scenarios will be the deployment and test of a enhance GPRS demonstrator. Nokia has developed a solution that enables a PDA to build an IPv6 link directly. The IPv6 feature is implemented in GGSN. Mobistar has a plan to test the IPv6 feature on Nokia GGSN node and will soon make a join-test with Brussels showroom. As Mobistar has no IPv6 connectivity, they will connect their GGSN to Brussels showroom through the tunnel. In a first phase, the aim is to run some streaming applications over the network.

### 4.2.3 IPv6 RAS

For offering native IPv6 connectivity to domestic users (without transition mechanisms like tunnels) most efforts are focused on links with more bandwidth like xDSL lines, due to the exploitation of the IPv6 features that improve the network performance. These kinds of links use the point-to-point protocol over Ethernet (PPPoE) as link protocol in order to set up the IPv6 link. However, all the users cannot afford this kind of links and they choose the legacy telephone lines in order to get IPv6 connectivity. For this, a telephone Remote Access Server (RAS) using the PPPv6 protocol is needed.

Madrid showroom has deployed a native IPv6 RAS on Linux allowing remote users to get IPv6 connectivity using phone lines, allowing demonstrations of this kind of access to IPv6 applications. This service is available calling to the phone number +34 911518197.

### 4.2.4 Network Management

Regarding Network Management tools deployed for demonstrations support, Madrid showroom has installed and tested several tools. As examples are:

#### SmokePing

SmokePing is a monitoring tool that uses ping6 packets to verify multiple network connectivity points (<http://people.ee.ethz.ch/~oetiker/webtools/smokeping/index.en.html>).

With SmokePing can be measured latency, latency distribution and packet loss in IPv6 networks. SmokePing maintains a long-term data store and draws pretty graphs, giving up to the minute information on the state of each network connection.

#### MRTG

An IPv6 enabled MRTG application has been tested in order to get network traffic statistics on showroom connections.

## **5. SUMMARY AND CONCLUSIONS**

This document describes the improved scenarios with all network components and applications acquired from the sponsors, projects and bought from commercial off the shelves components and services.

The improved scenarios will include enhancements on devices, multimedia and peer-to-peer applications, Home Portals, IPv6 on Cars, GPRS, AAA, DHCPv6, RAS, etc.

These scenarios will be available for IPv6 demonstration in the second year of the project.