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Abstract: Deliverable D3.3.11 is produced in the context of A3.1 and A3.2 activities. Activity A3.1 covers the deployment of the local networks attached to the different Euro6IX IXs nodes. Activity A3.2 deals with all deployments related to Euro6IX Backbone network. The main goal of these documents is to generate reports regarding the Euro6IX networks status, Deployment State and usage by internal activities as well as public events.

Keywords: Euro6IX, IPv6, Network Maps, Network Reports, Network Status, Statistics, Traffic.
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Revision History

Revision	Date	Description	Author (Organization)
v0.1	15/12/2002	Document creation	Carlos Ralli Ucendo (TID)
v1.0	01/02/2003	Final edition	Carlos Ralli Ucendo (TID)
v1.1	13/03/2003	Final update of template and review	Jordi Palet (Consulintel)

Executive Summary

Deliverables D3.3.x are being produced every month, and this document corresponds to month number 11 (November 2002). This is the second network monthly report after the milestone regarding IPv6 connectivity among most IXs, as this milestone was delayed from M7 to M9, September 30th 2002 in the 1st Euro6IX technical audit (Paris, Oct 31st 2002).

The structure of these network usage reports continues being the following:

- First section (Current Network Status) is intended to clarify which links have been already deployed and which concrete networks have been attached.
- Second section (Network Stability and Global Traffic Reports) is intended to show the reachability of all network sections as well as a global view of the total traffic exchanged in Euro6IX network.
- Third section (Detailed Network and Services Usage in Events/Trials) is intended to show and analyze the traffic produced in some internal trials and in all public events where Euro6IX contributes in any way.

Most of these sections will be empty in this D3.3.11 and next D3.3.x, until the statistics systems are installed in the Euro6IX IXs and partner's premises. The definition of the statistics systems and management & control software will be done in Euro6IX deliverable D3.2 "Definition of statistics, management and security control systems (draft)".

Then, these D3.3.x reports will contain only the news regarding Euro6IX network and services deployment as well as some small trials performed before the whole network is ready. These documents will significantly improve their content when the statistics and management systems provide information and concrete figures/graphics of network usage and status (this is expected to happen by March/April 2003, i.e. D3.3.15/16).

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1. INTRODUCTION

Euro6IX project has, as a key goal, to accelerate the introduction of IPv6 protocol in Europe. To reach this purpose, an appropriate architecture will be researched in order to design, develop, deploy and validate the first Pan-European pre-commercial IPv6 Internet Exchanges Network.

The network will connect regional and strategic neutral IPv6 Internet Exchanges across Europe in order to achieve higher levels of robustness and service quality than currently offered by IPv4 Networks.

The project will give the possibility to test advanced network services and IPv6 enabled applications that need to be properly monitored and reported, as part of the deployment activity, as is actually done in production networks.

2. CURRENT NETWORK STATUS

This section is intended to update and clarify which links have been already deployed and which concrete networks have been attached to Euro6IX backbone.

2.1 Remarkable News Related to Euro6IX Network & Services

In this period (November 2002, M11) the relevant news include:

- Establishment of LIS6IX-MAD6IX-LON6IX-PAR6IX-BER6IX connectivity and initial BGP4+ routing schemes to allow basic networking. PAR6IX-BER6IX has been configured at the layer-2 level but layer-3 is not ready by November 2002.
- Improvement of the statistics system (PAR6IX & BER6IX nodes are now monitored).
- Demonstrations realized in the IST2002 event (Copenhagen, Nov4-6th 2002). Euro6IX offered a small set of IPv6 services but it offered connectivity to the event (in collaboration with 6NET) to other IST projects such as LONG.
- The connection with the LONG test-bed has been realized at TID premises. This is very important since in IST2002 most IPv6 services that will be showed by LONG-Euro6IX will come from LONG project while Euro6IX (with 6NET collaboration) will offer connectivity to the event.
- After the demonstrations performed in IST2002, many issues have been learned:
 - Euro6IX needs a concrete routing policy since many traffic flows went from MAD6IX by Euro6IX and 6NET links but the return path was the 6Bone.
 - Euro6IX needs a concrete routing policy since other networks such as 6NET do not want to pass all routes (full peering) to one Euro6IX IX (LON6IX in this case) without the no-export field. Thanks to the negotiation of Jordi Palet with 6NET responsables, 6NET accepted to perform full routing with LONG6IX without the no-export for this event.
 - More efforts are needed to define in WP2 how Euro6IX network should be and appear to the rest of wide IPv6 networks or even the IPv6 Internet.
 - Euro6IX has a good position to enhance IPv6 deployment in Europe, not only by its own merits, but also allowing other projects to transit in order to perform remote demonstrations all over Europe.

2.2 Status of International Links

As stated in the contract Euro6IX will join all IXs with native and dedicated IPv6 high bandwidth links. If an agreement is finally signed with an external operator/carrier for the link TOR6IX-ZUR6IX, all foreseen links in the contract will be possible except the one that brings the ring topology: MAD6IX-TOR6IX.

In Paris Euro6IX plenary meeting it has been decided to replace MAD6IX-TOR6IX by a 6Bone connection or a tunnel over the Internet so that routing tests based in a ring topology and different quality ways to reach other IX could be made.

The updated status of the links is as follows:

- **LIS6IX-MAD6IX:** Up and running.
- **MAD6IX-LON6IX:** Up and running.
- **LON6IX-PAR6IX:** Up and running.
- **PAR6IX-BER6IX:** Being configured. L2 working but L3 is not configured.
- **BER6IX-TOR6IX:** Not ready. Expected to be ready by December 2002.
- **TOR6IX-ZUR6IX:** Not ready. TILAB activated one link to Zurich but one local loop in Zurich is needed to complete the connection. No solution is available by November 2002.
- **TOR6IX-MAD6IX:** It has been delayed until the beginning of the year 2003, due to problems found to get the required infrastructure of the whole link.

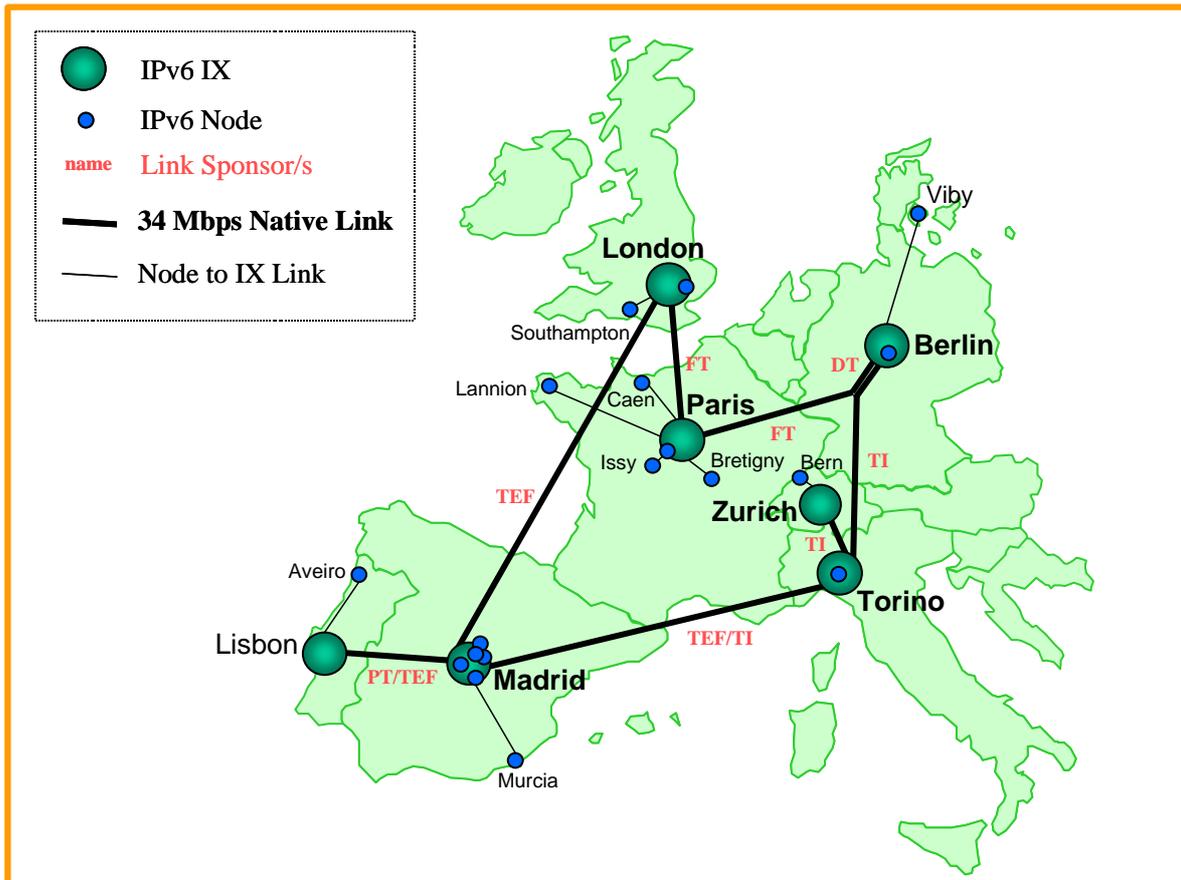


Figure 2-1: Planned Euro6IX International Links as of November 2002

3. NETWORK STABILITY AND GLOBAL TRAFFIC REPORTS

This section is intended to compile the traffic statistics diagrams automatically generated in order to have a global view of the Euro6IX network usage.

The following subsections show the global statistics systems that have been identified as necessary to characterize the Euro6IX network usage each month.

3.1 Hosts/Networks Reachability Statistics from TID

The “ping_stat” tool automatically generates these statistics from TID premises.

This system has been installed successfully at TID's Euro6IX local network and statistics are being shown in <http://stat6.tid.euro6ix.org/statistics/> to consortium members.

All Spanish sites currently being connected to MAD6IX (Consulintel/nGn, UMU, UPM, Vodafone) and IX nodes working by middle November (MAD6IX, LIS6IX, LON6IX, PAR6IX). At the end of November the system was able to show statistics to BER6IX (but it was 100% packet loss).

The system was designed to get statistics and show them in daily diagrams as the example showed below.

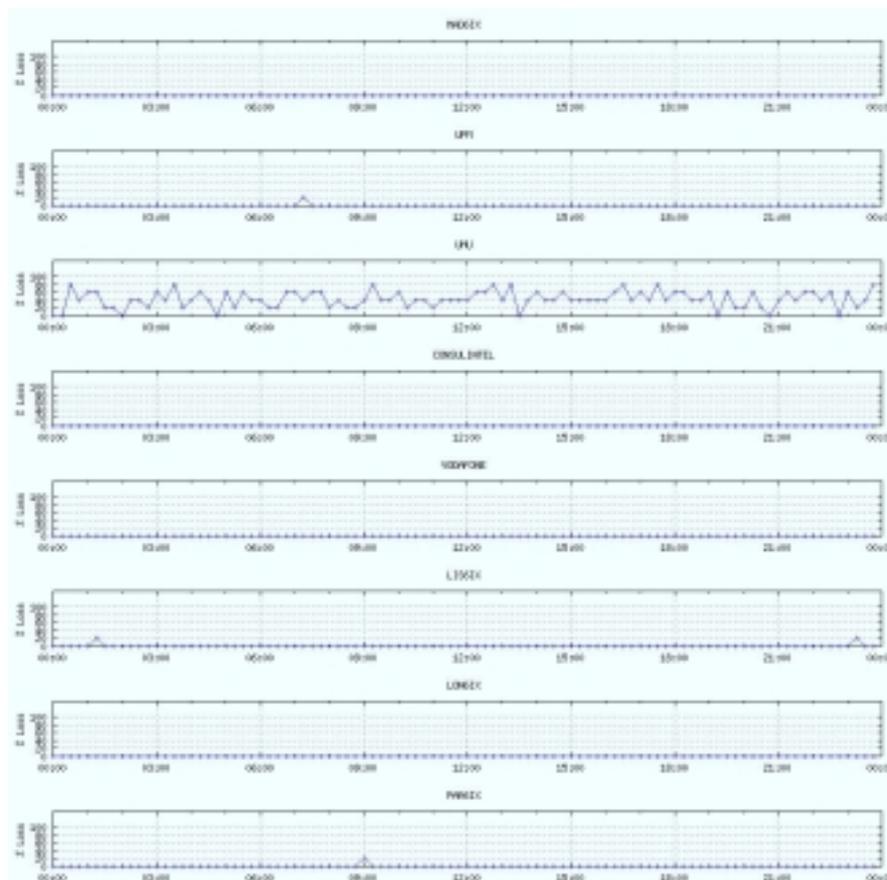


Figure 3-1: Example of Network Losses

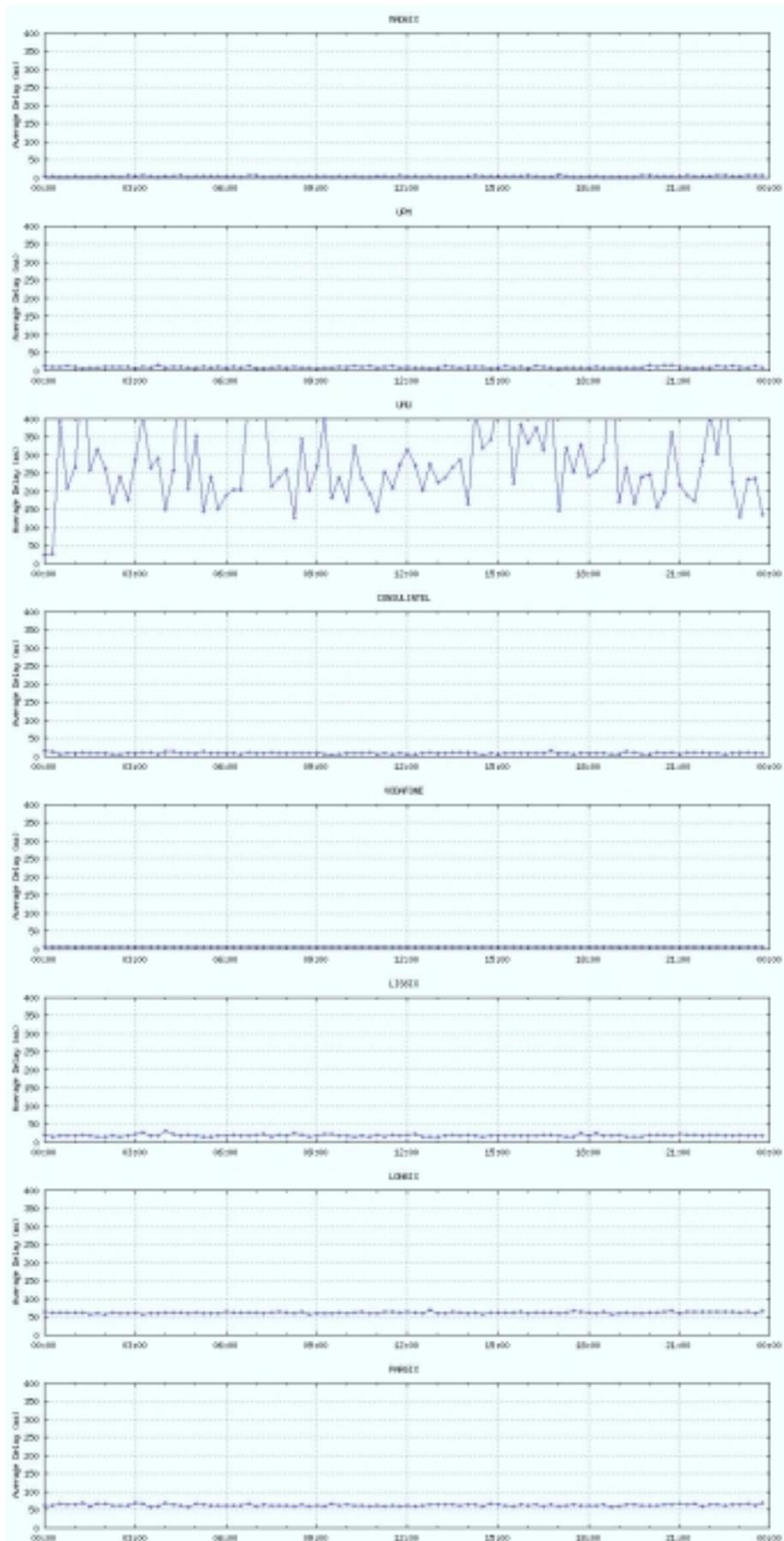


Figure 3-2: Example of Network Delays

3.2 Links Traffic Measurement Statistics

No Links Traffic Measurement system is available by November 2002. See Euro6IX Deliverable D3.2 for proposed systems to be used in Euro6IX.

In the future, this section will compile the traffic sent by Euro6IX international and national links. It will include also the traffic sent and received in the links connecting Euro6IX to other IPv6 backbones.

After installing the systems proposed in D3.2, some figures should be available for the network report of March/April (D3.3.15/16).

3.3 Euro6IX Services Statistics

The Euro6IX Statistics Service will show not only the availability of Euro6IX network gateways/routers, but also the availability of relevant or public IPv6 host/servers in <http://stat6.tid.euro6ix.org/statistics/> for consortium members.

No figures are available by November 2002.

In the future, this section will include concrete servers statistics related to the usage of a set of stable services implemented in Euro6IX.

As an example, this section will contain the statistics related to IPv6 accesses to Euro6IX official WEB page, that are already being logged in advance to the start of the project, so it can be processed and displayed at any time.

4. DETAILED NETWORK AND SERVICES USAGE IN EVENTS/TRIALS

This section is intended to study and analyze the network traffic generated in the following situations:

- **Internal Trials:** Internal Euro6IX trials performed in the context of activity A4.3 will generate traffic within the Euro6IX networks. In some of these trials, the detailed study and analysis of the traffic generated could be interesting. In such cases, particular diagrams and statistics will be shown in this section although they could be included in the general statistics showed in previous sections.
- **Public Events:** After a public event has been performed, the traffic processed by the network during it must be studied and analyzed. The study must be focused in the traffic obtained as a result of this concrete event.

During November 2002 there were many relevant events with the participation of Euro6IX: demonstration in the 1st project technical audit and participation in IST2002 event. These events have become the first ones where Euro6IX network has been started to use for demonstrations involving more than one IX.

5. SUMMARY AND CONCLUSIONS

Up to end of November 2002, several links of the Euro6IX network are active and fully operational, BGP4+ routing is being configured and a concrete policy to define the Euro6IX backbone and consequently configure all nodes is needed.

Also, Euro6IX network connectivity to/from 6NET and LONG projects, as well as the 6Bone, has been configured in order to enable network demonstrations for the IST2002 event in Copenhagen. In this event, Euro6IX has shown a small set of IPv6 services but has enabled the connectivity for other projects, such as LONG which started in December 2000, which has many IPv6 services working in a stable way.

In future events, the network statistics and management systems will allow WP3 to include concrete figures and graphics about network usage and links/services status during those trials.