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Euro6IX (http://www.euro6ix.org)

Eurov6 (http://www.eurov6.org)

Abstract:

This document summarizes all the demonstrations that will be showed at the Madrid 2003 Global IPv6 Summit, 12-14th May 2003.

The aim of the document is to show the IPv6 advantages and also that it is now easily deployable and a wide range of applications and services supports it.

The Madrid 2003 Global IPv6 Summit has been a good opportunity for several IST projects for showing their public trials. Thus, each project has presented its own achievements according to its goals.

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IPv6 Demonstrations

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1. INTRODUCTION

After the success of the two previous editions of the "Madrid Global IPv6 Summit", this new one will show that IPv6 is already operational and deployable.

Two years up-front of the deployment of IPv6 in Europe, the situation is already promising. This is being introduced by several IPv6 Cluster projects that will present the lessons learned regarding “IPv6 Deployment” issues in different fields, so you can “do it yourself”.

The sponsors and endorsers present, together with the participating ISPs and Telcos make this event the ideal platform for the exchange of experiences and the promotion of your activities.

The support from the industry and the Internet and Telecom relevant associations also prove that IPv6 is here. The sponsors and endorsers are a key factor for the organization of this event. We take the opportunity to thank them for their support: Without them it would not be possible.

Almost a hundred projects are demonstrating that IPv6 is working well. The European Union’s expectations regarding the new protocol, in order to support its leadership as a future economic power, are becoming real. "Madrid 2003 Global IPv6 Summit" is the reference to make an update of the situation. For a third consecutive year we are inviting you to participate in a key event about Internet developments.

2. 6POWER DEMONSTRATIONS

2.1 6WIND

2.1.1 DHCPv6 and Prefix Delegation

Overview

This demonstration shows the prefix delegation mechanism and the interaction between the delegating router and an IPv6 Radius server. Upon a request for an IPv6 prefix from the customer's CPE (6WIDGate 6100 serie) the delegating router (6WINDEdge 6200 series) asks to the Radius server over IPv6 in order to get the prefix subscribed by the customer.

Innovation

The new feature is on the 6WINDEdge equipment and is provided by the integration of two functionalities: DHCPv6 delegating prefixes function and IPv6 radius client. The advantage is the use of both a standard mechanism for prefix delegation like DHCPv6 and a standard protocol for customer's databases access like Radius. It should increase IPv6 deployment by reusing existing users databases on Radius servers.

How IPv6 improves this scenario

IPv6 brings customers routers auto-configuration thanks to the prefix delegation mechanism and integration with Radius server provides a transparent access to existing servers on ISP networks.

2.2 Consulintel

2.2.1 Video Streaming over PLC

Overview

The demonstration tries to show the audio/video streaming over IPv6 by mean of an IPv6 player (Windows Media Player Series 9.0). The streaming server is located at the Eurov6 stand.

In addition of a normal High Quality Video/Audio streaming, another goal is to show a preliminary use of IPv6 QoS functionalities for this kind of streaming services.

In a multihomed Video Streaming server, the clients can access to streams by two separate paths. In the first path, trough Euro6IX, the client can find a video with Best effort treatment, getting a high quality video. In the second path, trough 6Bone, the client can find a video with bandwidth limitation, getting a low quality video.

All this traffic will travel through PLC network, from the streaming server to the streaming client located at the 6POWER stand. With this test we can show the capacity of the PLC network, which is able to support up to 45 Mbps.

Innovation

The usage of an audio/video streaming service with IPv6, using PLC as network access.

How IPv6 improves this scenario

- The IPv6 protocol allows the use of a wide range of available addresses.
- The IPv6 protocol allows QoS facilities that improve the network performance.

2.3 UMU

2.3.1 Remote Control of Home Automation Devices

Overview

This demo shows the usage of a home gateway, particularly the OSGi Framework, as a central point at the house for home management; this home gateway allows controlling the home automation devices of our house remotely and in a secure way through IPv6. Thanks to the developed services on the home gateway, we will be able to control and monitor the status of our home.

This home gateway will allow our home to be always connected to the Internet. So, internal home clients can access to the Internet, in the same way we will be able to manage the house remotely. Another property of the OSGi home gateway is that it works as a protocol interconnection point, allowing to manage home automation devices controlled by protocols like X10 in our case, and the development of services on OSGi, as the services that allow to manage the home automation device for building access control and to manage X10 devices.

The services that we will see in this demonstration are:

- Building Access Control: The University of Murcia has developed a device that allows opening and closing doors and that can be controlled remotely. A service has been developed to be run on the OSGi home gateway to manage these devices through a web interface, so that the user can open and close the door.
- X10 Device Control: It is also available an X10 protocol service. This service, that is running on the home gateway too, allows managing X10 devices. In this case, the user to control the X10 lamp device installed at the remote location of this demo can use the service web interface. The user will be able to turn on and off the device.
- Home Monitoring: In this demo, there is also a monitoring service through remote camera. Thanks to this service, the user is able to check the status of his home, as well as the correct result of the control operations: the lamp status, how the door manager acts, etc.

Innovation

The new Home Automation web interface resides on a secure web server. This interface allows controlling remotely home automation devices.

Control operations can be monitored from a web page that contains an applet; this applet shows the room where the home automation devices are installed, as captured by a camera.

Scenario improvement with IPv6

The fact of desiring to be able to address a high number of devices at home (each door, each appliance, ...) requires a wide range of available addresses. While this is unaffordable when using IPv4, it no longer is a problem with IPv6. This also allows for a true end-to-end access to devices at home.

2.3.2 IPv6 Multimedia and Policy-Based QoS over PLC Networks

Overview

This part of the demonstration shows how policy based QoS can be achieved when using IPv6 over Power Line networks. The goal is to allow Power Line end users to take advantage of IPv6 QoS facilities without having to worry about network configuration or parameters; that is, right from the multimedia applications themselves. Final users are intended to deal with an application level concept of QoS (e.g., to choose between "low", "medium" or "high" quality, for example), whereas the network itself takes up with the task of setting its parameters accordingly for fulfilling the QoS requirements. The term "policy-based" refers to the fact that user requirements can be checked against a policy database (a set of rules), which makes it possible to accept or reject QoS requests based on user or host authentication, for example.

In this demonstration, we will use the Videophone from Agora Systems as a multimedia example application. This application makes use of the Session Initiation Protocol (SIP) to establish a videoconference call. The QoS requirements of each call will be taken from the SIP messaging by a central node called the QoS Broker, which will check them against the policy database and configure the PLC network if needed. The Common Open Policy Service protocol (COPS) will be used here to talk with the policy database server (called the Policy Decision Point or PDP), whereas Simple Network Management Protocol (SNMP) will be used to set PLC parameters for QoS configuration. So, what we will see is:

- Two PCs running the Videophone application will try to establish a call using the SIP protocol, after the desired quality (low, medium or high) has been selected by the user.
- The QoS Broker, running on a laptop, will act as a SIP proxy and grab the QoS requirements from the SIP messages.
- On the same laptop, a PDP process will also be running.
- The QoS Broker process will use COPS to query the PDP about whether to accept or reject the QoS request.
- If the request is accepted, the QoS Broker will use SNMP to update the PLC nodes configuration in order to support the requested service. At this point, an SNMP monitor will be used to check that the PLC configuration has been properly updated.
- Otherwise (if the PDP decides not to accept the QoS request), the original SIP call will be cancelled.
- If the Videophone call is established, we will be able to see a videoconference session with the chosen quality.

Innovation

The new SIP-enabled Videophone application from Agora Systems allows selecting the Quality of Service (low, medium, high).

The enhanced version of the QoS Broker application acts as a SIP proxy between Videophone peers, managing the QoS requirements from them. To do this, the QoS Broker makes use of COPS protocol to query a Policy Decision Point (PDP).

Scenario improvement with IPv6

One of the benefits of using IPv6 is the possibility of identifying and labeling traffic flows, in a more efficient and convenient way that it can be done with IPv4. This is especially attractive when it comes to considering that QoS requirements set inside the PLC network maybe must be enforced outside it too. Since the QoS Broker can only act on PLC nodes, traffic flows tagging (via the *Flow-ID* field in the IPv6 header) could be an easy way of "exporting" QoS requirements for treatment in a generic IPv6 network. A similar approach is also possible the other way around, when QoS is set outside the PLC network but must be enforced inside it too.

2.3.3 Network Address Translation-Protocol Translation (NAT-PT)

Overview

In this demo it will be possible to verify how NAT-PT protocol works; in particular, the implementation developed by 6WIND in their routers.

NAT-PT is a transition mechanism whose objective is to allow the communication between hosts with different IP protocol versions, that is, between IPv4 hosts and IPv6 hosts. The router implementing the NAT-PT protocol must reside on the boundary of the different IP version networks. NAT-PT is useful because it allows making use of services between different networks, whose communication between them would be impossible. Thanks to NAT-PT, new IPv6 networks are not isolated from the IPv4 actual Internet, being able not only to access new generation services, but also to use all the services already available in IPv4 networks. Concretely, in this demo, the user will be able to verify all these facts accessing to available IPv4 services in the network, like the web.

Innovation

Thanks to the NAT-PT protocol, during the transition period where IPv4 and IPv6 networks will be present, networks of both types will be able to coexist and to communicate with one another.

3. 6QM DEMONSTRATIONS

3.1 Fokus

3.1.1 IPv6 Satellite Multicast

Overview

One of the expected services that will be provided in future mobile communication networks is the distribution of live audio and video content. A typical example is a major soccer game at the European level, where the audio and the video stream from the location of the event needs to be distributed all over the continent, with additional (language-specific) information added to those streams. The final destinations are the mobile terminals of individual users. Typical data rates of such streams are 1-4 Mbit/s for the video, plus 8-64 Kbit/s for each audio component. Several options exist to implement this type of content delivery:

- The traditional unicast distribution suffers from the high burden put on the terrestrial infrastructure. It is just impossible to deliver several MBit/s from one source to a huge number of destinations.
- Multicast distribution over the terrestrial networks improves the situation significantly. But the data still has to be transmitted over every network link towards the receivers.
- One of the big advantages of satellite communication is the huge coverage area where "one can serve millions". While being well suited for high-bandwidth content distribution towards a large number of receivers, satellite distribution suffers from the fact that mobile terminals will typically not be able to receive the stream directly.

The challenge can be met by an integration of content distribution over satellite towards the radio base stations of the terrestrial mobile networks. In this scenario, the high-bandwidth part of the content (typically the video) is received by the base stations, while the low-bandwidth audio part can use either way (over the satellite or the terrestrial infrastructure).

The motivation for the terrestrial distribution of the audio signals is the fact that not all base stations may be equipped with a satellite downlink, allowing the audio signal to be received by every mobile terminal, while the video stream is only provided in those areas where the base station serving that area supports it.

How IPv6 improves the deployed environment

IPv6 satellite multicast is used in order to deliver content to the end users. Right now the demonstration scenario is to deliver content via satellite to the mobile laptops connected to the satellite based hot-spot WLAN access point. As a future step also UMTS and DVB-T would be used in order to access mobile clients (palm-tops, multimedia mobile phones, cars etc.). Due to the limit number of the IPv4 addresses IPv6 is the only one alternative to provide unique IP addresses for all mobile devices.

3.2 FT

3.2.1 IPPM and RTP Measurement System

Overview

This demonstration shows the usage of an IPv6 IPPM measurement system to control the quality of IPv6 services. The system is made of two components, the IPPM measurement system of QoS Metrix and the IPPM proxy of France Telecom. The probes are distributed on France Telecom IPv6 Network, VTHDv6, at Consulintel office and at IPv6 Global Summit. The probe manager and the IPPM proxy are located in the France Telecom Lab of Lannion. The following pictures show the complete scenario.

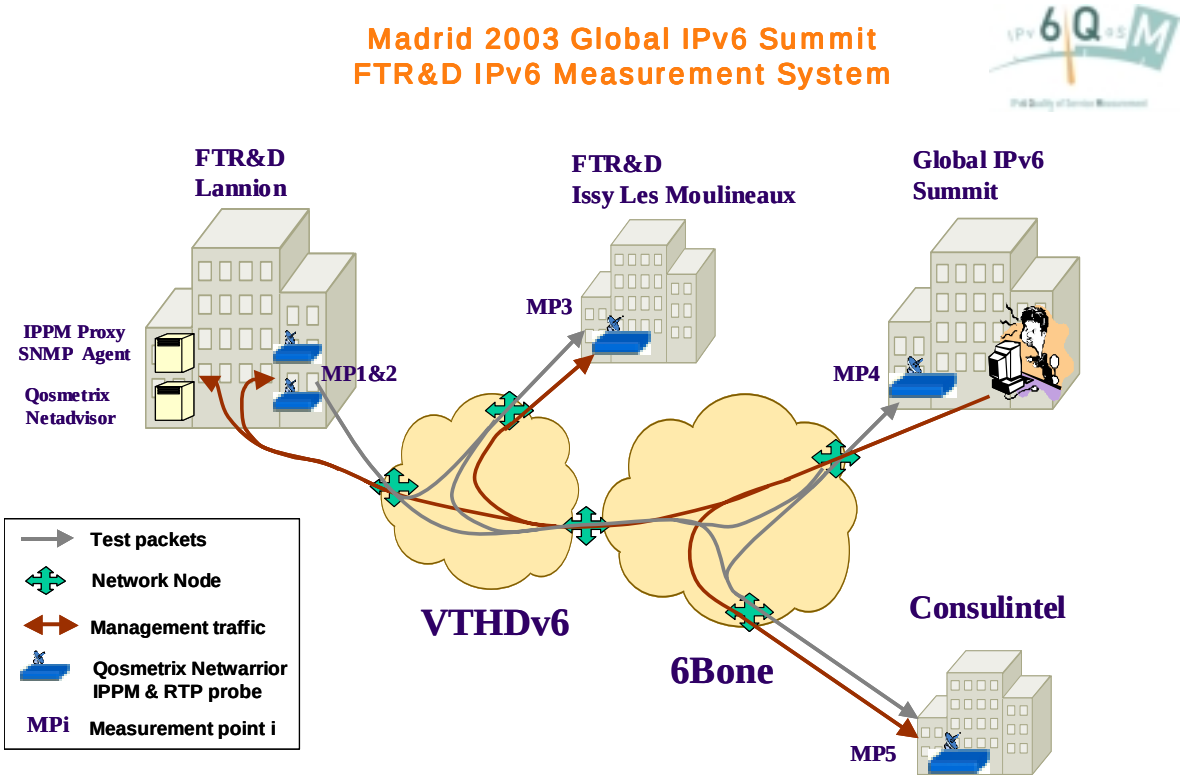

Figure 3-1: FTR&D Demonstration Scenario

The system of measure monitors the QoS of the traffic of IPv6 services (HTTP, RTP…) exchanged between the points of measures. It measures IPPM metrics and RTP metrics.

The IPPM Proxy is an implementation of the IPPM REPORTING MIB. Its management framework allows users to set up aggregated measures to be performed on results of networks measure exchanged between the probes.

Coupling these two components will allow results of IPPM measures performed among composite networks to be exchanged between administrative domains.

The services that we will see in this demonstration are:

- IPPM measures over an world wide IPv6 network: These measures perform IPPM metrics such as latency, packets loss and jitter;

- RTP measures over an world wide IPv6 network: These measures perform 80 different RTP metrics;
- IPPM REPORTING MIB agent: The agent allows the creation of aggregated measure reports and the production of measure reports based on results previously stored in the agent.

Innovation

A Full IPv6 (and IPv4) IPPM and RTP measurement system. Measures are performed per network services.

A MIB interface for exchanging in the Quality of Service measurement results.

Scenario improvement with IPv6

The system of measure provides both the capability of measuring intra domain performance and the capability of exchanging results between administrative areas. Measurement peering should permit to determine end-to-end QoS, based on the concatenation of measurements results exchanged.

4. EURO6IX DEMONSTRATIONS

4.1 6WIND

4.1.1 Multicast with IPv6

Overview

This demonstration shows the use of IPv6 multicast. Multicast is based on the concept of group communication. An arbitrary group of receivers expresses an interest in receiving a particular data stream. This group does not have any physical or geographical boundaries: The hosts can be located anywhere on the Internet. An advantage of multicast is that it saves network bandwidth: a single message is transmitted by the source whereas in point to point communication, the source should send as many messages as there are receivers. Applications that take advantage of multicast include videoconferencing, corporate communications, distance learning, and distribution of software, stock quotes, and news.

In this demonstration, some video sources are located in 6WIND and U. of Murcia. The receiver on the booth takes part in the group and receives the video traffics through M6BONE. The M6Bone is a test service which offers an IPv6 multicast service to interested sites. M6Bone is a very good place for testing lots of equipments, implementations or configurations, because it is connecting lots of sites from all over the world, and it is interesting for people who want to test some features about multicast, to test it with other connected sites.

The MBONE tools (SDR, VIC or RAT) enable video conferencing between remote sites on a multicast network. So, we test multicast technologies upon the M6bone network, creating a videoconference between several different hosts.

Scenario improvement with IPv6

Use of IPv6 in multicast bring:

- Better management of network scopes.
- Fewer limitations on the number of multicast addresses.
- An opportunity to deploy multicast together with IPv6. IPv6 routers are more likely to support multicast from the start.

4.2 BT

The partly funded European Commission project, Euro6IX, is concerned with the pre commercial deployment of the IPv6 Internet in Europe. The network is based on the interconnection of a number of IPv6 Internet Exchanges operated by the leading Telecommunication operators in Europe. Other areas of work within the project included the investigation of network services that could be based at the Internet Exchanges and the porting of applications to IPv6.

Some of the major trends in the Internet today are the increasing number of devices attached to the Internet, the user demand for ever higher bandwidths, the requirement for always on connections, security, the explosion of peer-to-peer applications etc. IPv6 meets these requirements and more.

The Euro6IX demonstration provided by BT aims to demonstrate a combination of the facilities of the Euro6IX network and how IPv6 has the capability to meet the Internet trends.

4.2.1 Mobile IPv6

Overview

In this demonstration the Mobile IPv6 protocol is used to show how a Laptop PC with WLAN access can remain connected to the network and continuously received a streamed MP3 audio whilst roaming between different WLAN networks.

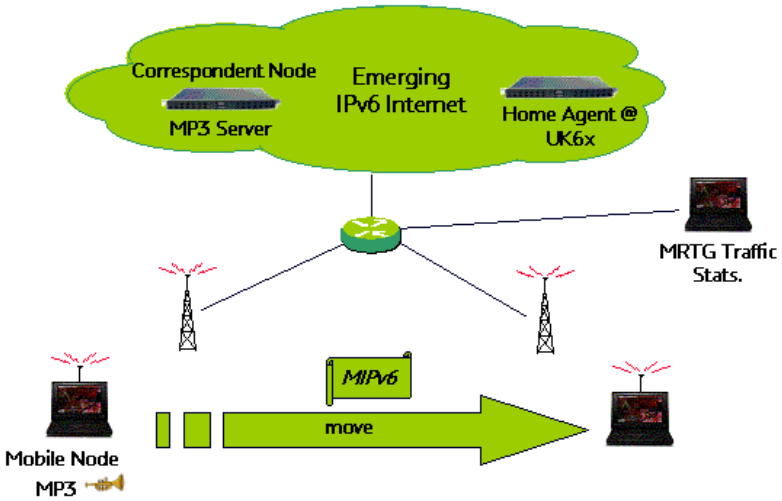

Figure 4-1: Mobile IPv6 Scenario

Innovation

Situations where Mobile IPv6 could potentially be very beneficial are large WLAN network i.e. would allow you to remain connected to the network whilst walking though a complete airport or town. Other situation are to allow continuous network connectivity between different network technologies e.g. fixed and WLAN or fixed and 3G.

Scenario improvement with IPv6

IPv6 mobility improves the capabilities offered by earlier mobile environments due to its better performance and features.

4.2.2 A range of IPv6 Applications

Overview

This demonstration shows a complete range of IPv6 applications:

1. Simple IPv6 wed browsing.

2. Interworking between IPv6 and IPv4.
3. High speed video streaming.
4. Audio streaming.
5. Multi player network based games.
6. Instant messaging.

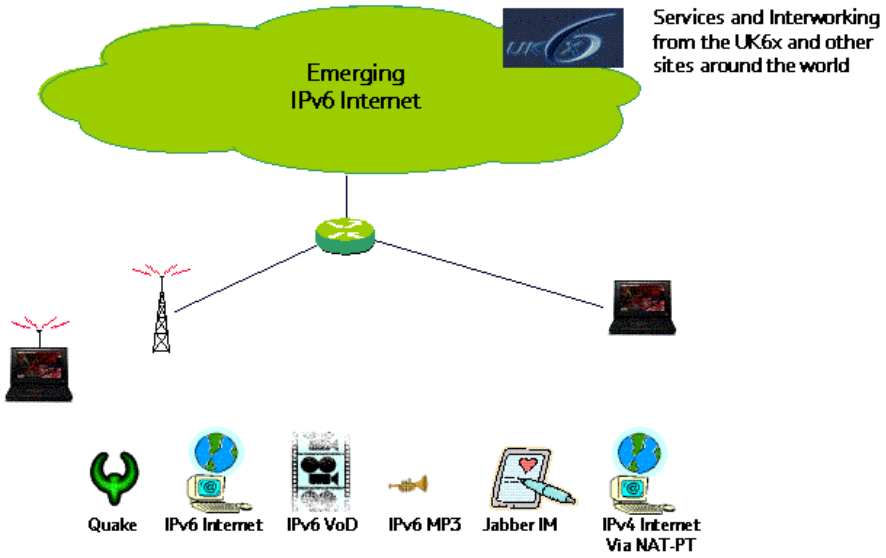

Figure 4-2: IPv6 Applications

Innovation

This demonstration will use the Euro6IX network to gain access to the services based at the UK6x (www.uk6x.com) which is BT's Internet Exchange based at Telehouse, London, UK. Interworking with the IPv4 Internet will be demonstrated via BT's Ultima device that contains a number of interworking mechanisms but in this circumstance seamless NAT-PT based interworking will be demonstrated. The high-speed video streaming demonstration is visually pleasing as well as providing an application that stresses the network. Combining the applications show that IPv6 application are available today in many forms.

Scenario improvement with IPv6

- The IPv6 protocol allows the use of a wide range of available addresses and better features regarding QoS, mobility, etc.
- Peer to Peer connection can be simply realized by using IPv6 address (Global address).

4.2.3 IPv6 Access via GPRS

Overview

Currently the GPRS networks being rolled out around the world does not support IPv6. This demonstration shows how IPv6 can be tunneled over the current IPv4 based GPRS networks to provide connectivity. The demonstration will use a Laptop PC connected to a GPRS mobile phone. It is easy to imagine GPRS capable palm devices with similar capabilities; these could have similar functionality to future 3G terminals, but with limited bandwidth capabilities compared with 3G.

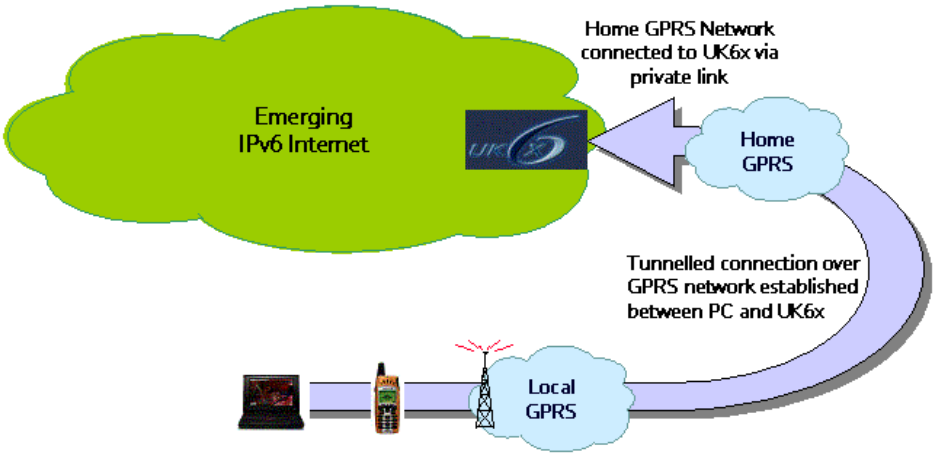

Figure 4-3: IPv6 Connectivity over GPRS

Innovation

The use of GPRS as network access shows how there are a lot of scenarios, even needing mobile capacities, where IPv6 can be used for having connectivity, thus it can be said that IPv6 connectivity is not reduced to LAN areas or home scenarios.

Scenario improvement with IPv6

The IPv6 protocol allows the use of a wide range of available addresses.

4.3 Consulintel

4.3.1 Audio/Video Streaming over IPv6

Overview

The demonstration tries to show the audio/video streaming over IPv6 by mean of an IPv6 player (Windows Media Player Series 9.0). The streaming server is located at the Eurov6 stand.

In addition of a normal High Quality Video/Audio streaming, another goal is to show a preliminary use of IPv6 QoS functionalities for this kind of streaming services.

In a multihomed Video Streaming server, the clients can access to streams by two separate paths. In the first path, trough Euro6IX, the client can find a video with Best effort treatment, getting a high quality video. In the second path, trough 6Bone, the client can find a video with bandwidth limitation, getting a low quality video.

At the same time, the IPv6 Traffic Class fields of the streams are marked for future uses exploiting DiffServ DSCP functions.

Furthermore, this PC is also used to attach an IPv6 Streaming server, which is located in a private home, behind an ADSL router with IPv4 NAT functionality and using a tunnel with protocol 41 forwarding.

Innovation

- The use of audio/video streaming over IPv6.
- The usage of protocol 41 forwarding to make an IPv6 tunnel over IPv4 Internet.

Scenario improvement with IPv6

- The IPv6 protocol allows the use of a wide range of available addresses.
- The IPv6 protocol allows QoS facilities that improve the network performances.

4.3.2 Video Multicast

Overview

This demonstration is performed along with TID and it tries to show the video streaming service over IPv6 multicast. The server is located at TID premises (nemuru.tid.euro6ix.org). It consists in software developed by TID that transmits IPv6 Multicast in raw transport stream (UDP).

Refer to TID demonstrations descriptions for more details.

4.4 nGn

4.4.1 MRTGv6

Overview

MRTG stands for "Multi Router Graphic Tool". Initially designed by Tobias Oetiker (http://people.ee.ethz.zh/~oetiker). Basically it consists of a perl-writen application acting as SNMP manager retrieving data from a SNMP Agent. Then, after processing received data it print them in a standard graphic format (.png) inside HTML pages you can view further using an HTML browser.

For showing how MRTGv6 works, nGn has installed an SNMPv6 agent in a Hitachi Router and the MRTGv6 in a where the generated HTML documents are stored. This HTML documents are built for MRTGv6 with traffic statistical graphics for showing network activity for selected router's interfaces.

Innovation

This demonstration shows statistics results on the main router of the event (HITACHI GR2000 H 10), running the SNMP protocol on IPv6.

4.4.2 Instant Messaging

Overview

nGn is developing an Instant Messaging application into the Euro6IX project frame.

The application uses a central service in a remote nGn site and a client side. This Instant Messaging release is a phase in the development process with central services as presence service, rosters management and contacts searches, and with p2p communications such as real time notifications and short messages transport.

Innovation

The use of peer-to-peer applications over IPv6 is the main innovation on this demonstration.

Scenario improvement with IPv6

- The IPv6 protocol allows the use of a wide range of available addresses.
- The IPv6 protocol avoids the use of NAT mechanism allowing the peer to peer applications works fine.

4.5 PTIN

4.5.1 Access of a Mobile Node to Advanced Services

Overview

This demo shows the access of a Mobile Node to different IPv6 services. These services can be located either at the demo local or remotely on the Euro6IX network.

The Mobility can be shown using 2 WLANs and moving the point of attachment to the network from one WLAN to another. Also, the Home Agent (HA) used could be locally installed or in any Euro6IX network.

Many services can be shown beyond the most traditional ones like www or ftp. The advanced services that can be shown are:

- Chat facilities (IRC)
- Instant Messaging (Jabber)
- Video Streaming (VIC).
- Audio Streaming (MP3).
- Gaming (Quake I and Quake II).

Innovation

- A Mobile Node is able to access advanced services while the node is moving physically and changing its point of attachment to the network.
- Some advanced application can be shown working like video streaming, audio streaming or network gaming.

Scenario improvement with IPv6

In this scenario, IPv6 makes all the difference, because the Mobility in IPv4 is not so efficient. In IPv4 the triangle routing cannot be avoided and this fact will impact on applications, specially the real-time ones.

4.6 Telscom

4.6.1 6VOICE: Voice over IPv6 Using SIP Protocol

Overview

This demonstration shows the use of a "Voice over IP" software that allows end-users to talk through the Internet infrastructure using the IPv6 protocol.

This software implements the SIP (Session Initiation Protocol) that lets users initiate a session.

Audio data are then transmitted using the RTP protocol, a protocol designed for Real Time applications. RTP comprises RTCP (real-time control protocol) that provides feedback on the quality of the data distribution. Applications may then use this feedback to adapt the streaming to different network conditions.

In this demo the application runs on two laptops based on the Linux RedHat Operating System.

The demonstration shows the two main aspects of this software, namely SIP and RTP:

- A user invites another user through an IPv6 address.
- The latter accepts the incoming invitation.
- The RTP session starts transmitting and receiving the audio data in "Full Duplex" mode.
- One of the two users ends the session.

Innovation

The VoIPv6 uses the Session Initiation Protocol.

Scenario improvement with IPv6

The IPv6 protocol allows the use of a wide range of available addresses, and thus facilitates, end-to-end communications.

4.7 TID

4.7.1 Magalia

Overview

This demo shows the usage of Magalia, an application developed by Euro6IX that monitors and watches Euro6IX networks through SNMP v4/v6 queries.

A server is installed at the Hotel, which will monitor several routers and nodes.

Any change made in network configuration in the event can be reflected in real-time using edition features of network maps of Xges.

An instance of the graphical client, Xges, will be opened connecting to the server in the Hotel and another one will be opened connecting to the server running in TID.

Demonstrations steps

- A Magalia Kernel is running in piltrafilla.gis2003.euro6ix.org. This server contains all of the information about the state of the network in the hotel.
- Open an instance of the graphical client, Xges, connecting to the Kernel in piltrafilla.gis2003.euro6Ix.org. At this time, any modification in the state of the network can be done from Xges.
- Open a new instance of Xges connecting to the Kernel running in TID premises. This instance shows the state of TID test-bed.

Innovation

- The application is being developed in the context of Euro6IX project. It offers the possibility to show at real-time what's happening in the Euro6IX networks.
- The possibility to monitor routers' load using IPv4 SNMP queries that are sent to Magalia Kernel through IPv6.
- The edition of network maps and the reload of every Xges instance when the maps are changed.

Scenario improvement with IPv6

Magalia adds the control and monitoring of Euro6IX networks.

4.7.2 Web Statistics

Overview

This demo shows the operation of Statistics Server running in TID premises.

Demonstrations steps

- TID Statistics System is running at TID premises. An IPv6 web Browser (Mozilla) instance will be opened.
- The URL of the Statistics System is http://stat6.tid.euro6ix.org.
- Periodically (every hour), the system refreshes the pages with new data about connectivity, so the connection must be reloaded to show them.

Innovation

- The main pages are daily statistics, but the system offers the possibility to recover past days and even, monthly statistics.
- There are some new utilities included such as telnet to a host (up to now only IPv4 telnet), ping to a host…and the addition of a new host to be monitored.

Scenario improvement with IPv6

This system provides a new way to control IPv6 hosts.

4.7.3 Web Access to Looking Glass Server

Overview

This demo shows the operation of Looking Glass Server running in TID premises.

Demonstrations steps

- TID Looking Glass System is running at TID premises. An IPv6 web Browser (Mozilla) instance will be opened.
- The URL of the Statistics System is http://lg.tid.euro6ix.org.
- In this URL you can ask about any information of the routers that belong to TID network.

Innovation

- The connections to every requested router is via IPv6.

Scenario improvement with IPv6

Looking Glass is a tool migrated to IPv6 to obtain information from IPv6 routers in an efficient way.

4.7.4 Afoto

Overview

This demo shows a funny application developed by LONG project that captures an image in real time and sends it by IPv6 mail.

The IPv6 mail server is located at TID premises (dns1.ist-long.com).

Demonstration steps

- The image captured by the Web-Cam it is shown in the application window.
- The user writes the mail address where the photo will be sent.
- After clicking “Send” button, the image is sent using IPv6 mail server in TID to the mailbox specified by the user in the previous step.

Innovation

This application was developed in the context of LONG project to show IPv6 mail service and its state is stable since then.

Scenario improvement with IPv6

This application wants to show the IPv6 mail service operation in a funny way.

4.7.5 Web Access to an IPv4 service

Overview

This demo shows the access to IPv4 world from IPv6 world. This is possible because the usage of a NAT-PT developed at TID, and installed and running at TID premises.

The IPv4 service to be shown in this case is “Digital Home” that offers the control of a house via http.

Demonstration steps

- The HTTP client initiates the connection.
- The NAT-PT translates IPv6 packets into IPv4.
- The client reaches the IPv4 server and the connection is established.

Innovation

This service offers the possibility to control in a remote way all of the devices at home.

Scenario improvement with IPv6

IPv6 cannot pretend to change everything deployed in the IPv4 Internet. It pretends to be a solution to all the problems that IPv4 protocol has.

In a first phase of IPv6 adoption, IPv4 services have to be adapted with solutions like these, but finally they have to be ported.

Final User Services like this can be one incentive to make the transition to IPv6.

4.7.6 New Terminals

Overview

This demo shows the usage of new terminals with IPv6. The terminal is an iPAQ H3970 equipped with a sleeve and a wireless PCMCIA card, which can access a streaming video service.

There will be streaming servers in TID and in the Hotel. The iPAQ is the streaming client.

Demonstration steps

- A unicast streaming server is running in servideo.gis2003.euro6ix.org. It serves video using the HTTP protocol over IPv6.
- The iPAQ is configured with IPv6 and VLC.
- The iPAQ demands the server a video over IPv6 and displays it.

Innovation

An IPv6 video client on demand installed in the new terminal.

How IPv6 improves this environment

These new terminals services are expected to be numerous and this will lead into a massive need of IP addresses, which is the main lack of IPv4. Besides the developing of mobility as a native IPv6 feature will easy the mobility environment in which the new terminals are expected to develop.

4.7.7 Video Multicast

Overview

This demo shows the video streaming service over IPv6 multicast. The server is located at TID premises (nemuru.tid.euro6ix.org). It consists in software developed by TID that transmits IPv6 Multicast in raw transport stream (UDP).

Two clients with 2 different operating systems will be used to show that multicast is being used. Firstly, a Red Hat Linux 9 running VLC 0.5.3. VLC version 0.5.3 introduces the capability of receiving IPv6 Multicast in Linux. Secondly, a Windows XP running VLC 0.5.3 and a multicast_to_unicast relay. The last version of VLC doesn't work yet with IPv6 Multicast, so a multicast_to_unicast relay has been developed as a temporary solution to be able to use VLC for Windows XP. Advantage: Network benefits of multicast in terms of load. Disadvantage: Final client equipment CPU usage increases.

Multicast connectivity will be provided via an IPv6 over IPv6 tunnel (Multicast over unicast) between the 6WIND router installed in the hotel and a multicast enabled router located at TID.

Demonstrations steps

For Linux:

- Launch VLC.
- Go to Network, UDP/RTP Multicast, and write the multicast group address (ff18::5) and port (1234).
- Accept.

For Windows:

- Launch the relay (relay ff18::55 1234 4 ::1 5678).
- Launch VLC.
- Go to Network, UDP/RTP, and select the port (5678).

Innovation

The Multicast support in the video server and in the client side.

Scenario improvement with IPv6

IPv6 TV broadcasting.

4.7.8 Video on Demand

Overview

This demo shows the video streaming service on demand. The server is located at TID premises (nemuru.tid.euro6ix.org). It consists in software developed by TID that transmits IPv6 MPEG-2 streams on demand (HTTP).

The client that will be used is a Red Hat Linux running VLC 0.5.3.

Demonstrations steps

- Launch VLC.

- Go to Network, HTTP/FTP/MMS, and write the URL (http://nemuru.tid.euro6ix.org:9999/video.mpg).
- Accept.

Innovation

IPv6 support.

Scenario improvement with IPv6

4.8 UMU

4.8.1 Network access via Tunnel Broker

Overview

The demonstration shows how attaching the IPv6 world with TILab's Tunnel Broker and using standard IPv6 applications like web browsing and standard software.

Innovation

The use of the tunnel broker as transition mechanism.

4.8.2 Attaching the IPv4 world from an IPv6 end system using NAT-PT

Overview

The demonstrations shows how attaching the IPv4 world from an IPv6 end system using the NAT-PT transition mechanism which could be placed within the service area of an IPv6 IX.

Innovation

The use of the NAT-PT as transition mechanism.

4.8.3 PKIv6 and Smartcard for Accessing IPv6 Network Services/Applications

Overview

This demo shows the integrated use of the PKIv6 developed within Euro6IX project to offer a wide range of services: Windows access control; web authentication based on smart cards and PKIv6; VPNs based on IPsecv6 based on certificates for multimedia applications. A Windows cryptographic module has been created to be enabled using smart cards in the certificate-based web authentication. Moreover the Windows access control has been modified to be enabled using smart cards.

Innovation

The use of both a PKI infrastructure and Smartcard over IPv6.

Scenario improvement with IPv6

The use of the integrated IPSec protocol guarantees the security in the communications.

4.8.4 ISABEL-VPN

Overview

UMU and UPM show the interaction between the PKIv6 services and VPN creation in request to dynamic provision for Multimedia Applications, i.e. ISABEL. This scenario is tested in combination with 6POWER demo creating the VPN between 2 ISABEL applications in each network.

Innovation

The implementation of the VPN over IPv6 using PKIv6 services.

Scenario improvement with IPv6

The use of the integrated IPSec protocol guarantees the security in the communications.

4.8.5 Mobile IPv6 with Video Streaming Applications

Overview

UMU demonstration shows how Mobile IPv6 can be used to offer streaming applications and services to end-users that are allowed to move between different networks defined inside Euro6IX project.

Innovation

The use of video streaming over IPv6

Scenario improvement with IPv6

- The IPv6 protocol allows the use of a wide range of available addresses.
- The IPv6 protocol provides a set of QoS features that can improve the streaming performance.

4.9 UPM

4.9.1 ISABELv6: Integration of SIP, H323 and Webantenna

Overview

These demos will show several ways of achieving interworking between the Isabel application being used to distribute the Global IPv6 Summit conference and standard web and videoconferencing applications.

The ISABEL CSCW application (isabel.dit.upm.es) is a group communication tool for the Internet, based on advanced videoconferencing features. Isabel has been extensively used and validated in real and world wide service trials since 1993, and successfully used for the retransmission of past editions of the Global IPv6 Summit in Madrid.

An Isabel Session is based on interaction modes that support different types of collaboration. Each interaction mode integrates RTP audio, video, graphics or pointer flows and can change during the life of a session following user's needs.

Isabel Web Antenna

Publicly accessible from:

- http://antenna.upm.euro6ix.org (IPv6).
- http://antenna.dit.upm.es (IPv4).

Isabel Web Antenna provides standard Web access to an Isabel session. It is a fully web based application made of several java applets. Its architecture is depicted in the figure:

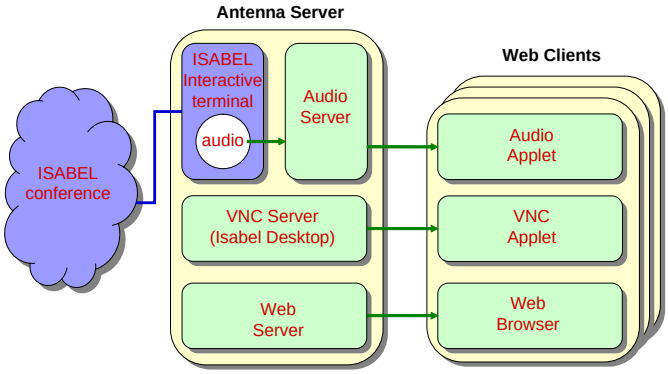

Figure 4-4: Isabel Web Antenna

Isabel Web Antenna is based on VNC streaming of the Isabel desktop and allows high quality streaming of the Isabel sessions. Although oriented for broadcasting Isabel sessions, it allows web clients to be interactive.

Since the Isabel Web Antenna is based on Java technology, you need a Java-enabled Web browser in order to use the service. You can get the latest version of the Java software from Sun Microsystems (http://java.sun.com/getjava).

For IPv4 connections any system configuration should be suitable. On IPv6 connections, since there is no IPv6 support for Java in Windows environments, the Linux Operating System and Java (JRE) version 1.4 or higher is required.

The Isabel desktop resolution is 1024x768. Therefore, to ensure a complete desktop view with no need to scroll we recommend a 1024x768 or higher screen resolution.

Isabel to SIP or H.323 Gateway

Isabel to SIP or H.323 Gateways provides interworking between standard videoconferencing applications based on SIP or H.323. Both include multipoint capabilities by the use of an MCU. The architecture used for both gateways is shown in the following pictures:

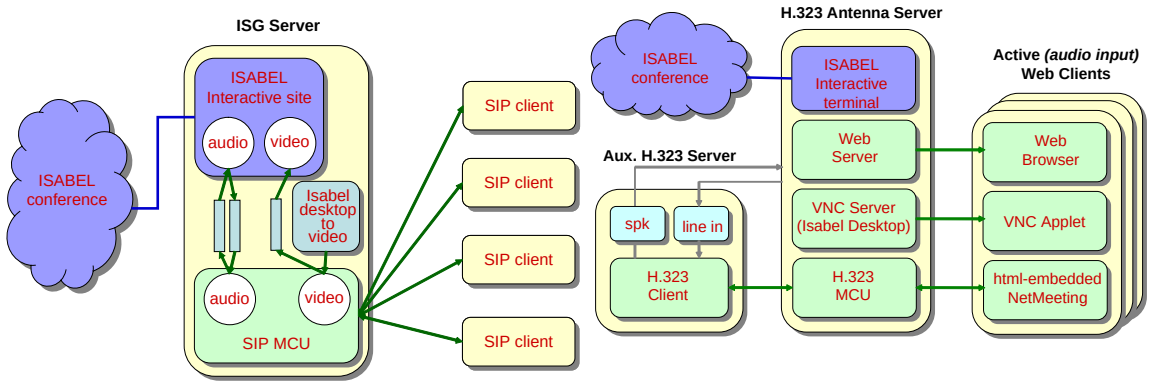

Figure 4-5: Isabel SIP Architecture

H.323 gateway functionality, which by now is only IPv4, can be tested from the Isabel Web Antenna site URL mentioned above. The SIP gateway is being shown on a Tablet PC through WLAN on Euro6IX demo booth.

Isabel web antenna and SIP and H.323 gateways are part of research line aimed to extend the coverage of Isabel application to new types of fixed or mobile devices. These demos show that:

Interworking of Isabel and standard videoconferencing is possible, by using a simple mapping of the desktop into the output video.

VNC (Virtual Network Computing) is a very appropriate choice as it provides good quality graphics with reasonable bandwidth.

More tight integration is needed between Isabelv6 and SIP/SDP: ongoing work to use SIP as Isabel's signaling.

Innovation

Isabel coverage is widely extended to all kind of devices based on standard protocols and applications.

Scenario improvement with IPv6

The Euro6IX security framework based on IPv6 and novel IX architectures will provide an interesting field of experimentation to provide secure access to Isabel sessions from all kind of devices.

4.9.2 IPv6 Multihoming based on Default Address Selection

Overview

This demo shows a modified source address selection implementation based on USAGI IPv6 protocol stack. It allows network administrators to define and implement their own source address selection policies, to cope with simple multihoming scenarios.

The IPv6 addressing architecture allows multiple unicast addresses to be assigned to interfaces. Multiple addresses can come from having different reachability scopes (link-local, site-local, or global); from renumbering situations where some prefixes are being deprecated and substituted by others; or from "temporary addresses" being used by privacy extensions. In addition, multihoming situations, typically coming from sites having multiple ISP attachments, each one using a different prefix, will result in more addresses per node.

As a direct consequence of this address multiplicity, IPv6 stacks will often face the problem of choosing which source address to use when sending a packet to a specific destination. RFC 3484, titled "Default Address Selection for IPv6", defines standard default algorithms to be used. However, sometimes network administrators need to override these default algorithms in order to implement their own policies, typically consisting in specifying a preferred source prefix for use with a destination prefix.

USAGI IPv6 protocol implementation includes only the default address selection algorithms, but does not allow their modification by network administrators. We have modified USAGI to add such capability in the context of Euro6IX project.

Basically, we have developed a user space tool for changing the kernel label table configuration described in RFC 3484, and provided the related support in the kernel. The tool is already available end under tests phase.

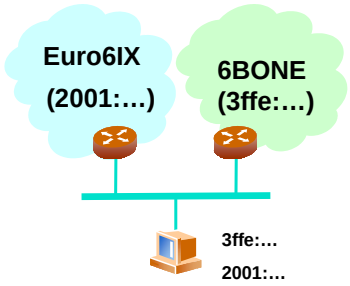

Figure 4-6: Multiple Connections

The demo will show how this implementation allows solving simple multihoming situations like the one depicted in the figure, where hosts inherit addresses from 6BONE and RIR assigned prefixes and need to decide which source address to use.

Innovation

The possibility for network administrators to define their own source address selection policies.

Scenario improvement with IPv6

Multiplicity of addresses gives flexibility to IPv6, however source address selection algorithms have to be designed and implemented to cope with them.

5. EUROV6 DEMONSTRATIONS

5.1 Consulintel

5.1.1 Nomadic Showcase

Overview

In this context, Consulintel has built an IPv6 applications and services nomadic showcase by bringing together devices and systems from vendors as sponsors, which is easily implemented at various locations, e.g. at international events or conferences.

The nomadic showcase aims showing all the IPv6 applications and services available and easily deployed that are not showed in other project trials.

Applications and services showed in Madrid 2003 Global IPv6 Summit will be the following:

- Server/Client services
  - Web
  - Ftp
  - Telnet
  - SSH
  - DNS
  - Audio and Video Streaming
  - Games: Tetrinet
  - NAT-PT transition mechanism
- Applications
  - Apache
  - Bind
  - Windows Media Server
  - Windows Media Player
  - Gtetrinet (client) and Xtetrinet (server)

Some Eurov6 services will also be available to other IST projects like Euro6IX and 6POWER.

Furthermore, the nomadic showcase integrates two demonstrations realized by two companies that are currently developing IPv6 products. These demonstrations are explained on the next sections.

Innovation

- The use of common services over IPv6.
- The use of transition mechanisms.

5.2 Panasonic

5.2.1 Remote monitoring by using a Network Camera

Overview

This demo shows the usage of the IPv4/IPv6 dual stack Network Camera which can be performed a remote monitoring, and the home security system, the remote management for chain store and so on can be simply realized by using it.

The Web (HTTP) Server is implemented in the Network Camera, so without any special software or equipments, the camera image can be accessed through Web browser of PC, PDA or mobile phone and not only monitoring camera image but also controlling the camera angle (Pan, Tilt or Zoom) can be performed simply.

Also, the network camera supports FTP and SMTP, so using external sensor trigger or preset timer can transmit the camera image transmitted to preset FTP sever by FTP and/or the preset e-mail address as attached file.

Two type of the Network Cameras will be demonstrated, which supports Outdoor / Pan-Tilt and Indoor / Pan-Tilt + 21x Zoom including remote monitoring and remote control of the Network camera through IPv6 supported Web Browser.

Innovation

New models of cameras with IPv6 (Indoor / Pan-Tilt + 21x Zoom).

Scenario improvement with IPv6

- Peer-to-Peer connection can be simply realized by using IPv6 address (Global address).
- Enhanced security of remote monitoring, which IPv6 supports as protocol level.
- Plug & Play set-up can be realized by supporting RA (router advertisement).

5.3 Xiran

5.3.1 Content Delivery with IPv6 using NAT-PT

Overview

Xiran has a large experience on the development of streaming products and nowadays is involved in implementing the IPv6 stack in their products.

On this demonstration Xiran provides two Linux hosts having one Giga-Ethernet card each one and they run the httperf client software issuing 3000 http requests to a STM-1000 streaming server continuously, simulating a multi-user big bandwidth traffic. It is planned that all this traffic travels over IPv6.

Other PC has a Fast-Ethernet card and it runs Windows playing (on RTP over IPv6) one Real Neworks Helix movie out of STM-1000. This PC requires Real Player Client and it has the possibility of simulate the traffic generated by 100 clients by mean of running the Real Networks client simulator provided by Xiran. This PC is located at an external site and is attached to a PLC network. It has IPv6 connectivity and it is connected to STM-1000 by mean of a NAT-PT node. An external router (Hitachi G2000 2B) is the node that implements the NAT-PT mechanism. Path between the PC and NAT-PT router has IPv6 connectivity. Path between NAT-PT router and STM-1000 has only IPv4 connectivity.

Innovation

- The use of IPv6 streaming players
- The use of NAT-PT as transition mechanism

Scenario improvement with IPv6

- The possibility of implement QoS on intermediate routers.