


IST-2001-32604	Deliverable D 1.5.2 Six monthly report on the Usage of 6NET and a list of activities supported	
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Abstract:

This document gives details of the usage of the 6NET network over the six-month period, and lists the activities supported.

Keywords:

IPv6, usage, 6NET, GÉANT, tunnel, fault report,

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1 Introduction

In the first six months of the 6net project an enormous effort has been made to build up the 6NET network. In 35 locations Cisco router have been installed, the national, backbone and local loops have been ordered and tested, the routing and addressing plan has been implemented and deployed, etc. In the second half year, with beginning of August, almost all NREN and Universities have been connected to 6NET, based on native IPv6 connections apart from Greece, where a MPLS/CCC tunneled connection was selected due to the extremely high costs of a native STM1 connection.

In addition to the original 31 6NET partners, four new partners (PSNC, CESNET, Hungarnet and ETRI) joined the project on 1st September 2002. To incorporate the new partners, the network has been extended with IPv6 tunnels to Poland, the Czech Republic and Hungary. These temporary tunnelled connections will be replaced by native links by the end of January. Moreover, the geographical coverage of the network and with it the scope of the activities has been broadened by connecting 6NET to other research networks in Europe, North America and Asia. 6NET provides connectivity for example to EURO6IX, 6BONE, Abilene and NTT (see 3.2 and 3.3 for a detailed description of 6net connectivity).

Although 6NET is a test-bed network, one of the major requirements was to keep the network stable. Special maintenance and test windows within the network core have been defined to realise that.

The day-to-day operation of the network is done by the entity responsible for the respective management area. Three management areas and entities have been defined:


1. 6NET NOC responsible for 6NET core Network Operation
2. NREN NOCs responsible for National Research Networks
3. End-user NOCs responsible for Universities/end site network operation

Moreover, special management entities with global responsibility have been defined:

- 6TAC (Technical Assistance Centre) is a Cisco help desk providing support in case of Software and Hardware problems related to the 6NET router provided by cisco.
- The 6NCC (6NET Network Coordination Center) is the entity responsible for the network and service management decisions related to 6NET network and services.

To allow a smooth cooperation, procedures have been defined and deployed how these management entities should work together to manage the whole network. The 6NET NOC, which is located in Paris and coordinated by DANTE, plays a central role in managing 6NET as it is the central contact point (help desk) in case of end-to-end network problems. In addition, mailing lists have been established for fault reporting and for getting help, as well as a trouble ticket system has been realized to keep all 6NET partners informed about the current network problems and their status.

This, the second 6NET six-monthly usage report, reports on the most significant activities on the network during the period (1 July to 30 December 2002). It gives an overview about the problems occurred in the network, the traffic statistic of the access and core links and their availability.

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2 List of Activities

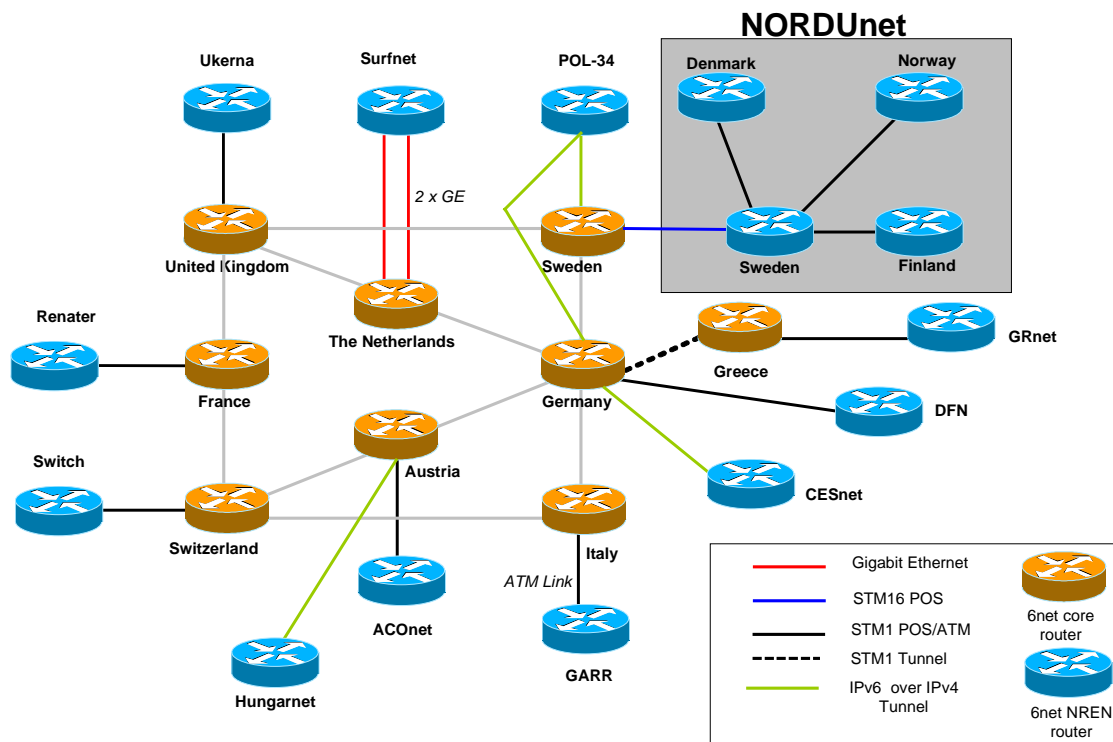
The most significant activity within the reporting period was to finalise the connectivity to all National Research and Education Network partners and to provide connectivity to the four new 6net members CESNET, Hungarnet, PSNC and ETRI (see section 3.1 for more details). Because of the interest of NRENs and end users, 6net is already connected to research networks in the Asia-Pacific and North America region, which was planned for March 2003, namely Abilene network and NTT (Japanese network) and other research networks like Euro6IX, 6WINIT and 6BONE.

With the extension of 6net, a routing policy was implemented based on D1.1 to avoid 6net to be used for transferring commercial traffic. ISIS link metrics have been changed in core to allow a faster transmission on the one hand and on the other hand to avoid cost-equal routing paths for an easier trouble shooting.

3 Management Overview

This section reports on the service and covers the main changes and events, which took place during July and December 2002.

3.1 Connection Overview



The 6net backbone consists of a set of international circuits to which there are local national connections and tunnelled international connections. From a network management point of view the 6net core is what is represented by the orange routers whilst the international circuits in the Nordic countries form a separately managed network, that connects to 6net core network.


In more detail, the 6net core provides native STM1 connections between:

- UK-NL, NL-DE, DE-IT, IT-CH, CH-FR, FR-UK (COLT)
- UK-SE, SE-DE (Telia)
- DE-AT, AT-CH (Deutsche Telekom)

and a tunneled connection (MPLS/CCC) because of economical reasons between

- DE-GR

as shown in the figure 1 above.

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All together, 11 NRENs are connected to 6NET core. To incorporate the four new partners (Hungarnet, CESNET, PSNC and ETRI) as soon as possible, IPv6 over IPv4-tunnels have been established to Hungarnet, PSNC and CESNET. With exception of Poland, these tunnels are a temporary solution and will be replaced by native STM1 connections by the end of January 2003. ETRI is connected via RENATER/EIN/KOREN.

3.2 Connectivity to other IPv6 projects/networks

Once the pan-European network was operational and stable with all NREN (except the new partners) and most of the end users connected, the initiative to link to North America and Asia was started. In October/November 6net was already connected to Abilene via NORDUnet and SURFnet using native connections. The connection to NTT in Japan is already in place, the port adapter to connect to from the 6net site is expected to be delivered mid of February. NTT will be connected via the 6net PoP in London.

Moreover, 6net is connected to Euro6IX (IST project) via UKERNA/ UK6X, to 6BONE and other IPv6 research networks.

3.3 Monthly activities/events

3.3.1 July

Circuits (NREN Access) or Gateway or Providers Access operational :

GRnet was connected to 6NET on 29th July. The CCC Tunnel between de6.de and gr6.ge was operational on 9th July.

The Service

All 6NET checklists were delivered on 17th July. The 6NET NOC was added in the trouble@6net.org, tickets@6net.org and advice@6net.org mailing lists on 25th July.

IPv4 and IPv6 access-lists were configured on all 6NET routers to secure the telnet access on 26th July.

A CCO account was provided by Cisco to the 6NET NOC on 31st July.

Future Plans and other Pending Actions

Upgrade of the 6NET core routers in 12.0(22)S.


3.3.2 August

The Service

To fix the Cisco bug regarding routing updates (CSCdw72626), the 6NET core was upgraded in 12.0(22)S on 2nd and 5th August. Due to a BGP authentication incompatibility between IOS prior to 12.0(22)S and after 12.0(22)S, BGP authentication was disabled on all 6NET BGP sessions (CSCuk30209) during this upgrade.

BGP authentication was re-enabled on all internal sessions on 27th and 28th August.

BGP authentication was re-enabled on SURFnet sessions on 28th August.

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BGP authentication was re-enabled on RENATER session on 28th August.

NTPv4 was enabled on fr6.fr as a test on 28th August.

Future Plans and other Pending Actions

BGP authentication needs to be re-enabled on sessions towards AConet, DFN, GARR, JANET, NORDUnet, PSNC and SWITCH. The 6NET NOC is in touch with parts of these NRENs to plan this operation.

NTPv4 implementation on 6NET core is scheduled in September.

6TAC meeting is scheduled in Paris on 23rd and 24th September.

3.3.3 September

Circuits (NREN Access) or Gateway or Providers Access operational:

HUNGARnet was connected to 6NET on 25th September.

The Service

On DANTE's request, a public key was defined for the 6NET NOC (trouble mailbox) on 2nd September. Besides, a public key was defined for the 6NET NOC for internal purposes to protect confidential files.

NTPv4 was fully deployed on 6NET on 11th September.

BGP sessions from/to Athens were disturbed this month due to a CCC JunOS incompatibility between JunOS 5.1 and JunOS 5.3. GÉANT routers have been upgraded to fix this problem.

The 6NET core router in Milan was upgraded in 12.0(22.4)S1 to fix the problem with the ATM connection to GARR.


Regarding Hungarnet connection to Vienna, Hungarnet's read-only access and BGP MD5 authentication were operational on 25th September.

Future Plans and other Pending Actions

Four new partners joined 6NET (Hungarnet, CESNET, PSNC and ETRI-Korea).

Hungarnet will be connected to Vienna with a native STM1 connection while CESNET will be connected to Frankfurt via POS STM-1 circuits by the end of January 2003. After the delivery of the HU router and the delivery of the native STM1 connection, Hungarnet connection to 6NET will be migrated from Vienna (IPv4 tunnel) to a direct connection on HU. The same applies for CESNET, which is currently connected via an IPv4 tunnel from Frankfurt using GÉANT resources.

PSNC (Poland) is connected via a primary tunnel from Sweden. According to their request, a second tunnel will be configured to Frankfurt as a backup connection to their existing tunnel to Stockholm.

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3.3.4 October

Circuits (NREN Access) or Gateway or Providers Access operational:

A peering between Euro6IX and 6NET was configured via JANET on 16th October.

The Service

The Cisco case D180453 was opened by the 6NET NOC on 1st October, concerning a conflict between the NSE-1 and the PA-GE cards on a C7206VXR belonging to SWITCH.

Since the 15th October, 6NET BGP routes are tagged, and EBGP peerings are advertising the tagged routes: NREN prefixes are 6680:10 and others are 6680:99.

The 6NET router in Milan was upgraded to 12.0(22.4)S2 on 15th October with fixed a small bug noticed in 12.0(22.4)S1 .

6NET routers have been added to the weekly Out of Band tests on 17th October.

Future Plans and other Pending Actions

Four new partners joint 6NET (Hungarnet, CESNET, PSCN-Poland and ETRI-Korea). HUNGARnet will be connected to Vienna with a native STM1 connection while CESNET will be connected to Frankfurt via POS STM-1 circuits by the end of January 2003. After the delivery of the HU router and the delivery of the native STM1 connection, HUNGARnet connection to 6NET will be migrated from Vienna (IPv4 tunnel) to a direct connection on HU. The same applies for CESNET, which is currently connected via an IPv4 tunnel from Frankfurt using GÉANT resources.

The re-activation of MD5 authentication on EBGP peerings is still ongoing.

3.3.5 November

Circuits (NREN Access) or Gateway or Providers Access operational:

CESNET was connected on Frankfurt PoP on November, 6th.

Hungarnet router was rehomed on November, 25th.


The Service

The re-activation of MD5 authentication on EBGP peerings is still ongoing.

Future Plans and other Pending Actions

Four new partners joint 6NET (Hungarnet, CESNET, PSCN-Poland and ETRI-Korea). Hungarnet will be connected to Vienna with a native STM1 connection while CESNET will be connected to Frankfurt via POS STM-1 circuits by the end of January 2003. After the delivery of the HU router and the delivery of the native STM1 connection, Hungarnet connection to 6NET will be migrated from Vienna (IPv4 tunnel) to a direct connection on HU. The same applies for CESNET, which is currently connected via an IPv4 tunnel from Frankfurt using GÉANT resources.

An upgrade of the 6net core routers is scheduled during the weeks of the 09/12/02 and 06/12/02. The new IOS version on the 6net core will be 12.0(23)S1.

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3.3.6 December

Circuits (NREN Access) or Gateway or Providers Access operational:

None

The Service

The re-activation of MD5 authentication on EBGP peerings is still ongoing.


Future Plans and other Pending Actions

Four new partners joint 6NET (Hungarnet, CESNET, PSCN-Poland and ETRI-Korea). Hungarnet will be connected to Vienna with a native STM1 connection while CESNET will be connected to Frankfurt via POS STM-1 circuits by the end of January 2003. After the delivery of the HU router and the delivery of the native STM1 connection, Hungarnet connection to 6NET will be migrated from Vienna (IPv4 tunnel) to a direct connection on HU. The same applies for CESNET, which is currently connected via an IPv4 tunnel from Frankfurt using GÉANT resources.

According to DANTE the circuits DE-CZ and AT-HU have been ordered and will be delivered by T-Systems by the end of January 2003.

An upgrade of the 6net core routers was scheduled during the weeks of the 09/12/02 and 06/12/02. The new IOS version on the 6net core is 12.0(23)S1.

SNMP + MD5 authentication access will be provided to all 6NET NRNs on their directly connected core routers.

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3 Fault Report

As the network only started to carry traffic in June, the fault report for this six-month period has been produced to indicate the format, which will be used for the next report, and to gather comments, which can be used to improve the fault report.

3.1 Trouble Tickets


This section contains the trouble ticket summary and the network availability for the reporting period. All times are in UTC.

Trouble tickets are assigned to seven categories. Below is the description of these categories:

Trouble Ticket Classes	Description
AC	ATM VC Configuration Problem
LF	Line Fault
RC	Routing Configuration Problem
RH	Router Hardware fault
RS	Router Software fault
SE	Security problem
SM	Scheduled Maintenance
UM	Unscheduled Maintenance
UP	Unidentified Problem
OT	Other


3.1.1 July

Ticket No	Problem				
	Problem Start D/M h:m	Problem End D/M h:m	Duration h:m	Class	Summary
291909	25/04/2002 16:00	05/07/2002 14:24	1702:24	OT	Set up problem on AT6-ACONET connection.
293029	04/07/2002 03:00	04/07/2002 05:30	2:30	SM	Maintenance work on AT-CH
300274	24/07/2002 13:53			RH	Hardware problems on the NORDUNET router located
300359	24/07/2002 15:04	24/07/2002 16:08	1:04	LF	Trunk is down between 6NET-AT-DE
301533	29/07/2002 15:29	30/07/2002 09:32	18:03	RS	ACONET-AT6 : bgp peering down.
301574	24/07/2002 01:08	29/07/2002 17:40	136:32	RC	GR6-DE6 CCC Tunnel : Down
302322	29/07/2002 17:40			RC	IS-IS problem between gr6.gr and de6.de. All ibgp
302330	12/07/2002 09:48			OT	RENATER 6NET connection fr1 PoP.
302793	02/08/2002 09:15	02/08/2002 10:53	1:38	SM	se6.se upgrade in 12.0(22)S.

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3.1.2 August

Ticket No	Problem				Summary
	Problem Start D/M h:m	Problem End D/M h:m	Duration h:m	Class	
302322	29/07/2002 17:40	07/08/2002 13:51	212:11	RC	IS-IS problem between gr6.gr and de6.de with the MTU size configuration
302330	12/07/2002 09:48	08/08/2002 10:12	648:24	OT	follow NOC TT 296864 : France telecom delay the RENATER's fiber delivery
302793	02/08/2002 09:15	02/08/2002 11:16	2:01	SM	se6.se upgrade in 12.0(22)S
302963	02/08/2002 13:58	02/08/2002 14:34	0:36	SM	fr6.fr upgrade in 12.0(22)S
302965	02/08/2002 14:54	02/08/2002 15:31	0:37	SM	uk6.uk upgrade in 12.0(22)S
302967	02/08/2002 11:45	02/08/2002 16:23	4:38	SM	nl6.nl upgrade in 12.0(22)S
303124	05/08/2002 10:01	05/08/2002 10:52	0:51	SM	at6.at upgrade in 12.0(22)S
303125	05/08/2002 10:55	05/08/2002 11:45	0:50	SM	ch6.ch upgrade in 12.0(22)S
303126	05/08/2002 11:49	05/08/2002 12:21	0:32	SM	de6.de upgrade in 12.0(22)S
303127	05/08/2002 11:30	05/08/2002 16:01	4:31	SM	it6.it upgrade in 12.0(22)S
303131	05/08/2002 13:45	05/08/2002 18:38	4:53	SM	gr6.gr upgrade in 12.0(22)S
303262	05/08/2002 18:00	05/08/2002 20:00	2:00	SM	SURFnet's router upgrade in 12.0(22)S
303672	06/08/2002 11:18	07/08/2002 10:51	23:33	OT	Check of the 6net connection on the fr1. Trouble ticket : 302330
306064	14/08/2002 05:30	20/08/2002 13:39	152:09	RH	UK6
307958	27/08/2002 15:30	27/08/2002 15:46	0:16	RC	Re-activation of the bgp authentication on the internal sessions from/to AT
307976	27/08/2002 15:55	27/08/2002 16:03	0:08	RC	Re-activation of the bgp authentication on the internal sessions from/to CH
307994	27/08/2002 16:11	27/08/2002 16:18	0:07	RC	Re-activation of the bgp authentication on the internal sessions from/to DE
307999	27/08/2002 16:24	27/08/2002 16:25	0:01	RC	Re-activation of the bgp authentication on the internal sessions from/to FR
308003	27/08/2002 16:30	27/08/2002 16:37	0:07	RC	Re-activation of the bgp authentication on the internal sessions from/to GR
308419	28/08/2002 13:10	28/08/2002 13:14	0:04	RC	Re-activation of the bgp authentication on the internal sessions from/to IT
308435	28/08/2002 13:44	28/08/2002 13:46	0:02	RC	iBGP authentication from/to NL
308437	28/08/2002 13:47	28/08/2002 13:50	0:03	RC	iBGP authentication from/to SE
308445	28/08/2002 14:45	28/08/2002 15:25	0:40	RC	BGP Authentication with SURFnet
308530	28/08/2002 17:11	28/08/2002 17:12	0:01	RC	BGP Authentication with Renater
302793	02/08/2002 09:15	02/08/2002 10:53	1:38	SM	se6.se upgrade in 12.0(22)S.


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3.1.3 September

Ticket No	Problem				Summary
	Problem Start D/M h:m	Problem End D/M h:m	Duration h:m	Class	
308419	28/08/2002 13:10	28/08/2002 13:14	0:04	UM	Re-activation of the bgp authentication on the internal sessions from/to IT.
308435	28/08/2002 13:44	28/08/2002 13:46	0:02	UM	iBGP authentication from/to NL.
308437	28/08/2002 13:47	28/08/2002 13:50	0:03	UM	iBGP authentication from/to SE.
308445	28/08/2002 14:45	28/08/2002 15:25	0:40	UM	BGP Authentication with SURFnet
308530	28/08/2002 17:11	28/08/2002 17:12	0:01	UM	BGP Authentication with Renater
310970	29/08/2002 15:49	29/08/2002 16:32	0:43	RS	Routing problem with GARR
310993	05/09/2002 13:35	05/09/2002 13:36	0:01	UM	NTPv4 Configuration on at6.at
310994	05/09/2002 13:45	05/09/2002 14:21	0:36	UM	NTPv4 Configuration on ch6.ch
310995	05/09/2002 14:00	05/09/2002 14:21	0:21	UM	NTPv4 Configuration on de6.de
310996	05/09/2002 14:15	05/09/2002 14:21	0:06	UM	NTPv4 Configuration on gr6.gr
311512	08/09/2002 07:24	08/09/2002 09:44	2:19	LF	IPv6 bgp peering DE6 - GR6 down
312081	14/09/2002 02:00	14/09/2002 05:00	3:00	SM	Maintenance / 14 sept 02 / 6NET - SE - UK
312985	22/09/2002 00:01	22/09/2002 06:00	5:59	SM	Maintenance / 22 sept 02 / 6NET - SE - UK
313282	12/09/2002 09:55	12/09/2002 09:56	0:01	UM	NTPv4 Configuration on it6.it
313283	12/09/2002 10:00	12/09/2002 10:02	0:02	UM	NTPv4 Configuration on nl6.nl
313285	12/09/2002 10:02	12/09/2002 10:04	0:02	UM	NTPv4 Configuration on se6.se.
313287	12/09/2002 10:04	12/09/2002 10:06	0:02	UM	NTPv4 Configuration on uk6.uk.
313602	25/09/2002 23:00	25/09/2002 23:30	0:30	SM	Maintenance / 25 Sep 02 / DE - SE
314955	17/09/2002 12:07	17/09/2002 16:00	3:53	SM	Maintenance Operation on Renater Access.

3.1.4 October

Géant NOC Ticket No	Problem Start d/m h:m:s	Problem End d/m h:m:s	Duration h:m:s	Class	Fixer Ticket No	Summary
323971	15/10 07:00:00	15/10 09:00:00	2:00:00	RC	6NET NOC	Configuration of the BGP routing policy based on communities on 6NET backbone / Operation done
324670	15/10 07:00:00	15/10 09:00:00	2:00:00	RC	6NET NOC	IOS upgrade on IT6.IT to 12.0(22.4)S2 / Upgrade successful
328830	24/10 00:11:00	24/10 00:19:00	0:08:00	LF	TELIA 4366319	Scheduled Outage 6NET - SE - UK / Maintenance occurred
329306	25/10 00:00:00	25/10 00:21:00	0:21:00	LF	TELIA 4368928	Scheduled Outage 6NET - SE - UK / Maintenance occurred


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3.1.5 November

Géant NOC Ticket No	Problem Start <i>d/m h:m:s</i>	Problem End <i>d/m h:m:s</i>	Duration <i>h:m:s</i>	Class	Fixer Ticket No	Summary
334471	09/11 19:34:19	10/11 00:04:22	4:30:03	LF	Colt NL017225	Loss of connectivity DE6 - NL6 / Faulty Colt cable replaced / Colt Ticket NL017225
340614	27/11 18:28:22	27/11 20:14:48	1:46:26	LF	Telia 4478826	Loss of connectivity SE - UK / Patch of a cable and swap of an OA card in Aruika (SE) / Telia Ticket 4478826
326936	05/11 00:23:27	05/11 04:10:09	3:46:42	LF	Telia NMCP5554	Loss of connectivity 6net SE - UK / Telia maintenance done - Change of optical amplifier / Telia Ticket NMCP5554
331669	08/11 00:00:00	08/11 00:05:00	0:05:00	LF	T-Systems	Loss of connectivity 6net AT-CH/ Maintenance done / T-systems no-reference
331670	07/11 00:01:00	07/11 00:06:00	0:05:00	LF	T-Systems	Loss of connectivity 6net AT-CH/ Maintenance done / T-systems no-reference
332878			0:00:00	LF	T-Systems 571966	Loss of connectivity AT6 - DE6 / planned work by the carrier Pragonet / T Systems Ticket 571966
333794	07/11 08:50:57	07/11 10:56:49	2:05:52	LF	T-Systems 574034	Loss of connectivity AT - DE / Fiber break fixed / T-Systems Ticket 574034
336063	15/11 16:07:36	15/11 16:56:29	0:48:53	LF	T-Systems 581978	Loss of connectivity AT6 - DE6 / Outage in Slovakia / T-Systems Ticket 581978
336400	15/11 13:26:00	15/11 14:30:17	1:04:17	LF	T-Systems 582928	Loss of Connectivity / 6NET-AT-DE / Reason For Outage not Specified / T-Systems TT 582928
340435	27/11 12:46:28	27/11 14:06:20	1:19:52	LF	T-Systems 594449	Loss of connectivity AT6 - DE6 / The circuit has been transferred to a higher line 2.5G because of this outage / T-Systems Ticket: 594449
330794	09/11 06:00:00	10/11 06:00:00	24:00:00	OT		6net trouble ticketing system unavailable due to an equipment replacement / The equipment replacement has been postponed.
333673	07/11 08:42:00	07/11 08:45:00	0:03:00	OT		CESNET connexion to 6NET DE PoP / BGP session is up and running for 26mn.
339444	25/11 14:30:00	25/11 15:30:00	1:00:00	OT		HUNGARnet router rehomeing / HUNGARNET router has been rehomed successfully.
333607	11/11 07:30:00	11/11 07:35:00	0:05:00	RC		IOS upgrade of NORDUNET router to 12.0(23)S / Upgrade successful
335878	13/11 14:53:00	14/11 18:49:00	27:56:00	RC		Routing Problem from and to RENATER / This routing problem was due to a misconfiguration on Renater router.
332975	05/11 12:41:00	05/11 16:24:00	3:43:00	RS		BGP sessions down from AT to DE, GR, NL and SE / AT router has been reloaded. It is now stable.

3.1.6 December

Géant NOC Ticket No	Problem Start <i>d/m h:m:s</i>	Problem End <i>d/m h:m:s</i>	Duration <i>h:m:s</i>	Class	Fixer Ticket No
334471	09/11/2006 19:34	10/11/2006 00:04	LF	Colt NL017225	Loss of connectivity DE6 - NL6 / Faulty Colt cable replaced / NL017225
339957	10/12/2006 23:00	11/12/2006 04:00	LF	Telia	Loss of connectivity SE - DE (6net) / maintenance done
339999	13/12/2006 23:00	14/12/2006 04:00	LF	Telia	Loss of connectivity SE - UK (6net) / maintenance done
340614	28/11/2006 18:28	28/11/2006 20:14	LF	Telia 4478826	Loss of connectivity SE - UK / Patch a cable and swap of a OA card in Aruika (SE) / Telia Trouble Ticket 4478826
333794	08/11/2006 08:50	08/11/2006 10:56	LF	T-systems 574034	Loss of connectivity AT - DE / Fiber break fixed / T Systems trouble ticket 574034
336063	15/11/2006 16:07	15/11/2006 16:56	LF	T-systems 581978	Loss of connectivity AT6 - DE6 / Outage in Slovakia / T-SYSTEMS 581978
340435	28/11/2006 12:46	28/11/2006 14:06	LF	T-systems 594449	Loss of connectivity AT6 -DE6 / The circuit has been transferred to a higher line 2.5G because of this outage / Systems Trouble ticket: 594449
342757	04/12/2006 06:00:00	05/12/2006 08:48	OT		6net IS-IS metrics modifications has been done.
342796	05/12/2006 07:10	05/12/2006 08:30	OT		The GR-DE CCC connection was down due to a misconfiguration on de1.de. The GR6-DE6 circuit is up. We can close this ticket.
342855	26/11/2006 10:38	06/12/2006 14:19	OT		BGP session between GR6 and DE6 down.
343657	07/12/2006 08:00	07/12/2006 11:00	OT		According to ACOnet, this operation has been postponed because NPE-G1 is not yet supported in 12.2(13)T.
346501	20/12/2006 07:00	20/12/2006 18:10	OT		The maintenance is done. We're closing this ticket with GARR's agreement.
347929	20/12/2006 08:00	20/12/2006 11:00	OT		The operation has been successfully performed. ACOnet performed a reboot of the AS1853 6Net borderrouter.
335878	14/11/2006 14:53	15/11/2006 18:49	RC		The routing problem from/to Renater was dued to a misconfiguration on Renater router. The problem is solved. Renater routes are advertised to fr6.fr. We can close this ticket.
333607	12/11/2006 07:30	12/11/2006 07:35	RS		NORDUNET's router was successfully upgraded in 12.0(23)S on November, the 23th
341709	04/12/2006 14:30	04/12/2006 14:45	RS		Renater access router was upgraded successfully. According to Renater : "No problem at that time (no change in the conf at this time, no use of extended ACLs yet)". We can close this ticket.
343660	11/12/2006 09:45	11/12/2006 10:14	RS		The upgrade is finished. fr6.fr is running in 12.0 (23)S1. All bgp sessions are up and running. Don't hesitate to contact us if there is any problem.
346506	18/12/2006 08:30	18/12/2006 09:09	RS		At6.at has been upgraded to 12.0(23)S1
346507	18/12/2006 08:30	18/12/2006 09:09	RS		Ch6.ch has been upgraded to 12.0(23)S1
346510	19/12/2006 08:30	20/12/2006 09:59	RS		De6.de has been upgraded to 12.0(23)S1
346511	19/12/2006 08:30	20/12/2006 09:59	RS		Gr6.gr has been upgraded to 12.0(23)S1
346512	19/12/2006 08:45	20/12/2006 09:59	RS		It6.it has been upgraded to 12.0(23)S1
346514	20/12/2006 08:30	20/12/2006 09:59	RS		Nl6.nl has been upgraded to 12.0(23)S1
346515	20/12/2006 08:30	20/12/2006 09:59	RS		Se6.se has been upgraded to 12.0(23)S1
346516	20/12/2006 08:45	20/12/2006 09:59	RS		Uk6.uk has been upgraded to 12.0(23)S1
342725	18/12/2006 00:04	18/12/2006 00:06	SM	Telia	Loss of connectivity SE6 - UK6 / Maintenance done / Telia no-reference
345151	11/12/2006	11/12/2006 16:12	SM	Telia 4523212	Scheduled outage 6net DE- SE / card swap in Hamburg/ Telia trouble ticket 4523212
339961	12/12/2006 23:00	13/12/2006 04:00	SM	Telia NMCP6194	Scheduled Outage DE - SE / Maintenance canceled / TELIA NMCP6194
331669	08/11/2006	08/11/2006 00:05	SM	T-systems	Loss of connectivity 6net AT-CH/ Maintenance done / T-systems
331670	07/11/2006 00:01	07/11/2006 00:06	SM	T-systems	Loss of connectivity 6net AT-CH/ Maintenance done / T-systems
340439	11/12/2006 04:30	10/12/2002 10:48:00	SM	T-systems	Scheduled outage AT - DE / Maintenance did not occur / T-Systems no-reference
339444	02/01/1904 14:30	02/01/1904 15:30	SM		The HUNGARNET router has been rehomed successfully.

IST-2001-32604	Deliverable D 1.5.2 Six monthly report on the Usage of 6NET and a list of activities supported	
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3.2 Availability

The elements of the core network were brought into service in late May and early June. Since then the project partner NRENS have started to connect to the core network. The table below shows when the connections were made between the NREN and the core router.

Table 1: Access links in production

NREN	City	Speed	Type	Production
ACOnet	Vienna	155	stm1/sm	04-Jul-02
CESNET	Prague		IPv4 tunnel using GÉANT	6-Nov-2002
DFN	Frankfurt	155	stm1/sm	27-Jun-02
GARR	Milan	155	stm1/ATM: VPI/VCI 6/260	21-Jun-02
Grnet	Athen	GRE tunnel-155		30-Jul-02
HUNGARnet	Budapest		IPv4 tunnel using GÉANT	23-Sep-2002
Janet	London	155	stm1/sm	25-Jun-02
NORDUnet	Stockholm	2500	stm16/sm	11-Jun-02
PSNC1	Poznan		IPv4 tunnel using GÉANT	11-Jun-02
PSNC2	Poznan		IPv4 tunnel using GÉANT	3-Oct-2002
Renater	Paris	155	stm1/sm	09-Aug-2002
SURFnet1	Amsterdam	1000	GE LH	13-Jun-02
SURFnet2	Amsterdam	1000	GE ZX	19-Jun-02
Switch	Zurich	155	stm1/sm	13-Jun-02

Once the physical connectivity in place scheduled (e.g. circuit maintenance performed by the provider with an advance notice) and unscheduled outages can occur. The following tables give an overview about the average availability (in %) over the last 6 months of the access and core links.


IST-2001-32604	Deliverable D 1.5.2 Six monthly report on the Usage of 6NET and a list of activities supported	
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Table 2: Average Availability of Access Links

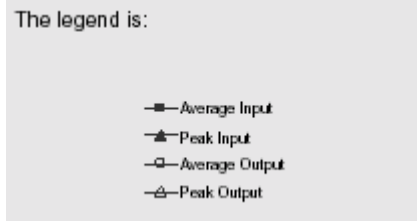
NREN	Scheduled Outage (hours)	Unscheduled outage (hours)	Average Availability [%] in last 6 month
ACOnet	0:39	18:30	97.36
CESNET	0:39		99.91
DFN	0:39		99.91
GARR	0:50		99.88
GRnet	0:39		99.91
Hungarnet	2:39		99.63
Janet	0:40		99.91
NORDUnet	2:23		99.67
PSNC1	0:40		99.91
PSNC2	0:40		99.91
Renater	0:44	3:53	99.36
SURFnet1	0:40		99.91
SURFnet2	0:40		99.91
Switch	0:39		99.91

Table 3: Average Availability of Core Links

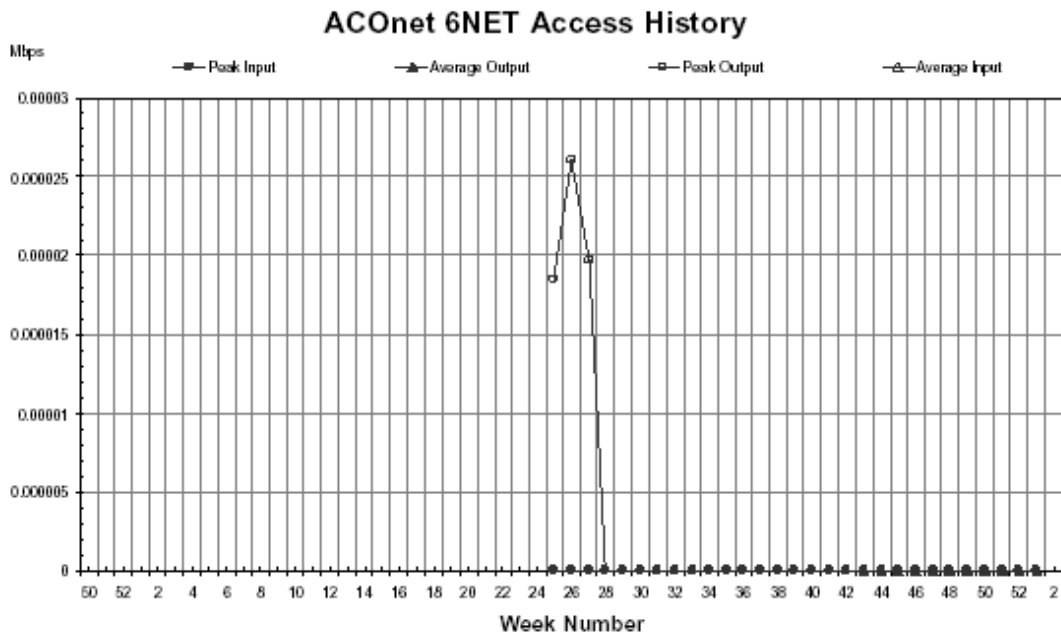
NREN	Scheduled Outage (hours)	Unscheduled outage (hours)	Average Availability %
AT-CH	2:30	0:10	99.64
AT-DE		10:35	98.55
CH-FR			100.00
CH-IT			100.00
DE-GR			63.43
DE-IT			100.00
DE-NL			100.00
DE-SE	0:12	5:30	99.22
FR-UK			100.00
NL-UK			100.00
SE-UK#	9:01	13:04	96.98

4 Performance Reports

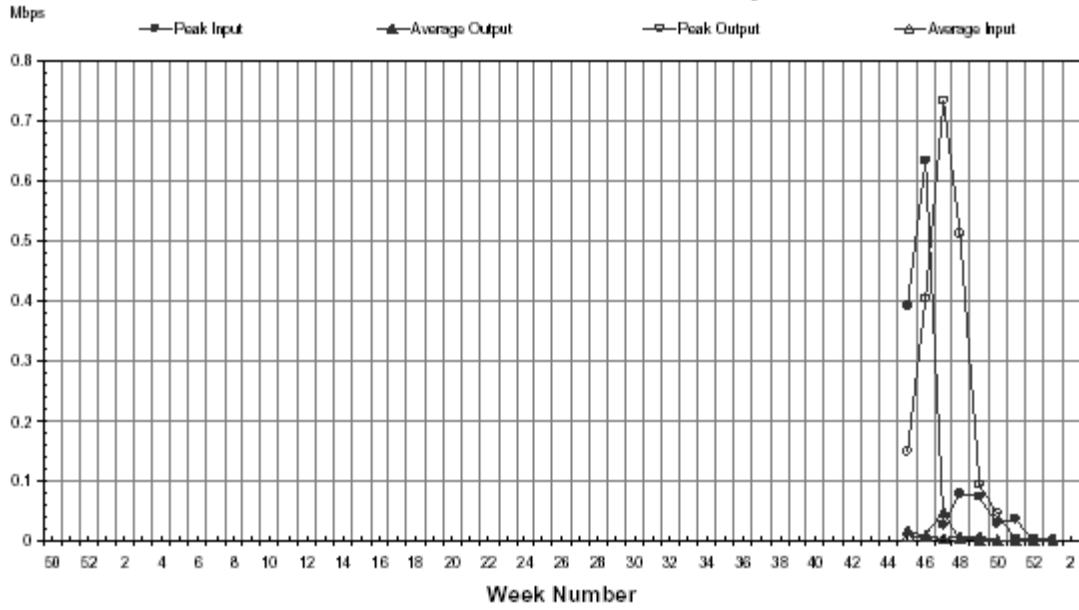
This section contains the traffic data for the NREN accesses and core links for each month.



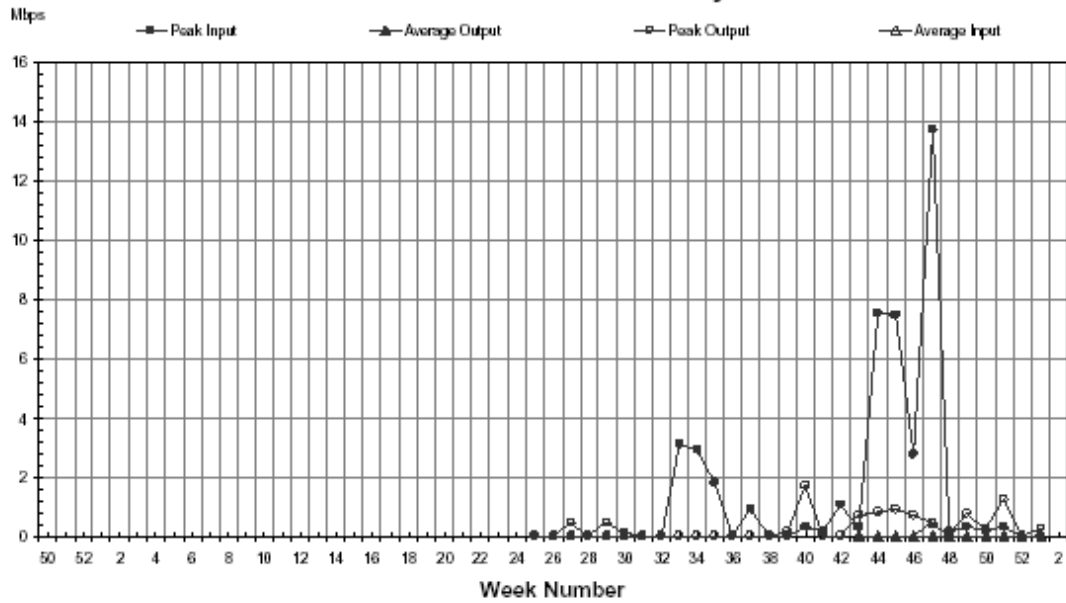
4.1 Access traffic



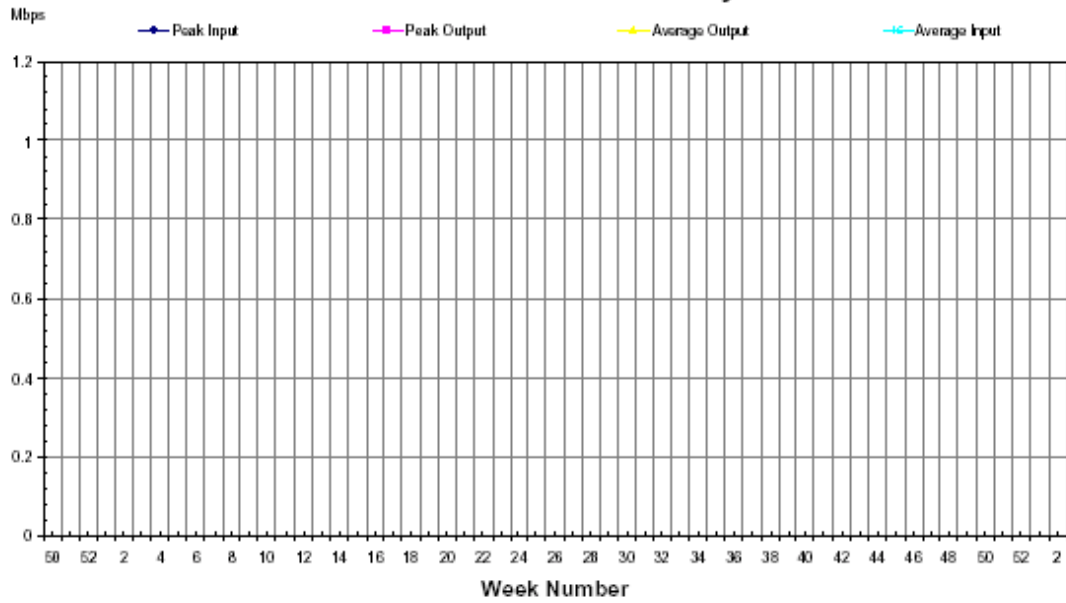
CESNET 6NET Access History



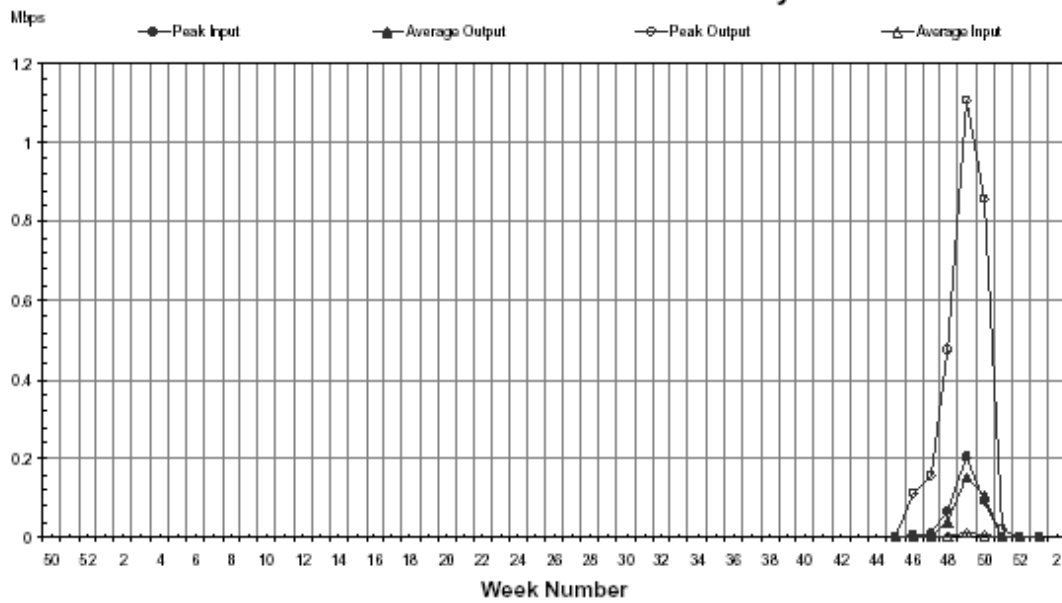
DFN 6NET Access History



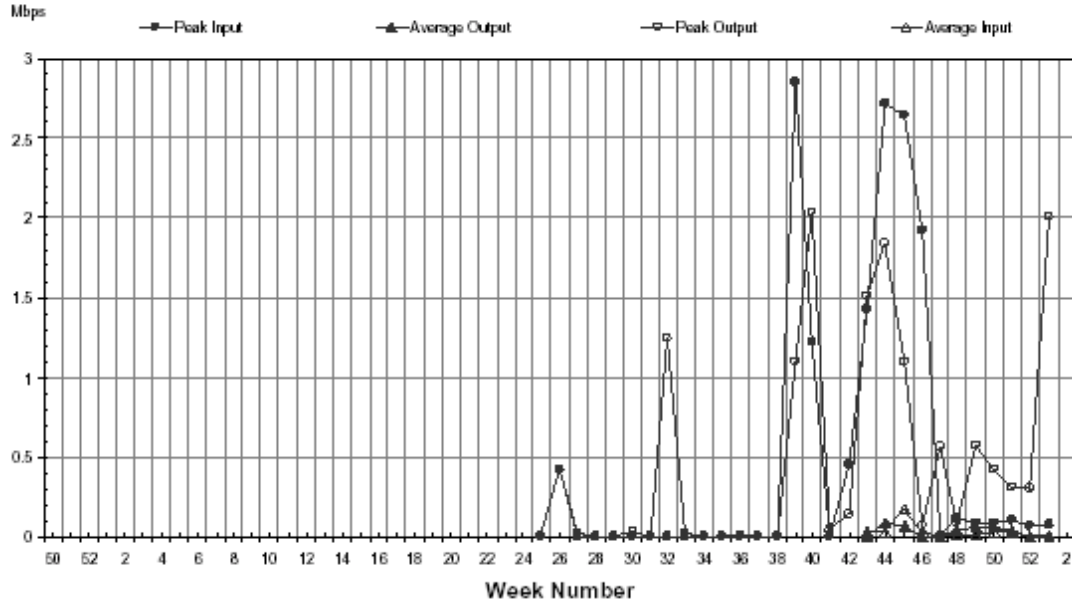
GARR 6NET Access History



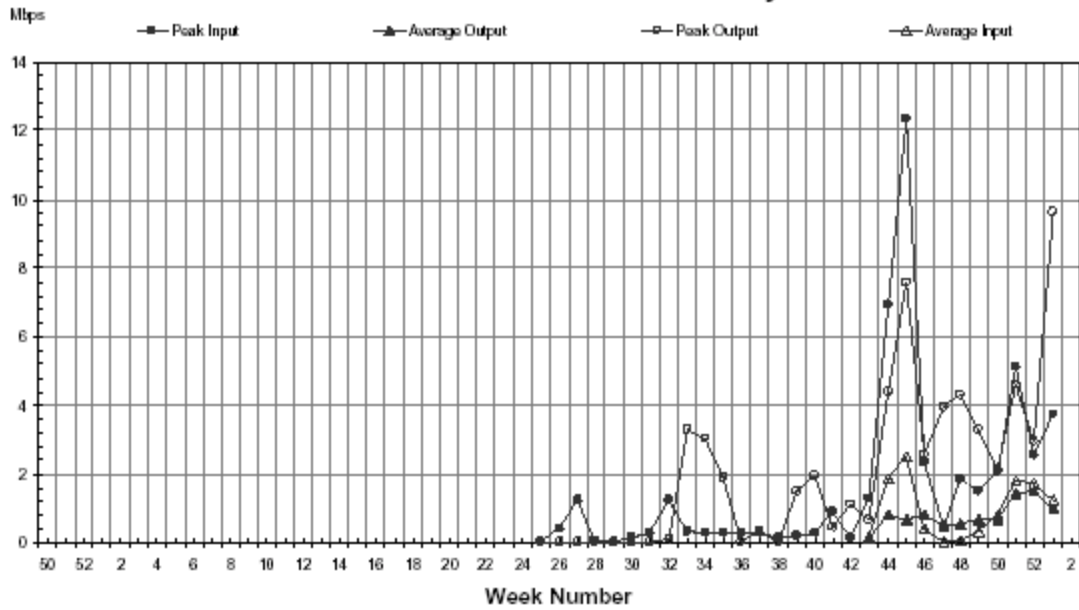
HUNGARNET 6NET Access History



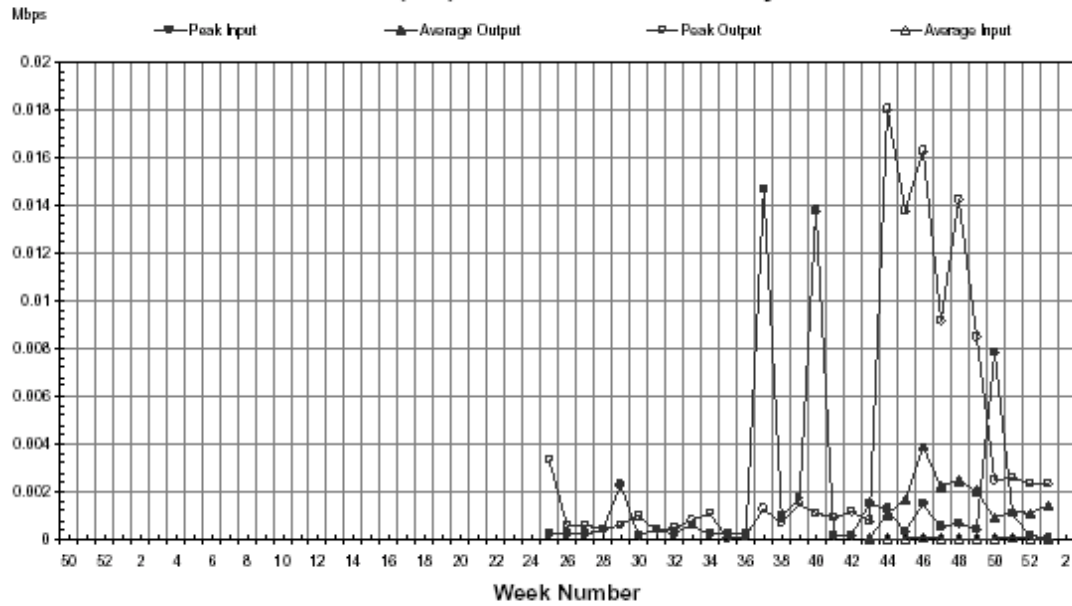
JANET 6NET Access History



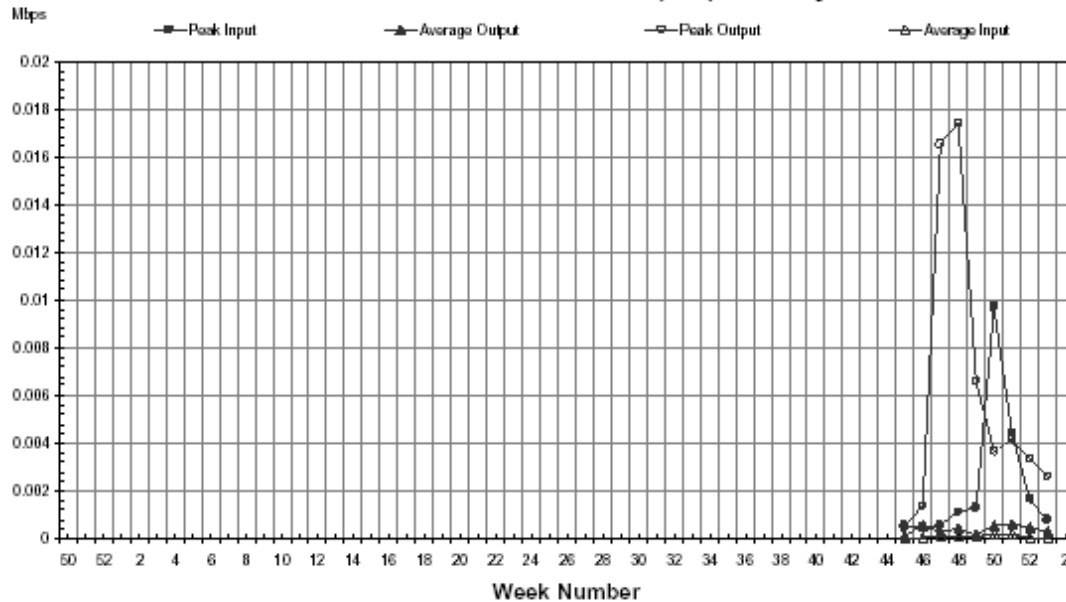
NORDUnet 6NET Access History



PSNC (SE) 6NET Access History

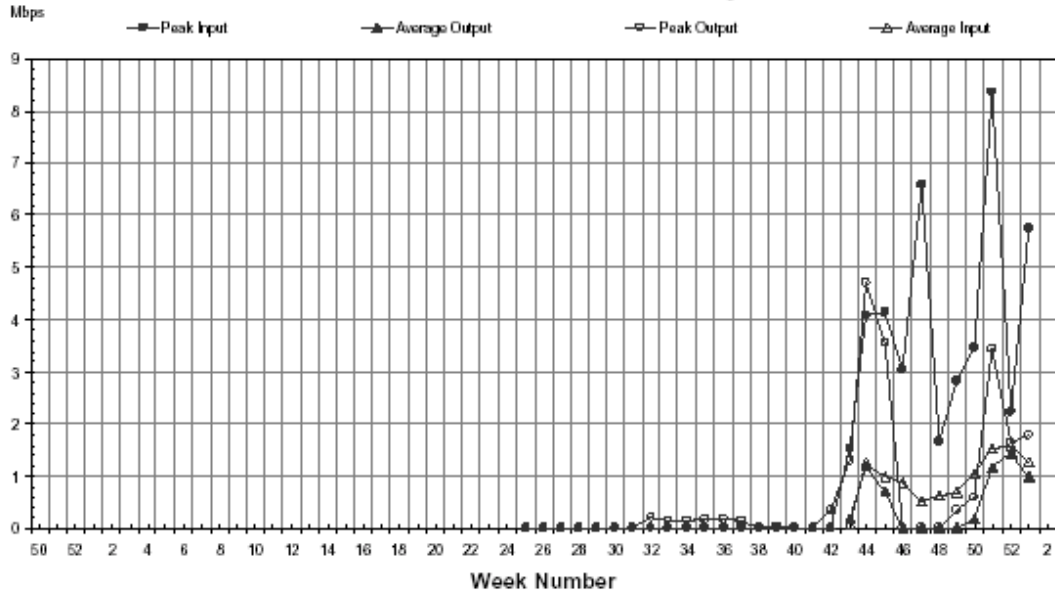


PSNC 6NET Tunnel Access (DE) History

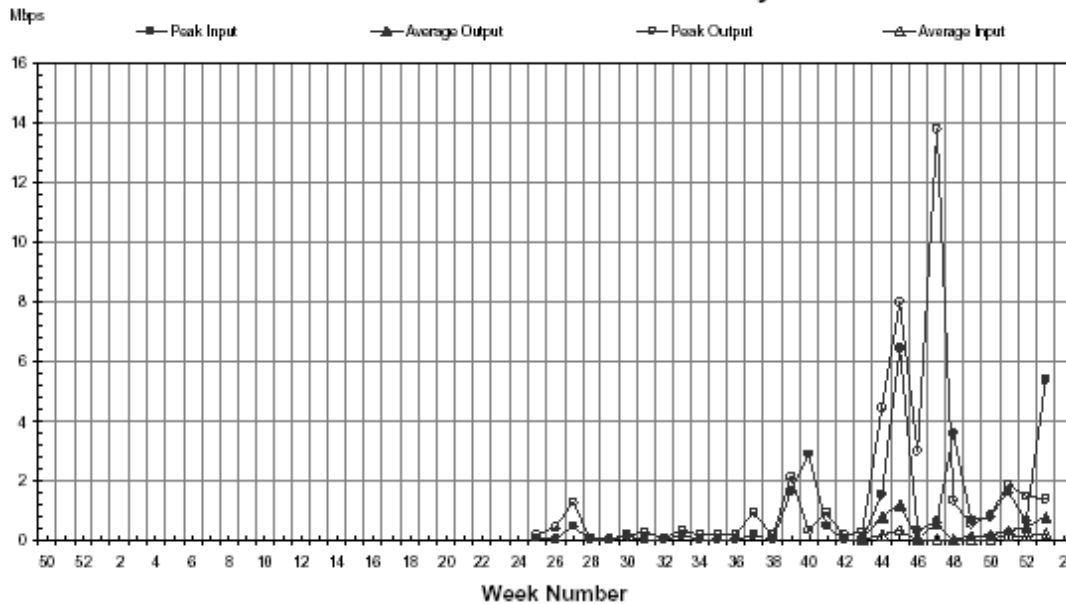




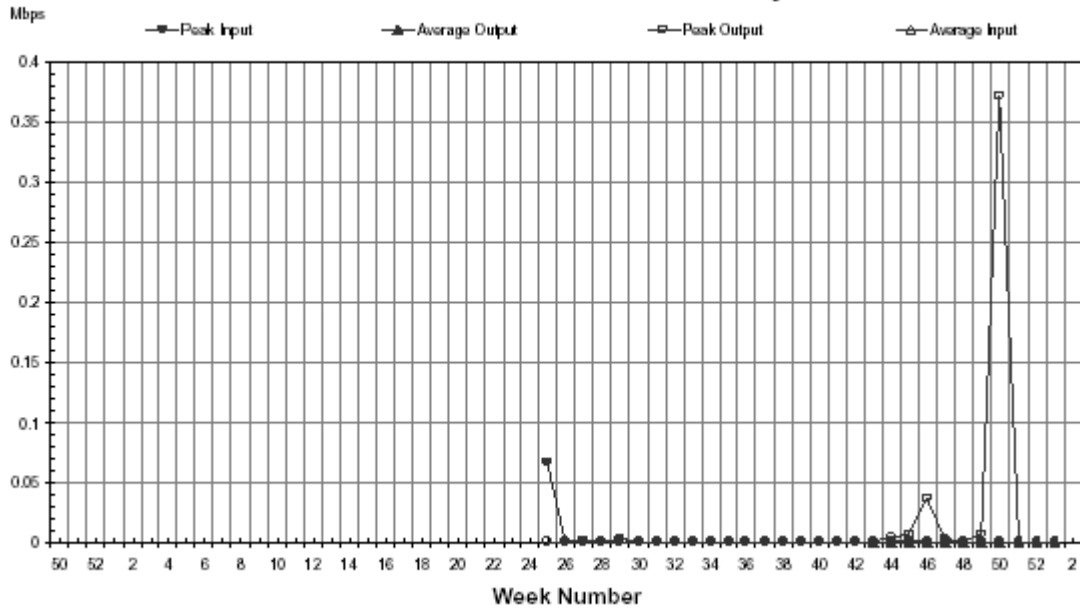
Renater 6NET Access History



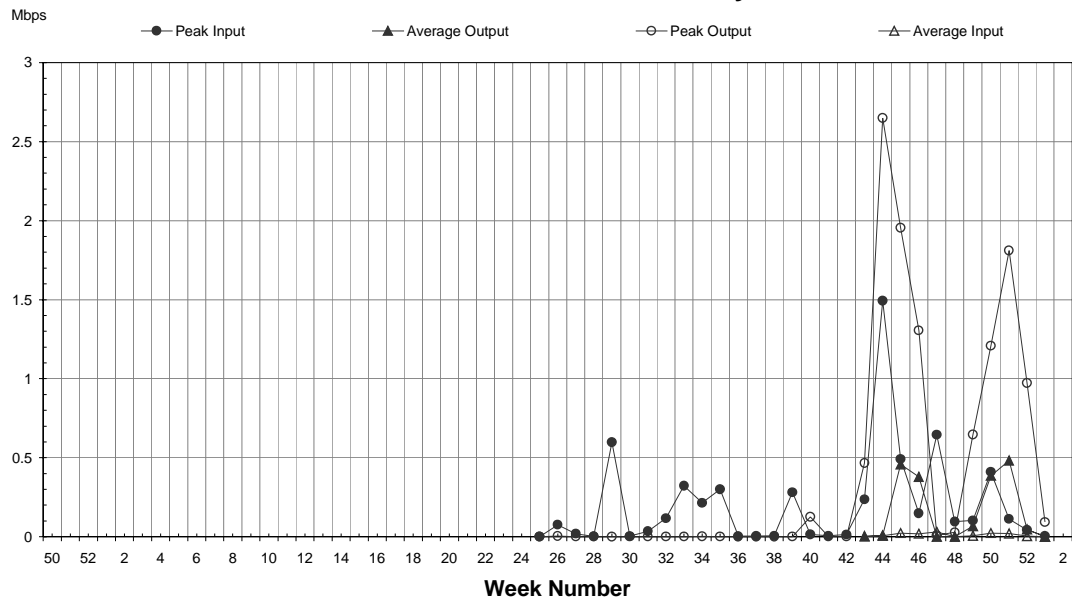
SURFnet 6NET Access 1 History



SURFNET 6NET Access 2 History

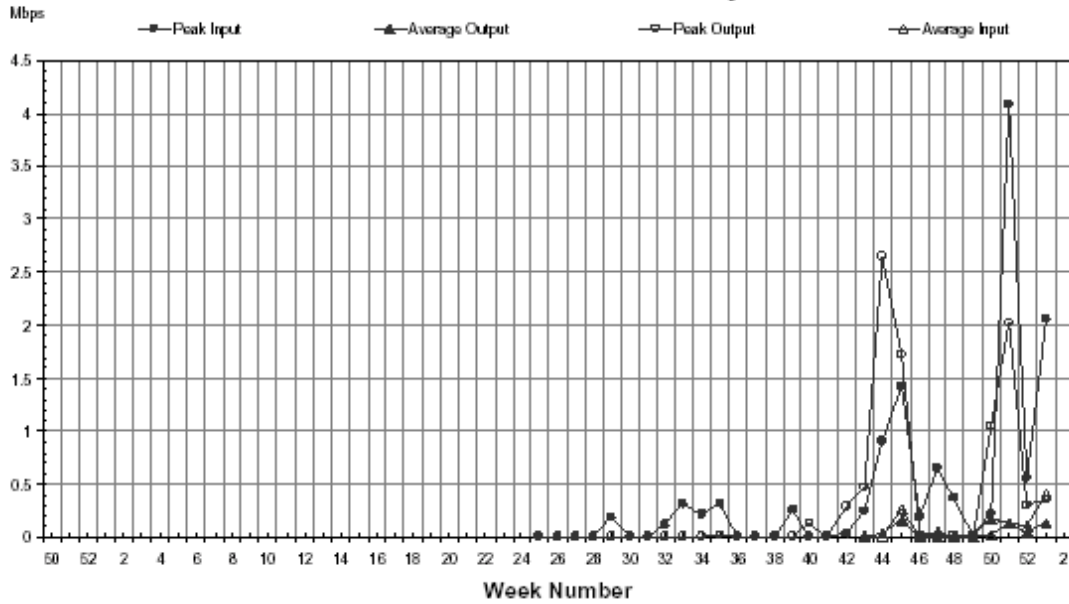


SWITCH 6NET Access History

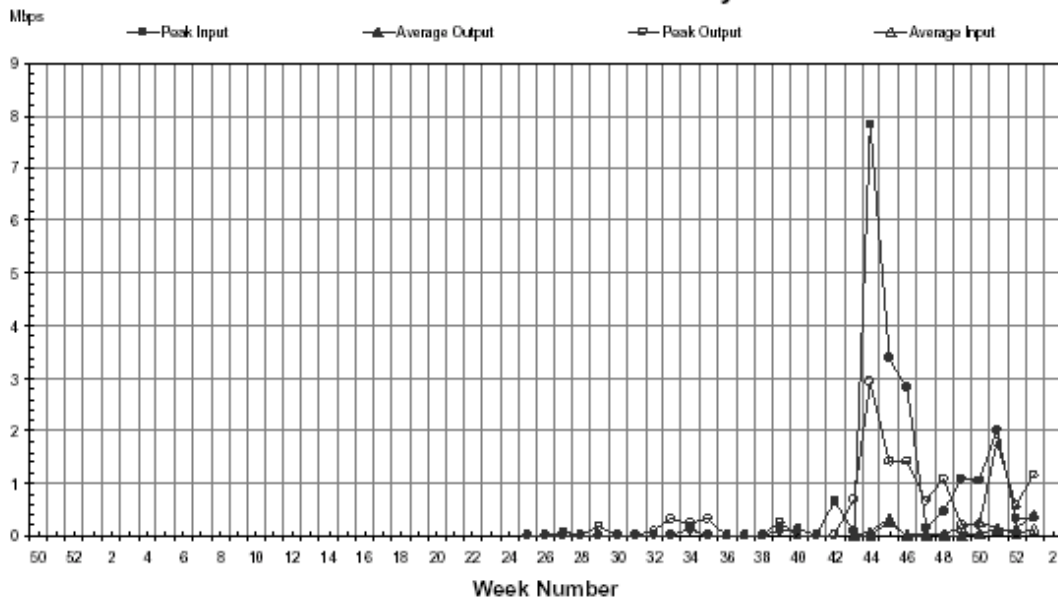


4.2 Backbone traffic

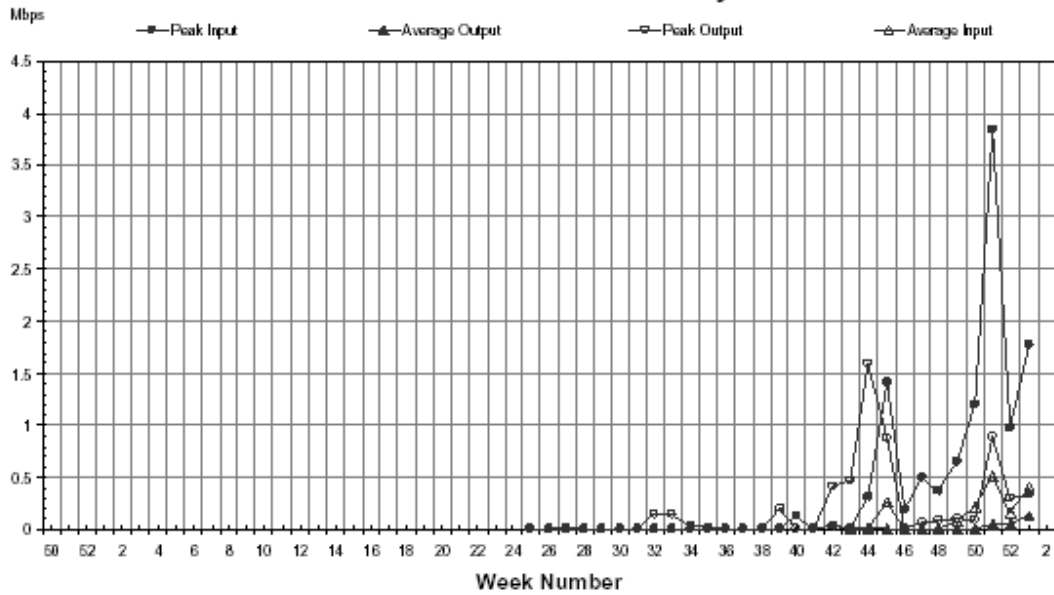
AT - CH 6NET Trunk History



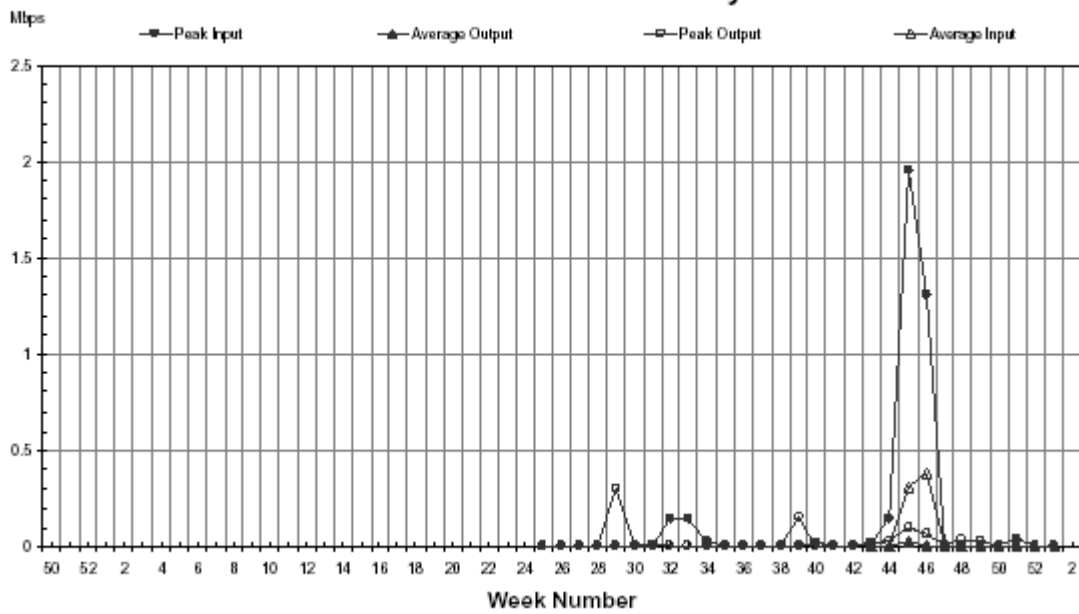
AT - DE 6NET Trunk History



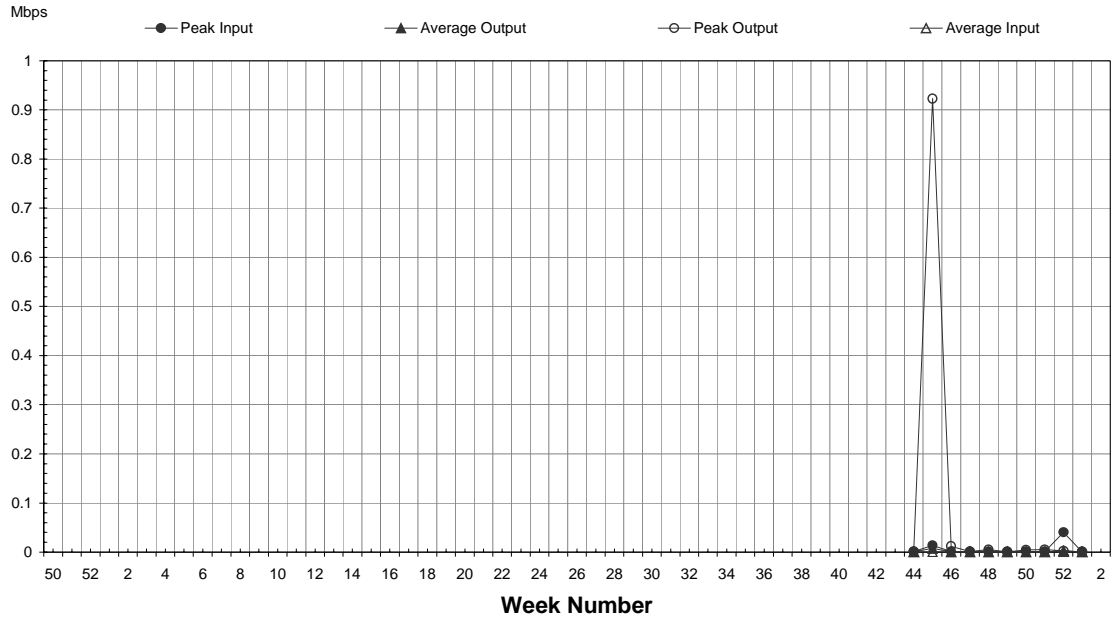
CH - FR 6NET Trunk History



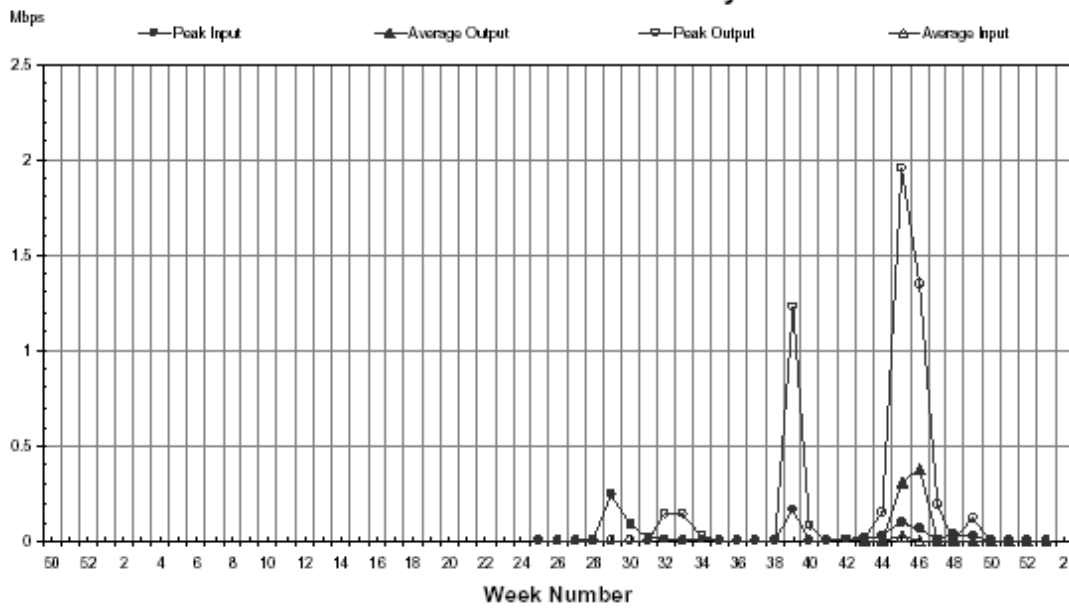
CH - IT 6NET Trunk History



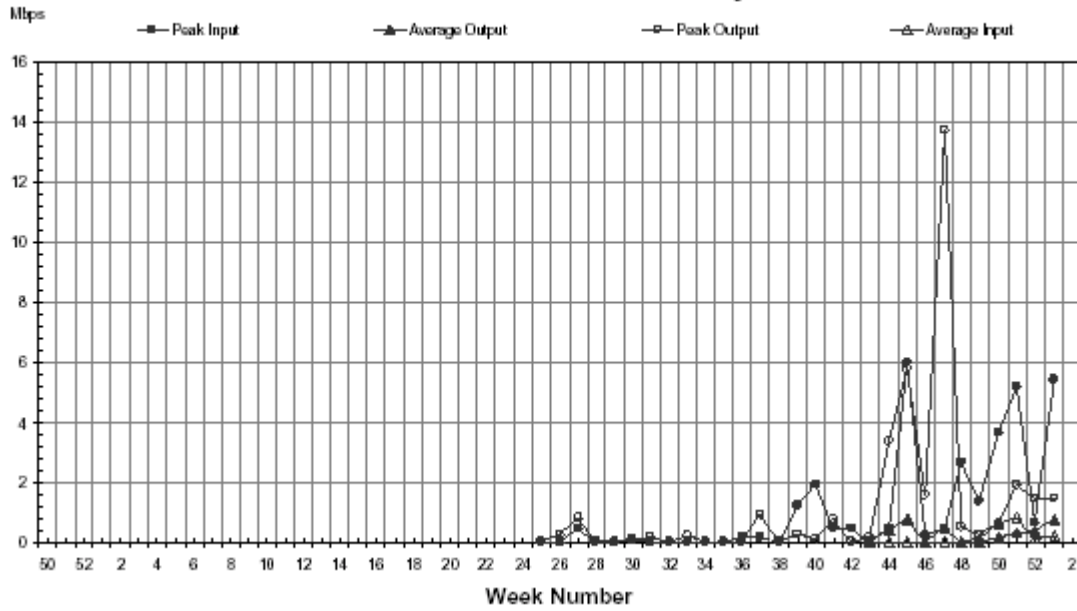
DE - GR 6NET Tunnel History



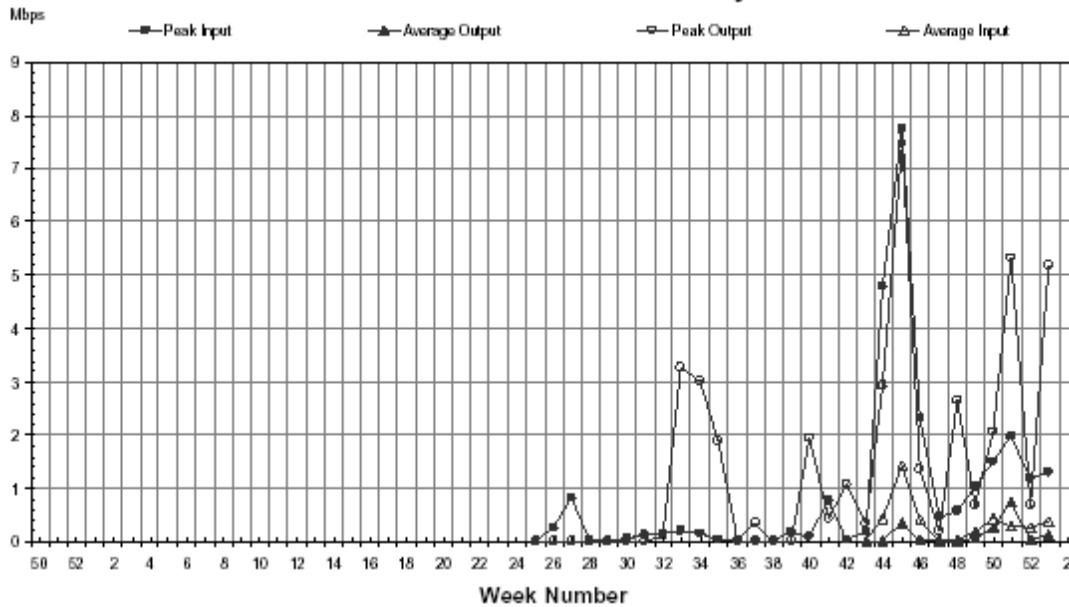
DE - IT 6NET Trunk History



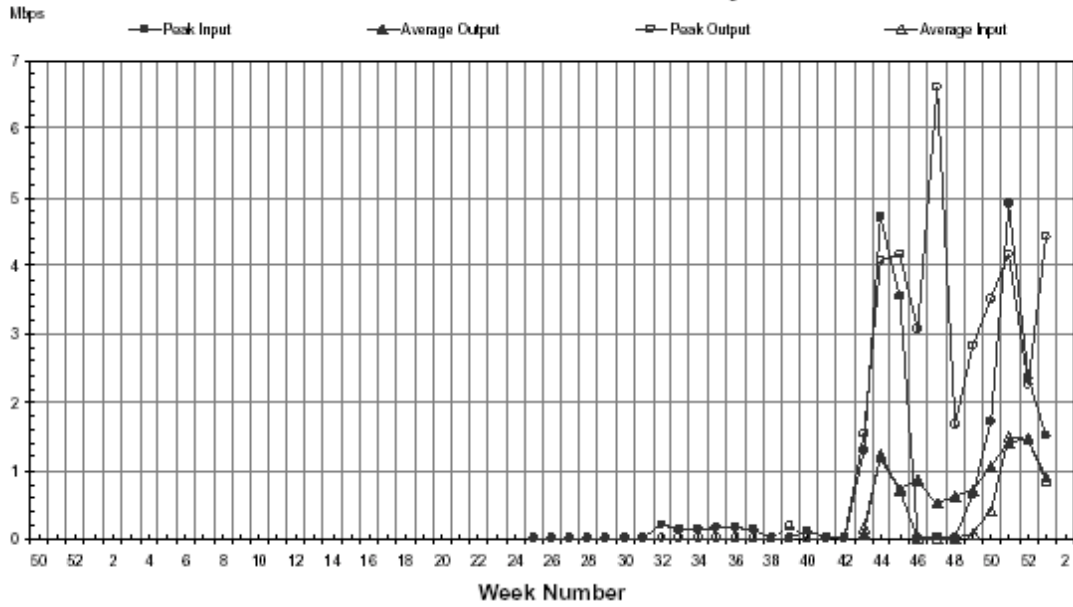
DE - NL 6NET Trunk History



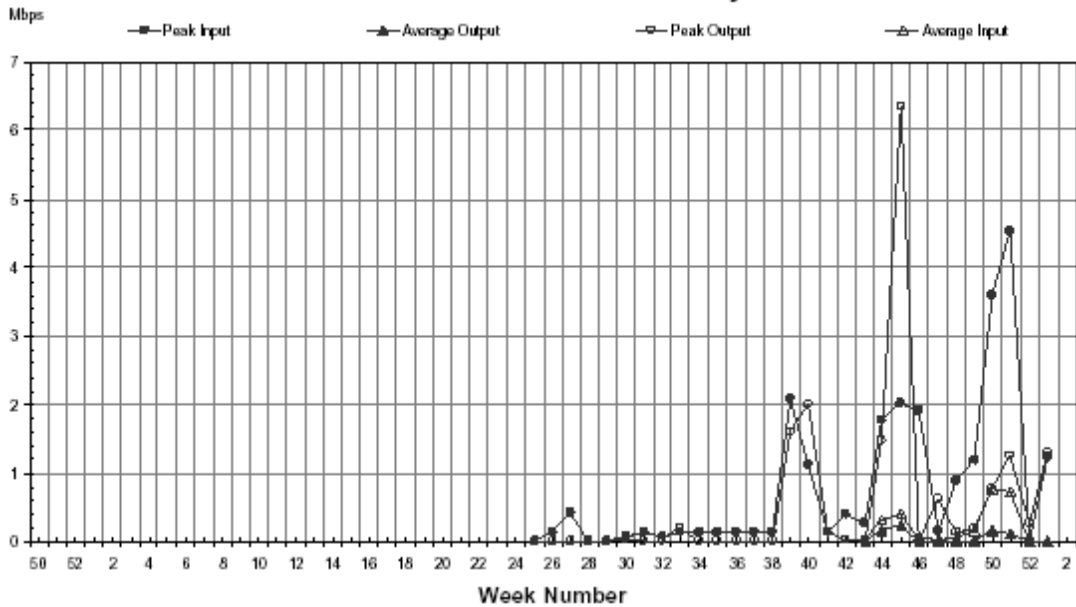
DE - SE 6NET Trunk History



FR - UK 6NET Trunk History

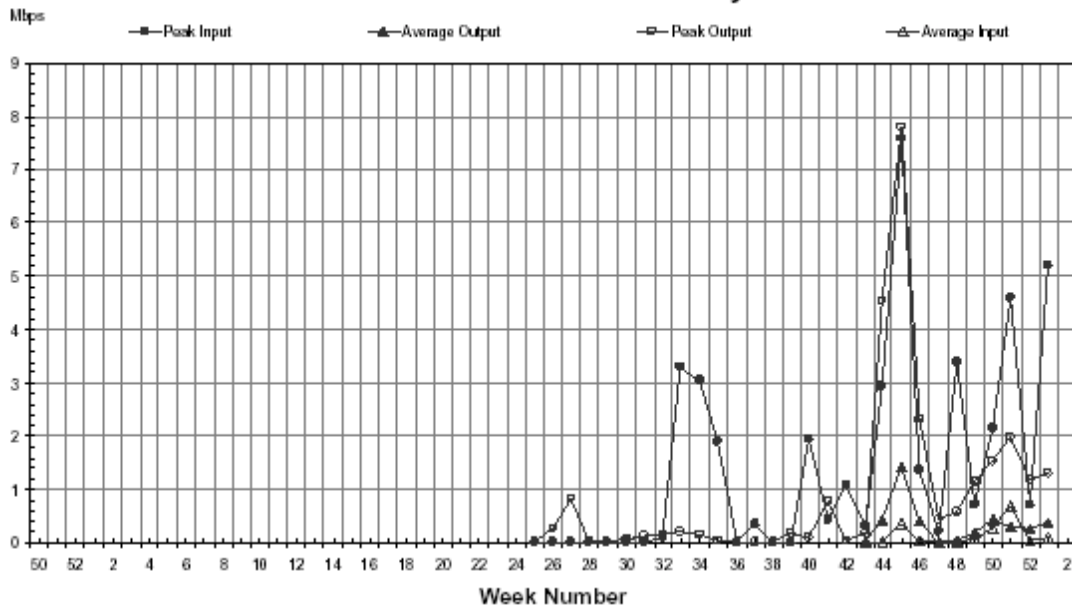


NL - UK 6NET Trunk History





SE - UK 6NET Trunk History



5 Monitoring and Reporting Procedure

Mailing lists have been set up so that problems can be reported, progressed and solved by the appropriate project partner.

This section describes the tools and procedures in place at the NOC to gather the measurements for this report. It is intended to provide the reader with some in-depth information in order to provide a better understanding of the various data and graphs.

The IP performance of the 6NET Network is monitored using InfoVista, a commercial network monitoring application, which is configured to gather information from all the relevant routers at regular intervals using SNMP GET-requests. In order to avoid problems with 32-bit SNMP counters wrapping during the polling cycle on high-speed links, 64-bit SNMP counters are used instead. The routers are all monitored for the same information, which enables the 6NET-NOC to provide uniform reporting across the entire 6NET network. The traffic measurement is based on samples of the MIB variables ifHCInOctets and ifHCOutOctets, which give traffic at the physical or logical interface level. The 6NET links are mainly POS (Packet Over Sonet) but there is still some ATM VC (Virtual Channel). Based on a 15 minutes polling interval, Infovista generates data aggregated in months or in years.

The availability measurement is based on SNMP Traps received by the HP OpenView administration server. These traps are consolidated and compared to the corresponding trouble tickets to separate outages due to scheduled maintenance and outages due to actual link failures.

Currently the report includes these types of measures

Traffic history : This plot shows the history of the peak and average traffic rates for each week of the reporting period and all preceding weeks during the last year. Infovista measurement has started in June.

The plots are produced for each of the following traffic categories

- NREN Access Ports
- 6net trunks

Note : For access ports, the sense of Input and Output is defined from the point of view of the 6NET network so that input traffic is received by 6NET from an NREN, and output traffic is sent from 6NET to an NREN.

Definition of terms used in this report

Asymmetry : The traffic asymmetry is a measure of the relative volumes of traffic sent and received on an NREN Access Port. It is defined such that a positive asymmetry indicates that an NREN is a net exporter of data to 6NET . Its maximum and minimum values are +1 and -

1, however these are asymptotic and correspond to purely unidirectional flows which should never happen in practice. It can be calculated by the following formula:

$$\text{Asymmetry} = (B - A) / (B + A)$$

Where A is the traffic received from 6NET and B is the traffic transmitted to GÉANT.

Availability : The calculation of availability is based on the following formula.

$$\text{Availability} = (T - (tu + ts)) / (T - ts) \times 100\%$$

Where T is the total time in the month, tu is the total unscheduled unavailability in one month and ts is the total scheduled unavailability in one month.

Note : Link Availability is calculated based on SDH or ATM links outages between two PoPs (Trunks) or between a PoP and an NREN (Access Ports). Service Availability is calculated on an end-to-end basis including NREN equipment. It represents the NREN ability to access the service.

IfHCInOctets : The total number of octets received on the interface, including framing characters.

IfHCOutOctets : The total number of octets transmitted out of the interface, including framing characters.

Max. Load : Since POS links offer the same throughput in both directions, the load percentage calculation is based on the direction which has the maximum rate. As an example, if an NREN sends more data to 6NET than it receives, the column “Transmitted To 6NET” will be used to compute the link load percentage.

MIB : In the SNMP environment, the manager can obtain information from the agent by periodically polling managed objects. The management data exchanged between managers and agents is called the Management Information Base (MIB)