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Abstract:

Deliverables D5.2 and D5.4 “Identification of user community for 6Net activities” list and briefly describe the communities identified by Workpackage 5 as potential users for the 6Net applications.

This Deliverable has two purposes:

- it consolidates and updates the information provided in D5.2 and D5.4, and
- it provides additional details for the applications identified as “ *6Net Trials*” in Deliverable 5.5 “Definition of generic framework for IPv6 applications trials and evaluation”.

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Introduction

This deliverable complements Deliverables D5.2 and D5.4 that list and briefly describe the communities identified as potential users for the 6Net applications, and Deliverable 5.5 that identifies the applications promoted to the level of “*6Net Trials*”.

A *Trial* is an application that complies with the evaluation process defined in section 4 of deliverable D5.5. A named person at a certain partner site is appointed as *Trial Coordinator* for each application classified as A or C in the catalogue. This person has the duty and responsibility to manage and report the trial and evaluation process. He or she must record the results of each test through a simple "fill in the blanks" Test Evaluation Form available from the WP5 Applications website.

Trials are classified A or C. For a class A, a trial requires a minimum of 3 named users at each of 5 named sites. For a class C, it requires a minimum of 2 named users at each of 2 named sites. In general, the user community in class C is limited to people at a subset of 6Net partner sites, and for classes A it is expected to grow outwards from the partner sites to other sites with indirect access to 6Net. Extension to other communities such as Euro6IX and Internet2 is certainly not excluded for individual applications.

This deliverables focuses on the user communities for the 6Net Trials. The descriptions of non-Trial applications (classified ‘No’) are essentially unchanged. They have been kept in order to make this deliverable into a comprehensive document about User Communities.

1 Activity 5.1 “Real-time video-conferencing and media streaming”

1.1 Streaming applications - Audio and Video: Storage and Retrieval

1.1.1 Video over IP – VIP

Overview of the application

VIP provides an “integrated chain” solution for video-over-IP services, offering full-screen, high-quality video (MPEG2 or TV quality) that is fully scaleable over the Internet. This solution will cover the entire chain from video production to delivery of video over the Internet.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

1.1.2 Video distribution - MPEG4IP

Overview of the application

MPEG4IP provides facilities for streaming from stored and live sources, based on the Darwin Streaming Server environment for video distribution, and the UCL common library. It is constructed out of a number open source encoding and streaming tools capable of serving multiple media formats.

Trial classification: C

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

Two users groups are mainly involved in using this application:

- The researchers at Telematica Instituut are involved on a daily basis with both fundamental research and the market-oriented application of the developed systems. In a network with numerous (inter)national centres of expertise, they are involved in strategic research for business and industry. The 6Net group within the Telematica Instituut consists of 3 researchers that participate in the 6Net project. These researchers have experience with network access technologies, distributed systems and next generation internet.
- The Surfnet people involved in 6Net have experience with core and access network technologies, video and streaming applications and offering this technology to end-users.

The main goal of the MPEG4IP community is to test the MPEG4IP application under "daily-life" circumstances. The MPEG4IP tools will be used a 6Net internal communication application. Members of the 6Net groups at TELIN and SURFnet can use the MPEG4IP application in discussions about 6Net project issues. To that purpose 2 (uni-directional) MPEG4IP sessions will be setup several times during the 6Net project to facilitate a videoconference between TELIN and SURFnet. Notice that the application is used as a videoconference tool although its primary use is only video streaming. This set-up however, fits the needs of the researchers better and provides more exhaustive testing of the application.

The 6Net group at the Telematica Instituut will test the MPEG4IP tools in two test setups:


- Server: A live video capture feed will be sent from the researcher's desktop to the remote party.
- Client: A live video stream from a remote party will be received and displayed on the researcher's desktop.

Both setups will be used in a unicast and a multicast configuration.

1.1.3 Music distribution - TUR

Overview of the application

TUR, "Trondheim Underground Radio", is a network radio providing music from the Trondheim underground music scene to people all over the Internet. This has been available for a while over IPv4 (see <http://www.turmusic.no/>) and IPv6 is now being worked on as part

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of the 6Net project. This is available as MP3 streams using tcp and either IPv4 or IPv6. Multicast streaming will also be available later. This application provides streaming of MP3 and (in the future) other formats.

Trial classification: A

User community

Depending a bit on musical taste, this service should appeal to a large number of end users with IPv4 or IPv6 connectivity. In 6Net, trials will be conducted for the IPv6 service. Two trials are planned, first one for unicast shortly, and one for multicast later.

To use this service one will need a suitable player. Microsoft Media Player and others are available. Work is going on to collect a list of suitable players. Next an announcement will be sent to the IPv6 community on general IPv6 mailing lists, and also in the 6Net community. The hope is to get end users both connected via 6Net and others to take part.

The service is connected via UNINETT to 6Net. For all the IPv6 users outside Norway, parts of the 6Net infrastructure will be used for the transmissions.

1.1.4 Multimedia Conference Recorder – MMCR

Overview of the application

The Multicast Multimedia Conference Recorder is a Java-based system capable of robust distributed recording of multicast multimedia data. This is achieved by deploying multiple recorders and then collating the data from these nodes to form a single lossless recording. The system also provides for playback of the recordings.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

1.1.5 VideoLAN

Overview of the application

VideoLAN is an open source project that provides unicast and multicast media streams from a variety of media sources. See: <http://www.videolan.org/> for details. VideoLAN can source from a hard drive, a DVD player, a satellite TV card or an MPEG2 compression card and can create streams with data rates of up to 9Mbit/s for DVD, less for MPEG-1. VideoLAN can also be used to stream HDTV broadcasts up to 20 Mbit/s.

Trial classification: A

User community

The user community is identified by three stages:

- The first stage concerns a user community out of the WP5 partners, mainly for testing the application. The application owner SURFnet will perform the initial tests and create a

webportal to facilitate the testing and use of VideoLAN as a platform for streaming on-demand assets and streaming of live events.

- In the second stage, the application and webportal will be advertised to the population of 6Net-connected users. With the 6Net user community, a coordinated trial will be conducted mainly focusing on aspects related to streaming video and usability of the setup; since the webportal handles all IPv6 related configuration of VideoLAN Client and server(s), the use of streaming video over IPv6 will be just like streaming over IPv4. The goal is “click and go”.
- In the third stage, new testers will be identified. SURFnet is for some time deploying VideoLAN as an additional streaming solution besides the SURFnet Video Portal and Live Streaming facilities. In future users will be directed to the webportal that controls several VideoLAN servers so users with IPv6 connectivity will automatically be served over IPv6, making the introduction of IPv6 streaming both invisible and transparent to regular end-users. If the webportal proves to be a success, it will become one of the standard streaming solutions of SURFnet. SURFnet will from that time offer and host the streaming solution for the whole 6Net community.

The work on the webportal has also been presented to video research initiatives, such as the Internet2/ResearchChannel workgroup. These groups are interested in new developments and have been asked to test the IPv6 streaming. First tests with the VideoLAN Server streaming MPEG2 over IPv6 between SURFnet and Internet2 have successfully been done.

Current status: The first stage of testing has been finished. The VideoLAN trial is being prepared for testing with the partners for the second (and third) stage. Some of these partners have participated in small-scale tests. The user community for the second and third stage mainly consists out of researchers familiar with IPv6 and mostly involved in multimedia, but eventually regular end users like students and researchers will be able to use VideoLAN over IPv6 (if available).

1.1.6 Multicast Radio - CRadio


Overview of the application

The University of Southampton has been working on and testing a number of tools designed to act as MP3 jukebox or streaming servers. These include CRadio, which is an MP3 jukebox developed at Southampton, which supports IPv6. The CRadio application performs Web-based MP3 track selection and queuing with multicast operation. The Server can re-reference the location of MP3 files via HTTP. Southampton has also tested other tools including icecast and shoutcast.

Trial classification: A

User community

Most recently the shoutcast utility has been used in conjunction with existing adapted software at the University of Southampton to distribute live content from the local student Surge radio station. The first user community for this application comprises the WP5 partners, mainly for testing the application, but Surge has also been accessed successfully over native IPv6 from sites on the Abilene network on Internet2. The application owner will perform the initial 6NET tests.

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The service is currently available over IPv6 from surge.ecs.soton.ac.uk:8090, with general Surge information available (for now over IPv4 only) from <http://surge.soton.ac.uk>.

Work is ongoing on using and comparing other radio streaming and MP3 streaming tools, including CRadio and other tools aimed at the PDA platform

1.1.7 Unified messaging system - 6UMS

Overview of the application

6UMS is the name given to an IPv6-enabled unified messaging system (6UMS) which is being developed at the University of Southampton. It allows peer-to-peer communication between users using a variety of media. The system eventually is hoped to include messaging using text, audio, images and video. It will also include location awareness, user context/preferences, and intrusiveness consideration.

The application is currently oriented towards Jabber and the Java platform. Some other local tools also exist, including an MSN Messenger "clone" written in Java that can act as a client or proxy for Messenger participants for instant messaging on Linux and other non-MS platforms, or on sites wishing to offer a dual-stack IM gateway. There is also a Java-based p2p file sharing application that has been developed locally.

Trial classification: C

User community

The first user community for this application area comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

We expect 6UMS version 1 to be released in Q3 2003, while the MSN clone should be available in Summer 2003. The first user trials will thus use the MSN Messenger clone. Later trials will use the first version of 6UMS.

1.1.8 FreeAMP


Overview of the application

FreeAMP is an extensible, cross-platform audio player. It features an optimized version of the GPLed Xing MPEG decoder, which makes it one of the fastest and best sounding players available. There are patches available for IPv6 operation.

Trial classification: A

User community

All the people who want to play with MP3 audio streams. The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

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1.1.9 MCast6

Overview of the application

MCast6 is an IPv6 enabled application for multicast media streaming. The MCast6 uses multicast transmission but unicast also is incorporated. IPv6 and IPv4 addressing types are both available seamlessly, which means that the user will receive a single tool to operate in both infrastructures. MCast6 can broadcast multimedia data according to programs created earlier by the application administrator or transmission can be demanded by privileged users. Incorporated well-known video/audio standards allow to use it with streaming applications already existing on the market. For instance, multimedia data could be sent by IP/TV Cisco server and received by the MCast6 client or inversely.

To date, the core of the client part of the MCast6 (receiving multimedia data over RTP) is done. PSNC is testing this tool on Linux and Solaris platform and still adding new things. They are also waiting for next release of Java (ver.1.5, at the end of this year) that should support IPv6 on Windows. A lot of effort is put in creating the MCast6 server (sending and management of multimedia content).

Trial classification: A

User community

This application is still in development phase and for next few months it will not be possible to make it available outside PNSC.

The first user community for this application will comprise the WP5 partners, mainly for testing the application. The service will then be advertised to the population of 6Net-connected users.

1.1.10 AMUSE

Overview of the application

AMUSE (Adaptive Multimedia Support Environment) is a prototypical Java based client/server platform for adaptive multimedia retrieval applications. The server platform consists of a RTSP server (Darwin Streaming Server) and a portal infrastructure, which delivers multimedia documents adapted to the clients device capabilities and user preferences. The client side consists of a middleware and a Multimedia Browser application capable of presenting multimedia documents. The system can dynamically adapt the multimedia presentation based on information from the network and based on adaptation possibilities contained in the multimedia document.

Sony is planning to enhance AMUSE to work in a multi-homed client environment where the traffic can be switched between the different networks by usage of MobileIPv6. In this scenario adaptations have to be done whenever a network switch occurs. Additionally the Middleware can decide to actively switch access networks based on the bandwidth requirements of the applications.

Trial classification: C

User community

As AMUSE is only a research prototype and there is also no 'real' service using the AMUSE platform, it is not targeted to have users outside the group of 6Net project participants. The user community is therefore limited to Sony internal use and usage by selected WP5 partners for doing joint testing.

The planned enhancement to integrate the platform with MobileIPv6 requires a complex set-up on the client side (a multi-homed host with specific versions of Linux and MobileIPv6). Thus this functionality will be most likely not part of a trial.

Instead the trial will show the delivery of multimedia presentations via IPv6 and adaptations of the multimedia presentation based on packet-loss measurements. During the trial the AMUSE sample demonstration service called 'Cinema Service' will be used (which demonstrates the platform functionality but has no additional value).

The main aspects of the trial will be:

- the usage of RTP, RTSP and HTTP over IPv6,
- the perceived quality of the multimedia presentation (errors due to packet-loss?),
- the adaptation behaviour.

The trial-users should therefore have some basic experiences with other IP based multimedia applications and in using software that is not product-quality.

For running the AMUSE platform, for each trial user an IPv6 enabled Linux based computer is required. Whether Microsoft Windows will be supported as well, depends on the availability of a IPv6 enabled Java version for the Windows platform.

The trial will take place after some enhancements and further developments of the AMUSE platform have been finished.

1.2 Streaming applications - Audio and Video: Conversational

1.2.1 Robust Audio Tool – RAT

Overview of the application


The Robust Audio Tool (RAT) is an open-source audio conferencing and streaming application that allows users to participate in audio conferences over the Internet. RAT requires no special features for point-to-point communication, just a network connection and a soundcard. For multiparty conferencing, RAT uses IP multicast and therefore all participants must reside on a multicast-capable network. RAT is based on IETF standards, using Realtime Transport Protocol (RTP) [RFC1889] above UDP/IP as its transport protocol, and conforming to the RTP profile for audio and videoconference with minimal control.

Trial classification: A

User community

Note: This text applies to RAT, VIC, SCS, SPAR and NTE.

The initial user community for this tool has been UCL and the members of WP5. Extensive internal testing has been carried out within UCL. Testing has also been carried out within a number of other WP5 members' premises. Testing trials have occurred between partners in WP5. Further trials are planned to other partners within WP5. These trials will be extended to partners in all work packages.

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A number of web pages have been set up for submission of the trial feedback on the tool trials. These questions identify specific concerns for the tool. Trials partners identified within 6Net so far include: University of Southampton, GRNET, UNINETT, SURFNET, TELIN, Renater, CSC.

As regards extending the user groups beyond 6Net, the plan to make contact with a number of groups external to the project. Unicast IPv6 connections will be tested initially which may be followed by multicast tests. The type of testing will be constrained by the available connectivity, platforms and hardware. As regards connectivity this may well involved the setup of tunnels for IPv6 links.

The first external tests will be carried out with collaborators at other departments within UCL. Although UCL does not yet have a college wide IPv6 network there are a number of departments who have IPv6 connectivity. Collaboration within UCL will provide for direct assistance with testers and experience of operations over a college wide LAN. Additionally it is planned to approach a number of collaborators in the US who are connected to Internet2/Abilene. Finally under the context of cross project collaboration contact has been made with members of the Euro6IX project with whom there are plans to carry out tests. These tests will provide opportunities for experience of wide area inter network connectivity.

1.2.2 Video Conference Tool – VIC

Overview of the application

VIC is an open-source video conferencing and streaming application that allows users to participate in videoconferences over the Internet. VIC requires no special features for receiving video from a session. To send video to a session a video capture device is required, which supports the platform specific capture libraries which include; Video4linux, Video for Windows, and Sunvideo. VIC is based on IETF standards, using RTP above UDP/IP as its transport protocol, and conforming to the RTP profile for audio and videoconference with minimal control.

Trial classification: A

User community

See RAT.

1.2.3 Network Text Editor - NTE

Overview of the application

NTE is an open-source shared text editor. The collaborative text editing can be between two participants directly, or between a group of participants on a common multicast group.

Trial classification: C

User community

See RAT.

1.2.4 Whiteboard - WBD

Overview of the application

WBD is an open-source shared whiteboard compatible with the LBL whiteboard, WB. The collaborative whiteboard activities can be between two participants directly, or between a group of participants on a common multicast group. WBD provides a shared canvas that may be edited by a number of users at the same time. WBD provides facilities for drawing various shapes, and text, in a variety of different colours. External postscript files may also be imported into WBD for collaborative annotation.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

1.2.5 Bonephone – SIP client

Overview of the application

Bonephone, a SIPv6 capable user agent, is part of a SIP infrastructure based on a high-performance, configurable, free SIP server (SER). SER is an open-source project that aims to make available a fully functional and scalable Session Initiated Protocol server. It can act as registrar, proxy or redirect server.

Bonephone provides the user with a GUI to enable him to start, answer or terminate calls as well as to maintain a phonebook with SIP addresses of possible callees and allows the user to establish and maintain parallel calls whereas it displays the status of the different calls. It integrates the RAT media engine, which interfaces with the system audio device and allows the user to send and receive packetised audio. Bonephone and SER IPv6 components as well are currently still undergoing bug-fixing and testing.

Because IPv6 porting has not finished yet, Bonephone's class C trial is targeted Q4/2003. For this reason there is no additional information with respect to experiences with the proposed application nor to further details on the user communities to be involved in the trials.


Trial classification: C

User community

The SIP-based VoIP application Bonephone is primarily targeted at research purposes. Therefore the user community is initially limited to internal use by specific WP5 partners for doing joint testing and measurements of the application. Later on it might be used within the 6Net community for generic VoIP communication purposes. At the same time the SIP server will be made available for use with other SIP based applications to enable interoperation testing between different 6Net trial applications. In this context the VOCAL community as another open source project targeted at facilitating the adoption of VoIP is one of the potential partners to be involved in the trial.

1.2.6 VOCAL – SIP system and client

Overview of the application

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The Vovida Open Communication Application Library (VOCAL) is an open source project targeted at facilitating the adoption of VoIP in the marketplace. VOCAL provides the development community with software and tools needed to build new and exciting VoIP features, applications and services. The software in VOCAL includes a SIP based Redirect Server, Feature Server, Provisioning Server and Marshal Proxy. The system also includes two SIP user agents. The SIP user agents have been ported for use with IPv6 and are undergoing testing. This is based on the stable development branch of the VOCAL.

At the time of writing, VOCAL v1.5 includes IPv6 code developed at the University of Southampton for three of the major components, including SIPset, which allows user-to-user VoIP calls to be made. Further work is anticipated in extending IPv6 functionality to additional VOCAL components in the next 6-12 months.

Southampton is also planning to demonstrate ENUM working with VOCAL, but at present the ENUM code has been removed from the latest version of VOCAL; we will be attempting to reinstate this.

Trial classification: C

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users. VOCAL can be used, in conjunction with instance(s) of the TZI SIP gateway, for 6Net project voice calls, and for calls with Euro6IX partners also.

VOCAL has already been run between at least two 6Net partners informally.

1.2.7 OpenH323

Overview of the application

The OpenH323 project is developing an open source H.323 protocol implementation, which contains both clients and server, and can be used for H.323 videoconferencing. The clients that are available include: a command line H.323 videoconference application and a GUI H.323 videoconference application. The servers that are available include: a H.323 MCU (Multipoint Control Unit), a H.323 Gatekeeper and a H.323 to PSTN Gateway.

GnomeMeeting (see below) is an example application that was easily ported due to OpenH323's library usage.

Trial classification: C

User community

The possible user communities of OpenH323 platform includes the following:

- Companies, which utilize H.323 videoconference in their daily operation in order to perform project meeting, internal meeting, tele-education, etc. The main advantage of using OpenH323 platform in a company environment is the fact that is a zero cost open source solution, which can be customized to the specific company needs. The main disadvantage of using OpenH323 platform in a company environment is the fact that there is not available professional support for the OpenH323 platform.

- Universities, which want to offer a videoconference, service to their members (faculty members, student, etc). This videoconference, service includes videoconference in the context of projects, tele-education, among students, etc. The main advantage of using OpenH323 platform in a university environment is the fact that is a zero cost open source solution, which can be customized to the specific needs and can encourage students to be involved in open source code evolution.
- Home users, which want to use videoconference for their daily needs like for example contact with relatives. The main advantage of using OpenH323 platform in a home environment is the fact that is a zero cost open source solution, which does not requires expensive hardware. The main disadvantage of using OpenH323 platform in a home environment is the fact that there is not available professional support for the OpenH323 platform.

The end users of the OpenH323 platform must have basic computer usages skills and basic videoconference knowledge. The administrators of the OpenH323 platform must have enough videoconference administration knowledge. In the case that someone wants to implement a custom solution based on the OpenH323 platform then he needs programming skills in C++ and videoconference protocols (H.323, etc).


Until now (end of June 2003) we have not perform any trial of the ported to IPv6 version of OpenH323 platform except some tests that we have performed in CTI local IPv6 network. Our plans for the OpenH323 platform trials are the following:

- At first stage the OpenH323 platform will be tested between the CTI and the University of Thessaloniki (subcontractor of GRNET).
- At second stage we intended to use the ported OpenH323 platform for virtual meetings with other Greek 6Net partners over the Greek IPv6 backbone network, (namely GRNET and its subcontractors University of Thessaloniki and National Technical University of Athens).
- At third stage the OpenH323 platform will be made available to all 6Net partners for use over the backbone of the European 6Net IPv6 network, and to the OpenH323 user community.

We plan at first stage to perform the following trials:

- Point-to-point communication with no network congestion: In this trial the basic operation of OpenH323 protocol stack will be tested using an OpenH323 based conference application, running on an uncongested network.
- Multipoint communication with no network congestion: In this trial the basic operation of OpenH323 protocol stack will be tested using an OpenH323 based conference application, in combination with OpenMCU, for a multipoint conference, running on an uncongested network.
- Point-to-point communication with network congestion: In this trial the basic operation of OpenH323 protocol stack will be tested using an OpenH323 based conference application. The network will be artificially congested using a traffic generator.
- Multipoint communication with no network congestion: In this trial the basic operation of OpenH323 protocol stack will be tested using an OpenH323 based conference application, in combination with OpenMCU, for a multipoint conference. The network will be artificially congested using a traffic generator

At next stages, we plan to perform the above trial with 6Net partners out of Greece in order to investigate the operation of OpenH323 platform for WAN communication with many hops.

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We will compare those results with the result acquired during the trial in the ‘Greek’ part of 6Net network.

1.2.8 GnomeMeeting

Overview of the application

GnomeMeeting is an open source H323 application for Linux based on the OpenH323 platform. It supports H.245 Tunnelling, Fast Start, auto-answering of incoming calls, and inter-works with Gatekeepers using H.235 authentication. It provides the H.261 video codec, and a number of audio codecs.

Trial classification: C

User community

The possible user communities of GnomeMeeting include the following:

- Research institutes, which utilize H.323 videoconference in their daily operation in order to perform project meeting, internal meeting, tele-education, etc. The main advantage of using GnomeMeeting in a research institute environment is cost in conjunction with proven compatibility and stability of H.323. GnomeMeeting is an open source package, which can be customized to specific user needs. The main disadvantage of using GnomeMeeting in a research institutes environment is security due to lack of encryption / security mechanisms in H.323.
- University members, which want to use videoconferencing services (e.g. faculty members, student, etc), Videoconferencing services can help them during project development, tele-education and research meetings, without the need of physical presence. The advantage of using GnomeMeeting in a university environment is cost. GnomeMeeting is an open source solution, which can be customized to specific user needs and can encourage students to be involved in open source code evolution.
- Home users, which want to use videoconference for their daily needs like for example contact with relatives. The main advantage of using GnomeMeeting in a home environment is, again, cost. The main disadvantage of GnomeMeeting in a home environment is pure video quality due to bandwidth requirements of H.323.

The users of GnomeMeeting must have basic computer usage skills and basic videoconference knowledge. GnomeMeeting is an open source packages which runs on Linux platform.

Until now (end of June 2003), we have performed some trial of the ported to IPv6 version of GnomeMeeting in a local IPv6 network. Our plans for the GnomeMeeting trials are the following:

- First ,we will complete the trials in our local IPv6 enabled network.
- Second, we will perform some tests with the CTI (Greek 6Net partner, developer of IPv6 enabled OpenH323) using GRNET’s IPv6 enabled backbone.
- Third, we will try to provide, supplementary to current IPv4 video conferencing services that GRNET provides with IPv6 enabled ones.

We plan to provide the following videoconferencing services:

- Point - to - Point communication.
- Multipoint communication using an IPv6 enabled, S/W or H/W, MCU.

1.2.9 High-quality Audio Tools - HAT

Overview of the application

The High Quality Audio Tool (HAT) provides for sending and receiving MP3 audio over Realtime Transport protocol (RTP) on IPv6. HAT uses the MP3 encoder, LAME to encode the MP3, which is taken packetised and sent out on RTP. For playback HAT retrieves the MP3 payload from the RTP packets and uses mpg123 to decode the MP3 stream.

Trial classification: No

User community

HAT has been tested from Korea to a number of sites including UCL. The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

1.2.10 Digital Video Transport System - DVTS

Overview of the application

DVTS (Digital Video Transport System) is an application for sending and receiving DV (Digital Video) streams in RTP over IPv4 and IPv6. IEEE1394 (Firewire) cables are used for connecting DV devices. However, the length of a single IEEE1394 cables cannot be longer than 4.5 meters. Using DVTS, DV data can be sent anywhere using the Internet.

Trial classification: C


User community

The initial user community for this tool has been UCL and the members of WP5. Extensive internal testing has been carried out within UCL. Testing has also been carried out within a number of other WP5 members' premises. Testing trials have occurred between partners in WP5. For instance, streaming has been done from SURFnet to UoS at full data rate with good quality. Further trials are planned to other partners within WP5. These trials will be extended to partners in all work packages.

As regards extending the user groups beyond 6Net, the plan to make contact with a number of groups external to the project. Unicast IPv6 connections will be tested initially which may be followed by multicast tests. The type of testing will be constrained by the available connectivity, platforms and hardware. As regards connectivity this may well involved the setup of tunnels for IPv6 links.

The first external tests will be carried out with collaborators at other departments within UCL. Although UCL does not yet have a college wide IPv6 network there are a number of departments who have IPv6 connectivity.

Collaboration within UCL will provide for direct assistance with testers and experience of operations over a college wide LAN. Additionally it is planned to approach a number of collaborators in the US who are connected to Internet2/Abilene. Thirdly under the context of cross project collaboration contact has been made with members of the Euro6IX project with

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whom there are plans to carry out tests. These tests will provide opportunities for experience of wide area inter network connectivity.

The DVTS application is fairly specialised and hence narrows the potential trial partners. Firstly it requires 30-40Mb/s per stream, and secondly for transmission it requires a IEEE1394 interface with a suitable DV source. Reception is possible in software, though results have been less good than hardware reception. Hardware reception requires an IEEE1394 interface with a suitable DV decoder.

1.3 Streaming applications - Audio and Video: Session

1.3.1 Multicast streaming tools - MUST

Overview of the application

Web-interface for simplified MBONE access using unicast or multicast connections. The toolkit is composed of two parts:

- multicast enabled listener application that monitors MBONE announcements and stores session info
- a cgi script for serving MBONE announcements over a web page to multicast or unicast enabled clients.

MUST is a simple toolkit consisting of a multicast enabled listener application that monitors MBONE announcements in order to get and store session into and a cgi script for serving MBONE announcements over a web page to multicast or unicast enabled clients.

Trial classification: C

User community

The possible user communities of MUST include mainly Research institutes and University communities which utilize multicast or unicast. The users of MUST must have basic computer usage skills.

MUST is a cross platform application. The only requirement is to have access to IPv6 MBONE announcements.


Until now (end of June 2003), we have not performed any trial due to lack of multicasting over our IPv6-enabled network. When multicasting be available and stable, together with some, publicly available IPv6 MBONE sessions we will perform the necessary trial before making MUST available to others 6Net partners. Right now, MUST is deployed in our IPv4 network working smoothly.

1.3.2 Secure Conference Store - SCS

Overview of the application

The UCL Secure Conference Store is a web-based system for secured creation, storage and access to conference information.

Trial classification: A

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User community

See RAT.

1.3.3 SDP Parser Applet – SPAR

Overview of the application

SPAR is a java applet that takes Session Description Protocol (SDP) as input, and starts the required media tools with the correct command line arguments, according to the content of the SDP message. It used in conjunction with the Secure Conference Store.

Trial classification: A

User community

See RAT.

1.3.4 Session Directory Tool – SDR

Overview of the application

SDR is a session directory tool designed to allow the advertisement and joining of multicast conferences on the Mbone. It was originally modelled on ‘sd’ written by Van Jacobson at LBNL, but implements a later version of the session description protocol than ‘sd’.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.

1.3.5 RTP Quality Matrix - RQM

Overview of the application

The Real-time Transport Protocol, RTP, provides Quality of Service feedback with reception reports sent alongside the media stream. If the media is sent via IP multicast it is possible for a third party to snoop on these reception reports, displaying reception quality for all members of a group. The RQM application performs such snooping.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users. The tool may be used as a add-on tool for RTP based audio/video conferences in the 6Net.

2 Activity A5.2 “Online gaming”

2.1.1 Quake

Overview of the application

Quake is a “First Person Shooter” action game from id Software, whose game engine has been made publicly available. The game player has to steer his character through a virtual world full of dangers and secrets and to fight his way to find and destroy Quake. When playing in multiplayer mode, the different players steer their characters through the same virtual world. They can play in teams or against each other.

Trial classification: A

User community

Mainly students having a native IPv6 connection will use Quake. GARR has already organised a Quake tournament with Italian students as user community (<http://www6.caspur.it/quakev6/index-en.html>). Further tournaments with an extended user community are under consideration.

It is available a first public IPv6 server: quake-rm.6net.garr.it.

2.1.2 XPilot

Overview of the application

XPilot is a multi-player tactical maneuvering game for Windows, Linux and Unix workstations. The essential elements of play are that all players have fighters which move through an artificial world with a number of customizable features, shooting each other and at the same time trying to attain some objective to score points. Players need to master a number of tactics in order to succeed. Depending on the kind of world, the game can be extremely fast paced, or taken at a more leisurely pace. But whatever the world or style of play, the main objective is to have a lot of fun.

XPilot has been available over IPv4 for a long time, but IPv6 support is currently being added by Invenia as part of the 6Net project. Both the client and server code is now available for testing with IPv6, for Unix-like platforms like Linux and NetBSD.

Trial classification: C

User community

Even though XPilot is not new or modern, it still manages to attract a large group of active players on the (IPv4) Internet. In addition, it is the type of game that could find a new life on 3G mobile phones and other handheld equipment, be it in a simplified form. For this reason, a project to port the XPilot client to Java, suitable for small hand-helds, was started. Although the code of that project is not currently publicly available, we hope to get permission to use it in our 6Net trials of XPilot.

Initially, we plan to run a XPilot trial with local users of Invenia, students of the University of Tromsø and members of 6Net. After that, we will distribute our IPv6 patches freely and announce our IPv6 XPilot server more widely in the IPv6 community. The hope is to get end

users connected via 6Net and other IPv6 users to take part in wholesome game playing. Later, we plan a trial that includes mobile users to the user group. These mobile users will be student laptop users connecting via our planned IPv6 WLAN MAN access point at the student house DRIV in Tromsø and others connecting via our existing IPv6 WLAN access points at the campus of the University of Tromsø. We also hope to be able to include the Java client running on PocketPC type of machines in our tests.

The XPilot server at Invenia is connected via the University of Tromsø and further via UNINETT to 6Net. For all the IPv6 users outside Norway, parts of the 6Net infrastructure will be used for the transmissions.

2.1.3 MUD gaming environment

Overview of the application

A MUD is a text-based multi-player gaming environment, which is usually combat oriented and set in a fantasy setting. An example of a text-based MUD is IPMud, which is client-server based. An advantage of IPv6 is that such servers could be run on home DSL networks, where NAT currently restricts such activity in IPv4.

Southampton is working on IPv6-enabling a text-based MUD, but is also working on adding IPv6 to the World Forge project, which is developing an (enhanced) clone of the Ultima Online gaming environment. It is expected that IPv6 for the WorldForge project will be available by Q3 2003.

Trial classification: No

User community

The first user community for this application comprises the WP5 partners, mainly for testing the application. The application owner will perform the initial tests. Additionally, the application will be advertised to the population of 6Net-connected users.


The WorldForge project has users all over the world; IPv6 support would thus encourage wider interest in IPv6 in a new gaming community outside 6NET.

3 Activity 5.3: E-business solutions

3.1.1 IBM Websphere Portal Technology

Overview of the application:

6Net portals will provide to their associated community of users a secure, single point of access to diverse information and applications. Each community will be able to have its own personalized environment (for instance for the support of a national language). Thanks to the communication environment of 6Net and the use of appropriate application level protocols, the information and applications will be integrated and shared seamlessly and easily providing a potential wide collaborative environment. The portals will also handle information on the users that will allow presenting a per-user customized view. Among applications, the portals will provide the secure environments to be associated with commerce applications.

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The 6Net portals will be developed with the use of existing IBM Websphere Portal Server technology associated with existing IBM Websphere Edge Server technology and IBM Websphere Commerce Suite technology, now re-packaged by IBM as Websphere Application Server.

Trial classification: A

User community:

The population of 6Net-connected users is made of coherent communities interested in accessing similar information and applications requiring common communication tools. A portal for such a community will consolidate all those needs in a controlled secured nutshell that will be the default application entry point on the network. In the background, the community of developers will make available services and applications that will be shared and accessed through the use of web services technologies.

The portal technology is being installed at four sites (Telin, Southampton, UCL and Athens) but portals can be created for any part of the 6Net community, not just those four sites. For example, a portal for 6Net operations could be defined. The Greek site will allow the validation of portals based on a non-Latin character set. The nature and user group for a given portal is limited only by the imagination of its designer. The trials will allow us to draw conclusions about the practical benefits of portal technology in an IPv6 context, and may be combined with the proxy trials described below, to explore the use of portals in a mixed IPv4/IPv6 environment.

3.1.2 Agent framework - SoFAR, SLITE

Overview of the application:

The Southampton Framework for Agent Research (SoFAR) is a Java framework used primarily for RMI communication. A “light” version, aimed at use of multicast for service discovery, has recently been developed (SLITE).


The framework provides a registry so that agents can advertise their services and others can find them, and it supports several communication patterns including queries and a publish-subscribe model. The framework is being used to explore the application of software agents to multimedia systems.

The IPv6 advantage lies in the addressability of multiple SoFAR/SLITE devices, who can communicate directly, peer to peer, IPv6’s multicast support is also an important feature for SLITE operation.

Trial classification: No

User community:

University of Southampton has a strong agent-based computing community in our department’s IAM group. Existing and future SoFAR applications will be tested under IPv6, and the main SoFAR code made IPv6-aware.

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The SLITE "leightweight" SoFAR framework will be made available to researchers at Southampton, where we will investigate further the applicability of the SLITE framework to existing activities, and also seek to discover new application areas for the SLITE approach. We hope to release open source code that research communities in 6Net and beyond can trial.

3.1.3 Hypermedia link services

Overview of the application:

Hypermedia link services are a key component of many of the multimedia applications developed in the research lab at University of Southampton.

A simple link server accepts a query from a client and returns a list of available links. The query could, for example, be a location in a temporal media stream. The key performance factor in link services is latency, particularly if the link service uses referrals or query routing or if there are synchronization requirements with temporal media.

As an output of 6WINIT, in order to experiment with an IPv6-enabled link service, two servers were ported:

- DLS1 is a specialised service with an HTTP interface. It is a standalone reference implementation in use by current research projects. DLS1 is a ‘context sensitive’ link service that makes use of information about the device making the query, as part of a pervasive computing infrastructure. Hence in addition to porting of the networking code, we are also introducing IPv6 addresses as part of the context handling mechanism.
- DLS2 is based on an LDAP directory service and provides a distributed implementation. DLS2, based on work in collaboration with BT, has recently been interfaced with the agent framework

Trial classification: No

User community:

University of Southampton’ IAM group makes heavy use of hypermedia link services and the DLS architecture. Making this IPv6-ready will enable IPv6 to pervade into other research projects.

As with the work on SLITE, what we intend make our IPv6 ready link services available to other researchers at Southampton and beyond. We believe such services will encourage development of novel services where link information, stream metadata, and other "markup" information associated with a certain piece of media can be sourced from distributed locations. Such architectures could be used for entertainment (e.g. an enhanced distributed jukebox service) or in a teaching environment (where different metadata threads, potentially from different hosts, may be selected by students).

IPv6's enhanced address space enables this goal, and components such as the OpenLDAP server are already ported for IPv6. The user community will initially be researchers, but during the course of the project we hope that demonstrator applications can be made available to a wider end user audience.

3.1.4 FunnelWeb

Overview of the application:

FunnelWeb is a system that runs on a node to provide an active services platform. Active services are loadable objects which provide particular application level functionality in the network. FunnelWeb is an implementation of an Application Level Active Networking (ALAN) active networking execution environment (EE). FunnelWeb was developed initially at UCL and has continued development at UTS, Australia under BT funding.

Specifically FunnelWeb provides an execution environment for java based active applications, known as proxylets. The FunnelWeb EE is termed the Execution Environment for Proxylets (EEP), which provides a java environment with a Remote Method Invocation (RMI) control interface for loading, running, modifying operation and stopping proxylets. The proxylets are java applications implementing the *Proxylet* base class, which exposes methods for initialising, starting, modification of operation, and stopping of the proxylet.

IPv6 functionality is possible using the Java JDK 1.4 which provides IPv6 functionality on Solaris8 and Linux.

Trial classification: No

User community:

FunnelWeb is deployed at a number of sites globally and provides a platform for a large variety of active services deployment. Thus the user community is potentially very wide, from small group use to large project uses.

3.1.5 Transcoding Active Gateway – TAG

Overview of the application:

The Transcoding Active Gateway (TAG) was developed to extend the functionality of an earlier tool, known as the UCL Transcoding Gateway (UTG). The implementation was based on the FunnelWeb [ALAN] Active Networking architecture. The key points to the new design were:

- Automatic configuration of a multicast session using the Secure Conference Store.
- Use of Active Networking for locating and positioning a reflection point
- re-multicasting of the reflected media streams on the client
- Modular approach to media relays, implemented as Java proxylets

As mentioned previously, TAG builds upon Funnel Web to provide its functionality. It was essential that components of the system were separated, to provide an easy upgrade when a new version of Funnel Web became available. The TAG client application is separated into two components that communicate using Remote Method Invocation (RMI):

- The Funnel Web EEP component of the client runs the Routing, Discovery and local Reflector proxylets. The Routing and Discovery proxylets are used by the client to identify its location in relation to other parts of the Active Network.

- The user interface component of the client is used to communicate both with the EEP component and with a remote EEP via the RMI interface. The server configuration section of the user-interface allows the user to query the local Routing proxylet for information regarding the current EEPs available and the closest EEP in relation to the local host. Once an EEP has been selected the controls for starting, stopping and configuring media streams are enabled.

TAG has recently been updated to provide an additional mode that allows it to connect a client into a conference VPN and subsequently provide access to the VPN media streams. Using this mode, a client will automatically request to join the VPN once local multicast activity is detected. The join request takes the form of a registration of a local EEP to a Reflector Manager (RM). The registration triggers the RM to notify each node within the VPN to forward media streams back to the registered EEP. In addition the RM can be used to convey rate and access information to each remote node.

Trial classification: No

User community:

TAG provides active gatewaying functionality which is of particular benefit to mobile users, or users on the edge of connectivity. TAG may also provide access to VPN's for unconnected entities. The gateway will benefit users registered for use with the TAG.

3.1.6 TZI Stargate

Overview of the application:


StarGate provides call signalling and media transcoding gateway functionality for connectivity between different kinds of endpoints interconnected through different types of networks (hence the name *Gate). This is expected to include in particular:

- Conversion between the three most important call signalling protocols (H.323, SIP, and ISDN) including media stream conversion if necessary;
- Actively accessing Mbone sessions from H.323 endpoints; and
- Inviting H.323 endpoints into Mbone sessions for audio and optional video communications.

StarGate was developed under the joint auspices of TELES and UB TZI. It also contains code from UCL's RAT tool.

The architecture of StarGate also allows for extension of the number of supported call signalling protocols. In addition, if feasible from the standardisation point of view (i.e. the necessary specification are complete and stable), security aspects will be incorporated into the StarGate implementation.

StarGate is conceptually built upon the same general Mbus architecture as AudioGate [AG], with largely different Mbus entities and different interactions between them, of course. AudioGate provides a dial-in point for users on any telephone network and enables them to participate in Mbone audio conferences.

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All three of the aforementioned control protocol entities share a core set of Mbus messages to set up, tear down, and monitor progress of a call. In addition, each entity supports protocol-specific Mbus extensions that may not be (easily) mapped to other control protocols. The Mbus controller is expected to understand all these Mbus commands, route incoming messages, and optionally perform translation between different protocols.

Call control messages are intended for interaction with call control and invitation protocols such as H.323 and SIP. They are designed to constitute the union of the call control messaging needed by endpoints, gateways, proxies, multi-point controllers, and gatekeepers. This allows the use of the Message Bus to act as gluing mechanism to create any type of system from roughly the same building blocks. Mbus call control messages are based on a common basic message set defined in the following that will be supported by any kind of call control protocol entity. The basic message set may be augmented by protocol-specific extensions required for protocol specific interactions between a local controller and/or local applications on one side and the respective protocol engine on the other. While the basic Call Control commands have been worked through, they still need to be mapped to H.323, SIP, and ISDN-specific messages.

Trial classification: No

User community:

The Stargate is a gateway specifically for multimedia participants in SIP, H.323, and ISDN based conferences. The gateway will benefit users within an administrative domain wishing to access conferencing on these protocols.

3.1.7 LightWeight Directory Access Protocol – OpenLDAP

Overview of the application:

OpenLDAP is used in many middleware applications and it is important that it is available over IPv6. OpenLDAP Software (<http://www.openldap.org/>) is an open source implementation of the Lightweight Directory Access Protocol (v3), base protocol is specified in RFC 2251. OpenLDAP is a simplification of the X.500 DAP. We have ported OpenLDAP to IPv6 and this is in the official 2.x versions.

We want to get OpenLDAP tested on a wide variety of platforms, and make any necessary changes to make IPv6 work on those. Some changes have already been necessary, since IPv6 stack implementations do things in slightly different ways. We will also see if we can use OpenLDAP as a proxy to give IPv4 clients access to IPv6 LDAP servers and vice versa.

A number of 6Net applications depend on LDAP, and should obviously use it over IPv6. Part of the work will be to assist them with any LDAP IPv6 problems.

Trial classification: No

User community:

There are probably tens of thousands of OpenLDAP users, and OpenLDAP will by default support IPv6. As operating systems and networks are IPv6 enabled, the number of people using OpenLDAP over IPv6 will grow.

One novel application of OpenLDAP over IPv6 lies in Southampton's tunnel broker service, where OpenLDAP has been used to implement the schema associated with tunnel broker connections. This work has been undertaken on the 6WINIT project, but will be made available in 6Net. The tunnel broker architecture uses FreeBSD, OpenSSH and OpenLDAP, all freely available components.

IPv6-enabled LDAP is also used in the PKI activity described below.

3.1.8 Public Key Infrastructure – PKI (University of Murcia)

Overview of the application:

The purpose of a Public Key Infrastructure (PKI) is to define the mechanisms and elements needed to manage and enable the effective use of public key encryption technology on a medium or large scale.


The base components are a certification authority, one (or several) registration authorities, and a directory server. Some additional components, like smart cards, time stamping servers, OSCP servers, can be present depending on the services offered by a particular PKI implementation.

The Public Key Infrastructure of the University of Murcia is based on the design and implementation of IPv6-enabled X.509 certification services. It can be used by an organisation to provide its users with a range of public key mechanisms for securing their communications.

The end users of the PKI are able to carry out the majority of their PKI operations using a web browser, e.g. to request a certificate, renew it, revoke it, or look for another user's certificate. The PKI also allows the use of smart cards to store cryptographic information, enabling greater key mobility and also increasing the security of the system.

The most important characteristics of this PKI are:

- It allows certificates to be requested, renewed and revoked for every entity (end user or process) of an organisation.
- It allows the use of an LDAP directory to store the users and Certificate Authority (CA) certificates and Certificate Revocation Lists (CRL).
- Final users can carry out a variety of certification operations from their own web browser or through the Registration Authority (RA).
- Users can use smart cards to store cryptographic information (private key, certificate and CA's certificate). This allows mobility and increases the security of the system.
- It supports the definition of a Certification Policy that will establish the restrictions inside an organisation. This policy is defined by the administrator and is applied in every PKI component (registration authority, certification authority, request server, etc.).
- It is completely developed in Java, allowing the use of any operating system to run an implementation of the PKI.

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- It is based on those drafts and standards specified by the IETF inside its PKIX working group.
- It supports the Simple Certificate Enrolment Protocol (SCEP), enabling router certificate requests.
- It supports the Online Certificate Status Protocol (OCSP).
- Time Stamping is implemented in the system.
- The end user interface for the system is IPv6 enabled, e.g. the LDAP server and web server, so final users can access the system using this network protocol.
- Work is underway by the University of Murcia to convert internal communication to use IPv6.

Trial classification: No

User community:

The PKI provides a wide range of facilities to a range of users. The administrative functions would be a closely controlled activity. General users within an administrative domain may utilise various certification operations. Users running services may also make use of the certification facilities for secured operations.

The PKI for IPv6 will enable secure applications to be demonstrated.

One of the goals of collaboration with the Euro6IX project is to run conferencing between the project participants using SRTP over IPv6. Thus the initial user community for such a demonstrator will be the project members, but the scope of a secure conferencing application is a much wider user community.

3.1.9 AWM – Application Workload Modeller


Overview of the application:

Application Workload Modeler (AWM) is an IBM tool giving the ability to measure and tune the performance of networks and applications in a client/server, multi-protocol environment. With AWM, one can more accurately plan the development and deployment of applications in a network, and determine where upgrades may be required in servers or network infrastructure.

AWM allows the user to simulate large numbers of clients and stress workload levels. This can be done from a single host or from several hosts when larger workload levels are required. When several hosts are used, a single AWM instance is designated as the controller, coordinating the set-up and execution of the test, as well as gathering results for all AWM client and server instances involved in the test.

AWM can simulate these TCP/IP clients: TN3270, HTTP, HTTPS (Open SSL and GSKit), CICS sockets, DNS, DHCP, FTP, SAP ICL and SMTP.

Application Workload Modeler provides detailed statistics describing the throughput levels and response times measured for each test, including response time variance and standard deviation metrics. These statistics can be viewed during the test and in final reports generated when the tests are complete. Reports include statistics for each instance of AWM involved in the test, as well as aggregate reports for the overall test.

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Thus AWM, though not an end-user application in itself, usefully simulates a range of e-business application workloads. It is a released product including IPv6 support, although a special build is needed for Linux systems.

Trial classification: C

User community:

In 6Net, AWM will be used by project specialists at IBM, Uninett and the University of Southampton to test the network's stability and performance for e-business workloads.

3.1.10 IBP – Network Storage

Overview of the application

The Internet Backplane Protocol (IBP) is middleware for managing and using remote storage. It was invented to support Logistical Networking in large scale, distributed systems and applications. Logistical networking is as the global scheduling and optimization of data movement, storage and computation based on a model that takes into account all the network's underlying physical resources. This contrasts with more traditional networking, which does not explicitly model storage or computation resources in the network. This approach is "logistical" because of the analogy it bears with the systems of warehouses, depots and distribution channels commonly used in the logistics of military and industrial activity. IBP provides a mechanism for using distributed storage for logistical purposes.

Trial classification: C

User community

The initial user community for this tool has been GARR. Testing will be carried out within a number of other WP5 member's premises. These trials will be extended to partners as clients and servers (depots). It is available a first IPv6 server: ibp-rm.6net.garr.it

3.1.11 IRC – Internet Relay Chat

Overview of the application

Internet Relay Chat (IRC) is one of the most popular services on the Internet. Using an IRC client (program) you can exchange text messages interactively with other people connect to the same chat networks. When logged into a chat session, you "converse" by typing messages that are instantly sent to other chat participants. The IPv6 implementation is very famous and many public IPv6 IRC servers are active. A list is available at:

http://www.join.uni-muenster.de/Dienste/IRCV6_Server.php?lang=en

Trial classification: A

User community

The population of 6Net users use IPv6 version of IRC very often. There are some functionality to extend and test (DCC). There are available two public servers in the 6NET-GARR network: irc.cs.unibo.6net.garr.it and irc-rm.6net.garr.it

4 Activity 5.4: Edge services for IPV6

4.1.1 Edge Server Proxy

Overview of the application:

IBM Edge Server is a powerful set of software components providing a better service both to users who access information on the enterprise's server and to internal users accessing to the Internet. Such devices are close to the boundary between the enterprise's network and the Internet, which is the reason for the name Edge Server. Edge Server is now packaged as part of the general Websphere Application Server platform.

Four systems are included in IBM Edge Server: Network Dispatcher, Application Service at the Edge, Content Distribution and Caching Proxy. The Caching Proxy intercepts a request from a client, retrieves the data from content host and sends it back to the client. Although HTTP(S) requests are often done, it can also deal with FTP and Gopher traffic. Caching is done by storing cacheable content before sending it to the client, so next requests to the same content can be delivered more quickly and with saving network bandwidth.

Proxys can be used in two different ways: Forward Proxy when located on the client's network, and Reverse Proxy when located on the server's network. In the 6Net context, the proxy can also serve as an application level gateway between IPv6 and IPv4, allowing 6Net users to access legacy IPv4 web content (and vice versa).

Trial classification: C

User community:


Proxy services are already widely spread. Main users are ISPs, Campus, content distribution and e-business networks. In fact, the Proxy is not per se an end application. It is a "gateway" between a user and the server. For the moment, the Proxy prototype deals with IPv4-v6 HTTP traffic, including forward and reverse functions. Due to that, the user community will depend on the HTTP servers or clients' users the Proxy will be used for. For example, it could include users of MUST, WebSphere Portal or CDN. In 6Net, proxies will be installed at four sites (Telin, Southampton, UCL and Athens) all of which can then serve as gateways between 6Net and the legacy network, for the benefit of any users who choose to use the respective proxies.

The trials will require a certain number of users to do this and report on results. This will give valuable experience in this important technique for IPv4/IPv6 coexistence and will reveal its advantages and disadvantages.

4.1.2 Contents Delivery Networking – CDN

Overview of the application:

Content Distribution networks scale and accelerate content services by distribution content at the edge of the network and redirecting client request to the most appropriate edge server by means of a content routing process.

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A CDN consists of a content distribution management function responsible for optimizing the distribution of content to the edge of the network, a content routing process to redirect client requests to the closest edge delivery node whereby closest is related to a metric based on RTT and content availability and the edge delivery node serving the content using different protocols like HTTP or RTSP.

6Net will study how the CDN infrastructure can be used to accelerate and scale other application services developed in Workpackage 5.

Trial classification: No

User community:

The CDN user community can be divided into 2 categories:

The first category is addressing the 6Net user side. Implementing CDN technologies in a network like 6Net will improve the user experience, give him better response time and better reliability. Large and rich media contents can be pre-positioned on the edge of the network at strategic locations, chosen as being the closest to the user communities for which this content is of real interest.

As an example, a scheduled e-learning session on brain surgery that contains a large presentation or several videos will only be of interest to the medical students community. All that content can be pre-positioned on edge servers located at medical universities before the scheduled e-learning session starts. All students taking the course from university premises will be redirected to the local cache where the content will delivered to this population in better conditions. However the same content will remain available to other users on the origin server, where it can be reached by anybody that has not been targeted as a user of primary interest to that content.

The other population interested in CDN technologies are Content Providers such as e.g. video producers and teachers producing web-based courses. They will be able to selectively address the population they are interested to reach with that content, by choosing the locations where the content should be cached.

The examples mentioned above are targeted at the academic community - teachers and students. It can be extended to all 6Net users and providers of applications that deliver large et very large multimedia content, accessible for example through web portals.

5 Activity 5.5: IPv6 support for Globus

5.1.1 GLOBUS 2.0

Overview of the application:

The GLOBUS toolkit is an open source middleware suite that supports Grid computing.

Quoting from the www.globus.org web site, "The Globus Project is a community effort, led by Argonne National Laboratory and the University of Southern California's Information Sciences Institute".

Globus is developing the basic software infrastructure for computations that integrate geographically distributed computational and information resources. The Toolkit is first and foremost a "bag of services," a set of useful components that can be used either independently or together to develop useful grid applications and programming tools... This release includes new many features, including the Globus Project's Data Grid software, MDS-2, and GRAM 1.5.

This release is also the first Globus Toolkit release to use NCSA's Grid Packaging Technology (GPT), and the first to offer binary releases on popular platforms including Linux 2.x, Solaris 8, Compaq's Tru64, IRIX 5.1, and AIX 5.1."

Trial classification: A

User community:

The Globus Toolkit is one which is being used increasingly by Grid and E-Science users to enable high capacity distributed computing.

A number of NRENs within the 6Net project already serve established Grid communities, e.g. in the UK there are nine regional E-Science centres who exchange data over the JANET infrastructure. One such centre is located at the University of Southampton, a 6Net project partner. There is also significant Grid effort at UCL, another 6Net partner, where the view is not

if IPv6 should be used for E-Science applications, but when.

Thus we can foresee at least national activity in the UK between Southampton and UCL, initially between researchers, and then also similar trials across other NRENs.

In addition to national activities, pan-European projects and initiatives such as the European Data Grid are potential users of an IPv6-enabled Globus infrastructure. It should be possible to enable IPv6 Globus trials between countries across the 6Net infrastructure.

While the NAT deployments that hamper direct peer-to-peer communication between hosts is more prevalent in the commercial domain, IPv6's address space advantage should also prove beneficial

in academic networks, allowing more end user groups to more readily take part in Grid computations.

Globus 3.0 is expected to be ready for public use by early 2003. We hope, through the 6Net project, to get IPv6 support enabled first as a patch for Globus 2.0, but later as an integral part of Globus 3.0. Having "out of the box" support for IPv6 in Globus 3.0 will allow the IPv6 functionality to reach a much wider user base.

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