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Project Title:	**6NET**
CEC Deliverable Number:	**32603/DANTE**
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Title of Deliverable:	**Six monthly report on the Usage of 6NET**
Work Package:	**WP1**
Type of Deliverable*:	**R**
Deliverable Security Class**:	**PU**
Editors:	Ana Romero
Contributors:	Aurore Crochot, David Harmelin, Jari Miettinen, Tim Streater

* Type: P – Prototype, R – Report, D – Demonstrator, O - Other
** Security Class: PU – Public, PP – Restricted to other programme participants (including the Commission), RE – Restricted to a group defined by the consortiom (inclding the Commission), CO – Confidential, only for members of the consortium (including the Commission)

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, tunnel, fault report

Contents

1. INTRODUCTION

Deliverable 1.5.5. gives an overview of the usage of the 6net network during the last six months from January 2004 until June 2004. During the first year of the project, 6net participants built up the network installing backbone, national and local loops circuits. Each participant was provided with the hardware necessary for connecting to the core, and almost all NREN and Universities were connected based on native IPv6 connections or via MPLS/CCC Layer 2 solution using GEANT resources, such as GRnet or PSCN.
In the last 6 months of the project, work was mainly dedicated to the network management and daily operation and also supporting other work packages and partners in the test activity helping them to be carried out in a scheduled and co-ordinated way.

D1.5.5. starts with a Management Overview, including a network configuration map and connection overview. The Overview also contains a report on faults and other problems with the network, based on the Trouble Tickets, and an availability table. The Trouble Tickets and the Traps are used to determine the availability of the Service. Section 5 on network performance, shows various traffic graphs and charts, which gives a more in-depth view of the separate circuits.

Section 6 explains the connection done with RIS and GRH project in order to publish and display 6net routing information.

Section 7 of this deliverable contains some statistics about round-trip time and packet loss between 6net core routers in unicast graphed by MPING tool.

2. LIST OF ACTIVITIES

The test activity was followed during this period focusing in the implementation of CoS in the 6net core and demonstration of multicast application running over the multicast IPv6 enable network that is 6net.

CoS was implemented in April 2004 in the task leaded by UKERNA and other partners in wp5. As in the multicast test organized last reported period, tests were scheduled following the procedures defined in Updated D.1.4.
Per tester request, CoS configuration was left over the network for possible future test since the configuration does not clash with other services already in place in the core network.

Third connection between 6net and Euro6IX was added via GARR-Telecom Italia Labs in January to collaborate between both IST projects. More details can be found in part 3.2. of this document.

NORDUnet upgraded the the Nordic part of the 6NET network to gigabit ethernet in June. The upgrade was implemented using the Northern Light lambda service.

The daily maintenance and operation is being done by 6net NOC. They have the responsibility to keep the core network stable and they have followed the procedures described whenever there has been a fault or trouble in the network. As described in D1.2., 6net trouble tickets has been created for following those problems.

6TAC (Technical Assistance Centre), Cisco help desk has provided support in case of Software and Hardware problems related to the 6NET routers provided by Cisco.

3. MANAGEMENT OVERVIEW

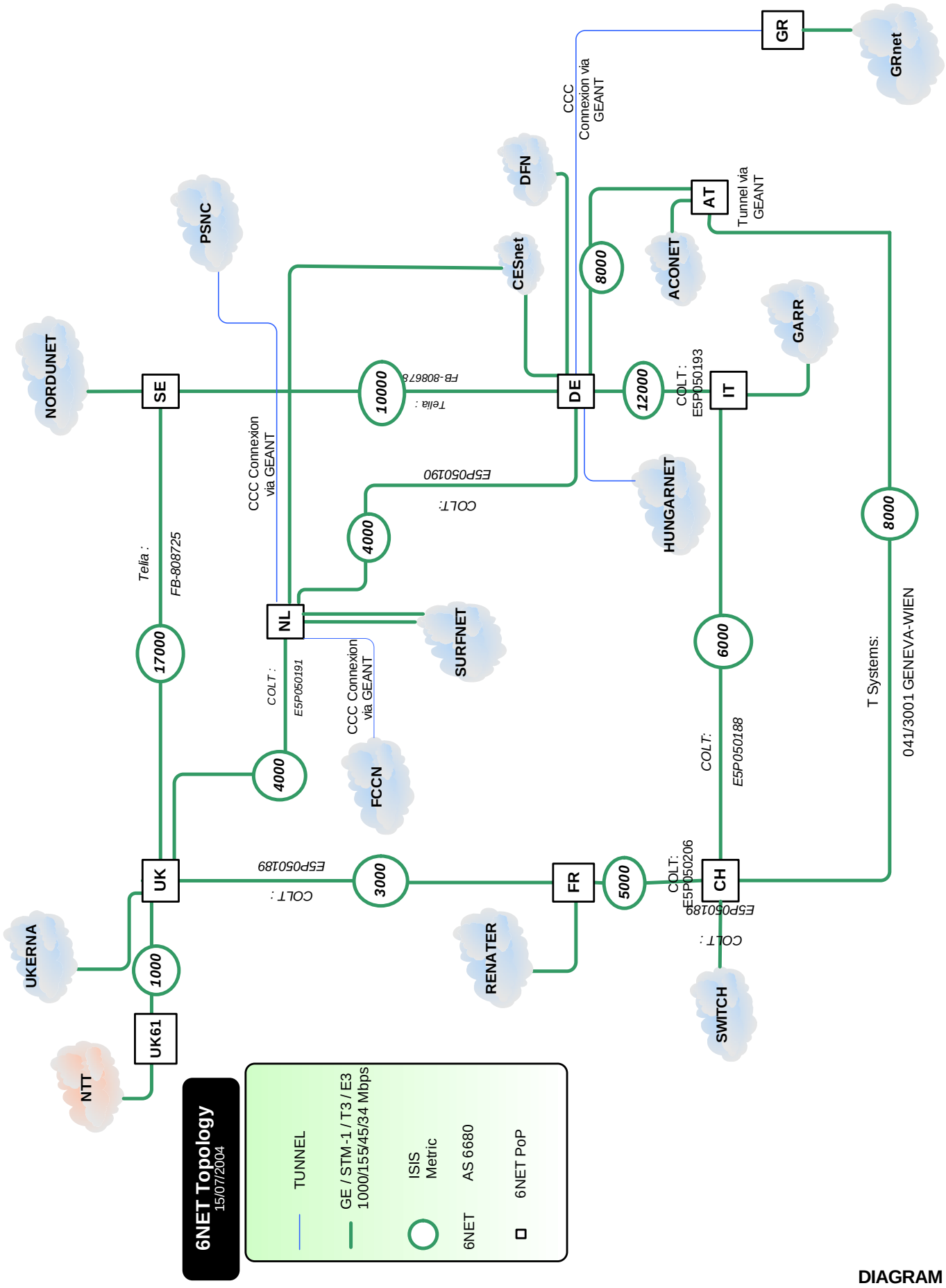
3.1. CONNECTION OVERVIEW

NRENs	Speed *Mbps*	Connected Since
ACONET	155	4-Jul-2002
CESNET	155	14-Feb-2003
CESNET MULTICAST	1,000	22-Mar-2004
DFN	155	27-Jun-2002
FCCN	155	12-Feb-2004
GARR	155	21-Jun-2002
GRNET	155	21-Jun-2002
HUNGARnet	155	30-Jan-2003
JANET/UKERNA	155	26-Jun-2002
NORDUNET	2,500	11-Jun-2002
NTT	2	28-Feb-2003
POZNAN	155	1-Jun-2003
RENATER	155	9-Aug-2002
SURFNET 1	1,000	19-Jun-2002
SURFNET 2	1,000	19-Jun-2002
SWITCH (CERN)	155	12-Jun-2002

Trunks	Speed *Mbps*	Connected Since
AT ⇔ CH	155	*2-Apr-02*
AT ⇔ DE	155	*29-May-02*
CH ⇔ FR	155	*28-May-02*
CH ⇔ IT	155	*28-May-02*
DE ⇔ GR	155	*7-Aug-02*
DE ⇔ IT	155	*28-May-02*
DE ⇔ NL	155	*29-May-02*
DE ⇔ SE	155	*28-May-02*
FR ⇔ UK	155	*28-May-02*
NL ⇔ UK	155	*28-May-02*
SE ⇔ UK	155	*29-May-02*
UK ⇔ UK61	34	*28-Feb-03*

3.2. CONNECTIONS TO OTHER IPV6 PROJECTS/NETWORKS

The only significant connection in the last six months has been the third access to Euro6IX via GARR-Telecom Italia Labs added to the Janet-UK6X and SWITCH-SWISSCOM ones, which will help out for collaboration between both projects during the rest of the project. In the same way than the rest of the Euro6IX connections, the routes are tagged with a specific community for the partners to easy recognize Euro6IX routes and to help to set up the correct routing.


6NET Topology
15/07/2004
TUNNEL
GE / STM-1 / T3 / E3
1000/155/45/34 Mbps
ISIS Metric
6NET AS 6680
6NET PoP
GR
GRnet
DFN
CCC Connexion via GEANT
PSNC
CESnet
AT
Tunnel via GEANT
ACONET
GARR
NORDUNET
SE
DE
IT
HUNGARNET
SURFNET
NL
UK
FR
CH
UKERNA
RENATER
SWITCH
NTT
UK61
FCCN
8000
10000
12000
4000
17000
6000
3000
5000
1000
Telia : FB-808678
COLT : E5P050193
E5P050190
COLT:
Telia : FB-808725
COLT : E5P050191
CCC Connexion via GEANT
E5P050188
COLT:
T Systems: 041/3001 GENEVA-WIEN
E5P050189
COLT :
COLT: E5P050206
E5P050189
COLT :

DIAGRAM

3.4. MONTHLY ACTIVITIES

JANUARY

Circuits (NREN Access) or Gateway or Providers Access operational

CESNET new GigaEthernet access to Amsterdam was brought up for multicast test purposes.
Third connection to Euro6IX was established via GARR and TILAB. This one adds to the connections already in place via SWITCH-SWISSCOM and JANET-UK6X.

The Service

Bi-annual 6NET report was produced.

Future Plans and other Pending Actions

None.

FEBRUARY

Circuits (NREN Access) or Gateway or Providers Access operational

FCCN was connected through a CCC Tunnel in NL6 router.

The Service

None.

Future Plans and other Pending Actions

None.

MARCH

Circuits (NREN Access) or Gateway or Providers Access operational

Connection of Hungarnet through a CCC Tunnel in de6 router.

The Service

Change of the routing policy : All routes coming from NREN tagged with 6NET-TEST community(6680:48) are tagged with a NON-EXPORT community.

Future Plans and other Pending Actions

None.

APRIL

Circuits (NREN Access) or Gateway or Providers Access operational

None.

The Service

HUNGARNET Layer 2 VPN access to German router was established on 6 April.
After testing the new connection, the native link AT-HUNGARNET was decommisioned on 30 April.
6net established a multihop eBGP peer with RIS project - RRC00 in Amsterdam - on 29 April, to publish BGP routing information.
The graphs and more information about the project can be found in the link:
http://www.ris.ripe.net/ipv6-updates/'
6net established a multihop eBGP peer with GHR project in order to display its routing information in GHR web. More information can be found in
http://www.sixxs.net/tools/grh/

Future Plans and other Pending Actions

None.

MAY

Circuits (NREN Access) or Gateway or Providers Access operational

None.

The Service

All 6NET routers were upgraded to IOS 12.0(28)S. Following that upgrade, a depreciated IOS command in route maps (match ipv6 address) lead to instabilities on the network, until the route map was disabled on IBGP peerings.

Routers were set up on the 28/05 for the upcoming QoS tests, and priviledge access to the tests' participants was enabled.

Future Plans and other Pending Actions

None.

JUNE

Circuits (NREN Access) or Gateway or Providers Access operational

The Nordic circuits se-fi, se-no and se-dk were upgraded from STM-1 POS to gigabit ethernet.

The Service

The problem about the command :match ipv6 address, is still present.

A Cisco case was opened (600202055) and the route-map removed on all iBGP peering.

Future Plans and other Pending Actions

None.

4. FAULT REPORT

4.1. 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 ten categories. Bellow 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

Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
474415	12/01/2004 16:52	13/01/2008 17:16	00:23	LF	COLT 0318181	Loss of Connectivity / CH6-FR6 / Colt technicians disconnected a fiber cable by mistake.
472849	13/01/2004 00:00	14/01/2008 02:00	02:00	SM	T Systems 3040024	Scheduled Maintenance / AT6 - DE6 / Maintenance successfully completed.
480910	28/01/2004 12:54	29/01/2008 13:23	00:29	RH	T Systems 1026549	Loss of Connectivity / AT6 - CH6 / Caused by power outage

Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
485137	06/02 16:46	06/02 20:42	03:56	LF	T-Systems 1037273	Loss of Connectivity / 6NET-AT6-DE6 / RFO: Major Outage in Austria.
488558	15/02 14:00	19/02 16:20	98:20:00	LF	Colt 331877	Loss of Connectivity / NL6 / The faulty card has been changed and two cables were switched in COLT network
480910	28/01 12:54	28/01 13:23	0:28	LF	T-Systems 1037273	Loss of Connectivity / AT6 - CH6 / RFO: Power outage in Austria
479957	10/02 00:00	10/02 04:00	0:15	SM	T-Systems 30400075	Scheduled Maintenance / 6NET AT - DE / Maintenance has occourred.
481477	03/02 04:30	03/02 04:45	0:15	SM	T-Systems 30400086	Scheduled Maintenance /6NET-DE-CESNET / Maintenance has occourred.
485885	10/02 03:18	10/02 07:49	4:30	LF	T-Systems 1039556	Loss of Connectivity / 6NET-AT-CH / RFO: Faulty Optical layer
477706	03/02 00:01	03/02 04:00	0:10	SM	Telia NMCP10182	Scheduled maintenance / SE6 - UK6 / Maintenance has occurred.
475283	03/02 03:00	03/02 03:30	0:30	SM	T-Systems 30400457	Scheduled Maintenance 6Net-AT-DE / Maintenance has occurred.
468611	28/01 00:00	28/01 06:00	0:30	SM	Telia NMCP9808	Scheduled Maintanance 6NET-SE-UK / Maintenance has occurred.
488263	15/02 15:26	15/02 15:26	0:00	SM	Colt 331378	Loss of Connectivity / 6NET-NL-UK / RFO: STM-16 card experiencing repeated crashes
487075	25/02 00:00	25/02 04:00	0:15	SM	T-Systems 30400161	Scheduled Maintenance / 6NET-AT-DE / Maintenance has occurred.

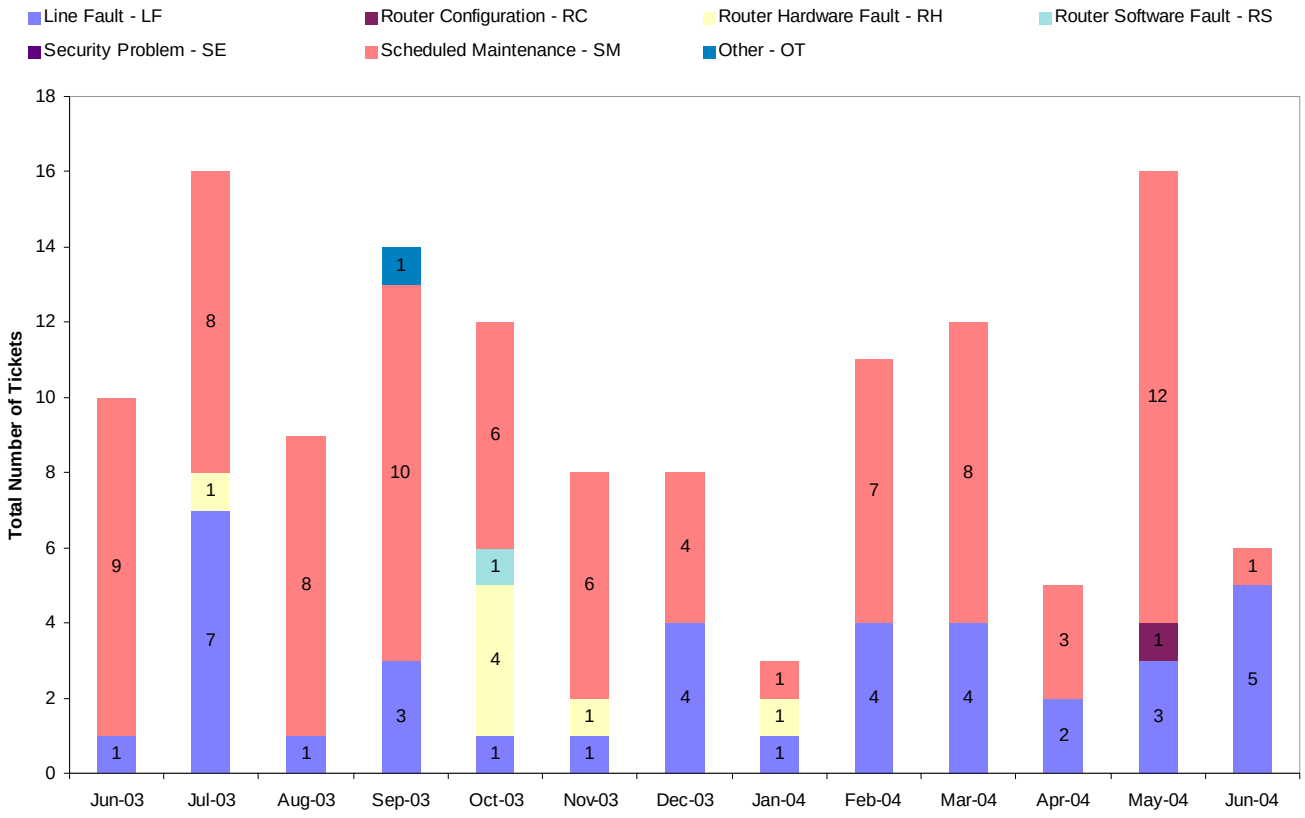
Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
488269	15/02 15:26	15/02 15:26	0:00	LF	Colt 331399	Loss of Connectivity / 15 Feb 2004 / 6NET-NL-DE
500567	17/03 09:50	17/03 12:00	2:10	LF	No SURFnet reference	Loss of Connectivity / 10 Feb 2004 / 6NET-AT-CH
495111	11/03 00:00	11/03 00:00	0:00	SM	T-Systems 30400366	Scheduled Maintenance / 11 Mar 2004 / 6NET-AT-DE

Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
513841	20/04 03:04	20/04 05:34	2:30	LF	T Systems 1110953	Loss of Connectivity AT6 - CH6 / This outage was due to a maintenance work
513844	20/04 04:45	20/04 05:15	0:30	LF	T-Systems 1116365	Loss of Connectivity AT6 - DE6 / This outage was due to a maintenance work
510642	28/04 01:00	28/04 05:00	4:00	SM	Telia NMCP10986	Scheduled Maintenance DE6 - SE6 / Maintenance has been completed
508190	20/04 23:00	20/04 23:00	0:00	SM	Telia NMCP11134	Scheduled Maintenance SE6 - UK6 / The maintenance didn't affect the circuit
508943	26/04 01:14	26/04 02:39	1:25	SM	Telia NMCP11174	Scheduled maintenance SE6 - UK6 / Maintenance has been completed

Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
520034	19/05 00:00	19/05 04:00	4:00	SM	Telia NMCP1164	Scheduled Maintenance DE6 - SE6 / Maintenance has been completed
524285	20/05 09:00	20/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance IT6 router / IOS has been upgraded successfully to version 12.0(28)S
524283	20/05 09:00	20/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance NL6 router / IOS has been upgraded successfully to version 12.0(28)S
524277	20/05 09:00	20/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance SE6 router / IOS has been upgraded successfully to version 12.0(28)S
526165	26/05 03:00	26/05 03:00	0:00	SM	T-Systems 4001183	Scheduled Maintenance AT6 - CH6 / Maintenance has been completed without any outage
524040	20/05 03:00	20/05 05:30	2:30	SM	T-Systems 4001086	Scheduled Maintenance AT6 - CH6 / Maintenance has been completed
524286	19/05 00:00	19/05 00:00	0:00	SM	GEANT NOC	Scheduled Maintenance GR6 router / IOS has been upgraded successfully to version 12.0(28)S
524284	19/05 09:00	19/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance FR6 router / IOS has been upgraded successfully to version 12.0(28)S
524282	19/05 09:00	19/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance DE6 router / IOS has been upgraded successfully to version 12.0(28)S
524278	18/05 09:00	18/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance CH6 router / IOS has been upgraded successfully to version 12.0(28)S
524269	18/05 09:00	18/05 10:00	1:00	SM	GEANT NOC	Scheduled Maintenance AT6 router / IOS has been upgraded successfully to version 12.0(28)S
515701	13/05 00:01	13/05 04:00	0:00	SM	Telia NMCP11455	Scheduled maintenance SE6 - UK6 / Maintenance did not occur / Telia reference is NMCP11455
519441	05/05 02:30	05/05 10:30	8:30	LF	T-Systems 1127537	Loss of Connectivity AT6 - CH6 / Fiber cut at Fürstenfeldbruck
526301	20/05 09:51	20/05 19:12	9:21	LF	T-Systems 1147135	Loss of Connectivity AT6 - CH6 / System Problem on the T-systems Network
518957	04/05 10:40	04/05 14:38	3:52	LF	T-Systems 1126183	Loss of connectivity AT6 - DE6 / interruption of the circuit between Bratislava and Budapest
521103	07/05 12:13	07/05 15:55	3:42	RC	GEANT NOC	Loss of connectivity DE6 - GR6 / Wrong MPLS configuration

Géant NOC Ticket No	Problem Start *d/m h:m:s*	Problem End *d/m h:m:s*	Duration *h:m*	Class	Fixer Ticket No	Summary
532281	07/06 13:10	07/06 13:20	0:10	LF	Telia 645508	Loss of connectivity DE6 - SE6 / Fiber cut between Düsseldorf - Köln
537676	19/06 01:09	19/06 05:02	3:53	LF	Telia 6505281	Loss of connectivity SE6 - UK6 / Faulty card in Oslo has been replaced
538648	29/06 05:00	29/06 05:20	0:20	SM	SURFnet 20040622-1	Scheduled Maintenance NL6 - Surfnet / The maintenance occured
538945	23/06 03:04	23/06 08:38	5:34	LF	T-Systems 11844396	Loss of connectivity AT6 - DE6 / Unscheduled maintenance
539425	23/06 12:05	23/06 12:35	0:30	LF	UKERNA	Loss of Connectivity UK6 - UKERNA / The outage disappeared after the reboot of the UKERNA router
541604	29/06 10:51	29/06 11:00	0:09	LF	Telia 6540189	Loss of connectivity SE6 - UK6 / Faulty DWDM - system between Örebro, Sweden and Oslo, Norway

4.2. TROUBLE TICKETS REPARTITION



4.3. AVAILABILITY

NRENs	Average Availability *(last 12 months)*
ACONET	100.00%
CESNET	96.58%
DFN	97.72%
FCCN	100.00%
GARR	99.74%
GRNET	99.96%
HUNGARnet	99.74%
JANET/UKERNA	99.99%
NORDUNET	100.00%
NTT	99.86%
POZNAN	98.86%
RENATER	99.80%
SURFNET 1	98.62%
SURFNET 2	98.86%
SWITCH (CERN)	100.00%

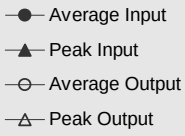
Trunks	Average Availability *(last 12 months)*
AT ⇔ CH	99.30%
AT ⇔ DE	96.79%
CH ⇔ FR	100.00%
CH ⇔ IT	100.00%
DE ⇔ GR	97.67%
DE ⇔ IT	97.72%
DE ⇔ NL	94.30%
DE ⇔ SE	97.46%
FR ⇔ UK	99.88%
NL ⇔ UK	96.49%
SE ⇔ UK	99.76%
UK ⇔ UK61	100.00%

5. PERFORMANCE REPORT

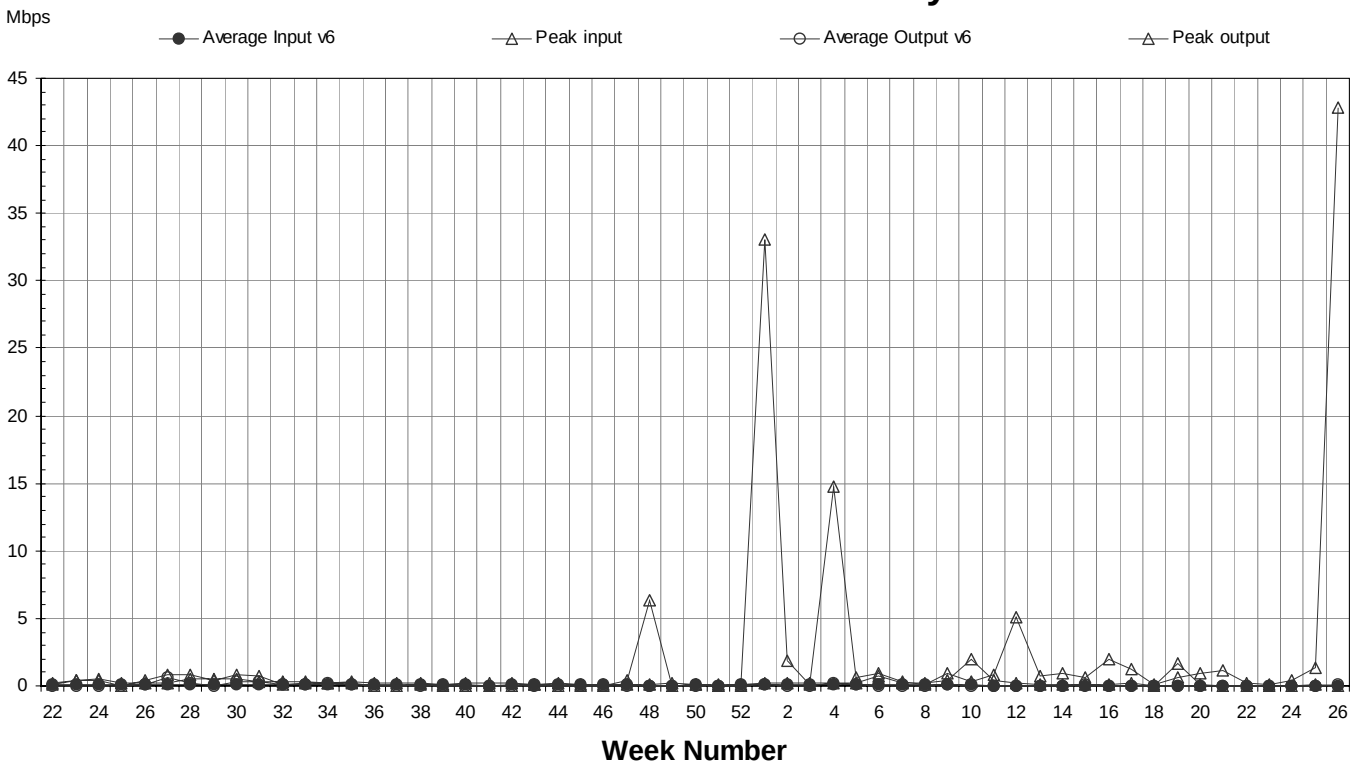
5.1. ACCESS PORTS

This section contains the traffic data for the NREN Accesses.

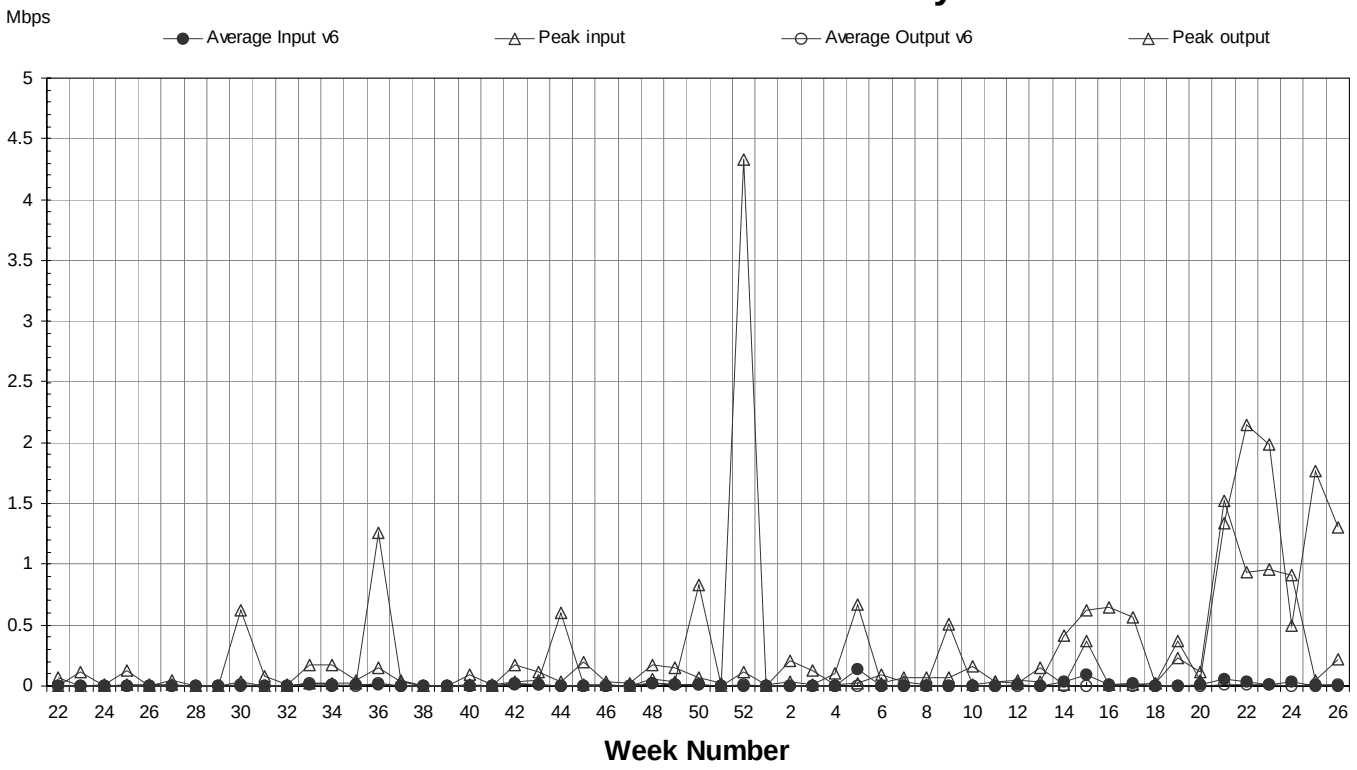
The legend is:



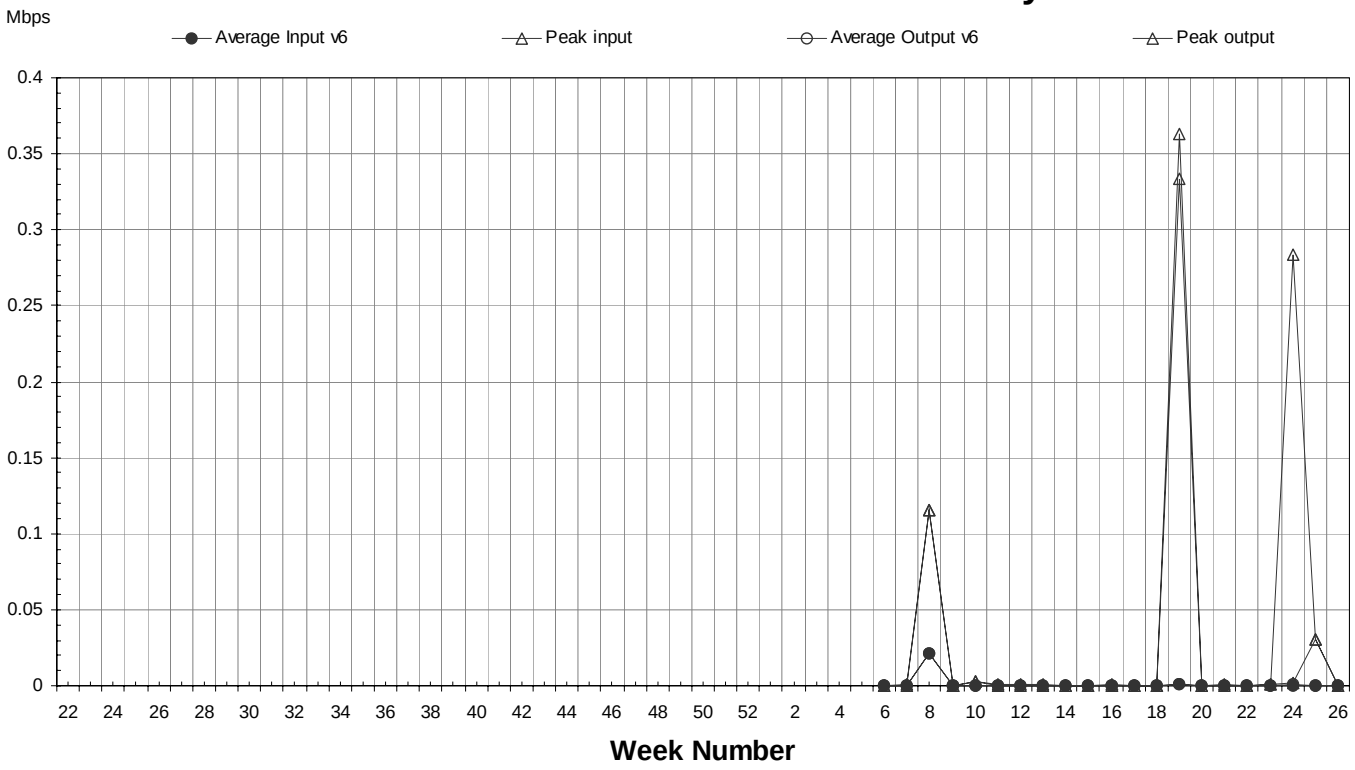
ACOnet 6NET Access History



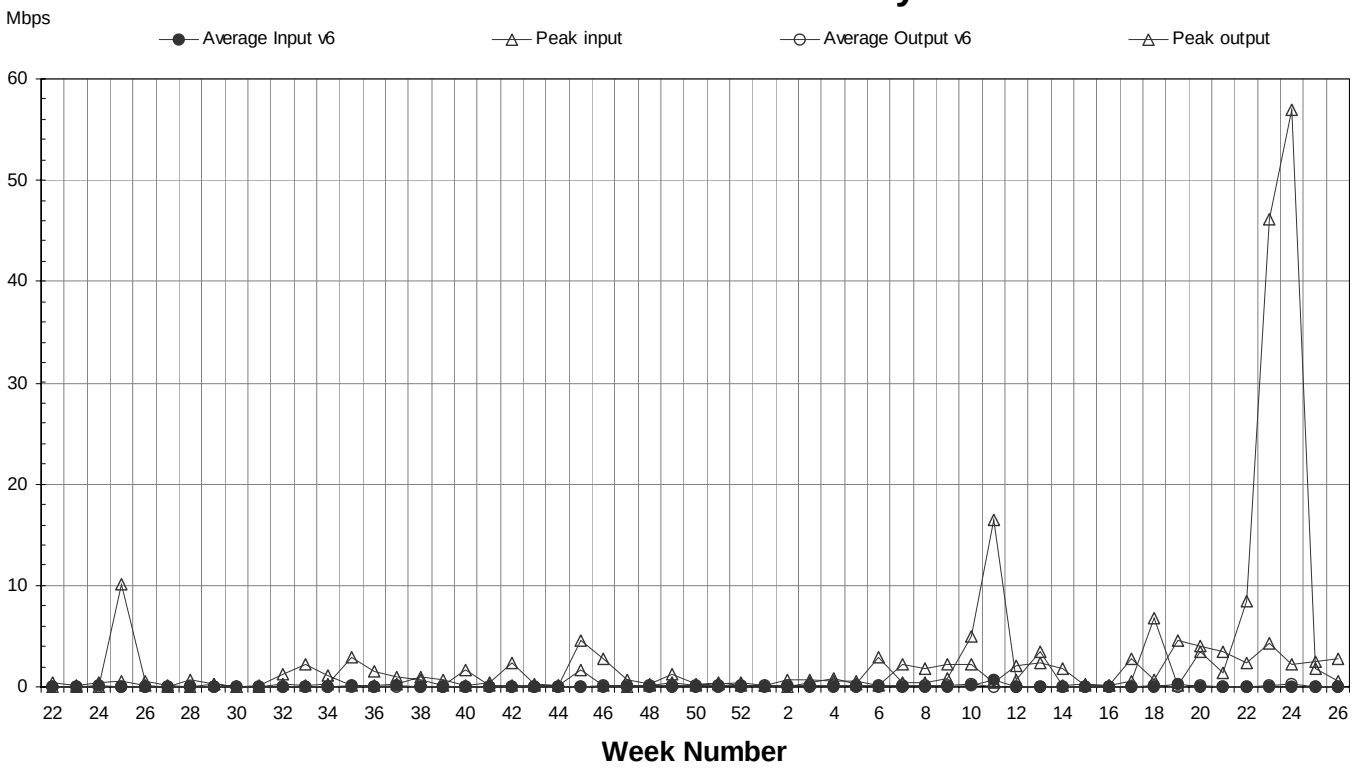
CESNET 6NET Access History



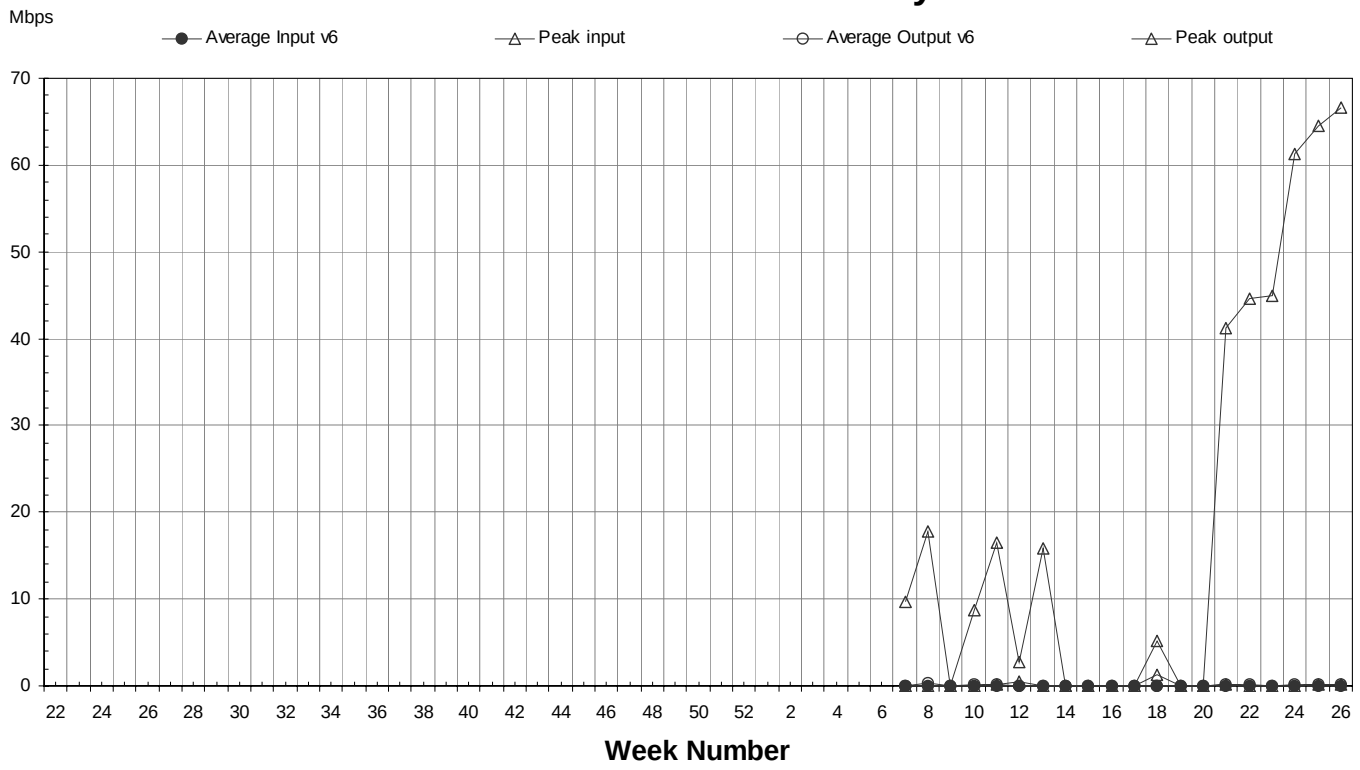
CESNET 6NET Multicast Access History



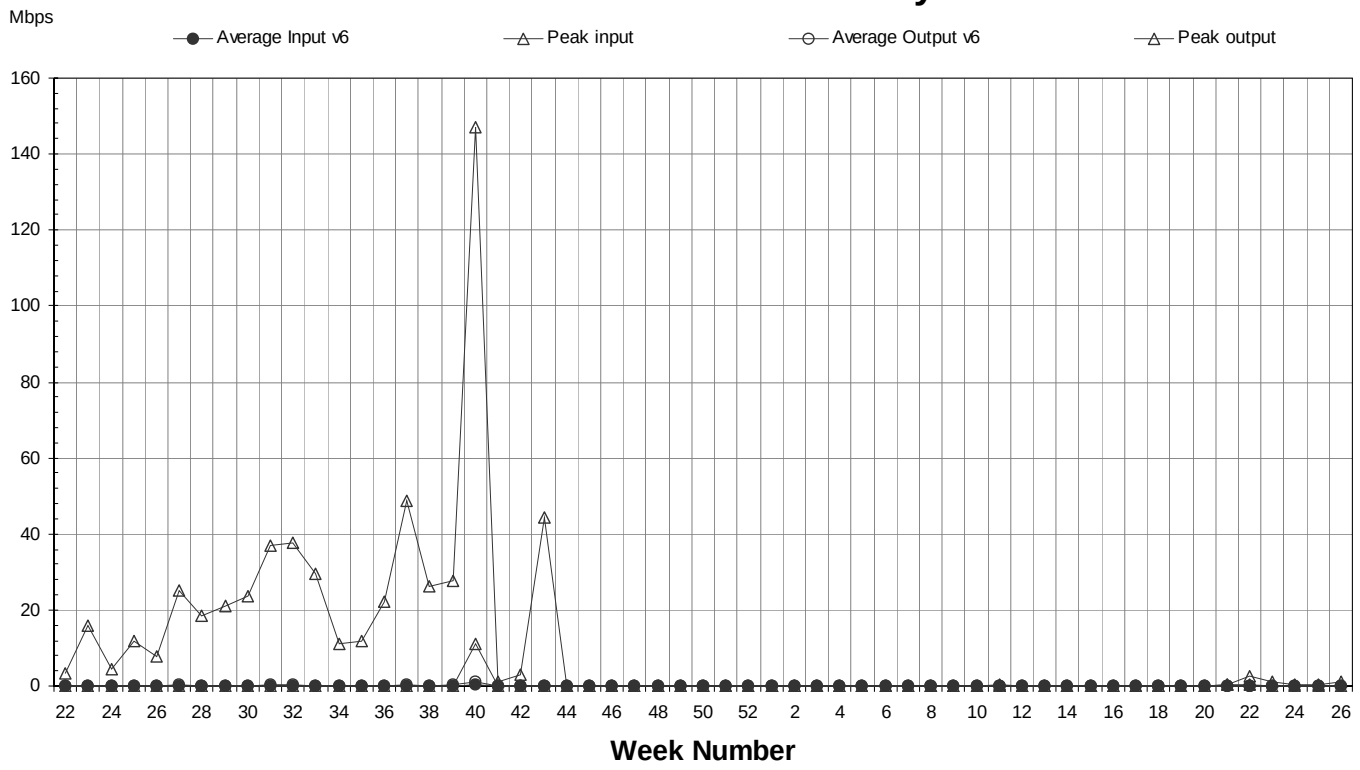
DFN 6NET Access History



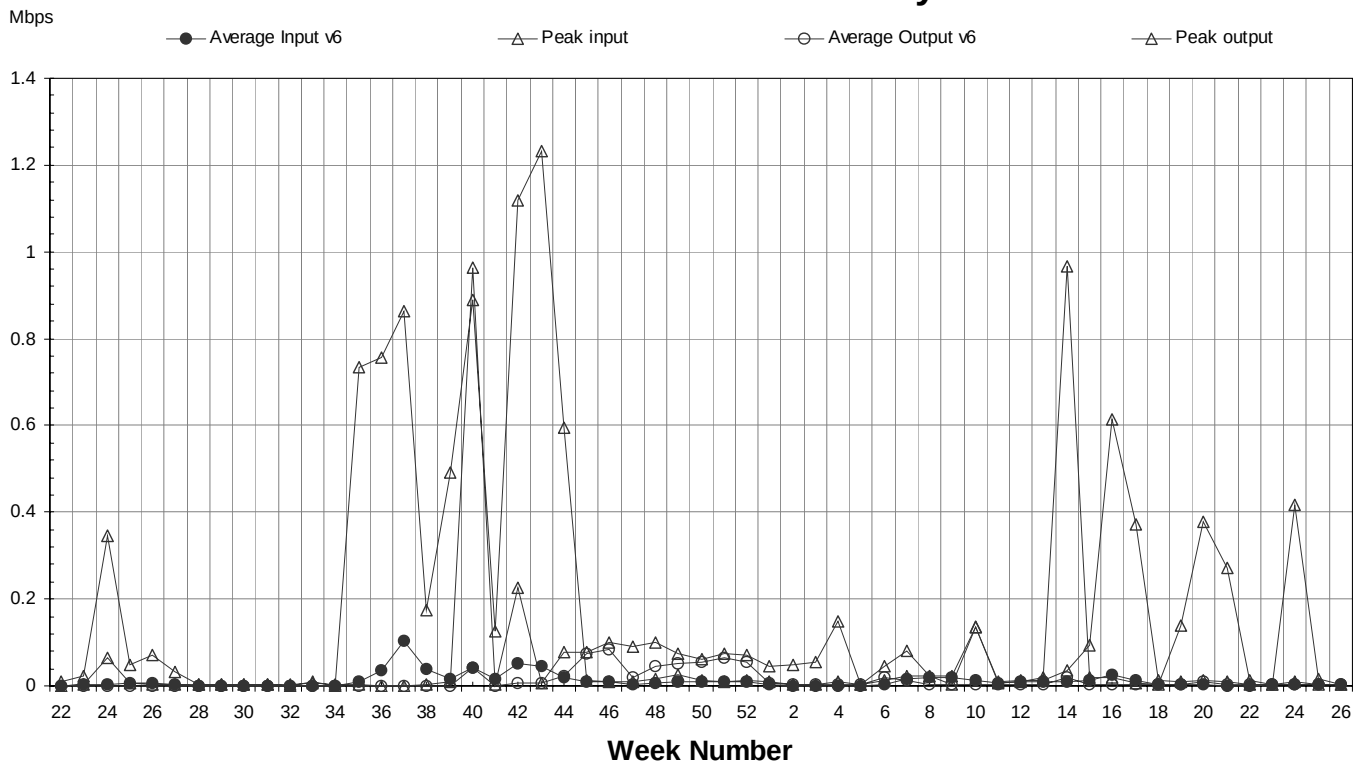
FCCN 6NET Access History



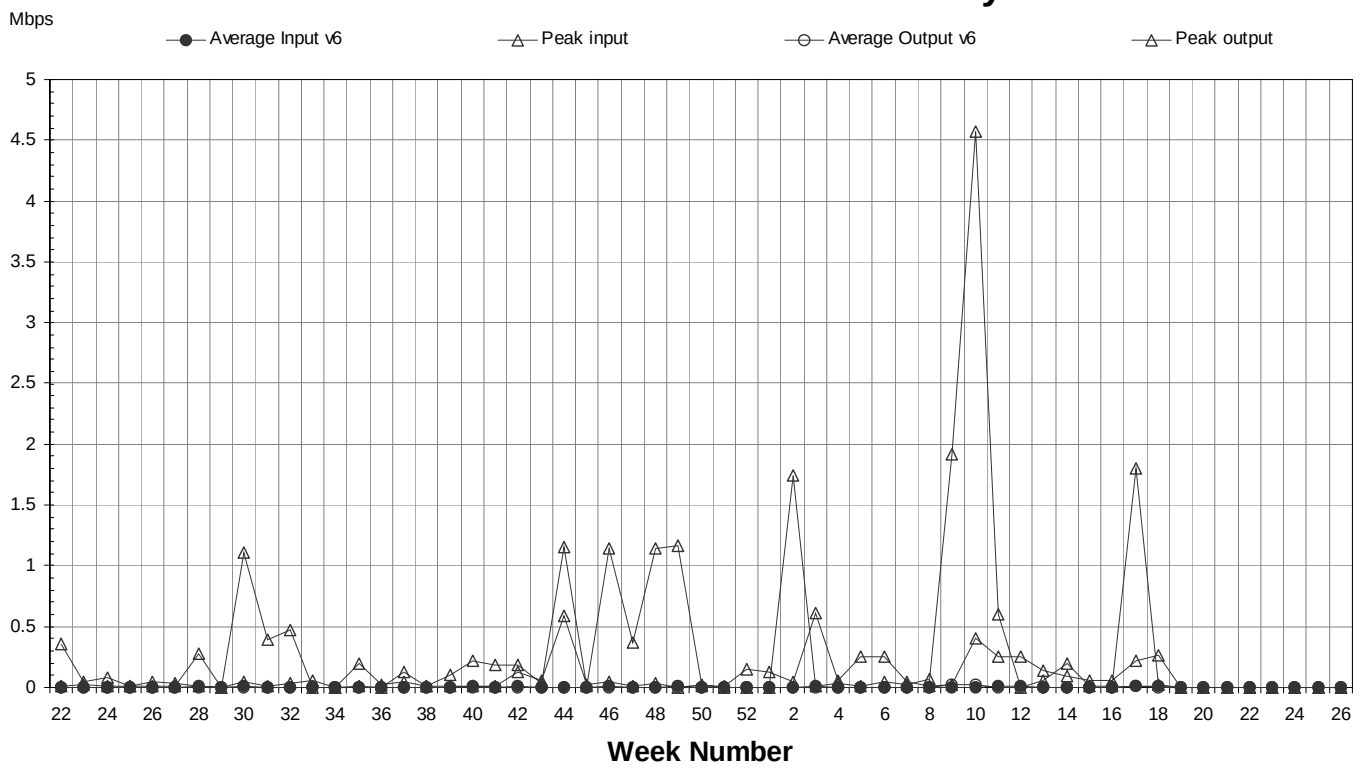
GARR 6NET Access History



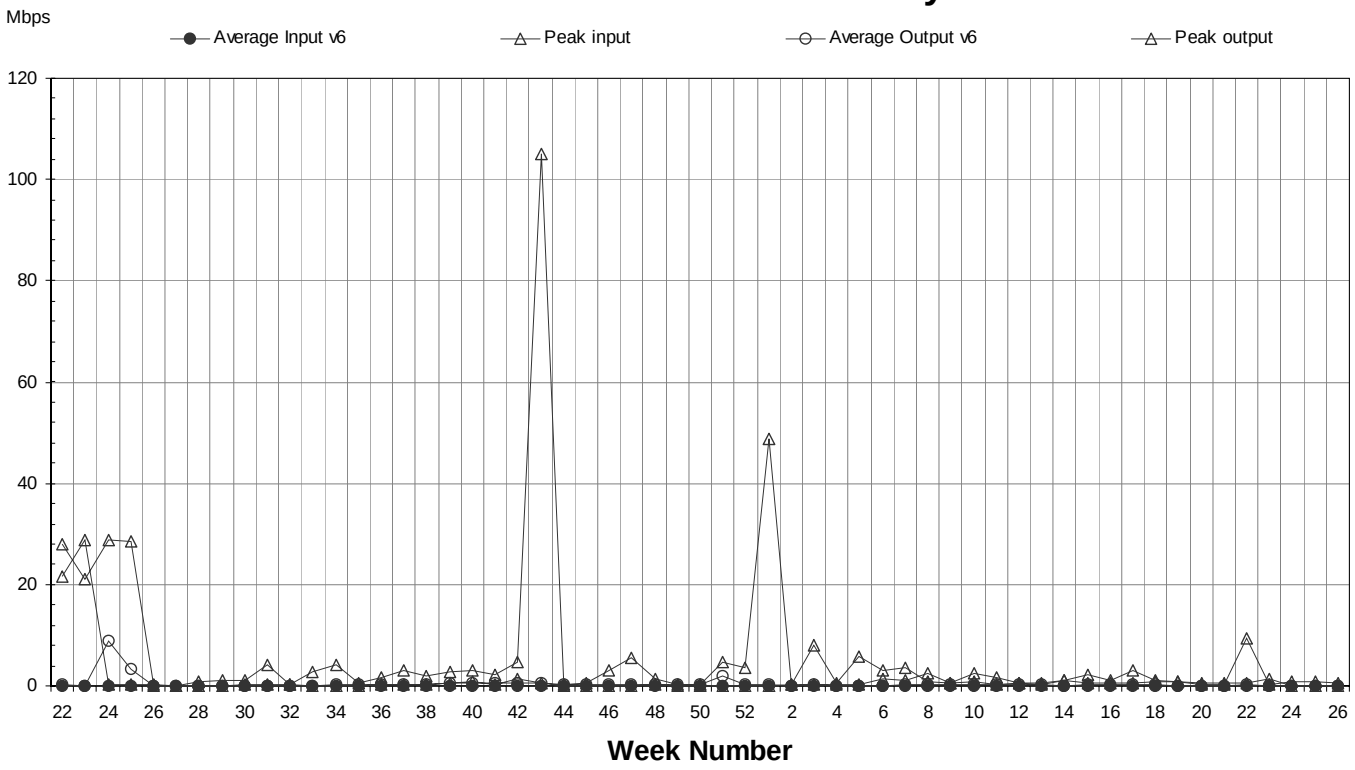
GRnet 6NET Access History



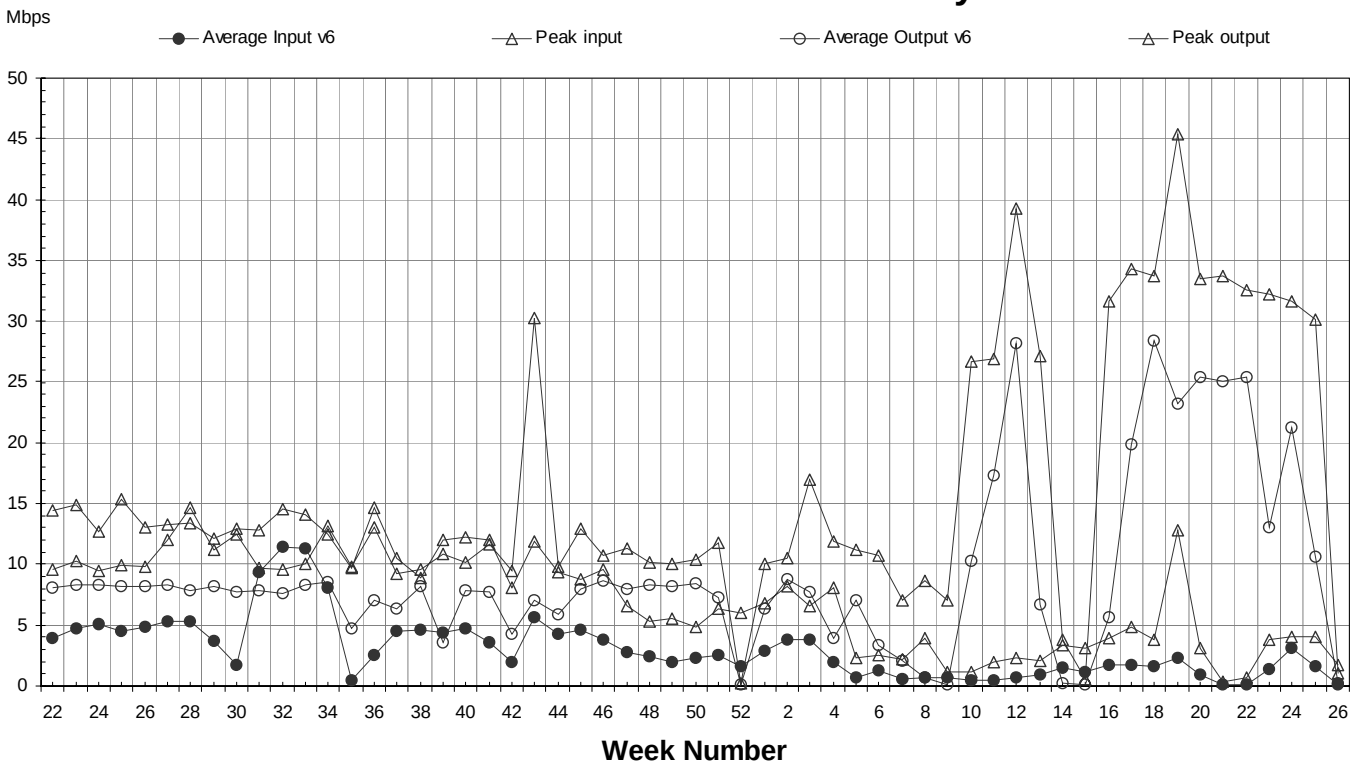
HUNGARNET 6NET Access History



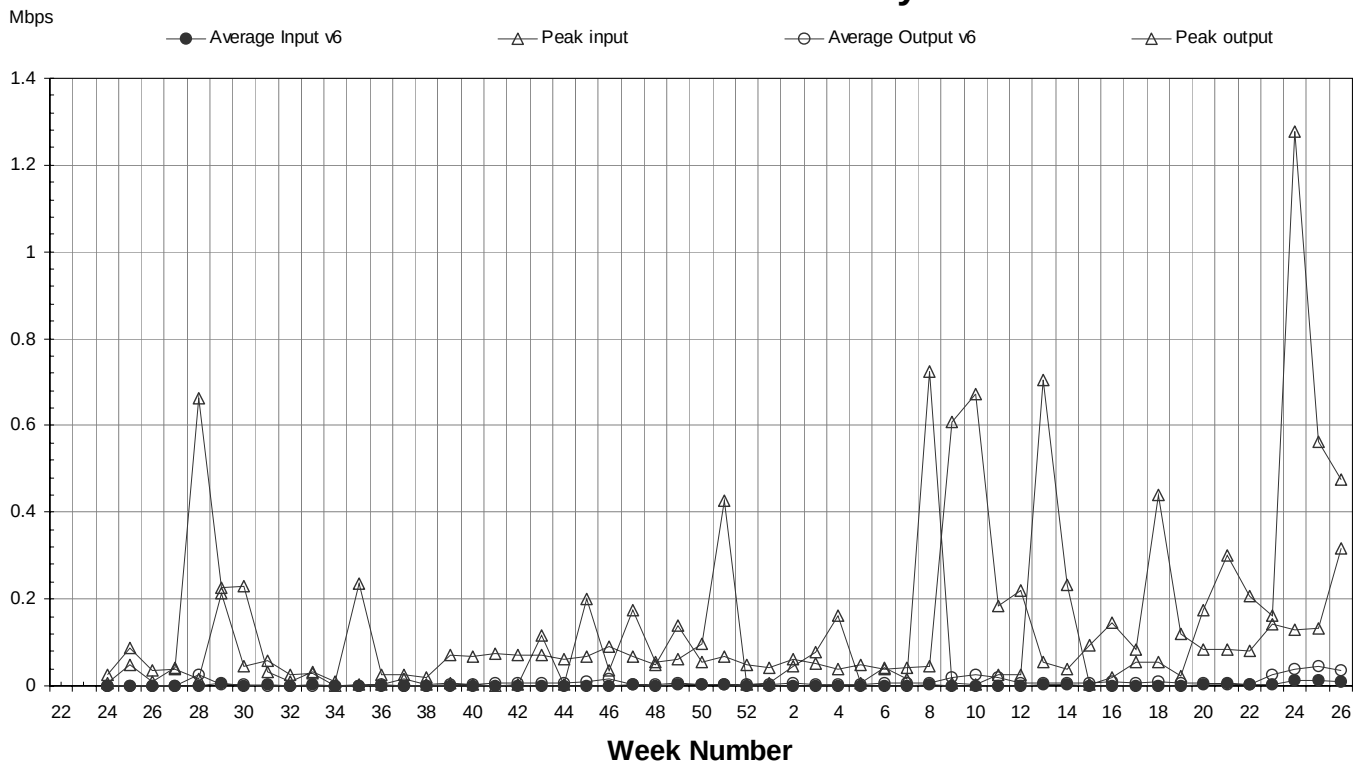
JANET 6NET Access History



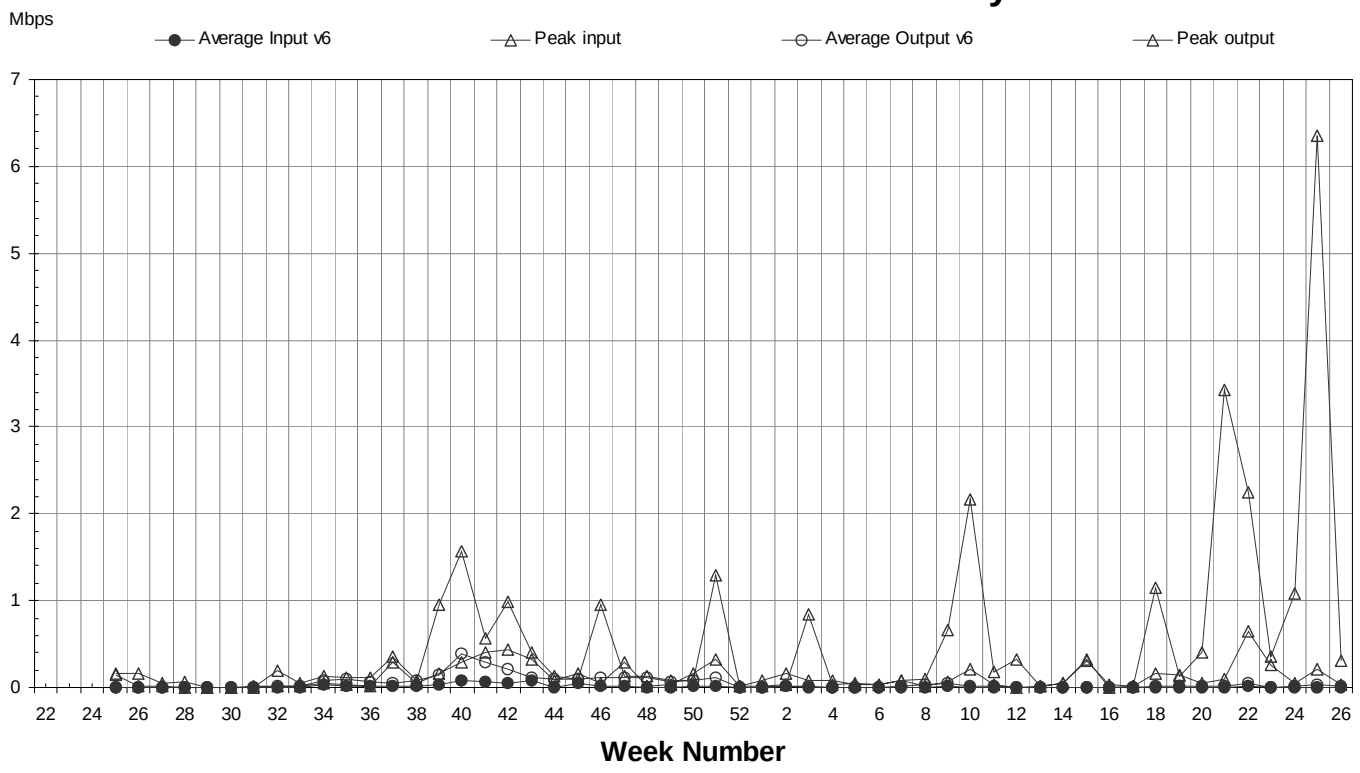
NORDUnet 6NET Access History



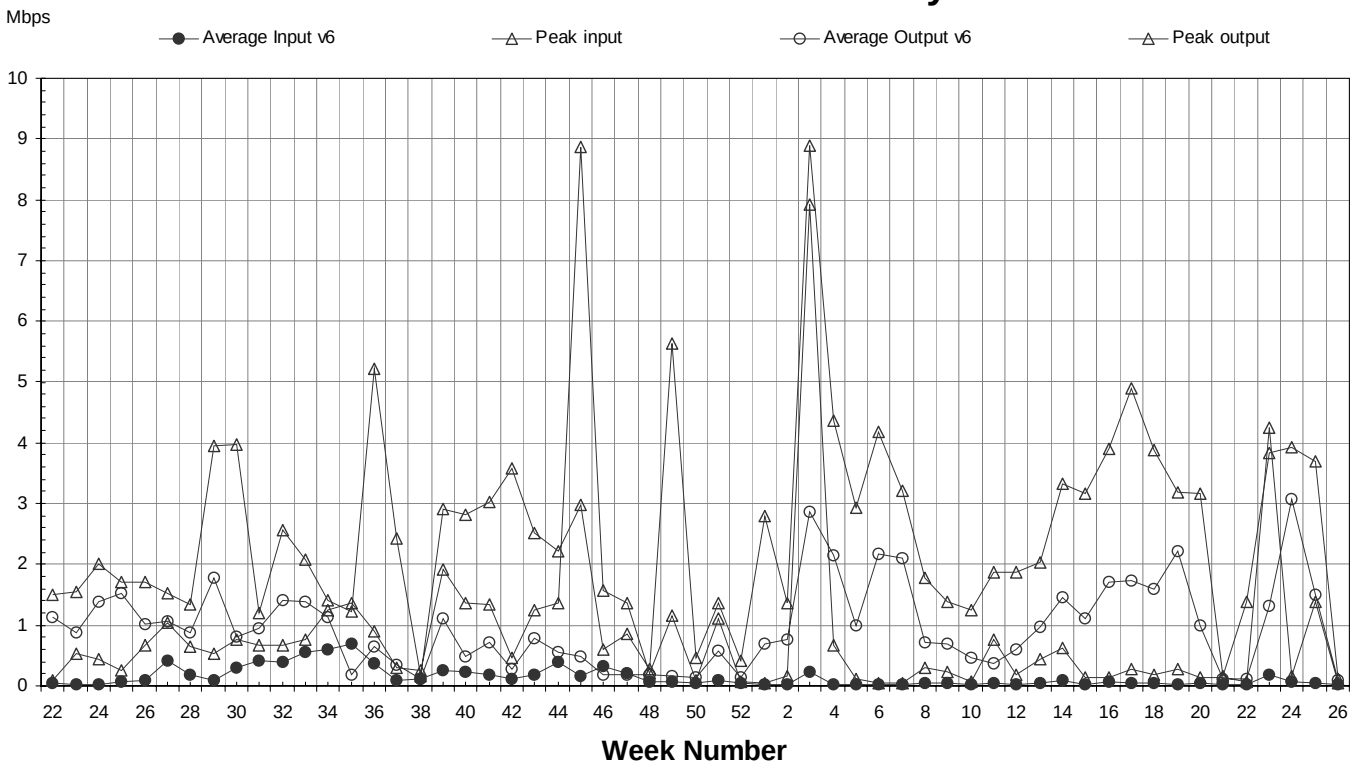
NTT 6NET Access History



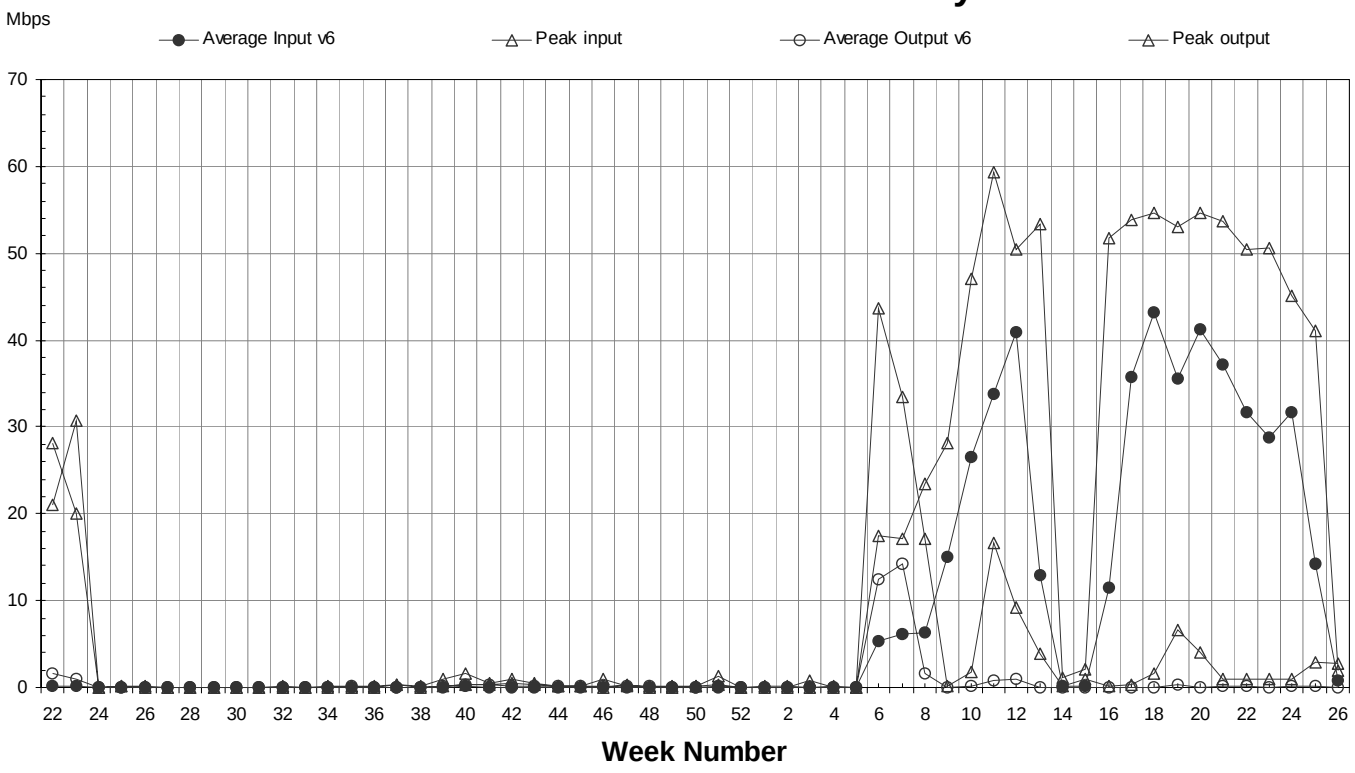
POL34 6NET Tunnel Access History



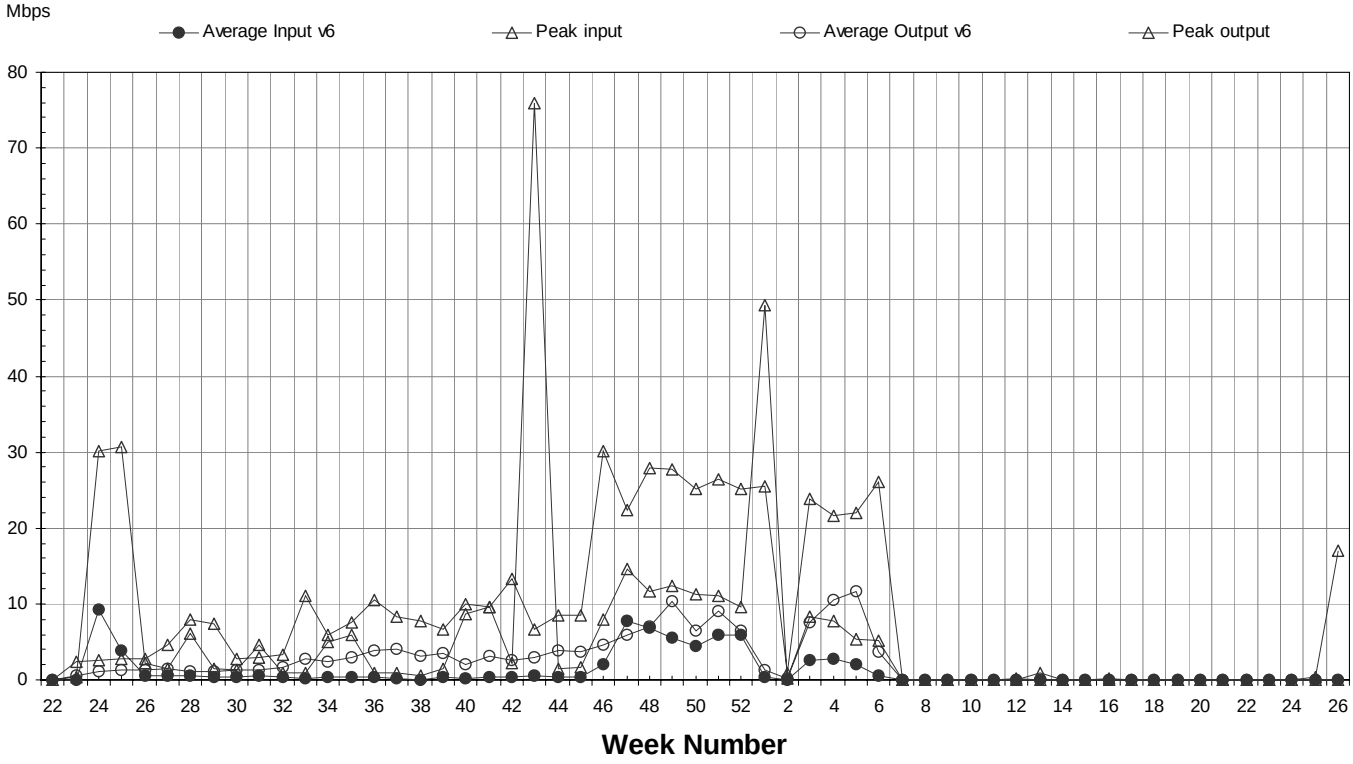
Renater 6NET Access History



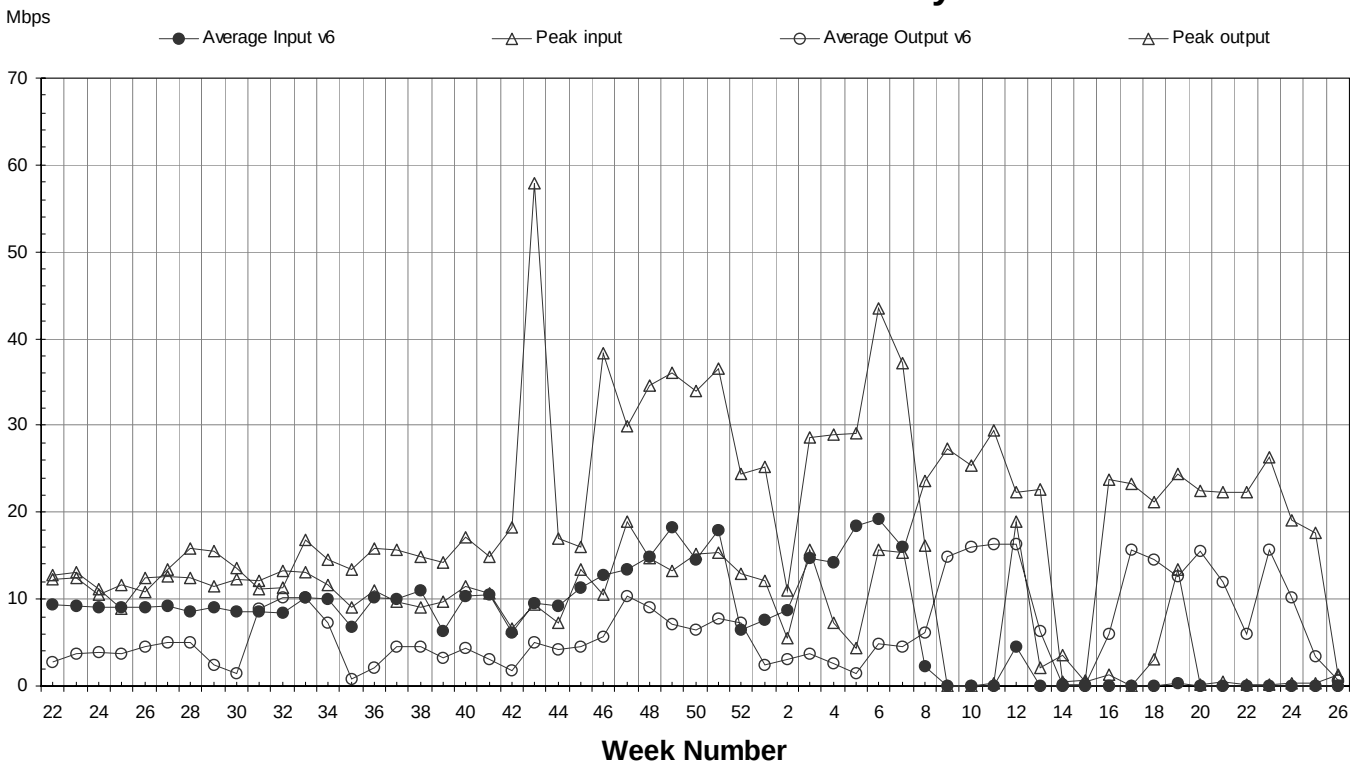
SURFnet 6NET Access 1 History



SURFNET 6NET Access 2 History



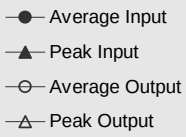
SWITCH 6NET Access History

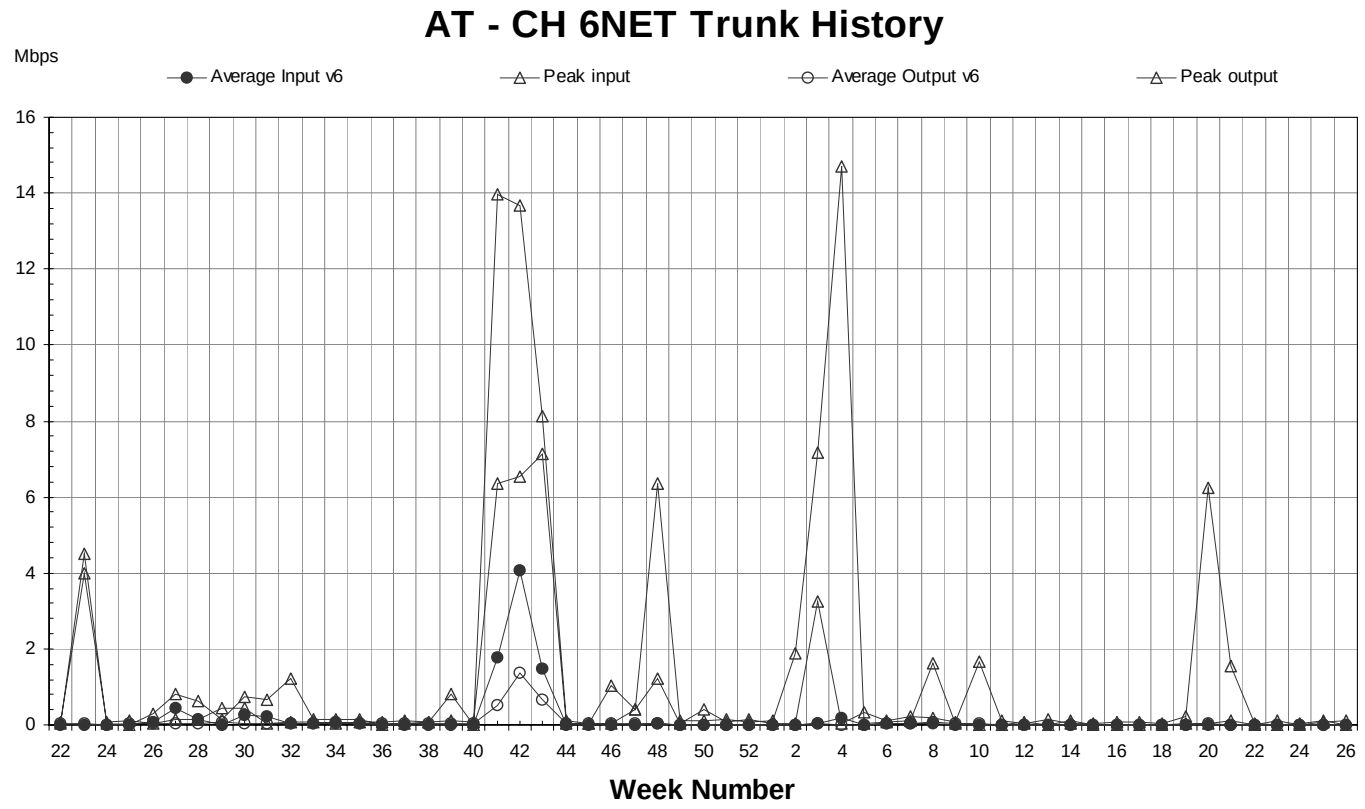


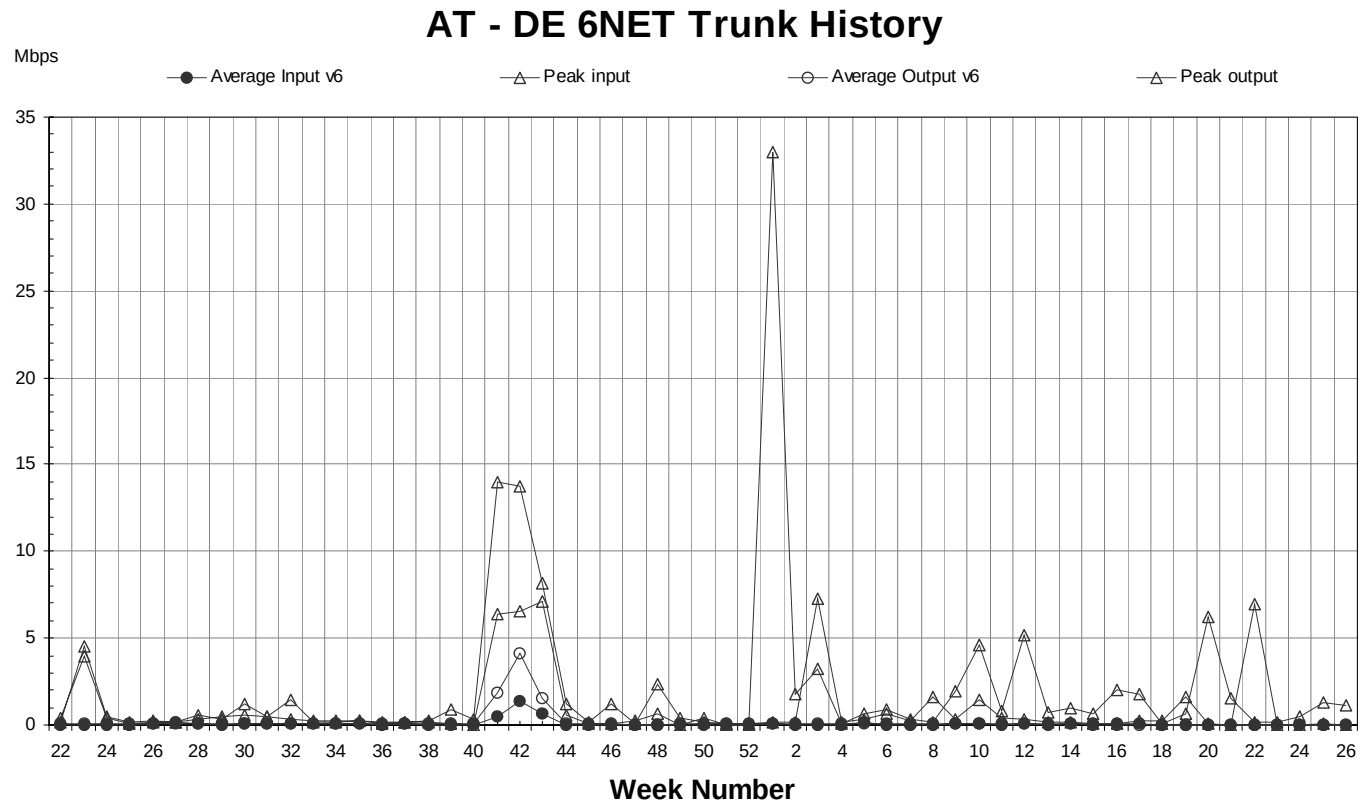
5.2. BACKBONE TRAFFIC

This section contains the traffic data for the backbone trunks.

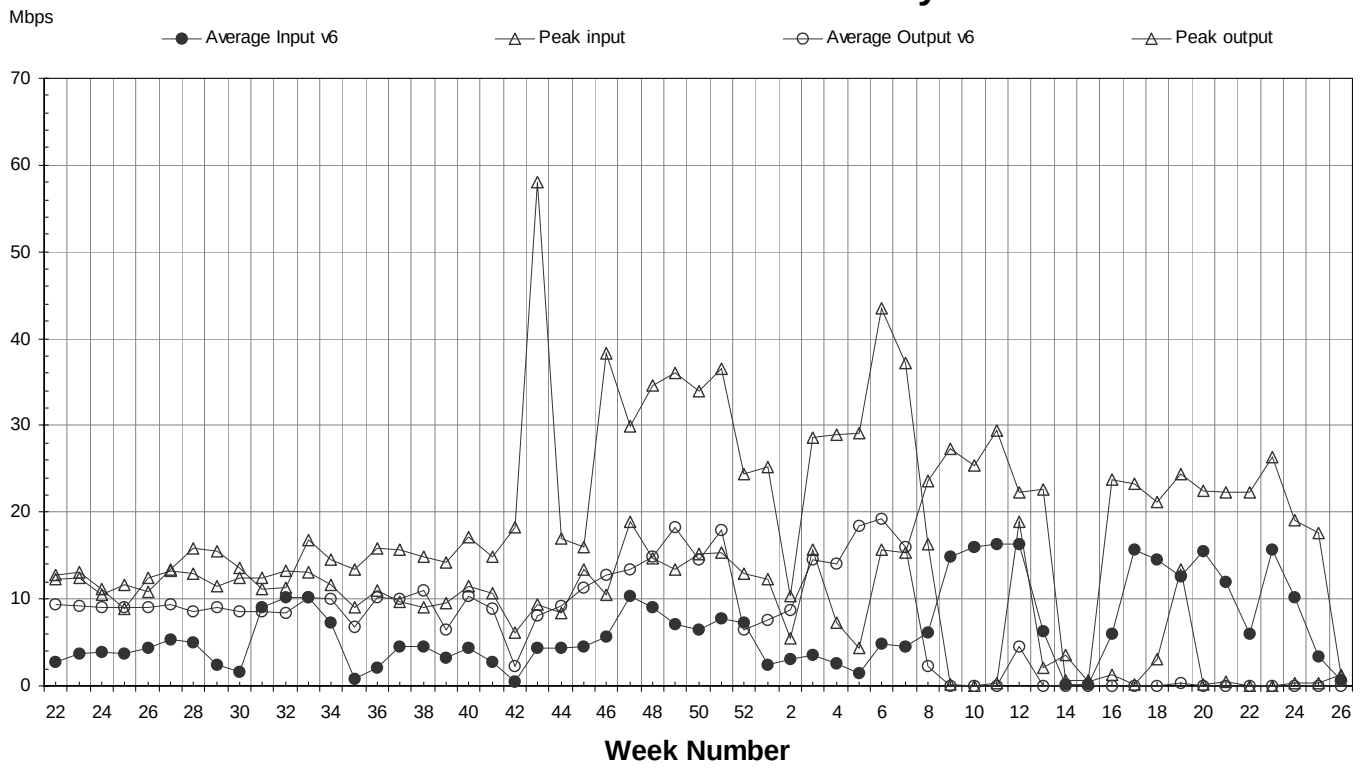
The legend is:



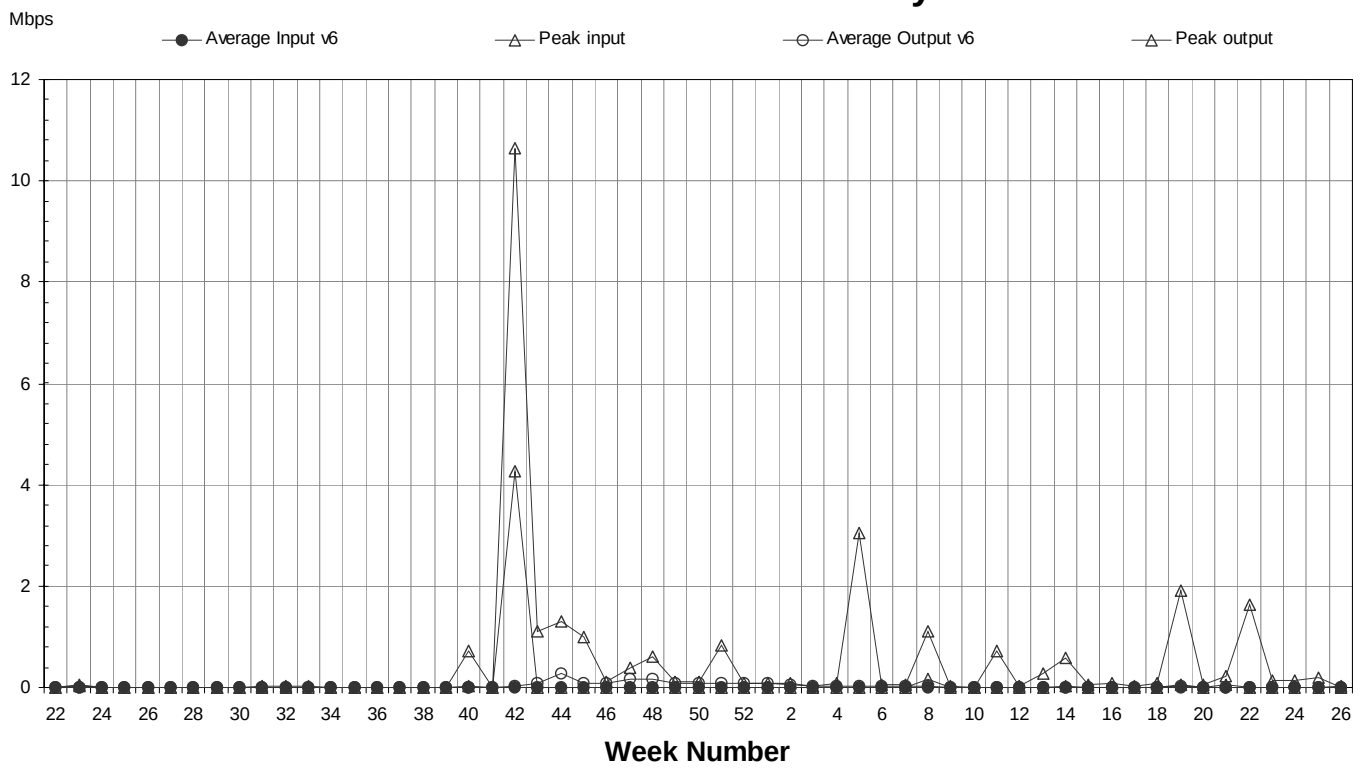

AT - CH 6NET Trunk History
Mbps
Average Input v6
Peak input
Average Output v6
Peak output
16
14
12
10
8
6
4
2
0
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 2 4 6 8 10 12 14 16 18 20 22 24 26
Week Number

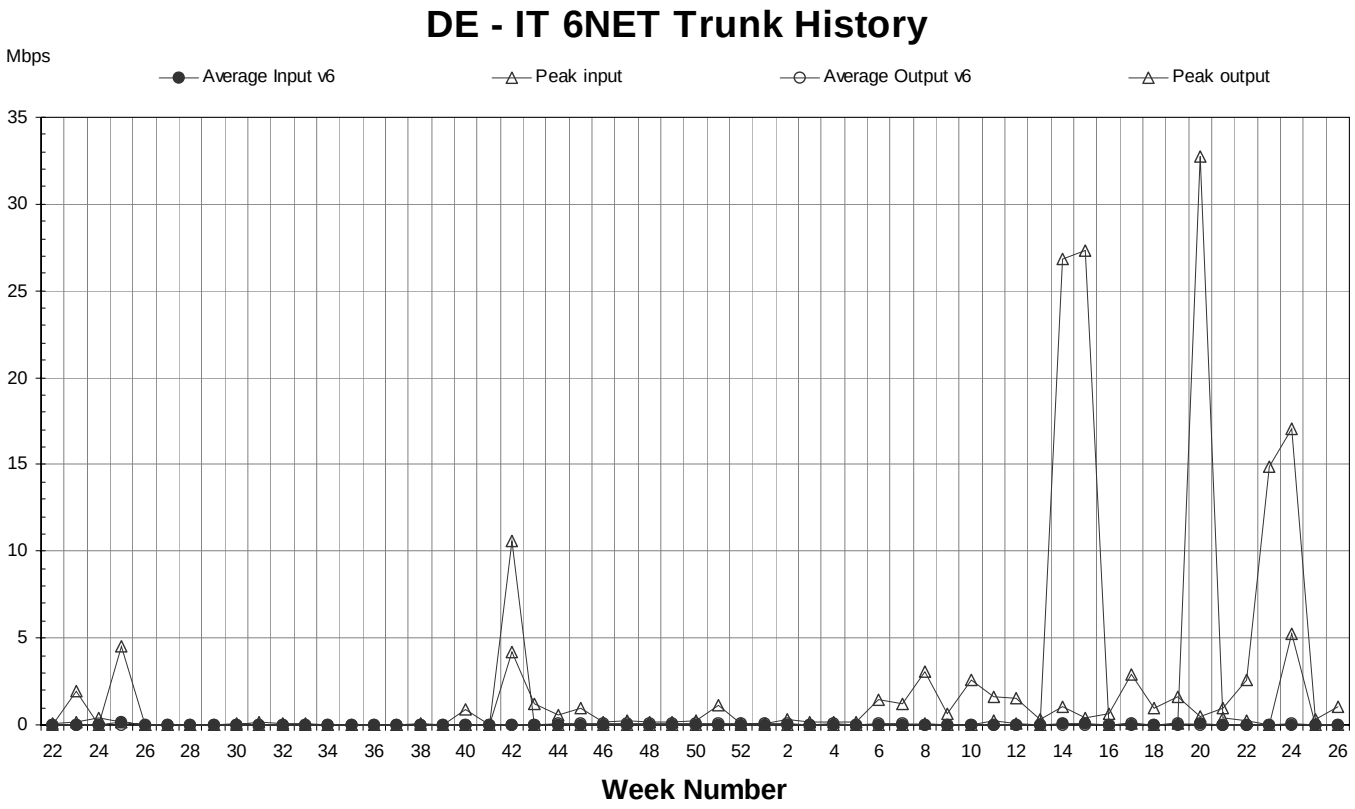

AT - DE 6NET Trunk History
Mbps
Average Input v6
Peak input
Average Output v6
Peak output
35
30
25
20
15
10
5
0
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 2 4 6 8 10 12 14 16 18 20 22 24 26
Week Number

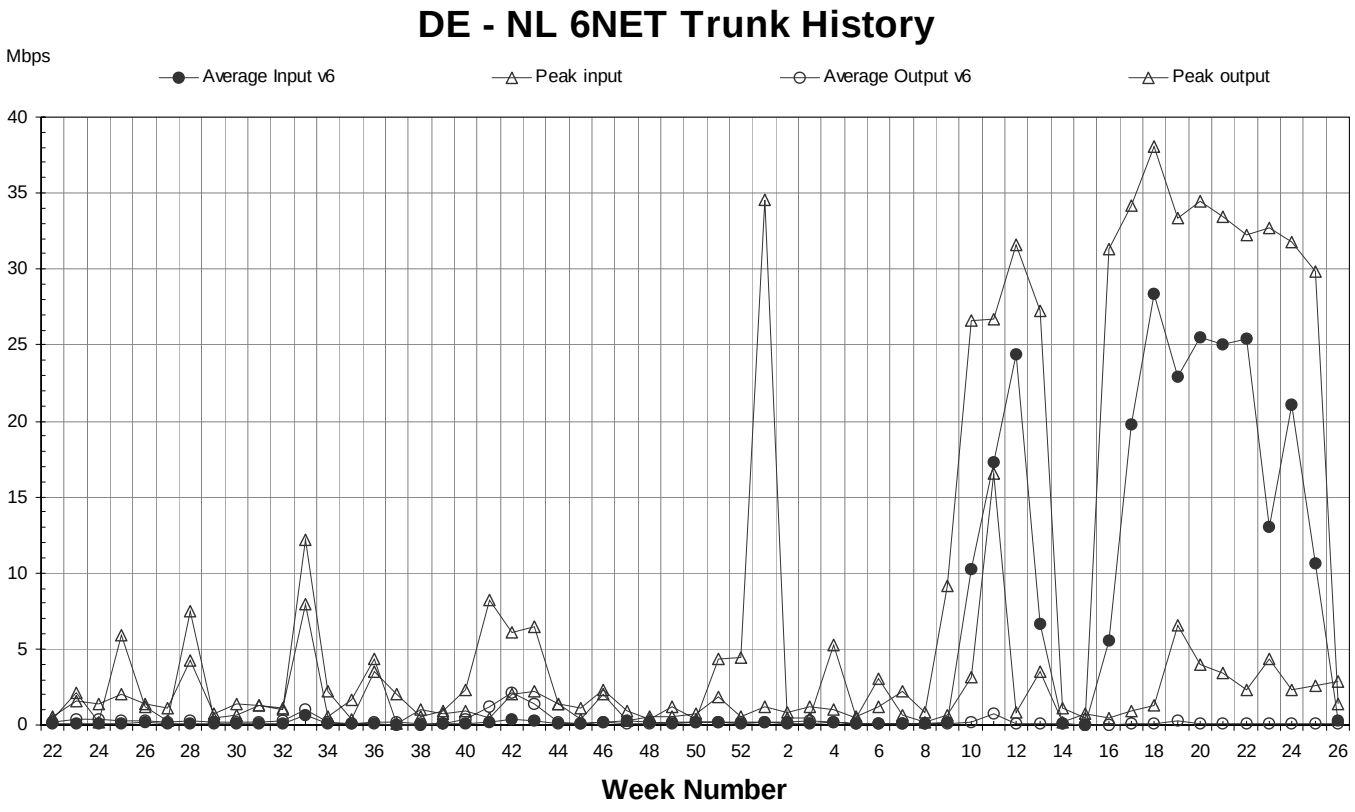
CH - FR 6NET Trunk History



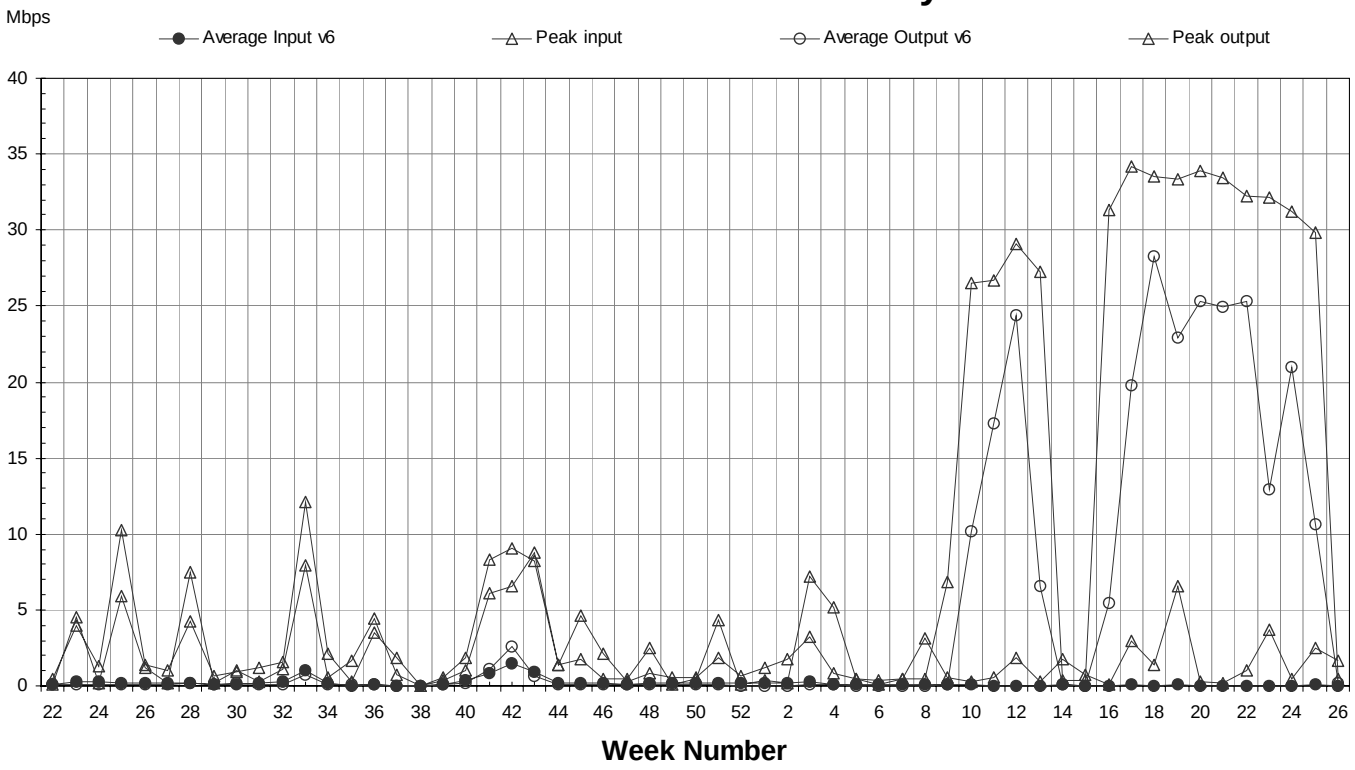
CH - IT 6NET Trunk History



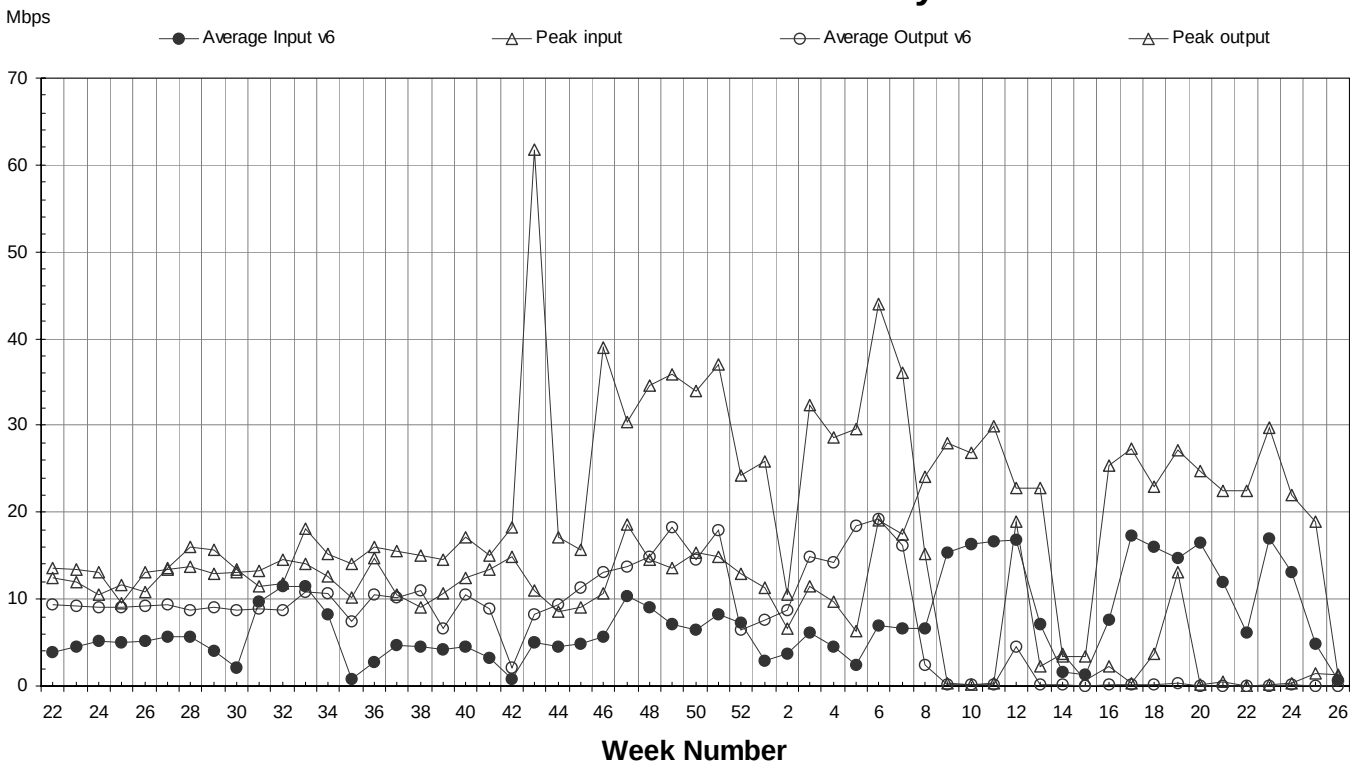

DE - IT 6NET Trunk History
Mbps
Average Input v6
Peak input
Average Output v6
Peak output
35
30
25
20
15
10
5
0
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 2 4 6 8 10 12 14 16 18 20 22 24 26
Week Number


DE - NL 6NET Trunk History
Mbps
Average Input v6
Peak input
Average Output v6
Peak output
40
35
30
25
20
15
10
5
0
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 2 4 6 8 10 12 14 16 18 20 22 24 26
Week Number

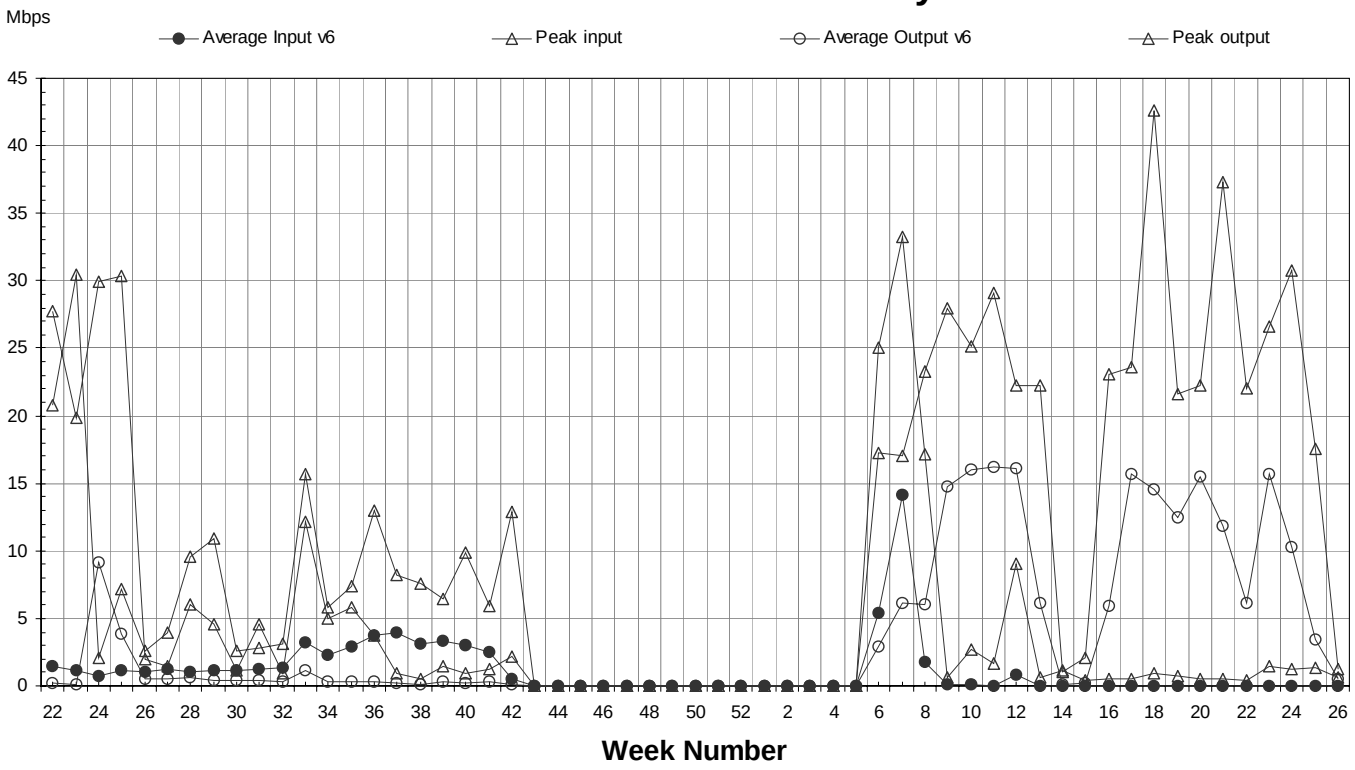
DE - SE 6NET Trunk History



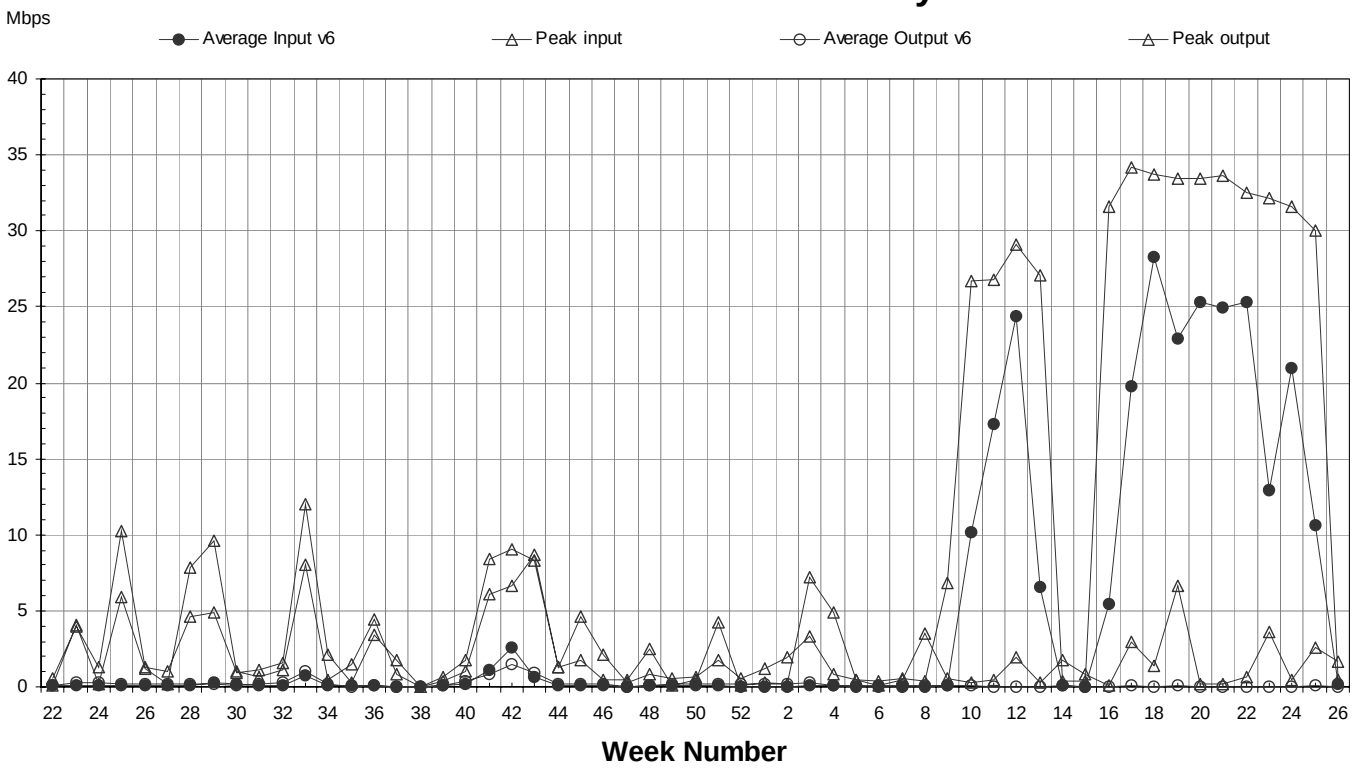
FR - UK 6NET Trunk History

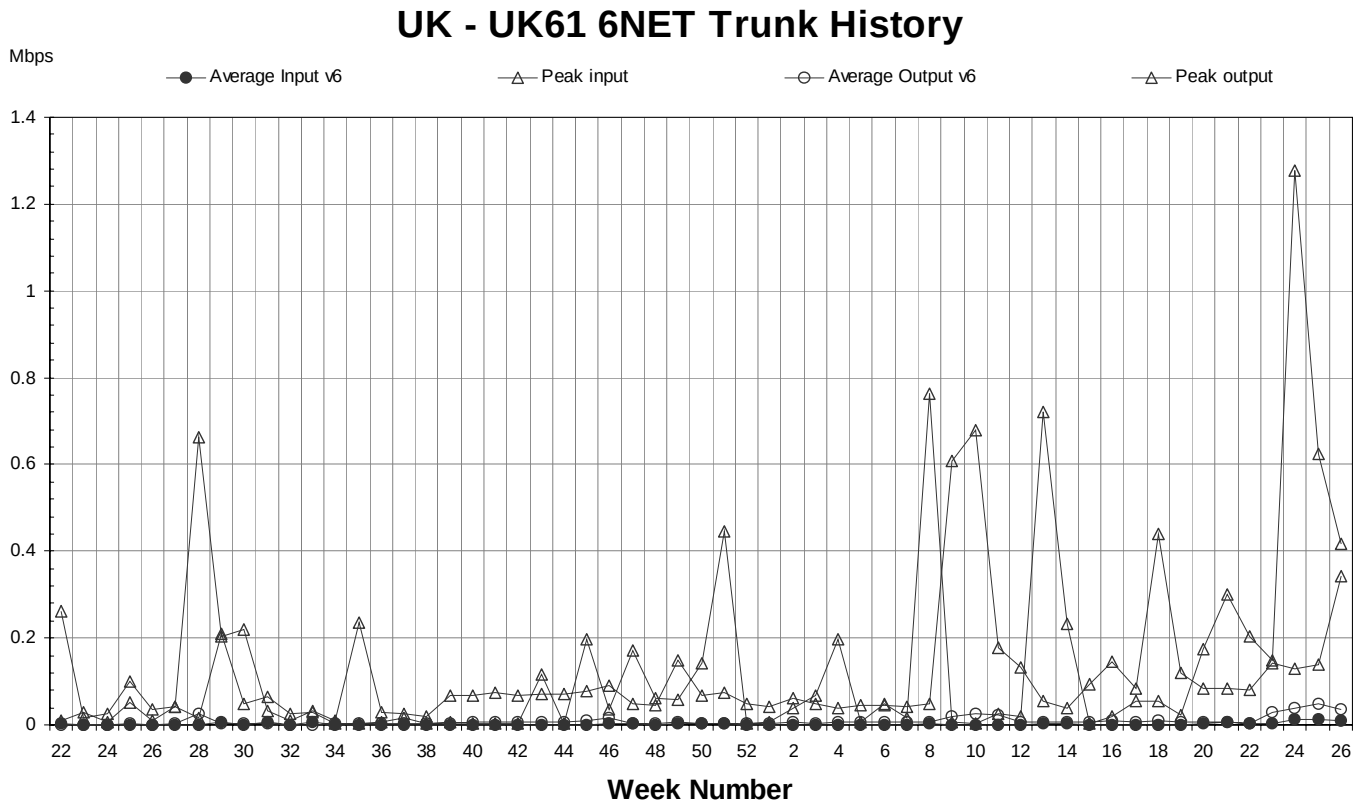


NL - UK 6NET Trunk History



SE - UK 6NET Trunk History




UK - UK61 6NET Trunk History
Mbps
Average Input v6
Peak input
Average Output v6
Peak output
1.4
1.2
1
0.8
0.6
0.4
0.2
0
22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 2 4 6 8 10 12 14 16 18 20 22 24 26
Week Number

6. ROUTING INFORMATION DISPLAY

6.1. RIS - 6NET connection

The Routing Information Service (RIS) provides information about BGP routing like “Looking Glass” services offered elsewhere on the Internet. However, the RIS can also provide historical information about Internet routing. The service collects routing information by using Remote Route Collectors at different locations around the world and integrates this information into a comprehensive view.
6net has set up a multihop eBGP peer in Amsterdam to export its IPv6 routing information to be displayed in RIS graphs. You can have a look to the following link which shows up IPv6 routing activity in Amsterdam RCC. At the time of writing this deliverable, only 6net information is collected in that router.

http://www.ris.ripe.net/ipv6-updates/rrc00/index.html

Figure 1 and Figure 2 show graphs taken on 8 July 2004 at 17:00 CET

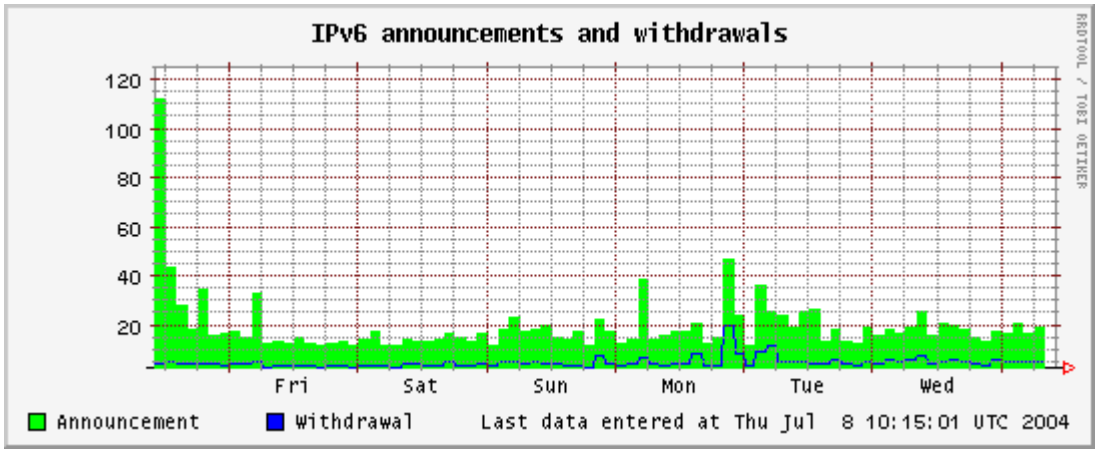


FIGURE 1

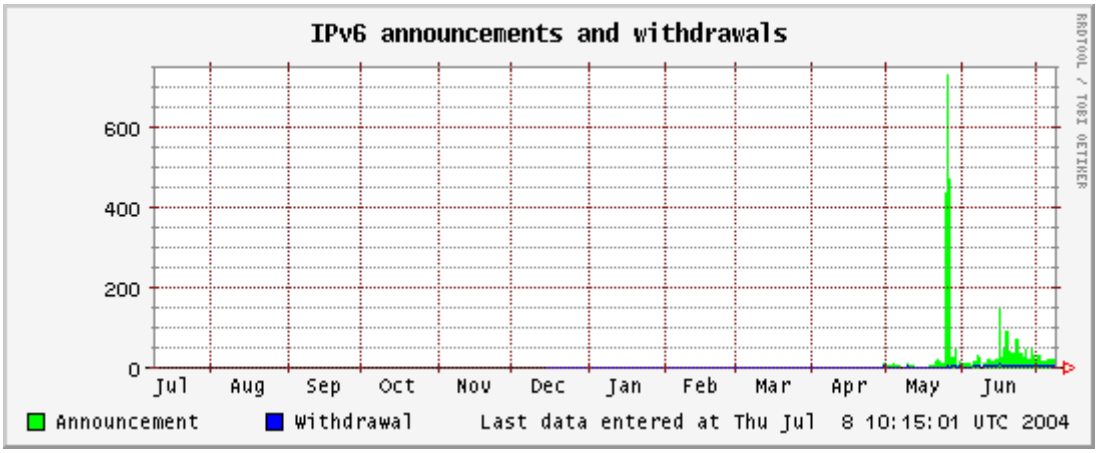


FIGURE 2

6.2. Ghost Route Hunter project - 6net connection

Ghost Route Hunter, GRH for short, is a tool for hunting down Ghost Routes in the IPv6 routing tables. It uses a looking glass to display in a centralized way all the routing entries from the participants in the GRH project. Note that output it is generated in real time.
6net network has set up a multihop eBGP peer with GRH router to export its routing information about ghost routes to be displayed in GRH project web.
You can have a look to the looking glass facility in the link:

http://www.sixxs.net/tools/grh/lg/

More information about the GRH project in:

http://www.sixxs.net/tools/grh/

7. PERFORMANCE TESTS

7.1. Round trip time and packet loss measures: MPING tool

The following statistics are gathered with Mping tool, server located at UNINETT - Norway.
Mping stands for Multi-ping and it is a system for collecting statistics over round-trip time and packet loss in a TCP/IP network using ICMP echo. Mping uses the InterNet Control Message Protocol (ICMP) “ECHO” facility, to measure round-trip-delays and packet loss across 6net backbone routers.

Figure 3 shows up the round-trip time and loss statistics between the 6net routers during May 2004.

Table 1 gives a correspondence of IPv6 address with DNS name for a better understanding of Figure 3

UNINETT Forskningsnettet i Norge

Round-trip time for 6Net

Data from May 2004 - Probes per interval: 10 - Interval per hour: 4

Available statistics: Other: Language:

Machine name (Route)	Round-trip time (ms)			Round-trip time distribution (%)				Packet loss (%)	
	Median	Max	Std dev	<25 ms	<50 ms	<100 ms	<200 ms	Avg	Max
2001:798:10::1	70.59	196.00	32.06	0.0	0.0	96.8	100.0	0.9	16.0
2001:798:20::1	66.28	187.70	30.97	0.0	0.0	96.8	100.0	0.9	16.0
2001:798:17::1	93.03	211.30	33.55	0.0	0.0	77.4	100.0	0.9	16.0
2001:798:14::1	40.43	166.90	31.80	0.0	96.8	96.8	100.0	0.4	7.0
2001:798:12::1	71.39	187.60	30.10	0.0	0.0	96.8	100.0	0.3	6.0
2001:798:16::1	61.37	177.90	30.96	0.0	0.0	96.8	100.0	0.3	6.0
2001:798:22::1	49.27	175.80	34.86	0.0	93.5	96.8	100.0	0.3	6.0
2001:798:25:200::1	16.72	74.90	28.93	100.0	100.0	100.0	100.0	0.0	1.0
2001:798:25::1	19.30	153.20	33.22	96.8	96.8	96.8	100.0	0.2	6.0
2001:798:28::1	54.05	177.10	40.94	0.0	0.0	96.8	100.0	0.2	5.0

Frank.Aune@uninett.no

FIGURE 3

DNS name	IPv6 address
Lo0.at6.at.6net.org	2001:798:10::1
Lo0.it6.it.6net.org	2001:798:20::1
Lo0.gr6.gr.6net.org	2001:798:17::1
Lo0.de6.de.6net.org	2001:798:14::1
Lo0.ch6.ch.6net.org	2001:798:12::1
Lo0.fr6.fr.6net.org	2001:798:16::1
Lo0.nl6.nl.6net.org	2001:798:22::1
nordunet.se6.se.6net.org	2001:798:25:200::1
Lo0.se6.se.6net.org	2001:798:25::1
Lo0.uk6.uk.6net.org	2001:798:28::1

Table 1

Figure 4 displays the round trip statistics to uk6.uk.6net.org during June 2004.

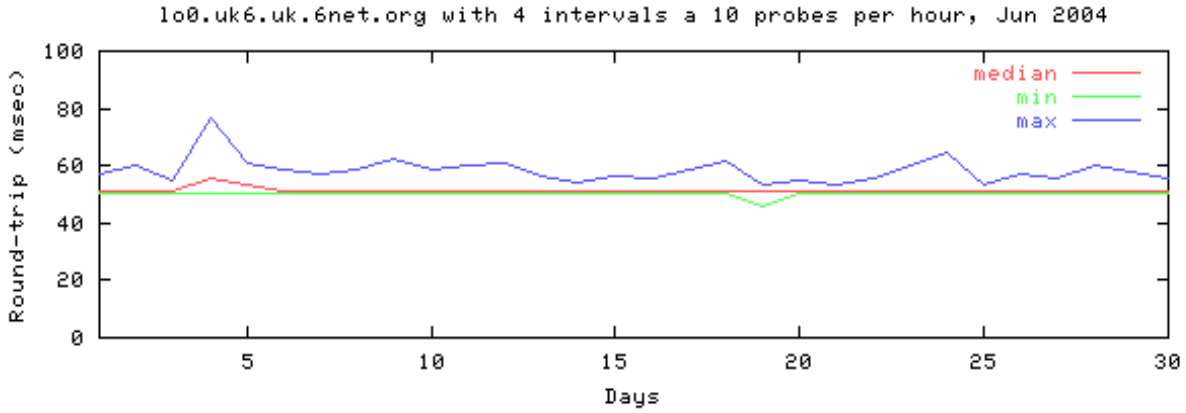


FIGURE 4

For more information about other time periods you can go to the link:

http://mping.uninett.no/index.en.html

8. MONITORING AND REPORTING PROCEDURE

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 schedule maintenances 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 2002.

The plots are produced for each of the following traffic categories

- NREN Access Ports
- GÉANT 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

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

Availability = (T - (tu + ts)) / (T - ts) x 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.

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)