# L3VPN LHCONE status update

*IPv6 edition!*

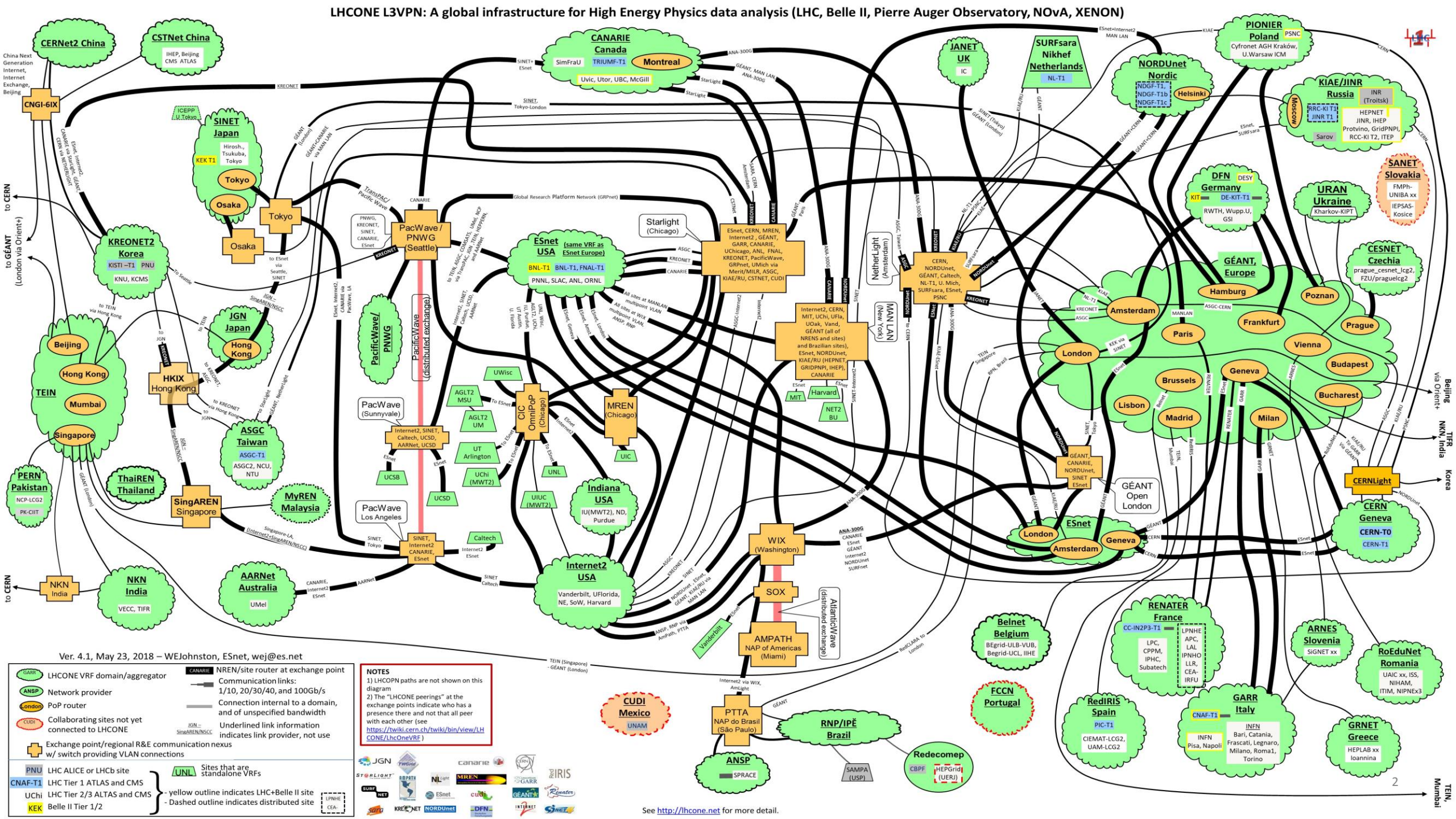

**Enzo Capone**

*Head of Research Engagement and Support*

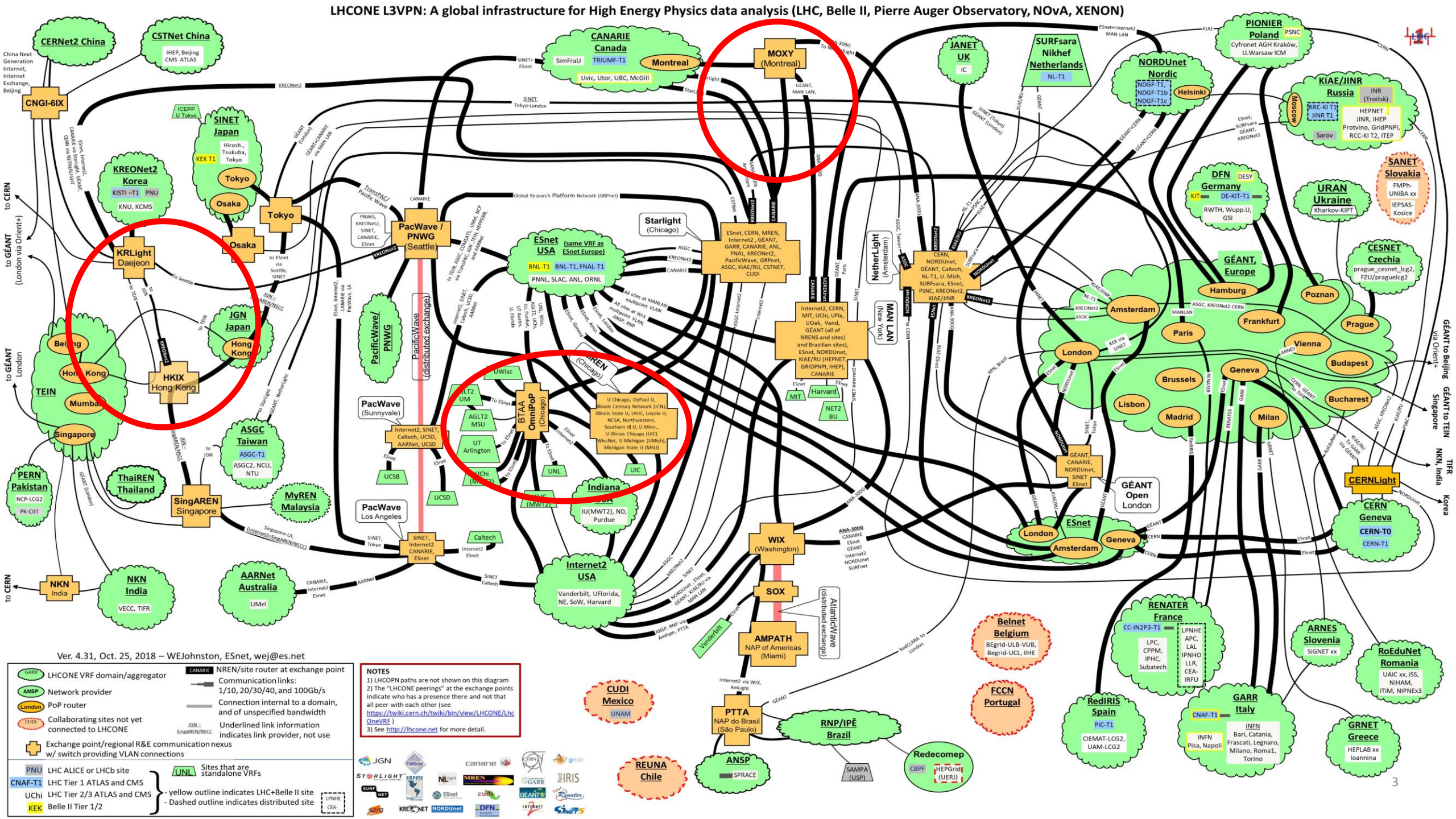
LHCONE-OPN Meeting

Fermilab, 30 October 2018

# LHCONE L3VPN: A global infrastructure for High Energy Physics data analysis (LHC, Belle II, Pierre Auger Observatory, NOvA, XENON)



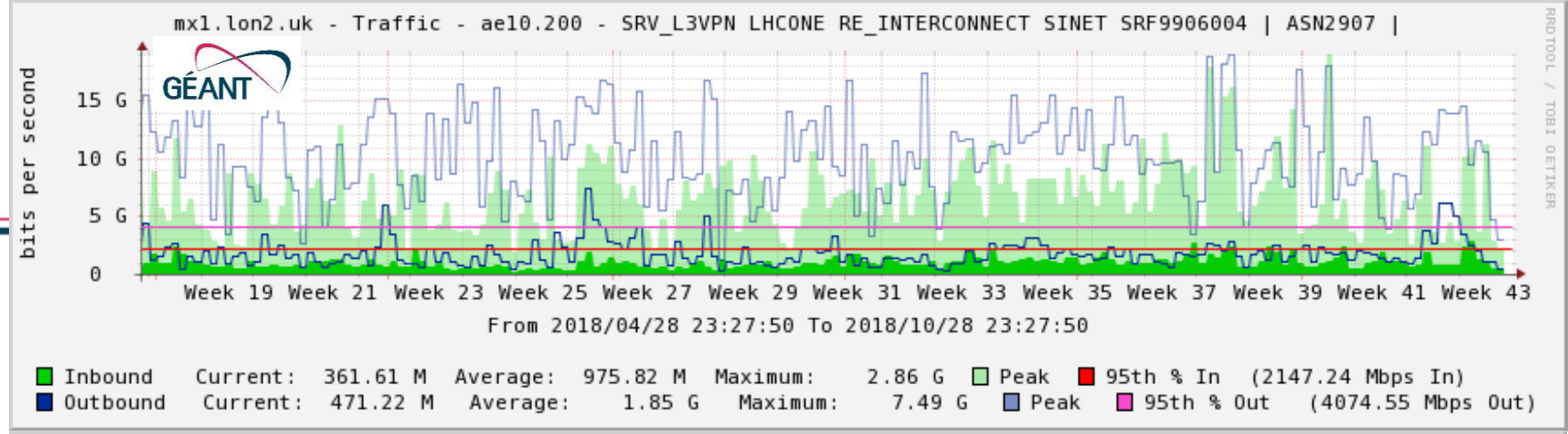
# LHCONE L3VPN: A global infrastructure for High Energy Physics data analysis (LHC, Belle II, Pierre Auger Observatory, NOvA, XENON)

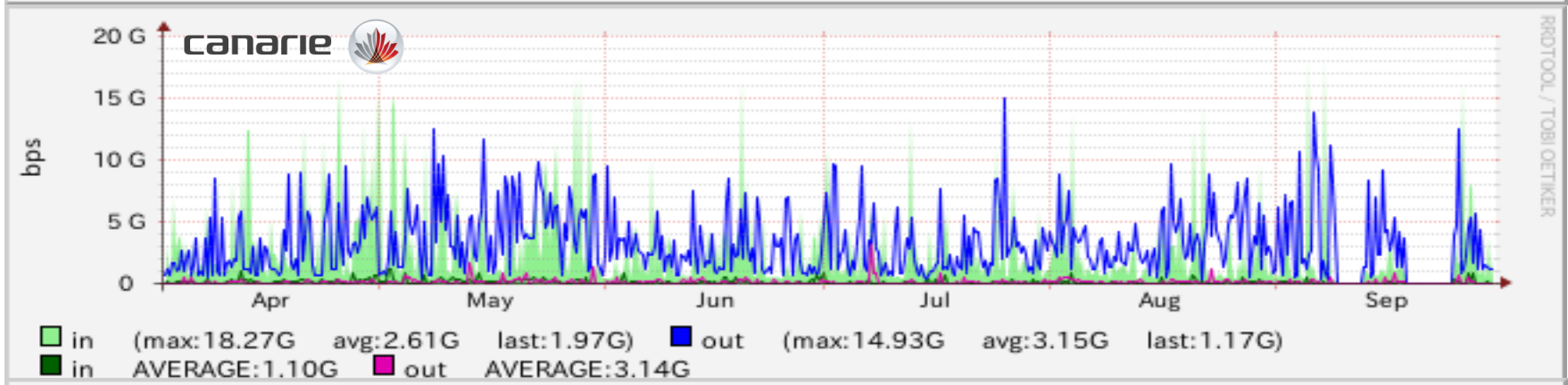


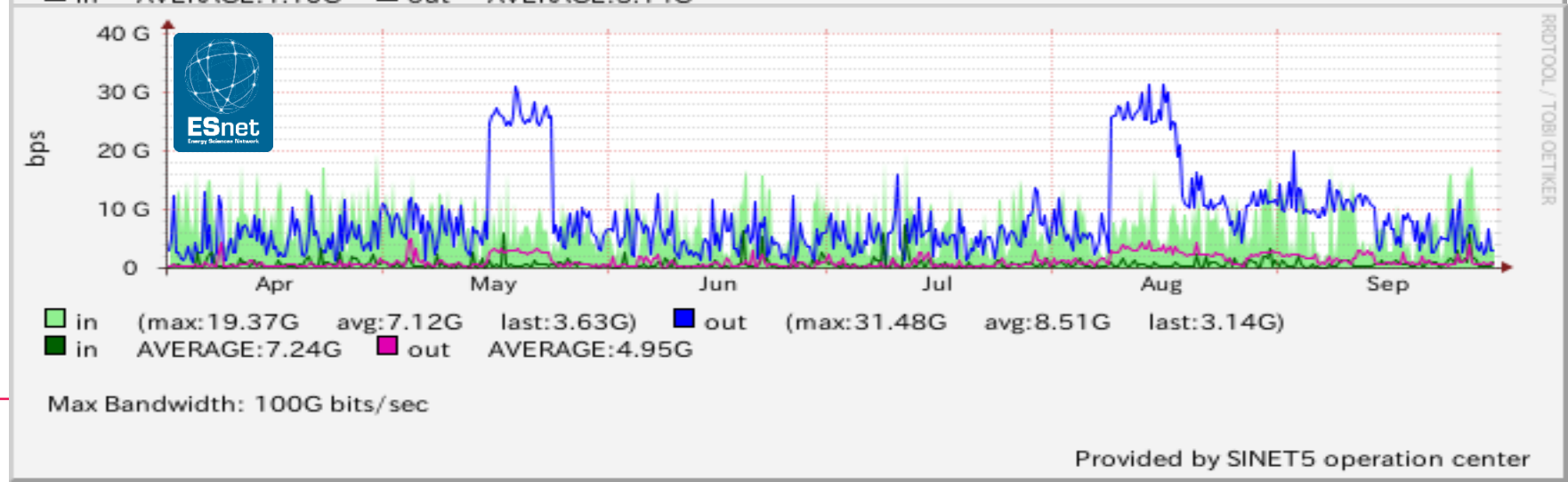
# World regions

- Asia-Pacific
- Europe
- North America
- Latin America

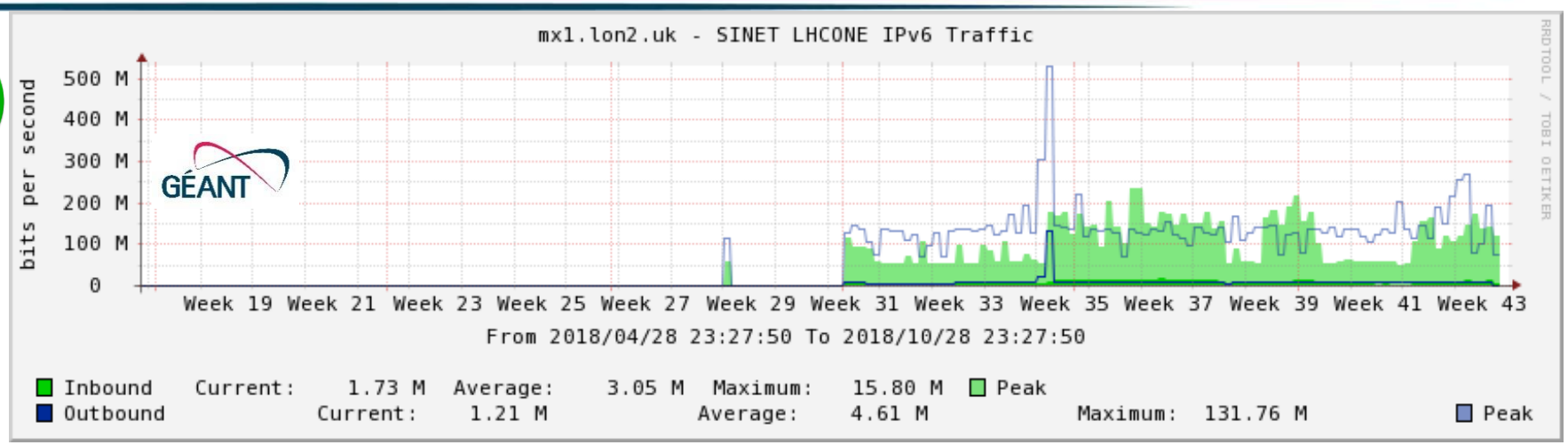
# SINET

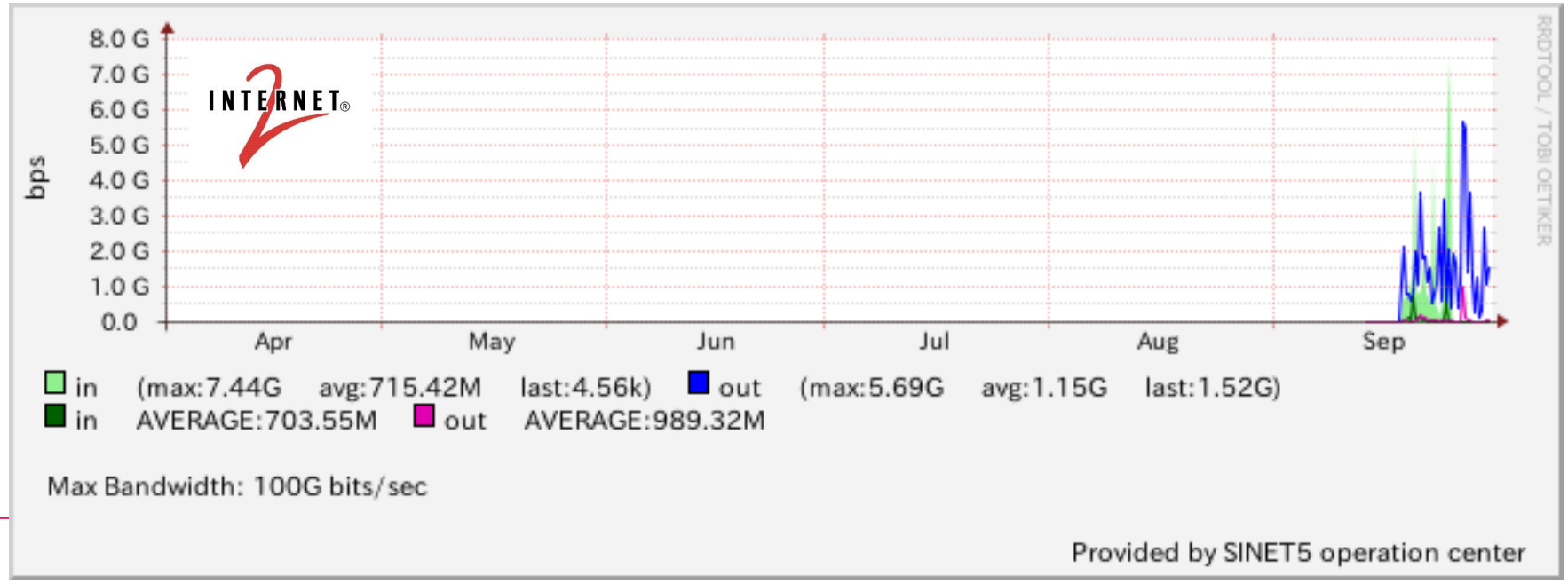

mx1.lon2.uk - Traffic - ae10.200 - SRV_L3VPN LHCONE RE_INTERCONNECT SINET SRF9906004 | ASN2907 |
GÉANT
bits per second
15 G
10 G
5 G
0
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/28 23:27:50 To 2018/10/28 23:27:50
Inbound Current: 361.61 M Average: 975.82 M Maximum: 2.86 G Peak 95th % In (2147.24 Mbps In)
Outbound Current: 471.22 M Average: 1.85 G Maximum: 7.49 G Peak 95th % Out (4074.55 Mbps Out)
RRDTOOL / TOBI OETIKER


canarie
bps
20 G
15 G
10 G
5 G
0
Apr May Jun Jul Aug Sep
in (max:18.27G avg:2.61G last:1.97G) out (max:14.93G avg:3.15G last:1.17G)
in AVERAGE:1.10G out AVERAGE:3.14G
RRDTOOL / TOBI OETIKER

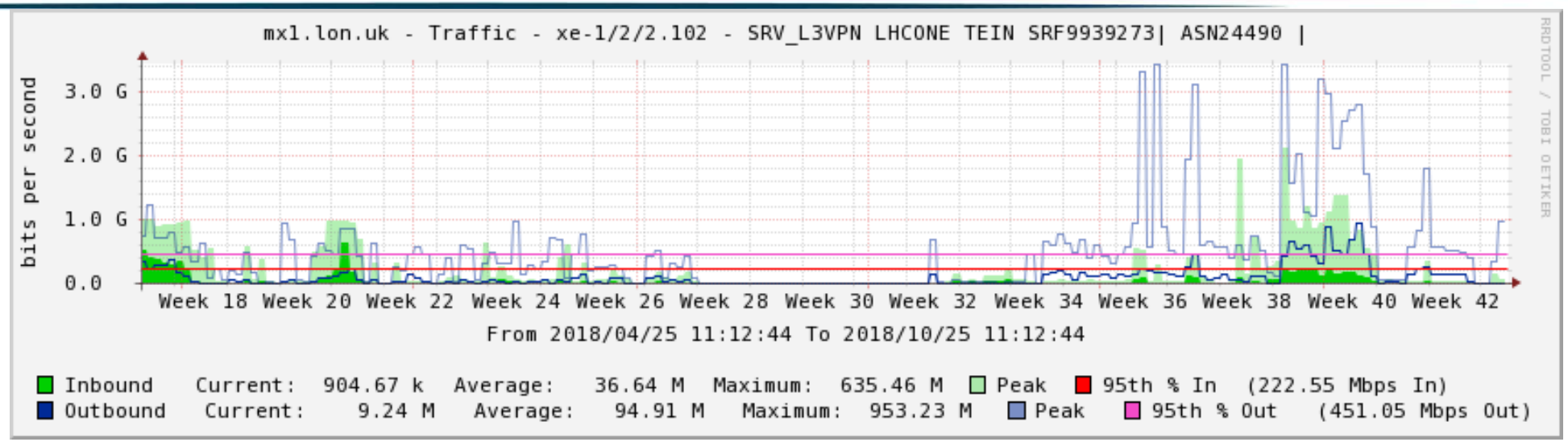

ESnet
bps
40 G
30 G
20 G
10 G
0
Apr May Jun Jul Aug Sep
in (max:19.37G avg:7.12G last:3.63G) out (max:31.48G avg:8.51G last:3.14G)
in AVERAGE:7.24G out AVERAGE:4.95G
Max Bandwidth: 100G bits/sec
Provided by SINET5 operation center
RRDTOOL / TOBI OETIKER

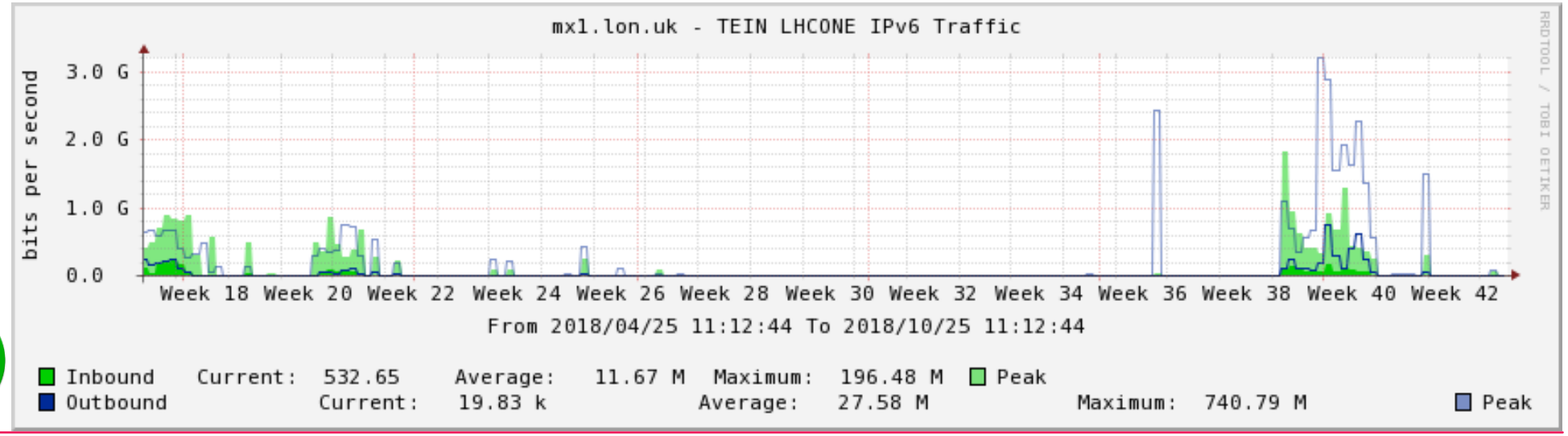
# SINET


mx1.lon2.uk - SINET LHCONE IPv6 Traffic
bits per second
500 M
400 M
300 M
200 M
100 M
0
GÉANT
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/28 23:27:50 To 2018/10/28 23:27:50
Inbound Current: 1.73 M Average: 3.05 M Maximum: 15.80 M Peak
Outbound Current: 1.21 M Average: 4.61 M Maximum: 131.76 M Peak
RRDTOOL / TOBI OETIKER


bps
8.0 G
7.0 G
6.0 G
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
INTERNET2
Apr May Jun Jul Aug Sep
in (max:7.44G avg:715.42M last:4.56k) out (max:5.69G avg:1.15G last:1.52G)
in AVERAGE:703.55M out AVERAGE:989.32M
Max Bandwidth: 100G bits/sec
Provided by SINET5 operation center
RRDTOOL / TOBI OETIKER

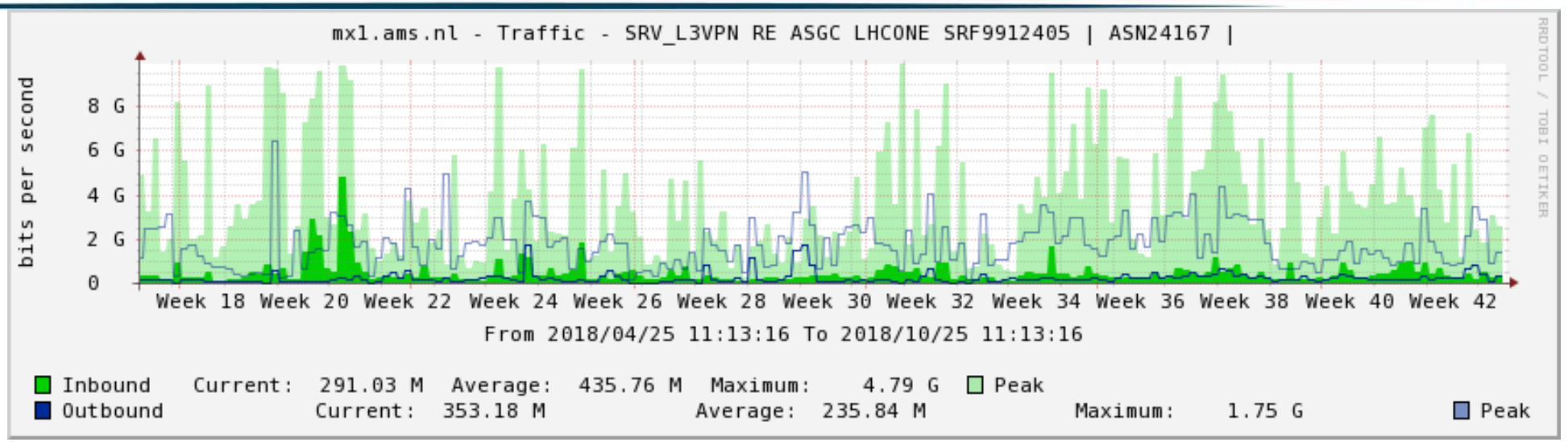
# TEIN

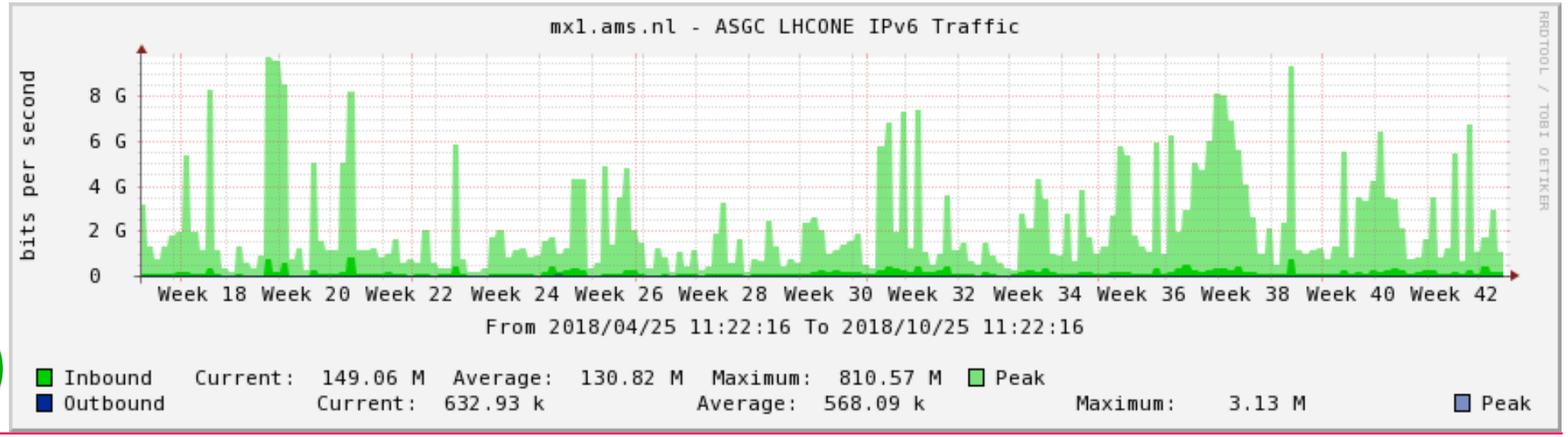

mx1.lon.uk - Traffic - xe-1/2/2.102 - SRV_L3VPN LHCONE TEIN SRF9939273| ASN24490 |
bits per second
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:12:44 To 2018/10/25 11:12:44
Inbound Current: 904.67 k Average: 36.64 M Maximum: 635.46 M Peak 95th % In (222.55 Mbps In)
Outbound Current: 9.24 M Average: 94.91 M Maximum: 953.23 M Peak 95th % Out (451.05 Mbps Out)
RRDTOOL / TOBI OETIKER


mx1.lon.uk - TEIN LHCONE IPv6 Traffic
bits per second
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:12:44 To 2018/10/25 11:12:44
Inbound Current: 532.65 Average: 11.67 M Maximum: 196.48 M Peak
Outbound Current: 19.83 k Average: 27.58 M Maximum: 740.79 M Peak
RRDTOOL / TOBI OETIKER

# ASGC

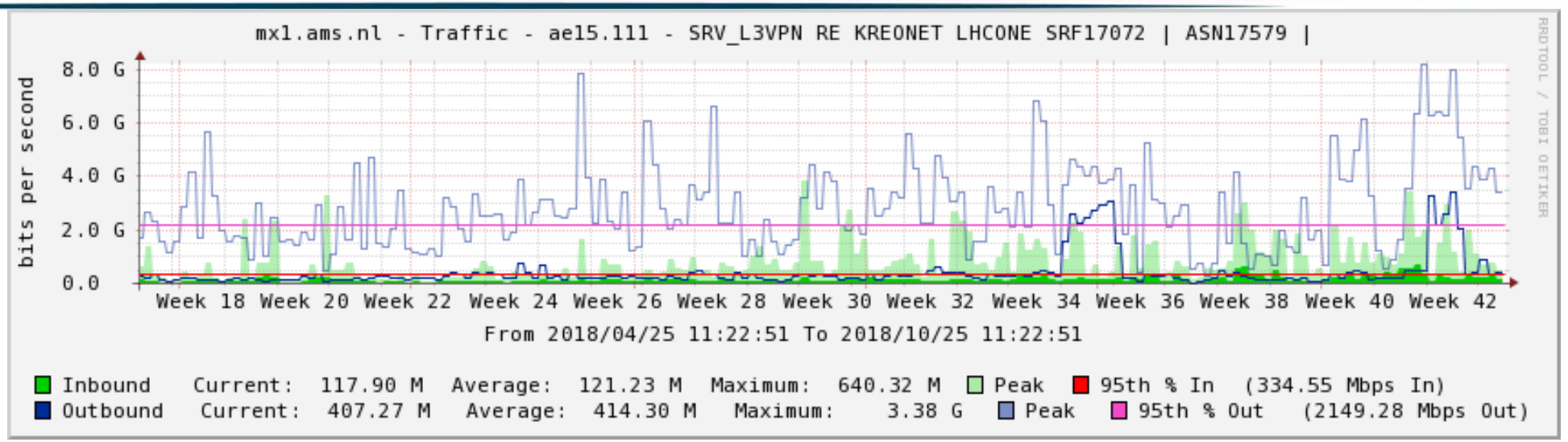
TWGrid
ASGC

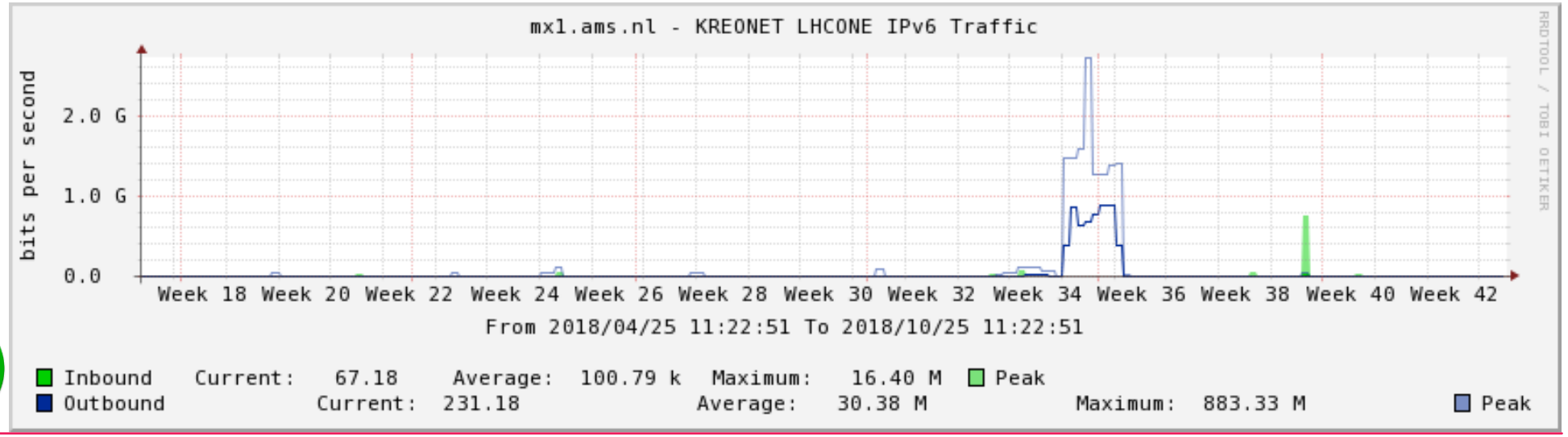

mx1.ams.nl - Traffic - SRV_L3VPN RE ASGC LHCONE SRF9912405 | ASN24167 |
bits per second
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:13:16 To 2018/10/25 11:13:16
Inbound Current: 291.03 M Average: 435.76 M Maximum: 4.79 G Peak
Outbound Current: 353.18 M Average: 235.84 M Maximum: 1.75 G Peak
RRDTOOL / TOBI OETIKER


mx1.ams.nl - ASGC LHCONE IPv6 Traffic
bits per second
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:22:16 To 2018/10/25 11:22:16
Inbound Current: 149.06 M Average: 130.82 M Maximum: 810.57 M Peak
Outbound Current: 632.93 k Average: 568.09 k Maximum: 3.13 M Peak
RRDTOOL / TOBI OETIKER

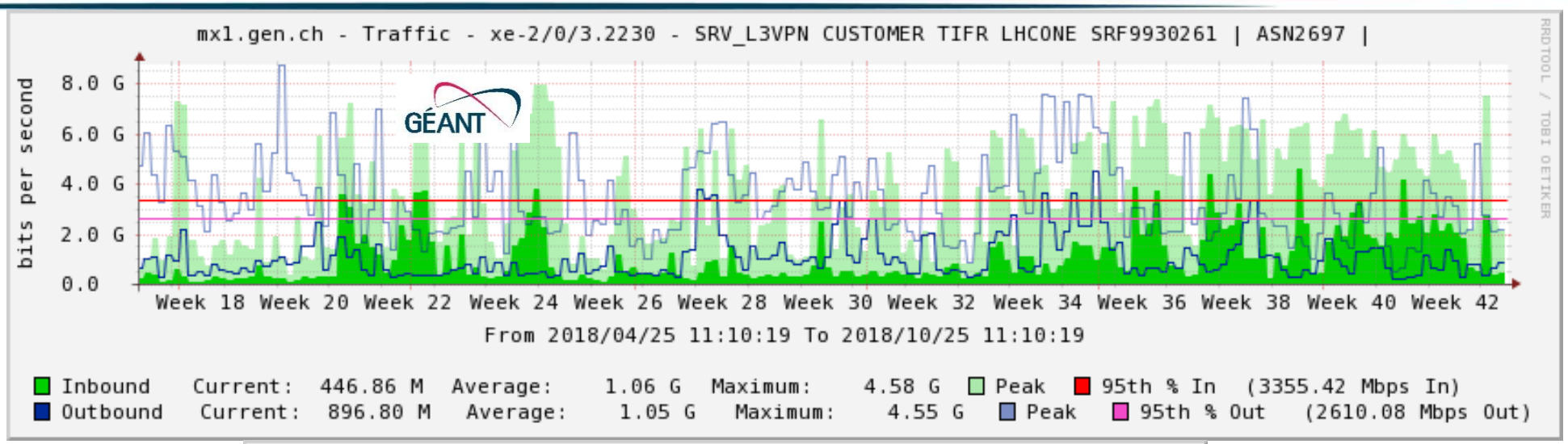
IPv6

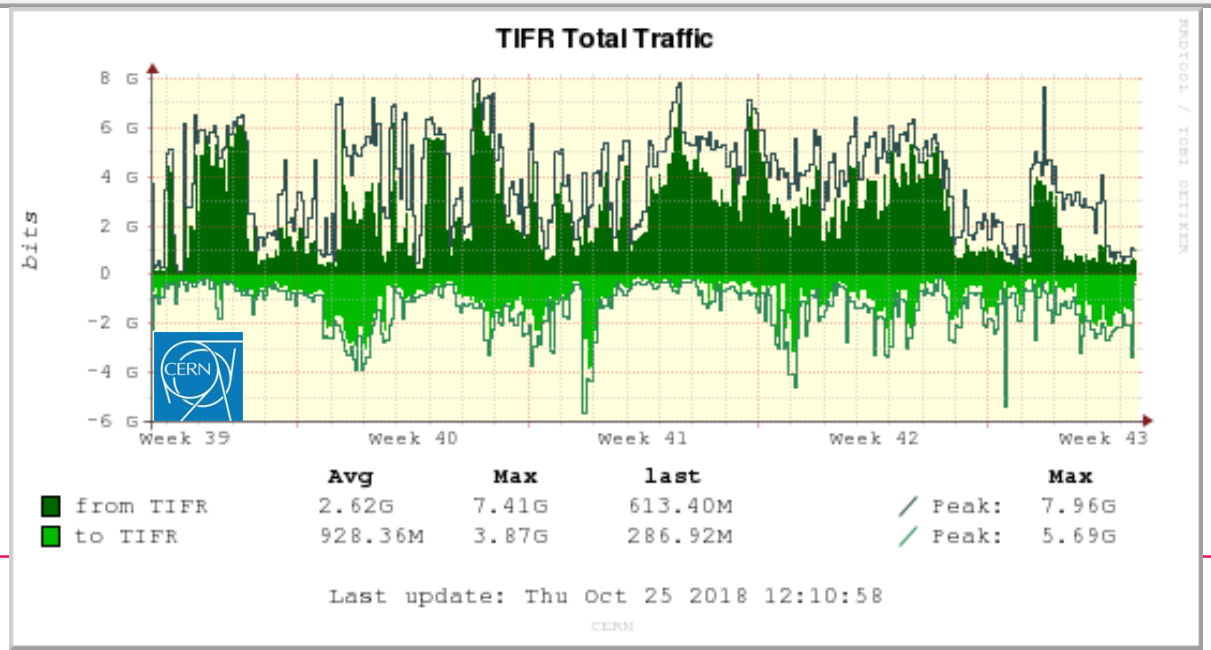
# KREONET/KISTI



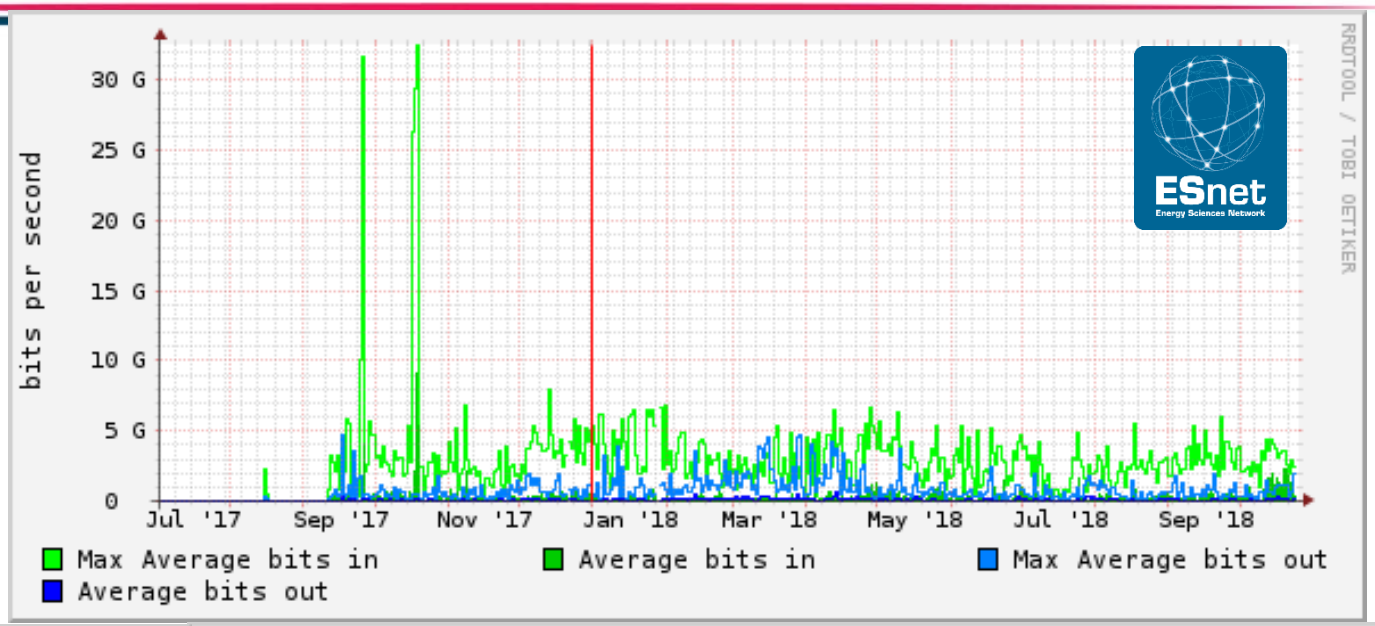



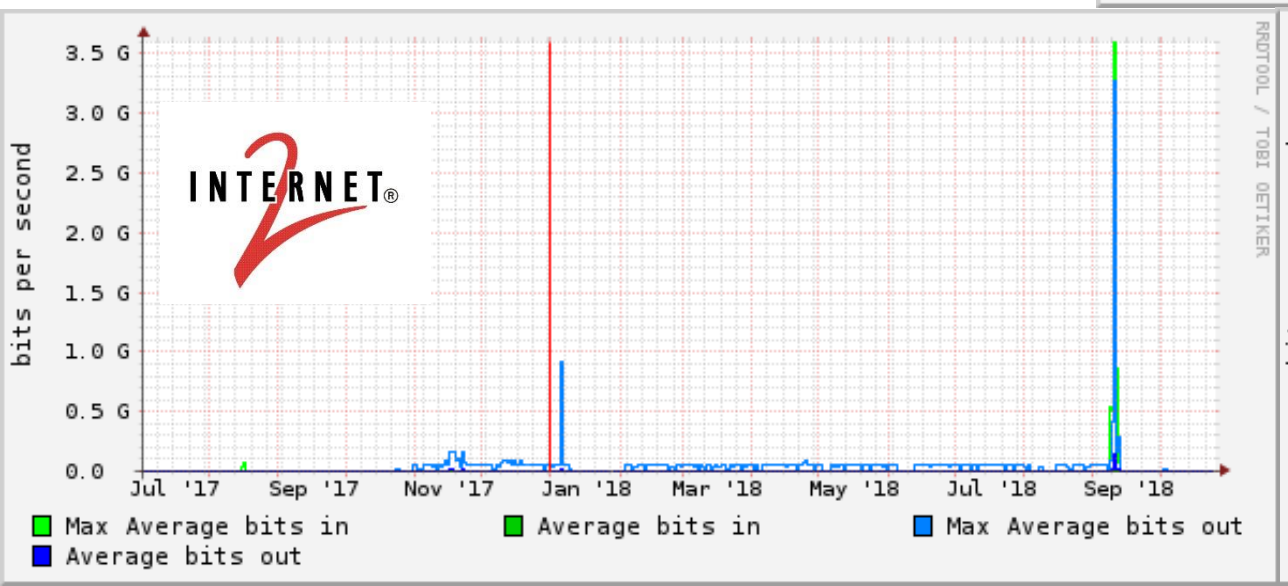
# TIFR

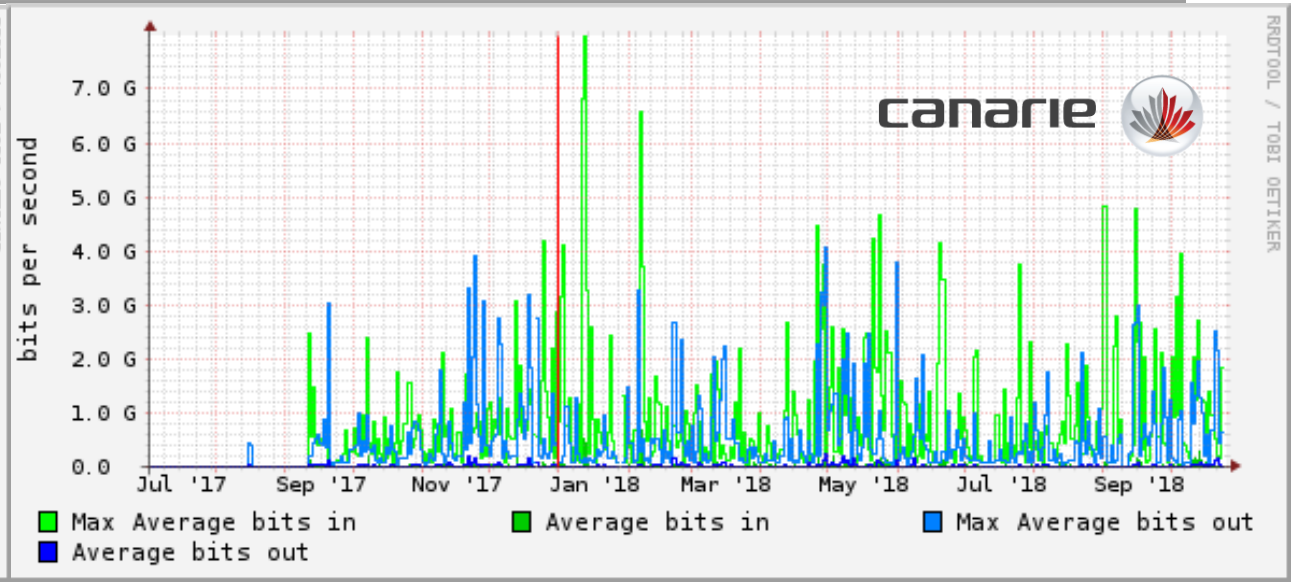

mx1.gen.ch - Traffic - xe-2/0/3.2230 - SRV_L3VPN CUSTOMER TIFR LHCONE SRF9930261 | ASN2697 |
bits per second
8.0 G
6.0 G
4.0 G
2.0 G
0.0
GÉANT
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:10:19 To 2018/10/25 11:10:19
Inbound Current: 446.86 M Average: 1.06 G Maximum: 4.58 G Peak 95th % In (3355.42 Mbps In)
Outbound Current: 896.80 M Average: 1.05 G Maximum: 4.55 G Peak 95th % Out (2610.08 Mbps Out)
RRDTOOL / TOBI OETIKER


TIFR Total Traffic
bits
8 G
6 G
4 G
2 G
0
-2 G
-4 G
-6 G
CERN
Week 39 Week 40 Week 41 Week 42 Week 43
Avg Max last Max
from TIFR 2.62G 7.41G 613.40M Peak: 7.96G
to TIFR 928.36M 3.87G 286.92M Peak: 5.69G
Last update: Thu Oct 25 2018 12:10:58
RRDTOOL / TOBI OETIKER

# AARNET


ESnet
Energy Sciences Network
bits per second
30 G
25 G
20 G
15 G
10 G
5 G
0
Jul '17
Sep '17
Nov '17
Jan '18
Mar '18
May '18
Jul '18
Sep '18
Max Average bits in
Average bits in
Max Average bits out
Average bits out
RRDTOOL / TOBI OETIKER


INTERNET 2
bits per second
3.5 G
3.0 G
2.5 G
2.0 G
1.5 G
1.0 G
0.5 G
0.0
Jul '17
Sep '17
Nov '17
Jan '18
Mar '18
May '18
Jul '18
Sep '18
Max Average bits in
Average bits in
Max Average bits out
Average bits out
RRDTOOL / TOBI OETIKER


canarie
bits per second
7.0 G
6.0 G
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
Jul '17
Sep '17
Nov '17
Jan '18
Mar '18
May '18
Jul '18
Sep '18
Max Average bits in
Average bits in
Max Average bits out
Average bits out
RRDTOOL / TOBI OETIKER

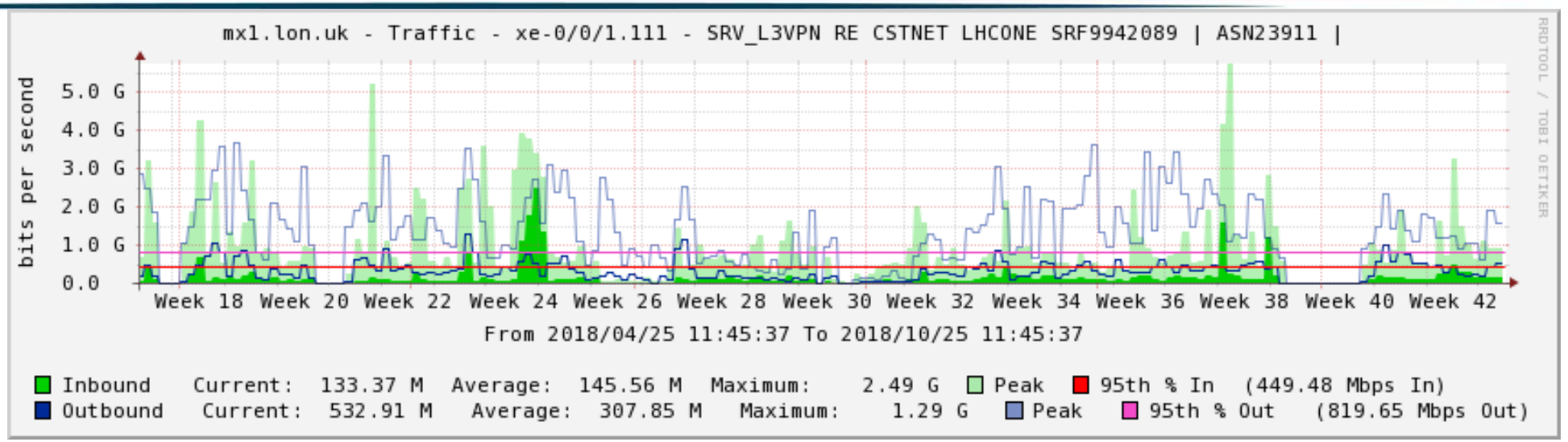
# CSTNET

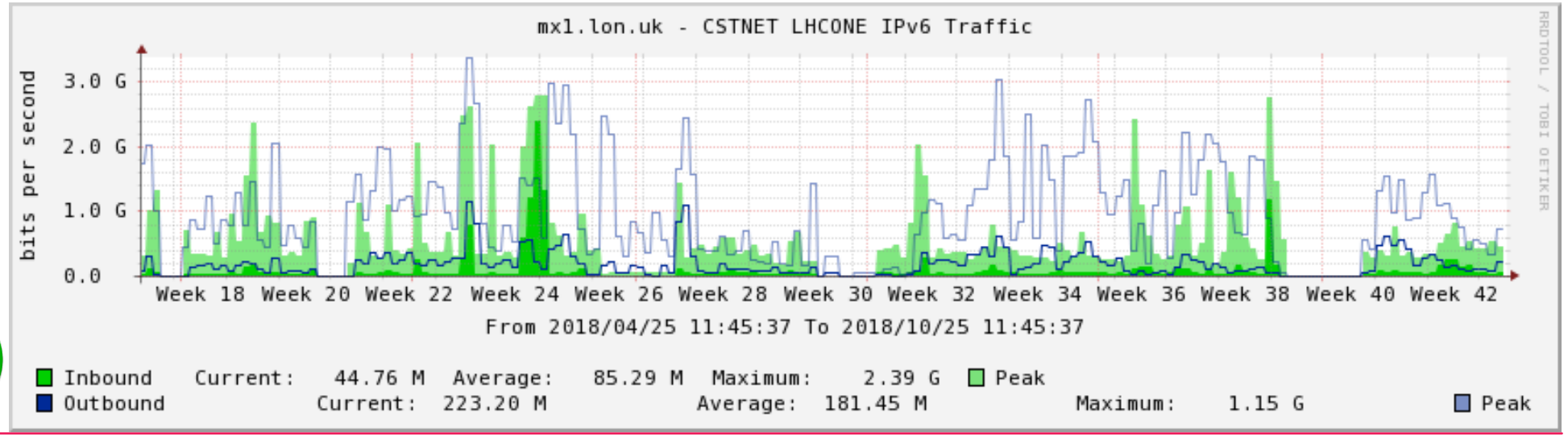
NEW

GÉANT

中国科技网

China Science & Technology Network



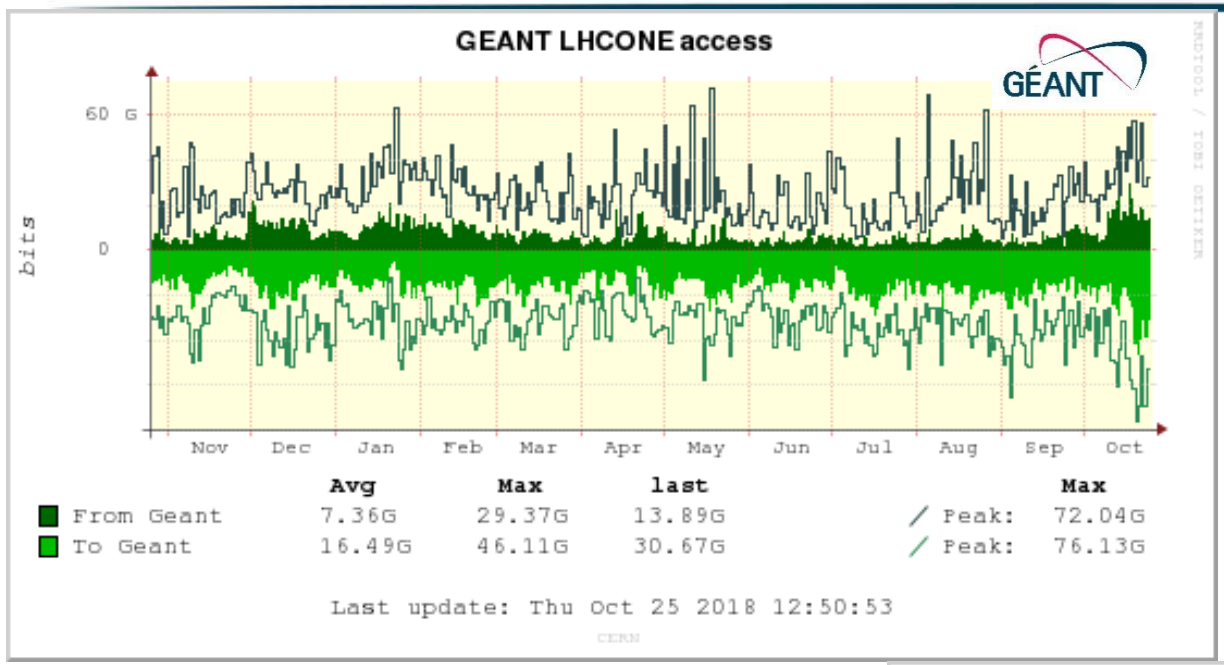

IPv6

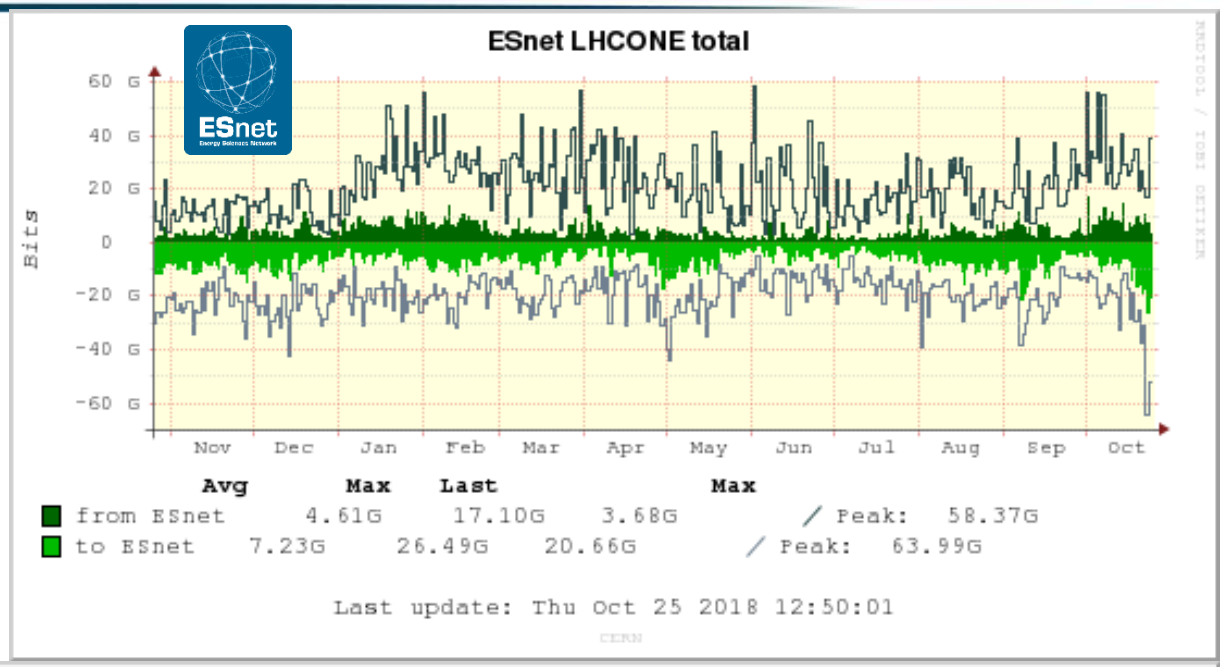
# LHCONE in Europe

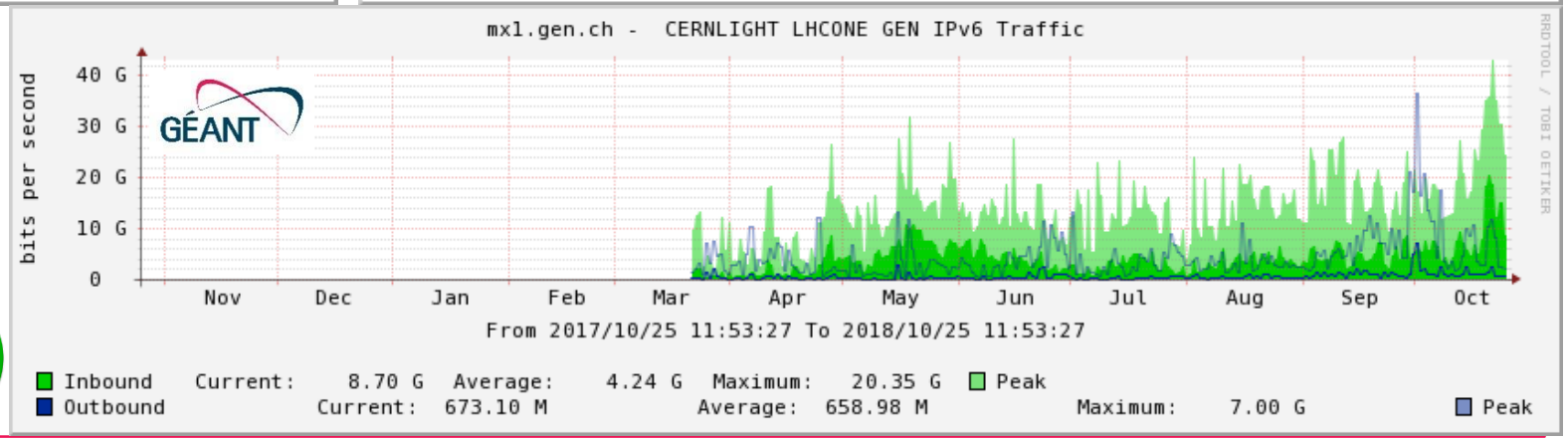
- LHCONE VPN Service in Europe is deployed in:
  - ARNES (Slovenia)
  - CERN (Switzerland)
  - CESnet (Czech Republic)
  - DFN (Germany)
  - GARR (Italy)
  - GÉANT
  - JISC (UK)
  - NORDUnet
  - RENATER (France)
  - RedIRIS (Spain)
  - RoEduNet (Romania)
  - SURFnet (Netherlands)
  - URAN (Ukraine)
  - PIONIER (Poland)
  - GRNET (Greece)

- RENs in these countries connect:
  - Six Tier 1s in Europe to LHCONE
  - 34 Tier 2s in Europe to LHCONE
  - Indian T2s (via TIFR)
  - Russian T1s and T2s (direct peering with GÉANT)

CERN

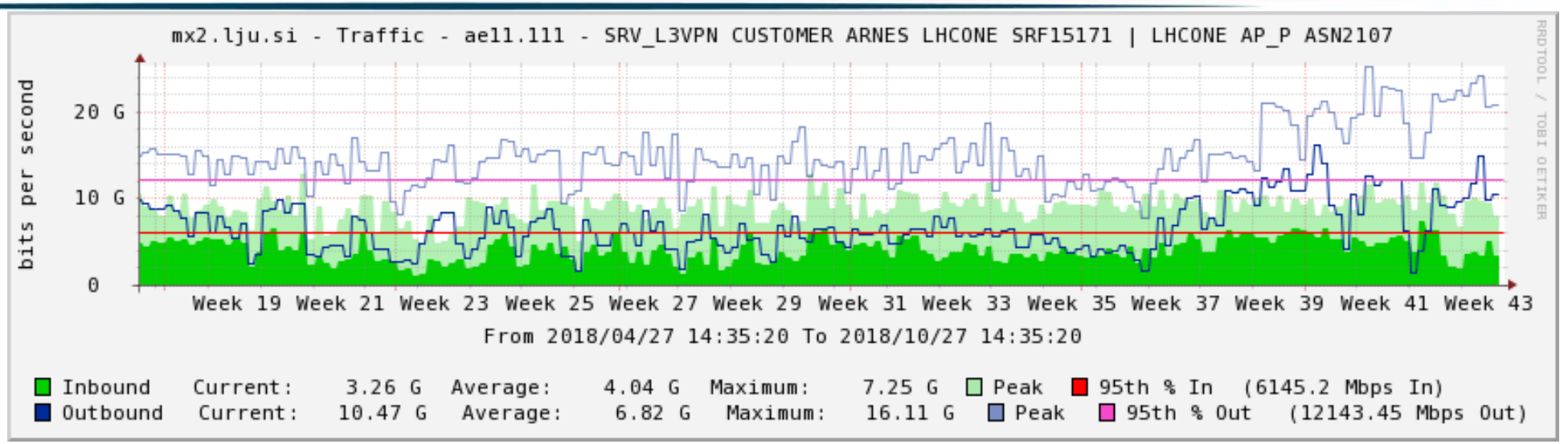

GEANT LHCONE access
GÉANT
60 G
0
bits
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Avg Max last Max
From Geant 7.36G 29.37G 13.89G / Peak: 72.04G
To Geant 16.49G 46.11G 30.67G / Peak: 76.13G
Last update: Thu Oct 25 2018 12:50:53


ESnet LHCONE total
ESnet
60 G
40 G
20 G
0
-20 G
-40 G
-60 G
Bits
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Avg Max Last Max
from ESnet 4.61G 17.10G 3.68G / Peak: 58.37G
to ESnet 7.23G 26.49G 20.66G / Peak: 63.99G
Last update: Thu Oct 25 2018 12:50:01


mx1.gen.ch - CERNLIGHT LHCONE GEN IPv6 Traffic
GÉANT
40 G
30 G
20 G
10 G
0
bits per second
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
From 2017/10/25 11:53:27 To 2018/10/25 11:53:27
Inbound Current: 8.70 G Average: 4.24 G Maximum: 20.35 G Peak
Outbound Current: 673.10 M Average: 658.98 M Maximum: 7.00 G Peak

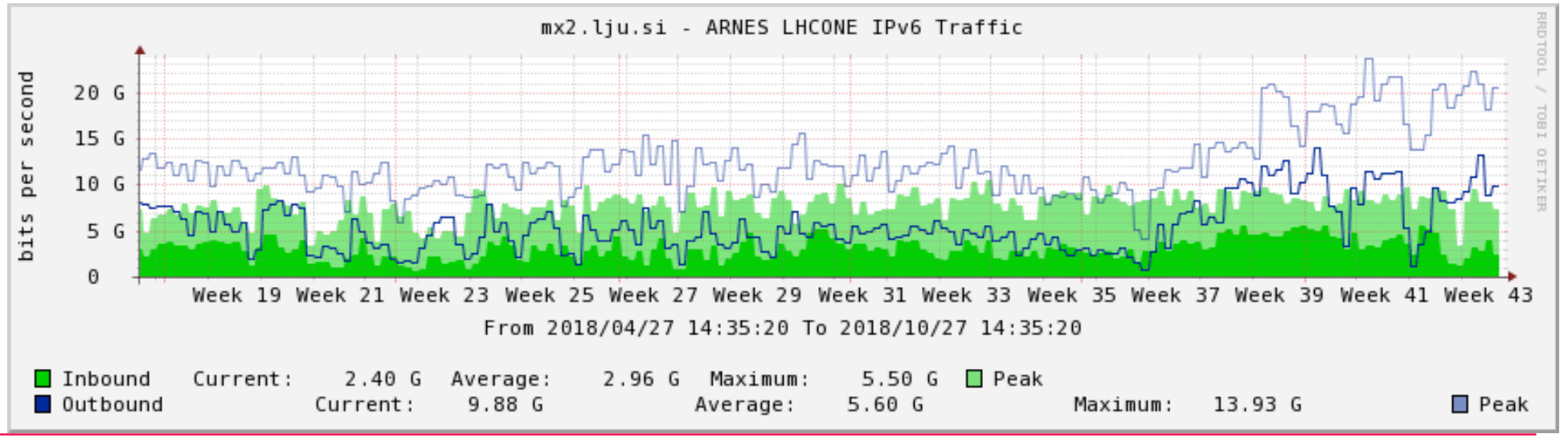
IPv6

# ARNES



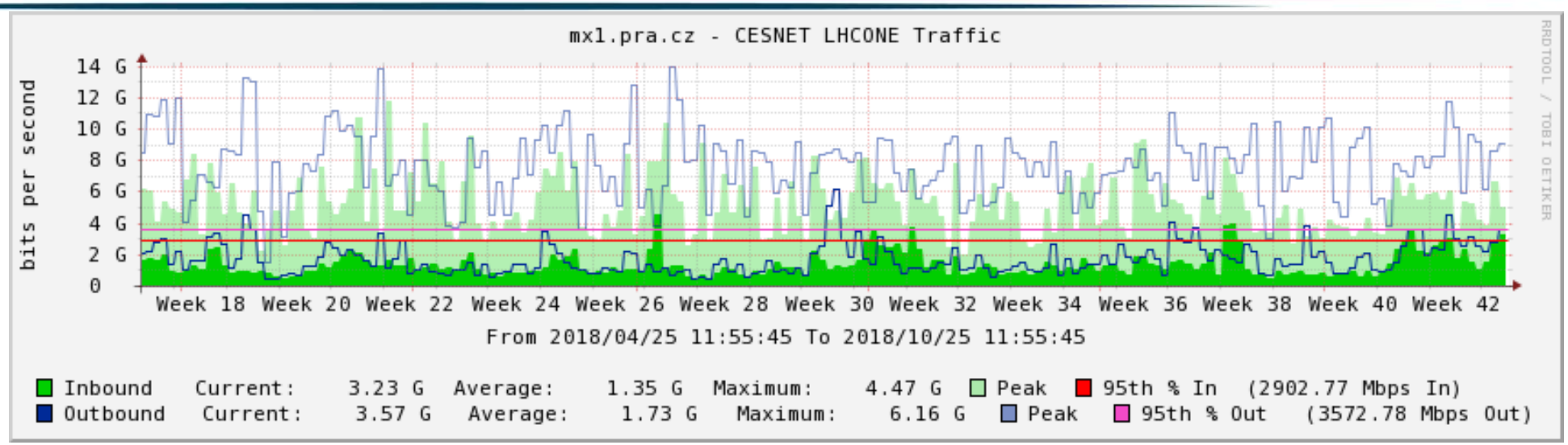

arnes

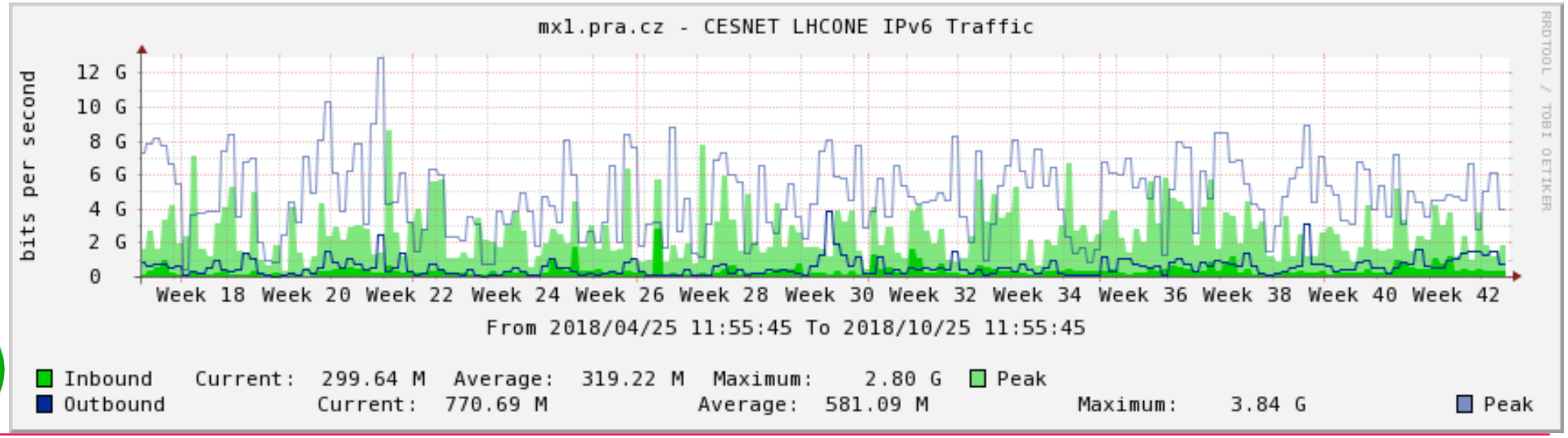
Upgraded to 3x10G



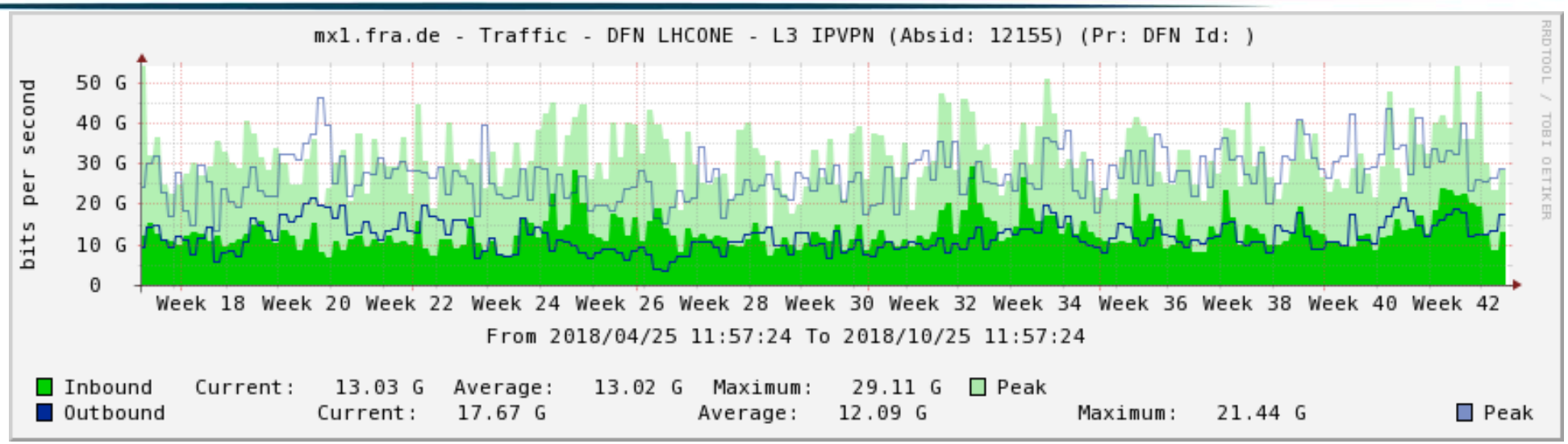

IPv6

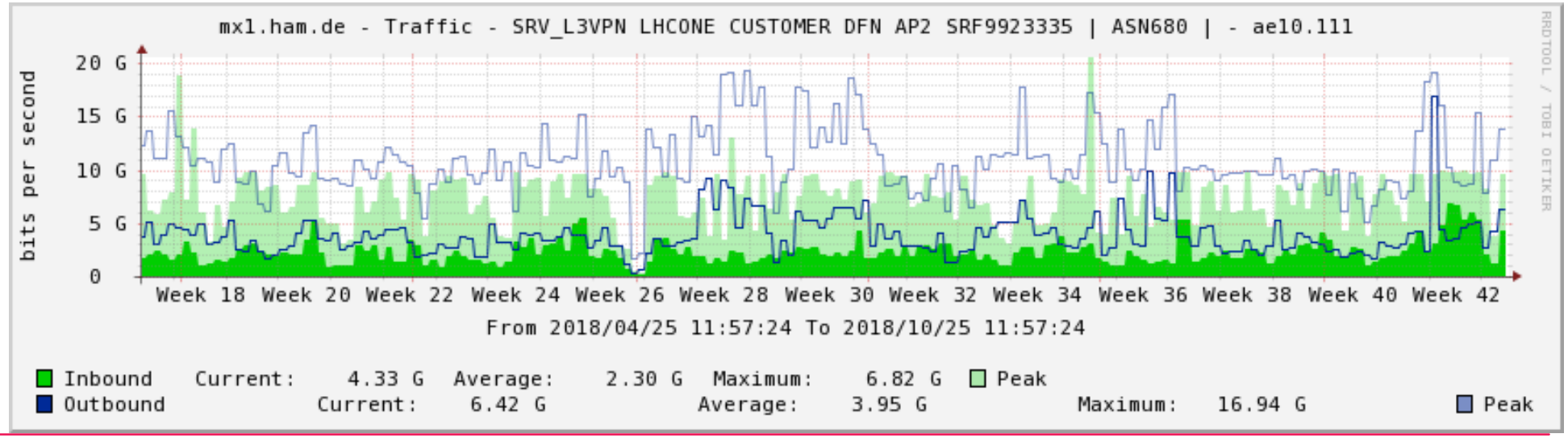
# CESNET


mx1.pra.cz - CESNET LHCONE Traffic
bits per second
14 G
12 G
10 G
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:55:45 To 2018/10/25 11:55:45
Inbound Current: 3.23 G Average: 1.35 G Maximum: 4.47 G Peak 95th % In (2902.77 Mbps In)
Outbound Current: 3.57 G Average: 1.73 G Maximum: 6.16 G Peak 95th % Out (3572.78 Mbps Out)
RRDTOOL / TOBI OETIKER

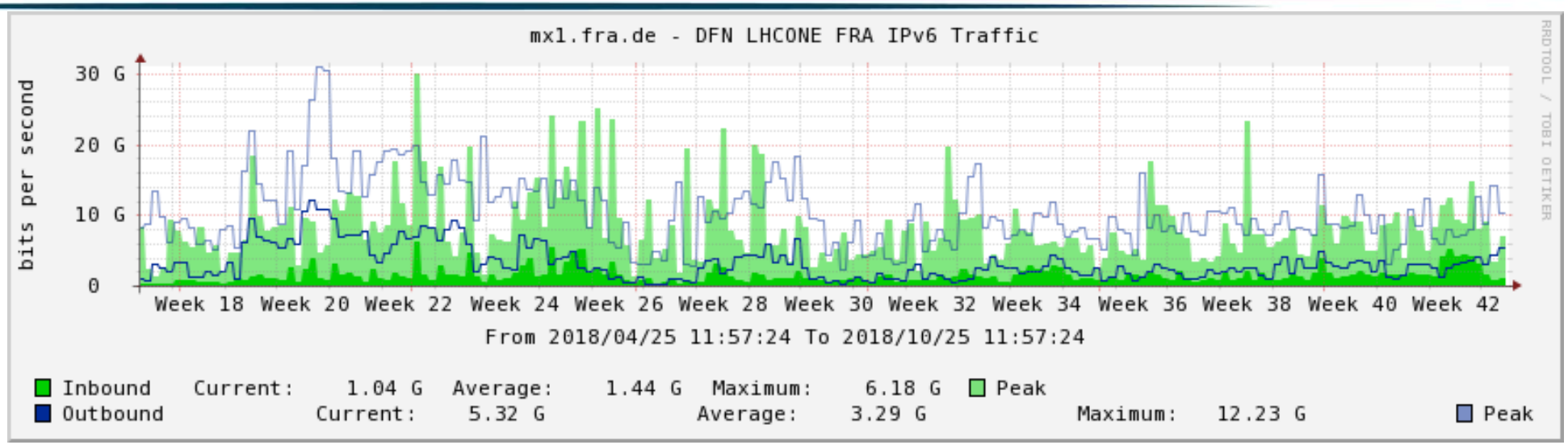

mx1.pra.cz - CESNET LHCONE IPv6 Traffic
bits per second
12 G
10 G
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 11:55:45 To 2018/10/25 11:55:45
Inbound Current: 299.64 M Average: 319.22 M Maximum: 2.80 G Peak
Outbound Current: 770.69 M Average: 581.09 M Maximum: 3.84 G Peak
RRDTOOL / TOBI OETIKER

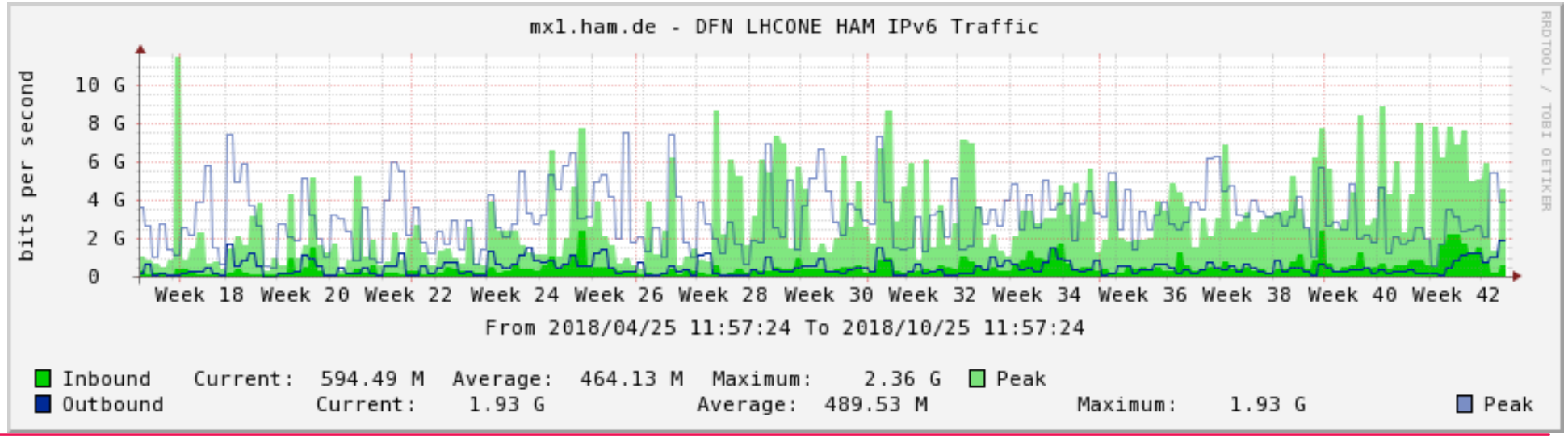
# DFN



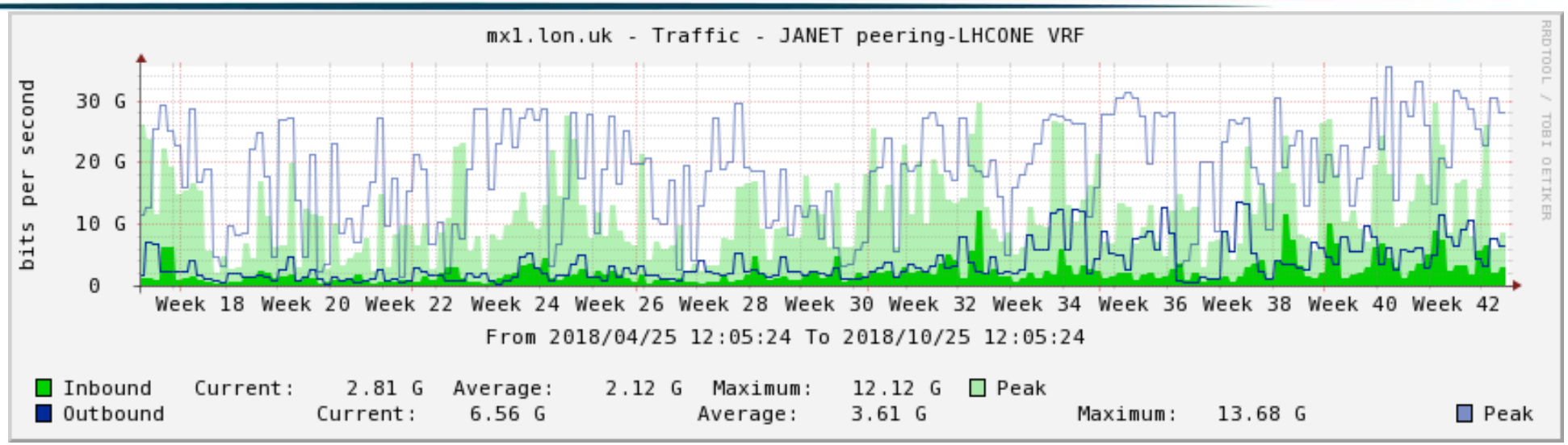

HAM upgraded to 2x100G



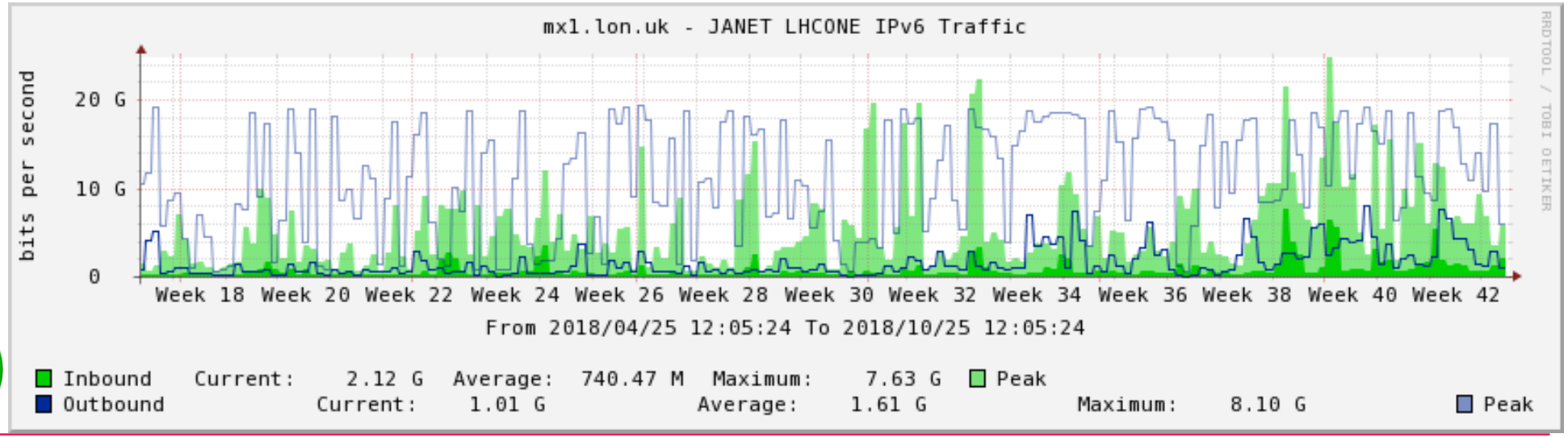




HAM upgraded to 2x100G

# JISC

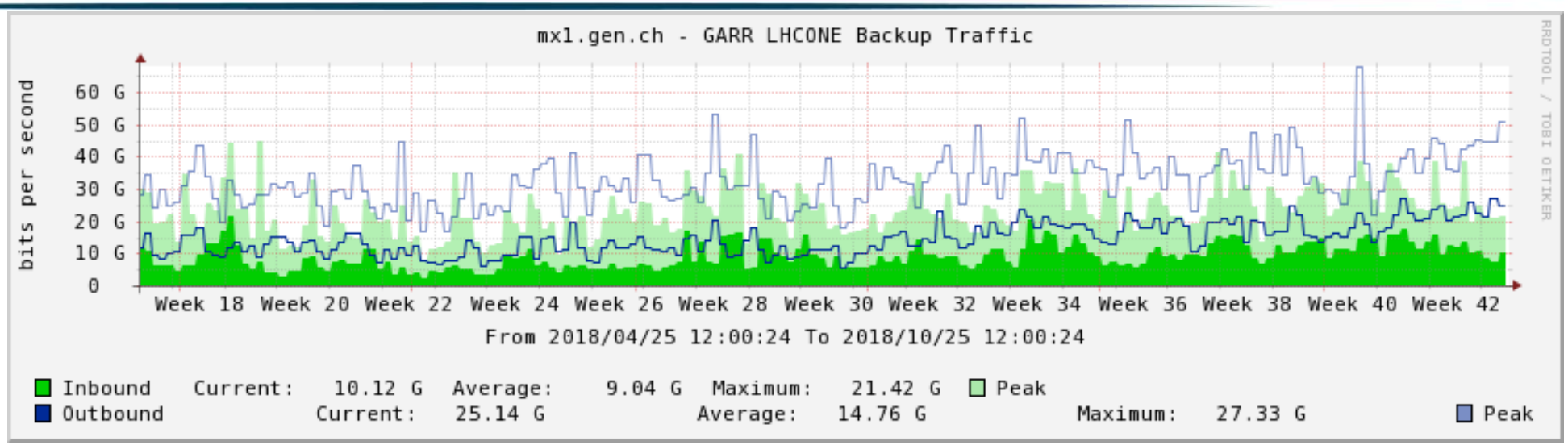


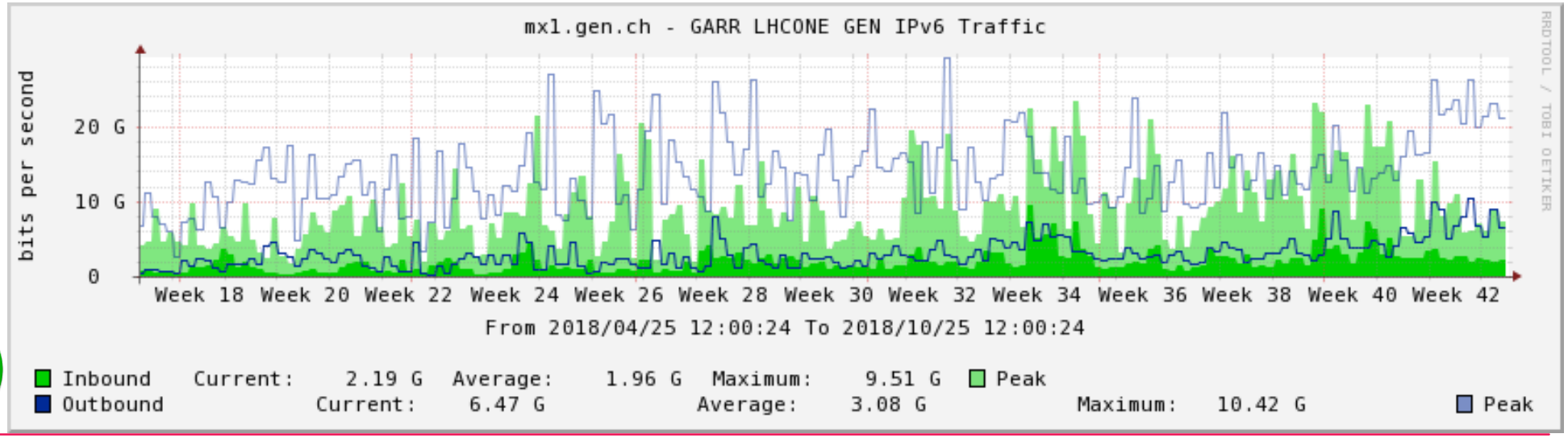

Imperial College T2
*(RAL T1 incoming)*



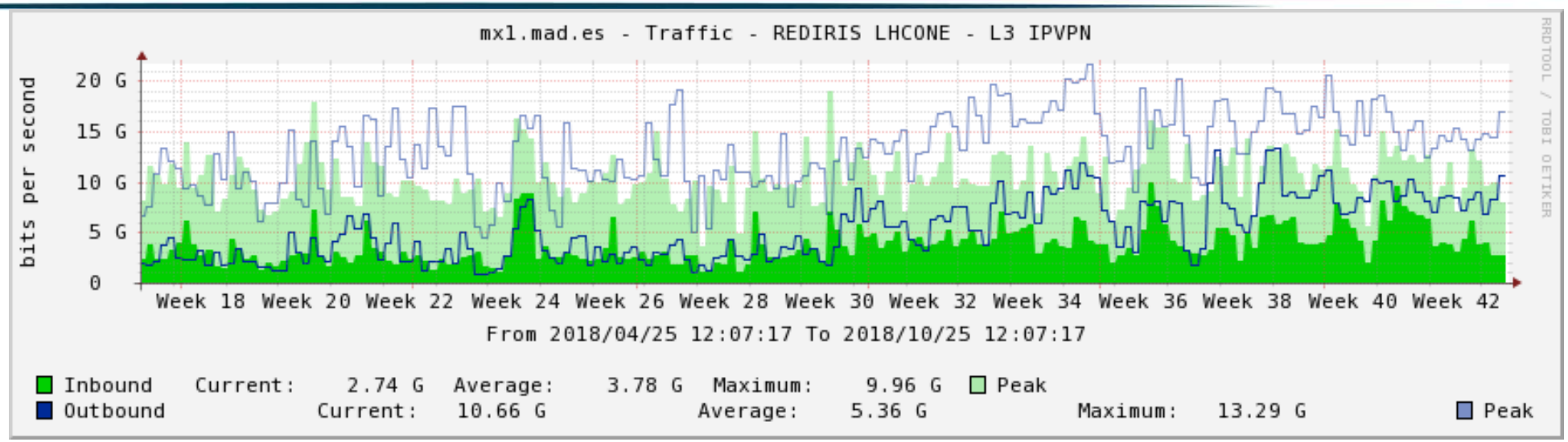

IPv6

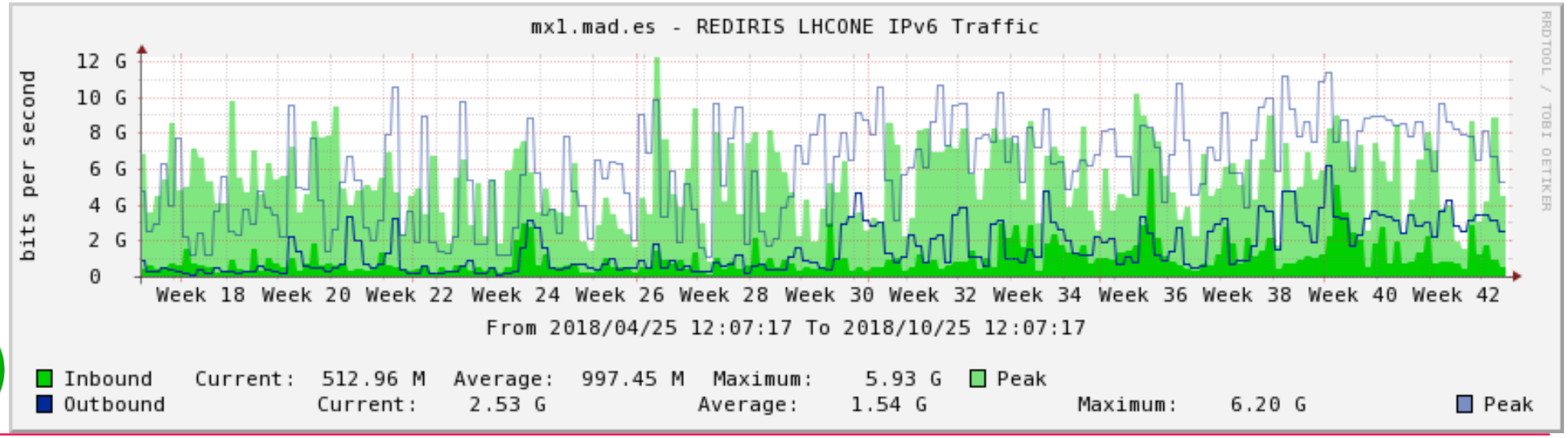
# GARR


mx1.gen.ch - GARR LHCONE Backup Traffic
bits per second
60 G
50 G
40 G
30 G
20 G
10 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:00:24 To 2018/10/25 12:00:24
Inbound Current: 10.12 G Average: 9.04 G Maximum: 21.42 G Peak
Outbound Current: 25.14 G Average: 14.76 G Maximum: 27.33 G Peak
RRDTOOL / TOBI OETIKER

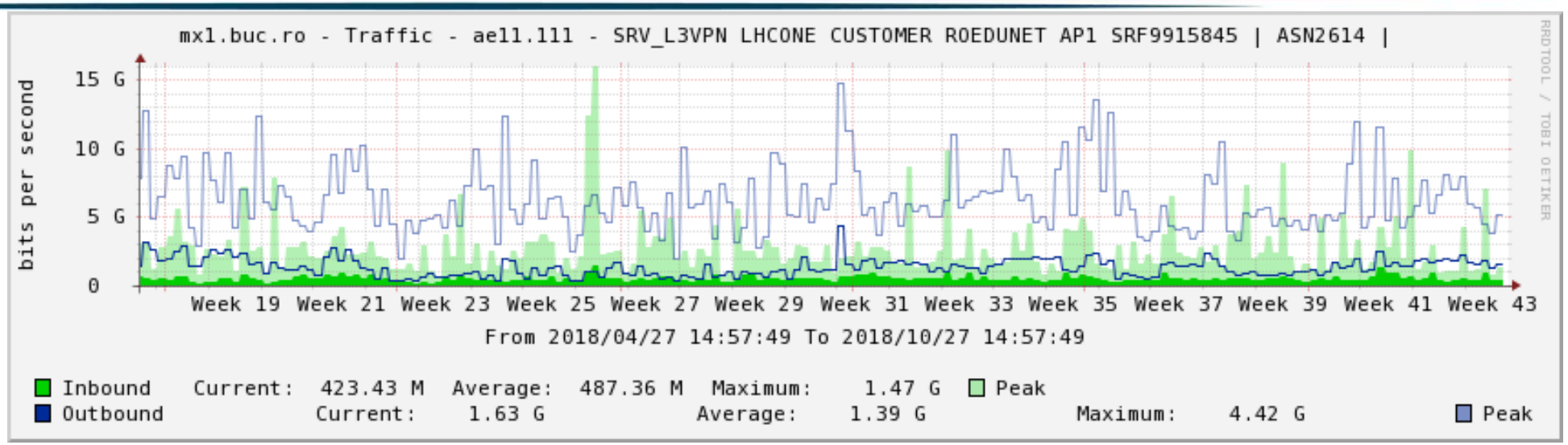

mx1.gen.ch - GARR LHCONE GEN IPv6 Traffic
bits per second
20 G
10 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:00:24 To 2018/10/25 12:00:24
Inbound Current: 2.19 G Average: 1.96 G Maximum: 9.51 G Peak
Outbound Current: 6.47 G Average: 3.08 G Maximum: 10.42 G Peak
RRDTOOL / TOBI OETIKER

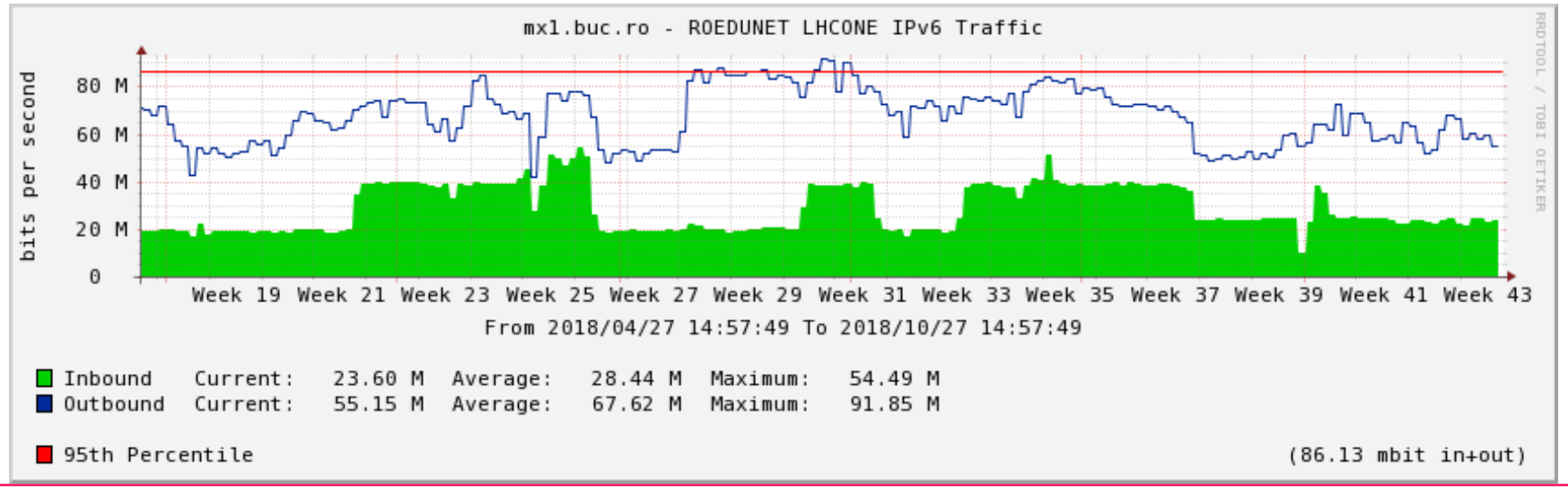
# RedIRIS


mx1.mad.es - Traffic - REDIRIS LHCONE - L3 IPVPN
bits per second
20 G
15 G
10 G
5 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:07:17 To 2018/10/25 12:07:17
Inbound Current: 2.74 G Average: 3.78 G Maximum: 9.96 G Peak
Outbound Current: 10.66 G Average: 5.36 G Maximum: 13.29 G Peak
RRDTOOL / TOBI OETIKER

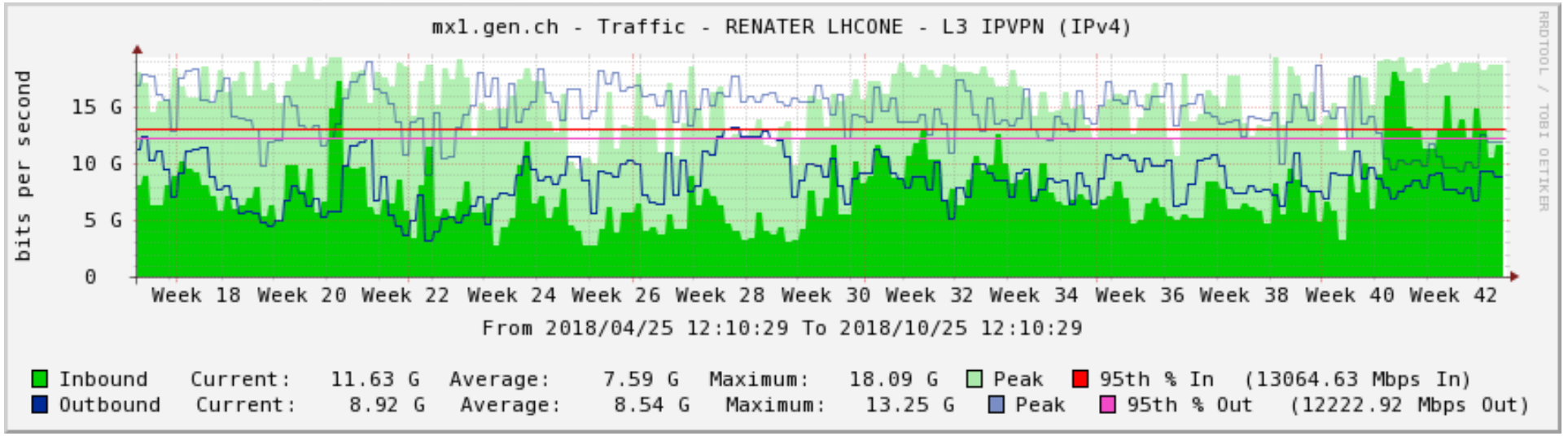

mx1.mad.es - REDIRIS LHCONE IPv6 Traffic
bits per second
12 G
10 G
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:07:17 To 2018/10/25 12:07:17
Inbound Current: 512.96 M Average: 997.45 M Maximum: 5.93 G Peak
Outbound Current: 2.53 G Average: 1.54 G Maximum: 6.20 G Peak
RRDTOOL / TOBI OETIKER

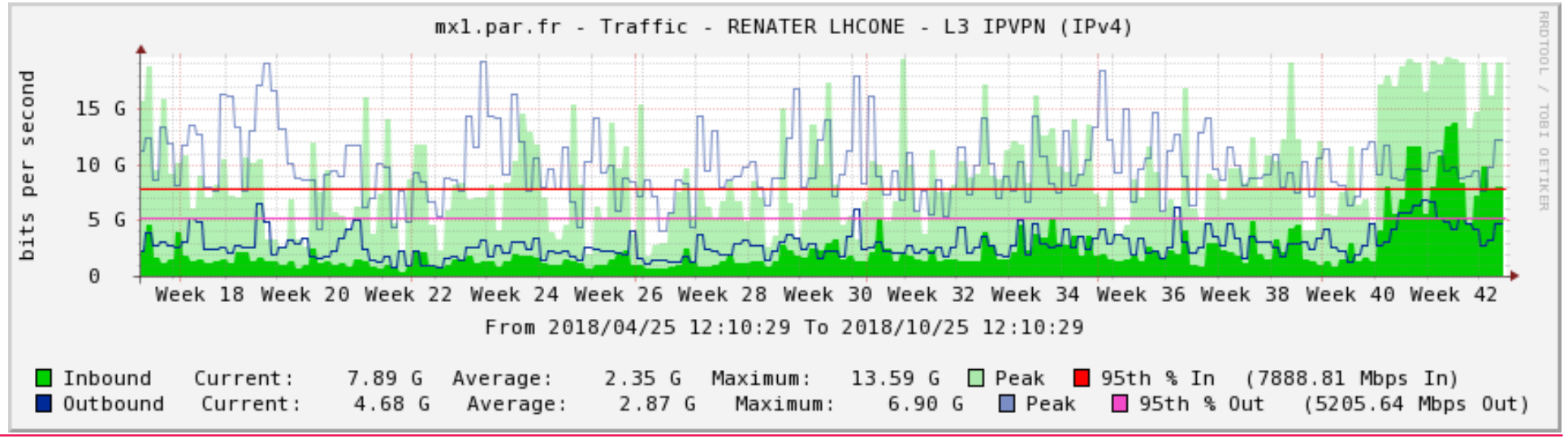
# RoEduNet

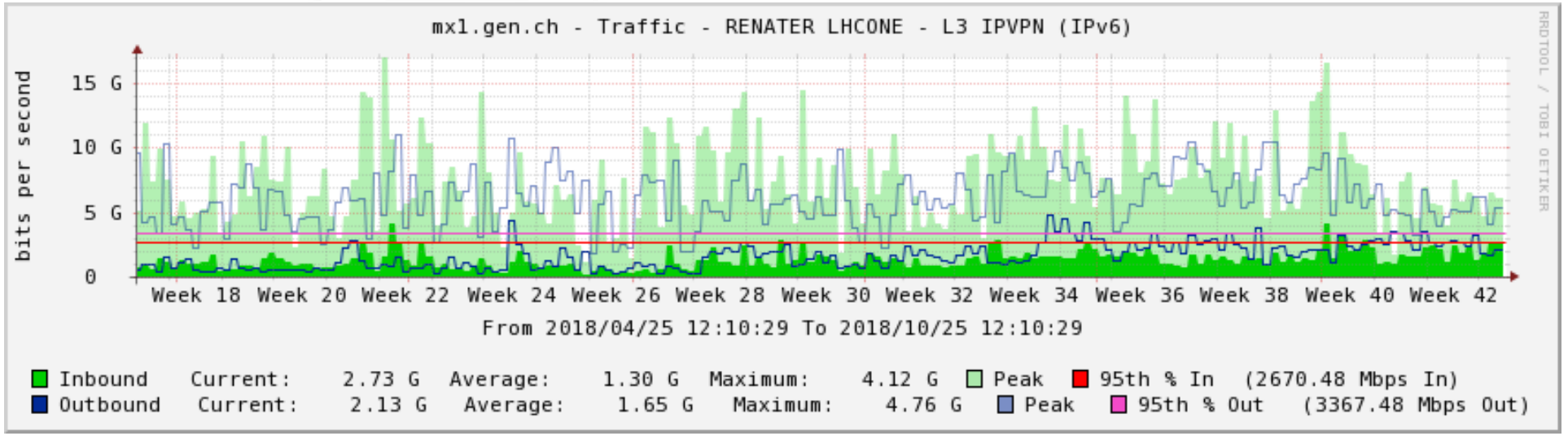

mx1.buc.ro - Traffic - ae11.111 - SRV_L3VPN LHCONE CUSTOMER ROEDUNET AP1 SRF9915845 | ASN2614 |
bits per second
15 G
10 G
5 G
0
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/27 14:57:49 To 2018/10/27 14:57:49
Inbound Current: 423.43 M Average: 487.36 M Maximum: 1.47 G Peak
Outbound Current: 1.63 G Average: 1.39 G Maximum: 4.42 G Peak
RRDTOOL / TOBI OETIKER

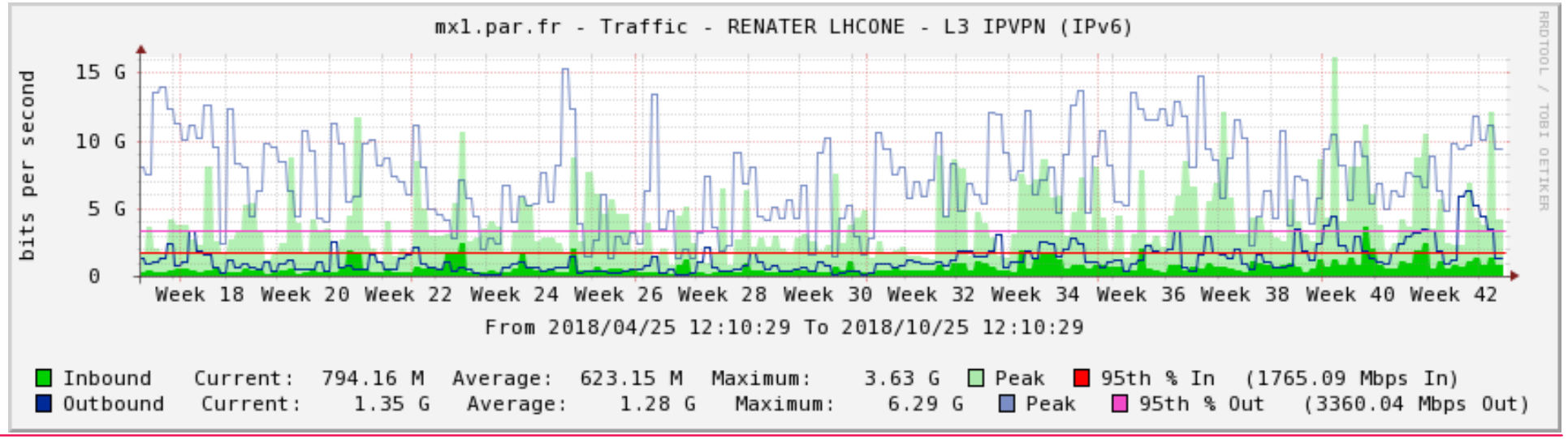

mx1.buc.ro - ROEDUNET LHCONE IPv6 Traffic
bits per second
80 M
60 M
40 M
20 M
0
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/27 14:57:49 To 2018/10/27 14:57:49
Inbound Current: 23.60 M Average: 28.44 M Maximum: 54.49 M
Outbound Current: 55.15 M Average: 67.62 M Maximum: 91.85 M
95th Percentile (86.13 mbit in+out)
RRDTOOL / TOBI OETIKER

# RENATER


mx1.gen.ch - Traffic - RENATER LHCONE - L3 IPVPN (IPv4)
bits per second
15 G
10 G
5 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:10:29 To 2018/10/25 12:10:29
Inbound Current: 11.63 G Average: 7.59 G Maximum: 18.09 G Peak 95th % In (13064.63 Mbps In)
Outbound Current: 8.92 G Average: 8.54 G Maximum: 13.25 G Peak 95th % Out (12222.92 Mbps Out)
RRDTOOL / TOBI OETIKER

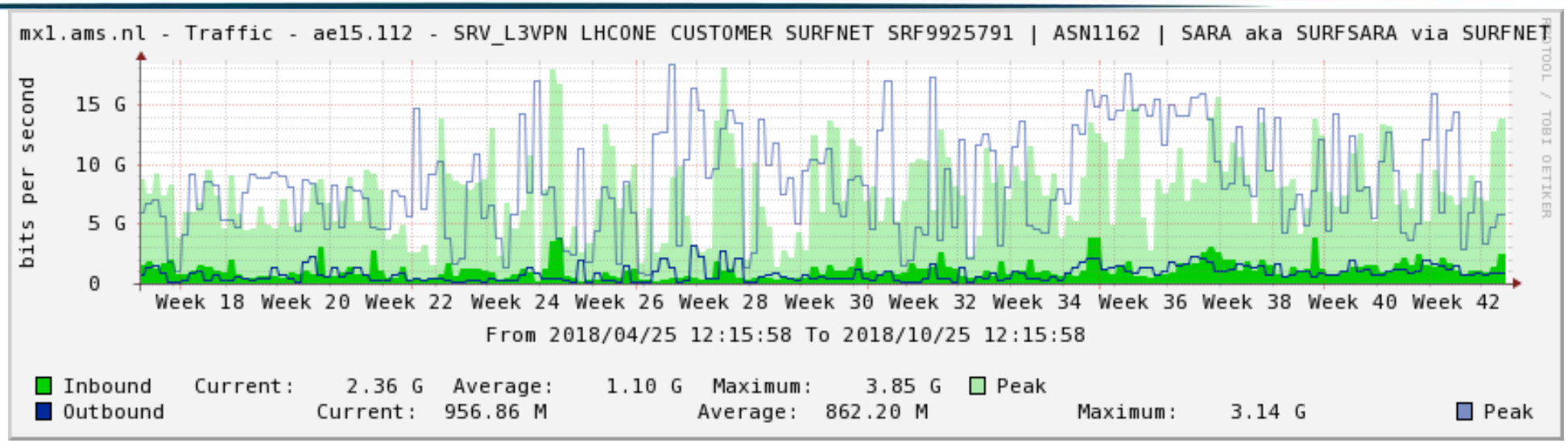

mx1.par.fr - Traffic - RENATER LHCONE - L3 IPVPN (IPv4)
bits per second
15 G
10 G
5 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:10:29 To 2018/10/25 12:10:29
Inbound Current: 7.89 G Average: 2.35 G Maximum: 13.59 G Peak 95th % In (7888.81 Mbps In)
Outbound Current: 4.68 G Average: 2.87 G Maximum: 6.90 G Peak 95th % Out (5205.64 Mbps Out)
RRDTOOL / TOBI OETIKER

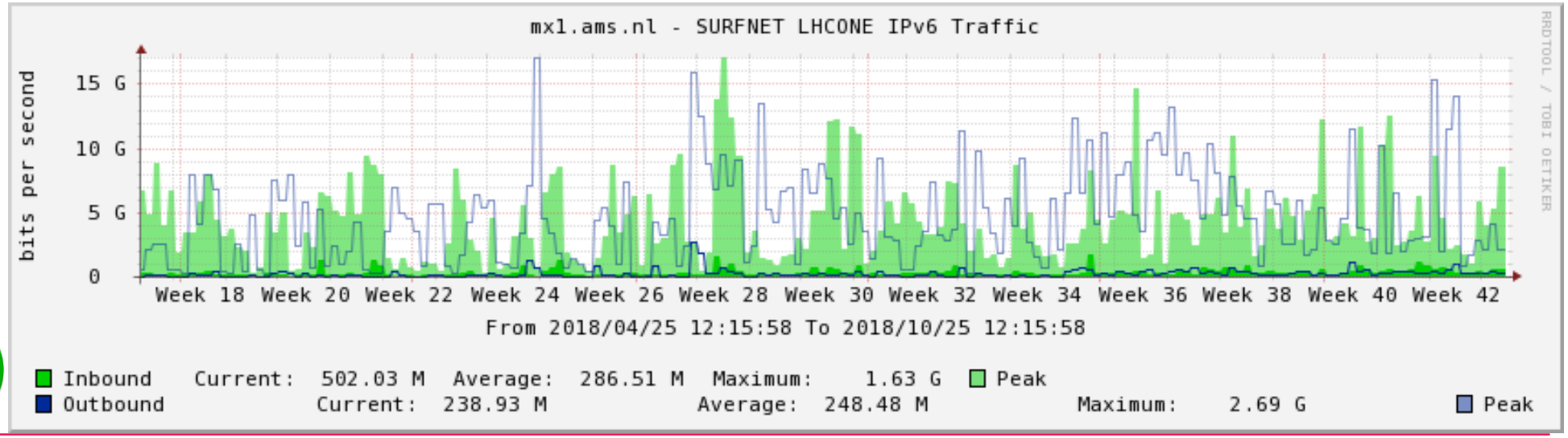



RENATER
CONNECTEUR DE SAVOIRS

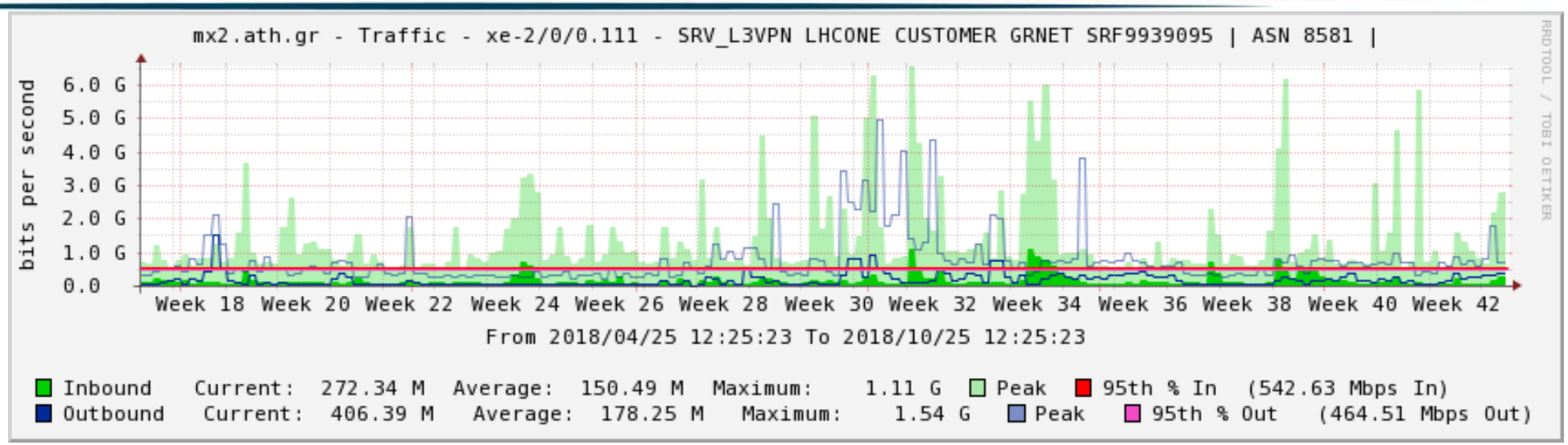
# SARA-Matrix

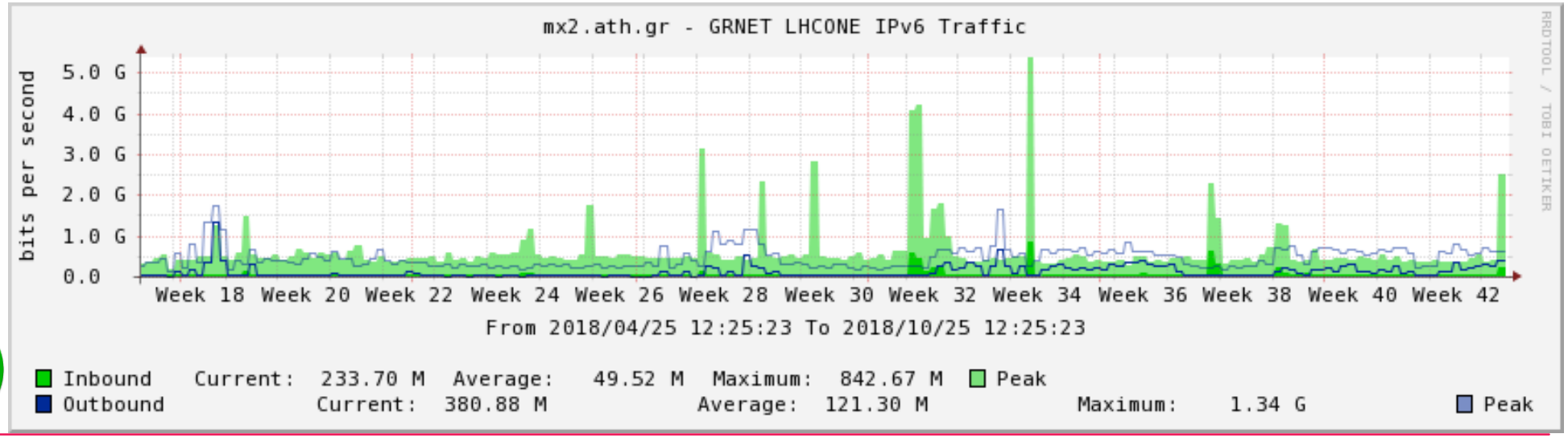


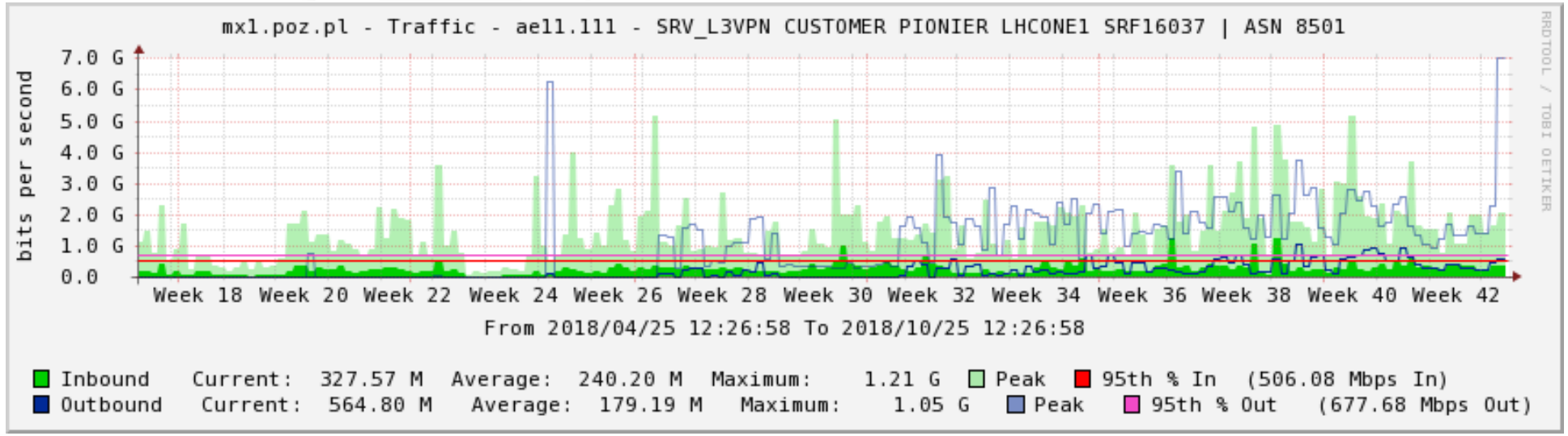

IPv6

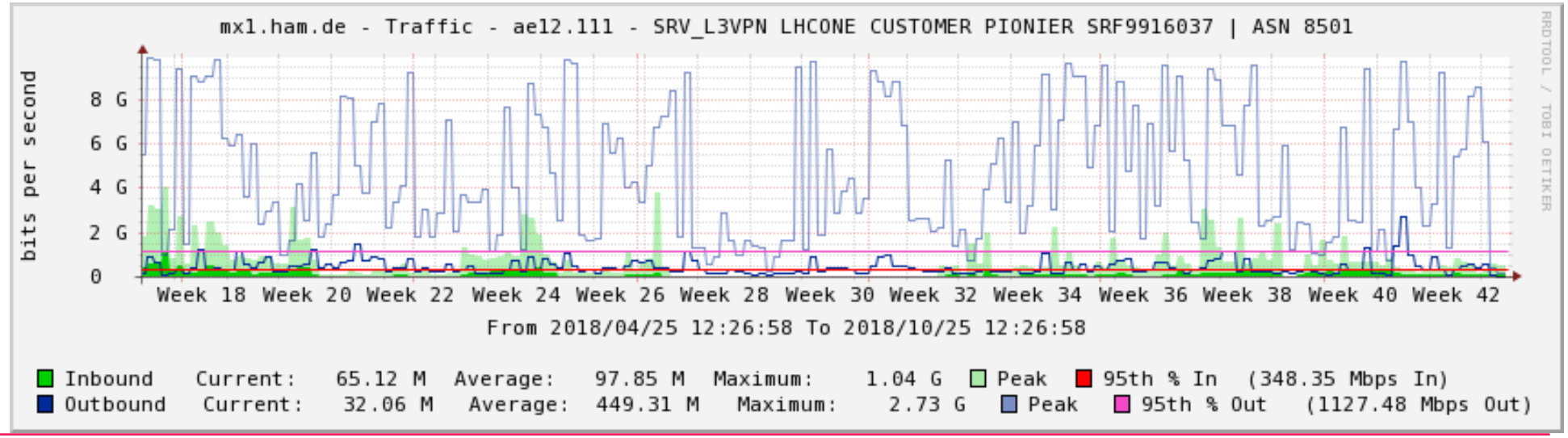
# GRNET

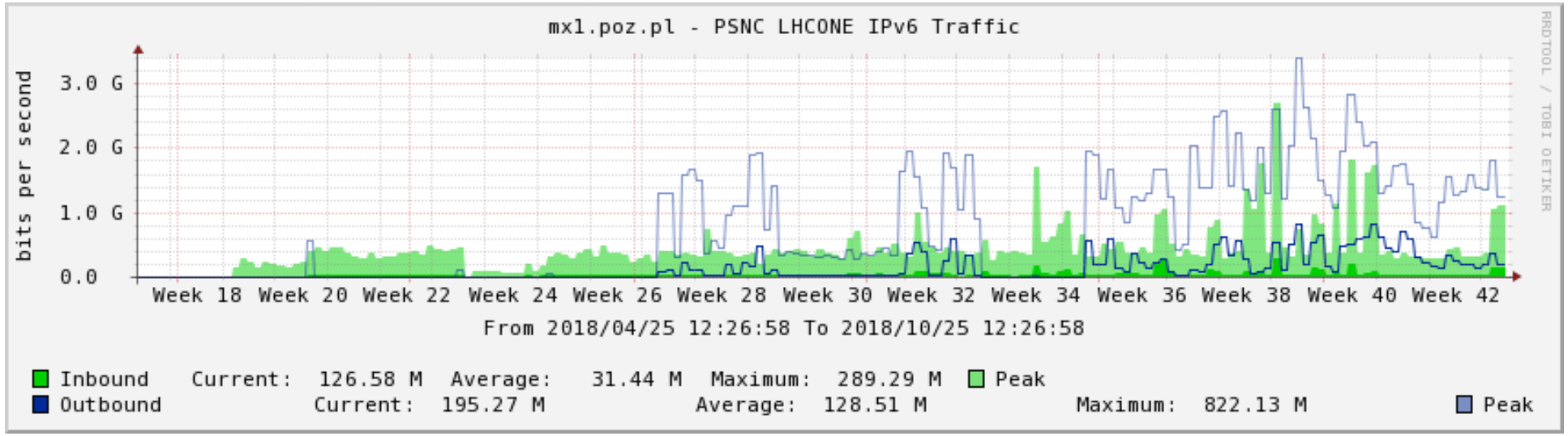

mx2.ath.gr - Traffic - xe-2/0/0.111 - SRV_L3VPN LHCONE CUSTOMER GRNET SRF9939095 | ASN 8581 |
bits per second
6.0 G
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:25:23 To 2018/10/25 12:25:23
Inbound Current: 272.34 M Average: 150.49 M Maximum: 1.11 G Peak 95th % In (542.63 Mbps In)
Outbound Current: 406.39 M Average: 178.25 M Maximum: 1.54 G Peak 95th % Out (464.51 Mbps Out)
RRDTOOL / TOBI OETIKER

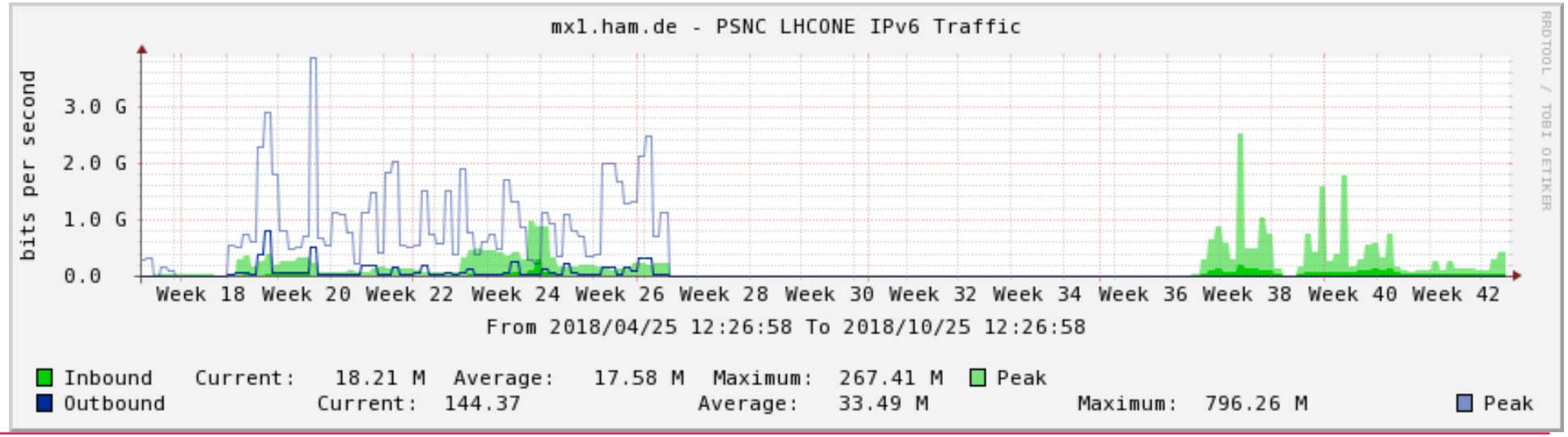

mx2.ath.gr - GRNET LHCONE IPv6 Traffic
bits per second
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:25:23 To 2018/10/25 12:25:23
Inbound Current: 233.70 M Average: 49.52 M Maximum: 842.67 M Peak
Outbound Current: 380.88 M Average: 121.30 M Maximum: 1.34 G Peak
RRDTOOL / TOBI OETIKER

# PIONIER

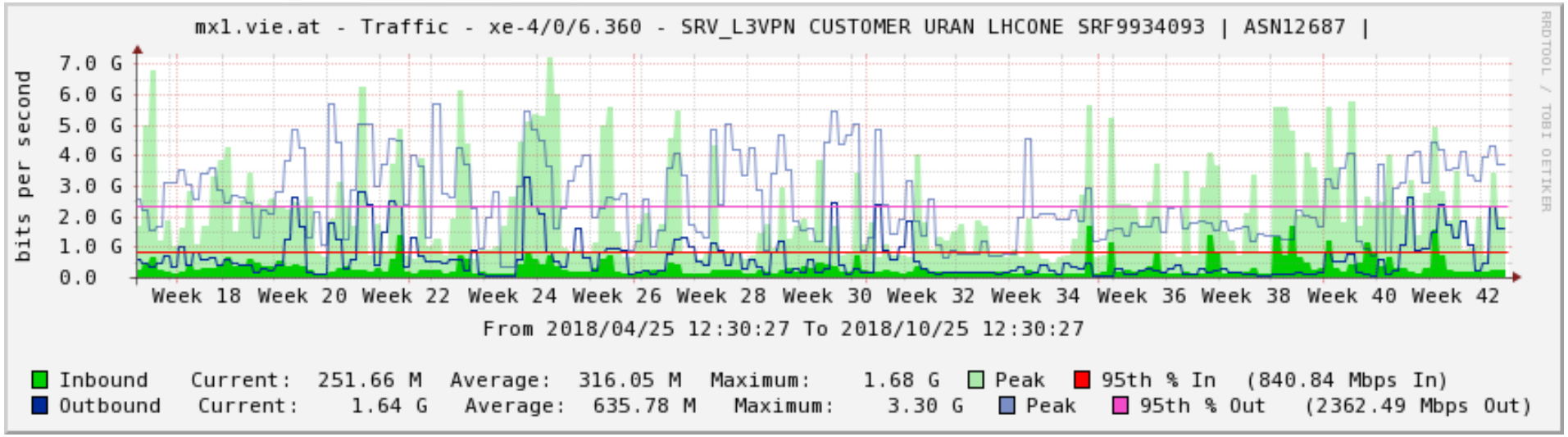

mx1.poz.pl - Traffic - ae11.111 - SRV_L3VPN CUSTOMER PIONIER LHCONE1 SRF16037 | ASN 8501
bits per second
7.0 G
6.0 G
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:26:58 To 2018/10/25 12:26:58
Inbound Current: 327.57 M Average: 240.20 M Maximum: 1.21 G Peak 95th % In (506.08 Mbps In)
Outbound Current: 564.80 M Average: 179.19 M Maximum: 1.05 G Peak 95th % Out (677.68 Mbps Out)
RRDTOOL / TOBI OETIKER

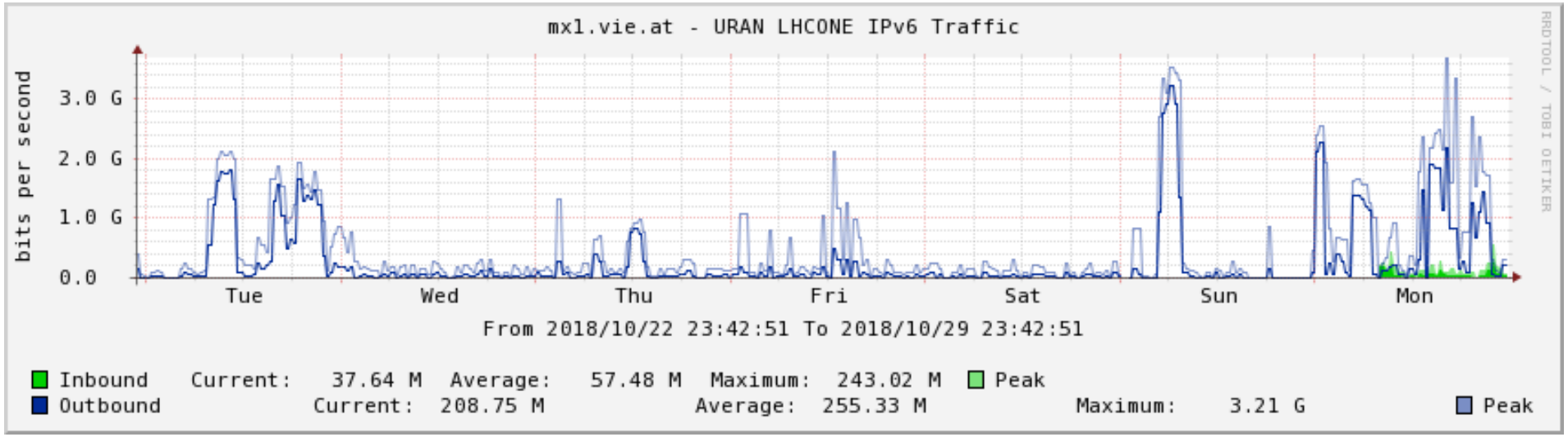

mx1.ham.de - Traffic - ae12.111 - SRV_L3VPN LHCONE CUSTOMER PIONIER SRF9916037 | ASN 8501
bits per second
8 G
6 G
4 G
2 G
0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:26:58 To 2018/10/25 12:26:58
Inbound Current: 65.12 M Average: 97.85 M Maximum: 1.04 G Peak 95th % In (348.35 Mbps In)
Outbound Current: 32.06 M Average: 449.31 M Maximum: 2.73 G Peak 95th % Out (1127.48 Mbps Out)
RRDTOOL / TOBI OETIKER


mx1.poz.pl - PSNC LHCONE IPv6 Traffic
bits per second
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:26:58 To 2018/10/25 12:26:58
Inbound Current: 126.58 M Average: 31.44 M Maximum: 289.29 M Peak
Outbound Current: 195.27 M Average: 128.51 M Maximum: 822.13 M Peak
RRDTOOL / TOBI OETIKER

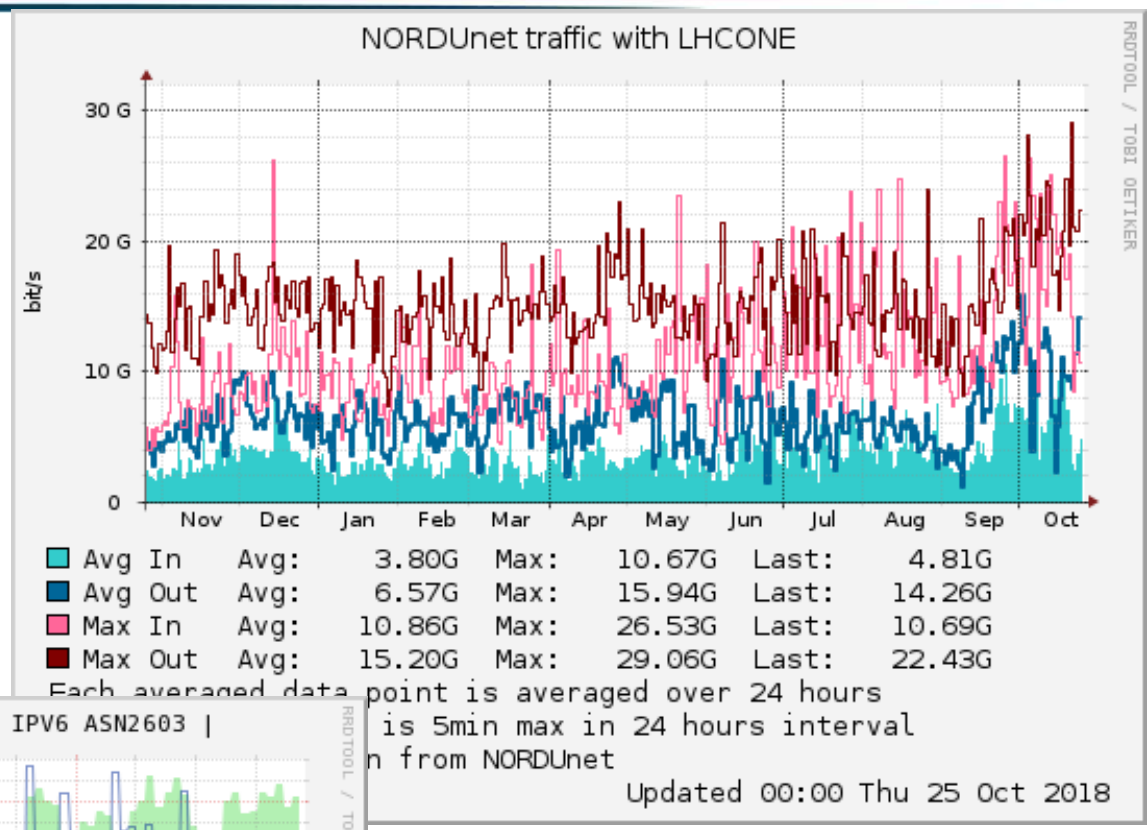

mx1.ham.de - PSNC LHCONE IPv6 Traffic
bits per second
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:26:58 To 2018/10/25 12:26:58
Inbound Current: 18.21 M Average: 17.58 M Maximum: 267.41 M Peak
Outbound Current: 144.37 Average: 33.49 M Maximum: 796.26 M Peak
RRDTOOL / TOBI OETIKER

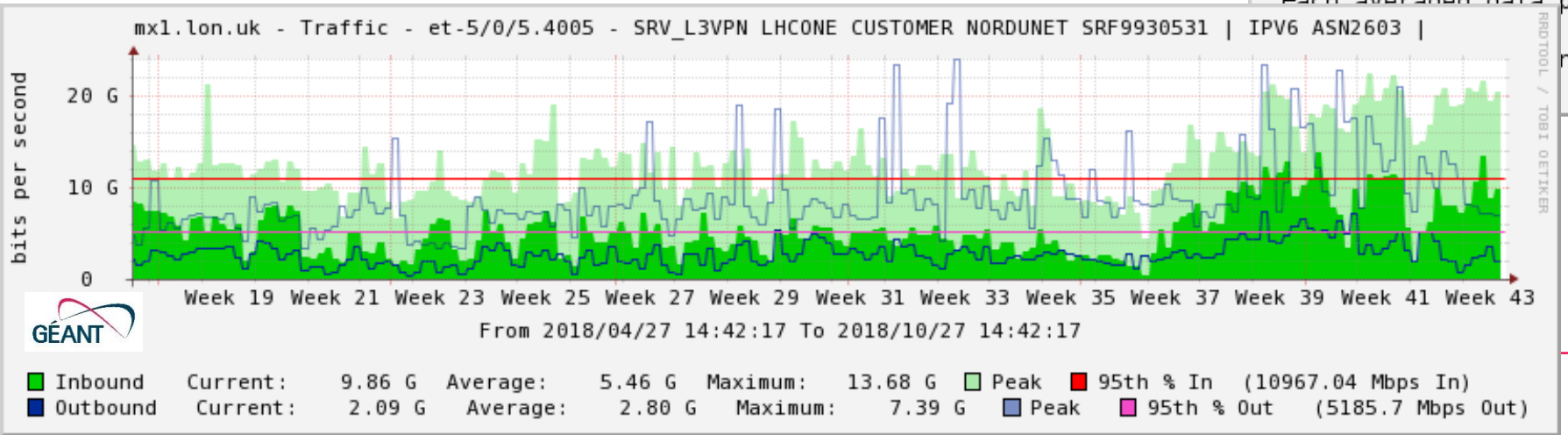
# URAN


mx1.vie.at - Traffic - xe-4/0/6.360 - SRV_L3VPN CUSTOMER URAN LHCONE SRF9934093 | ASN12687 |
bits per second
7.0 G
6.0 G
5.0 G
4.0 G
3.0 G
2.0 G
1.0 G
0.0
Week 18 Week 20 Week 22 Week 24 Week 26 Week 28 Week 30 Week 32 Week 34 Week 36 Week 38 Week 40 Week 42
From 2018/04/25 12:30:27 To 2018/10/25 12:30:27
Inbound Current: 251.66 M Average: 316.05 M Maximum: 1.68 G Peak 95th % In (840.84 Mbps In)
Outbound Current: 1.64 G Average: 635.78 M Maximum: 3.30 G Peak 95th % Out (2362.49 Mbps Out)
RRDTOOL / TOBI OETIKER


mx1.vie.at - URAN LHCONE IPv6 Traffic
bits per second
3.0 G
2.0 G
1.0 G
0.0
Tue
Wed
Thu
Fri
Sat
Sun
Mon
From 2018/10/22 23:42:51 To 2018/10/29 23:42:51
Inbound Current: 37.64 M Average: 57.48 M Maximum: 243.02 M Peak
Outbound Current: 208.75 M Average: 255.33 M Maximum: 3.21 G Peak
RRDTOOL / TOBI OETIKER

# NORDUNet

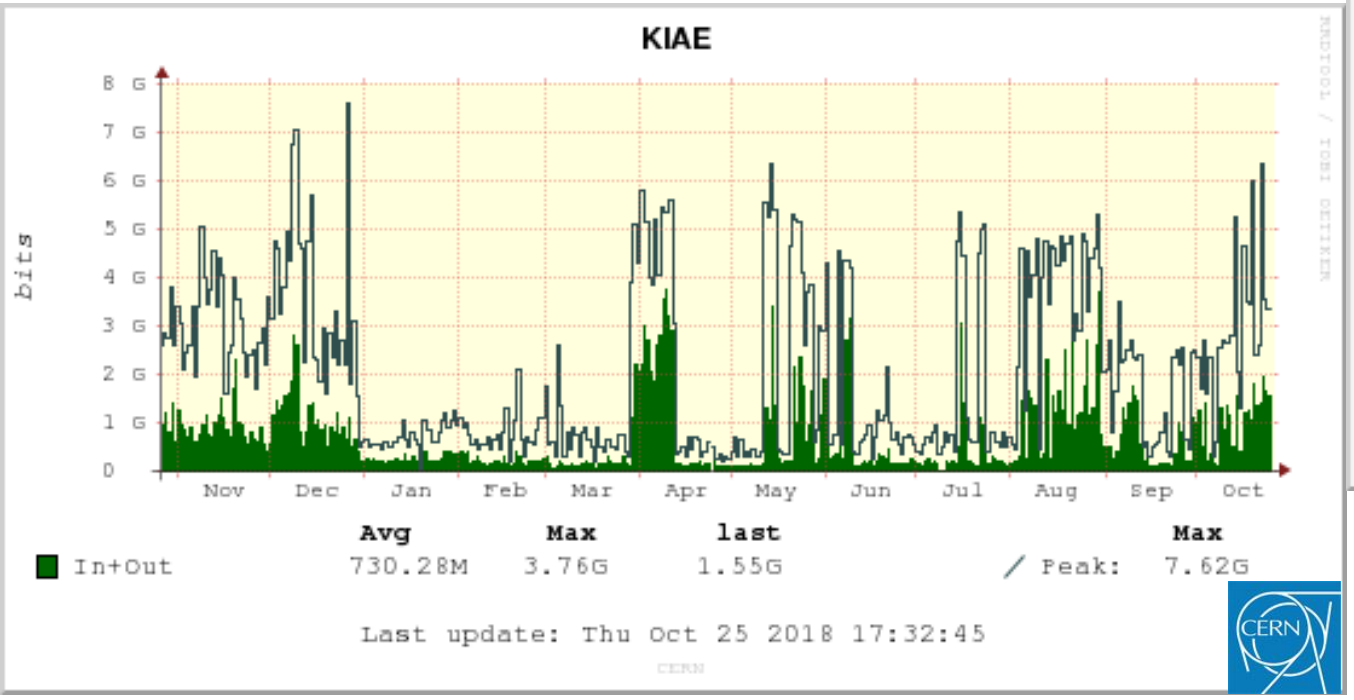

NORDUnet traffic with LHCONE
bit/s
30 G
20 G
10 G
0
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Avg In Avg: 3.80G Max: 10.67G Last: 4.81G
Avg Out Avg: 6.57G Max: 15.94G Last: 14.26G
Max In Avg: 10.86G Max: 26.53G Last: 10.69G
Max Out Avg: 15.20G Max: 29.06G Last: 22.43G
Each averaged data point is averaged over 24 hours
is 5min max in 24 hours interval
n from NORDUnet
Updated 00:00 Thu 25 Oct 2018
RRDTOOL / TOBI OETIKER

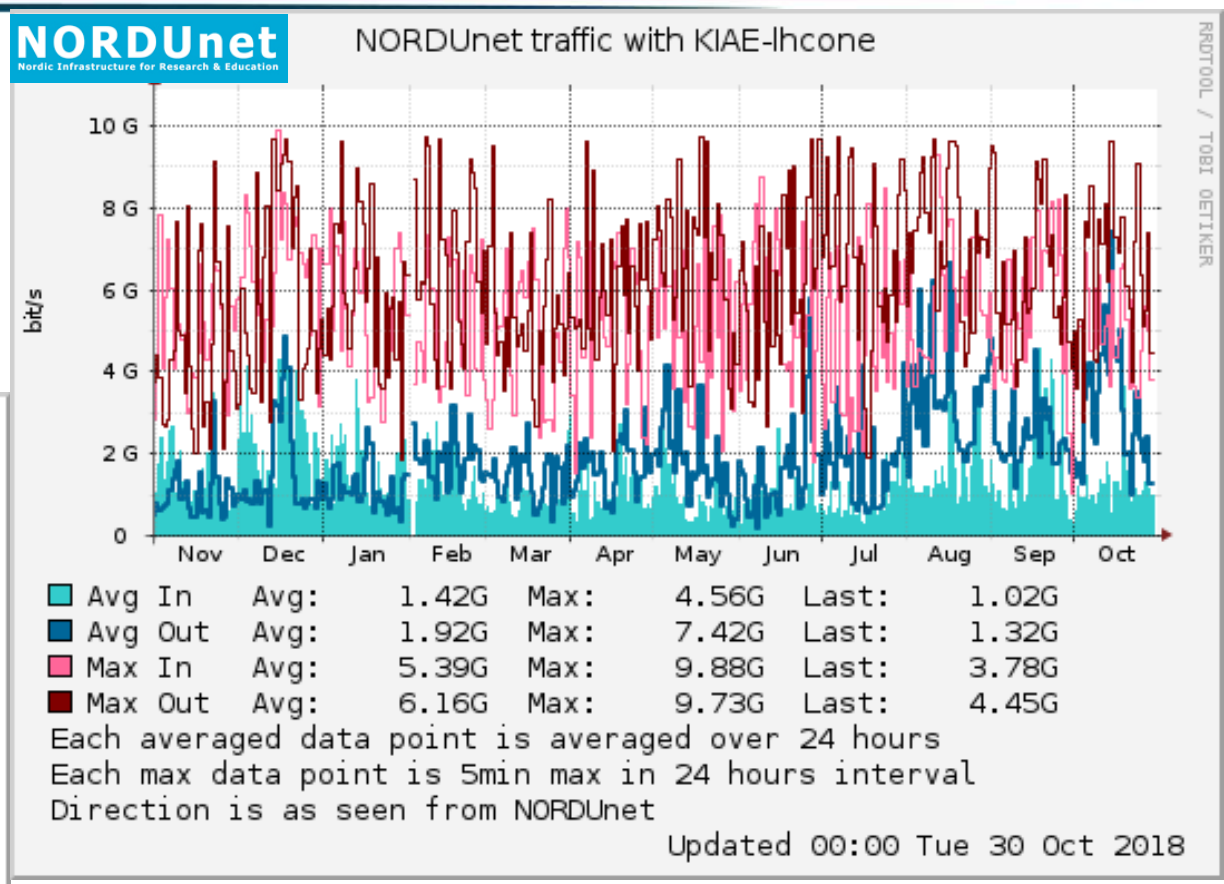

mx1.lon.uk - Traffic - et-5/0/5.4005 - SRV_L3VPN LHCONE CUSTOMER NORDUNET SRF9930531 | IPV6 ASN2603 |
bits per second
20 G
10 G
0
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/27 14:42:17 To 2018/10/27 14:42:17
Inbound Current: 9.86 G Average: 5.46 G Maximum: 13.68 G Peak 95th % In (10967.04 Mbps In)
Outbound Current: 2.09 G Average: 2.80 G Maximum: 7.39 G Peak 95th % Out (5185.7 Mbps Out)
RRDTOOL / TOBI OETIKER

# RU-VRF

NATIONAL RESEARCH CENTRE «KURCHATOV INSTITUTE»

JINR

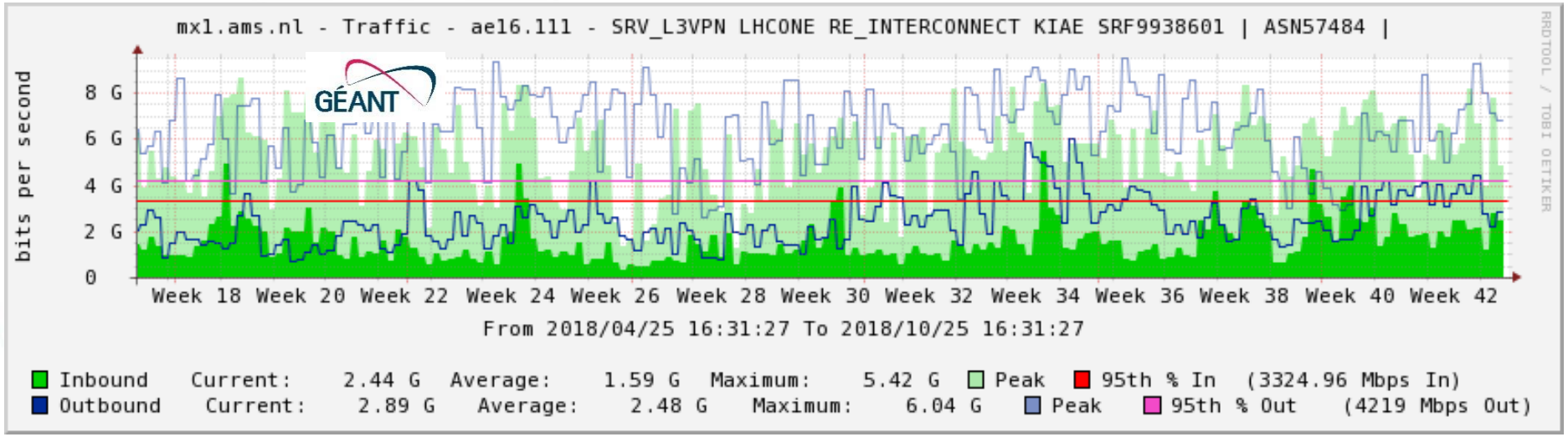


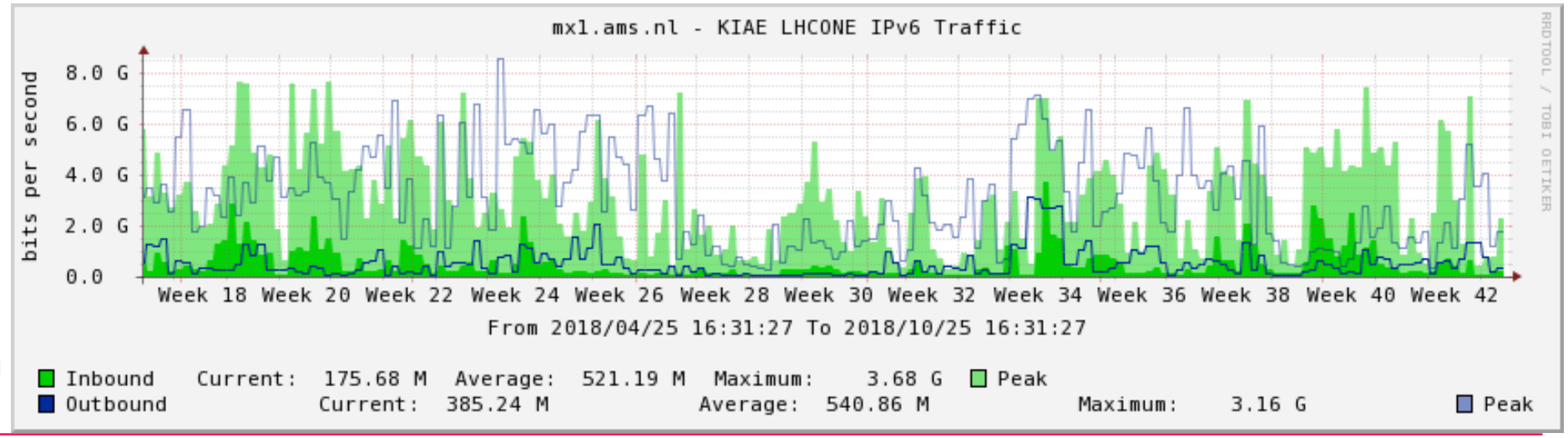



# RU-VRF

NATIONAL RESEARCH CENTRE «KURCHATOV INSTITUTE»

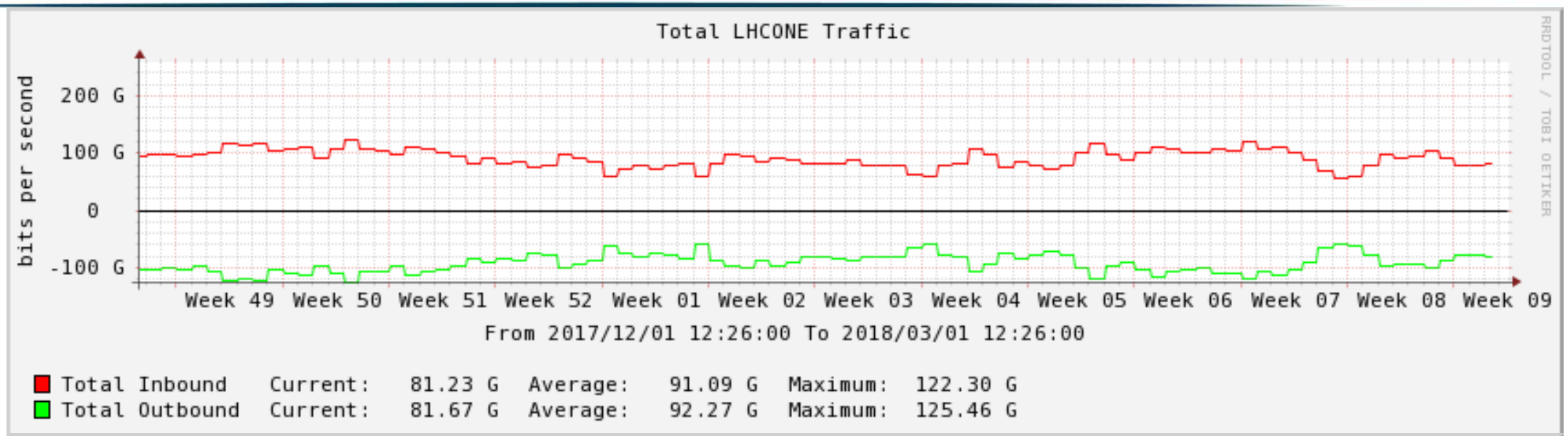
JINR

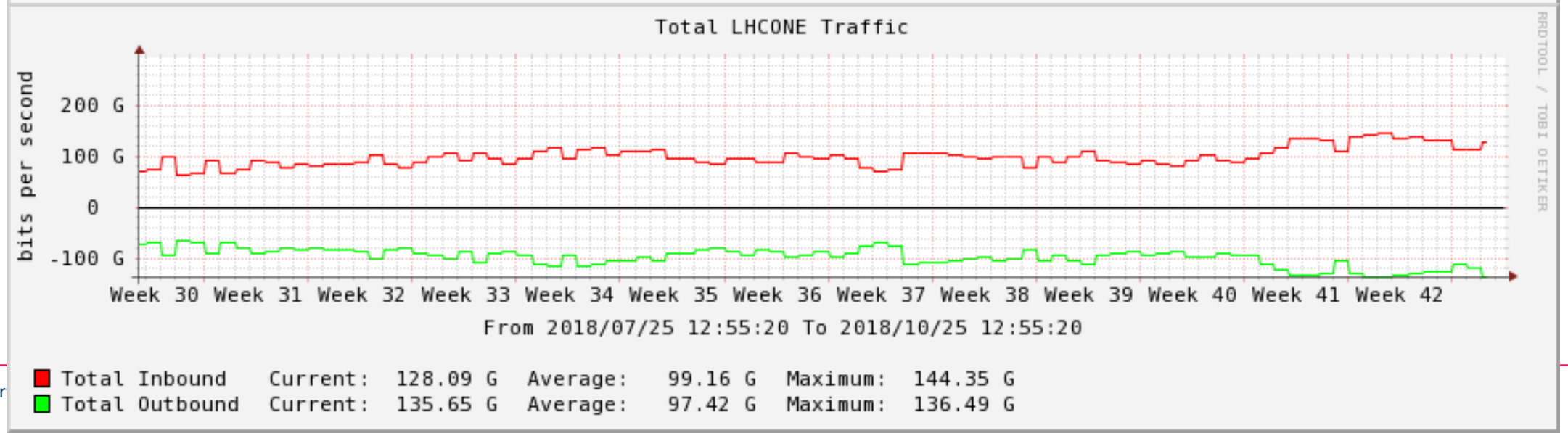


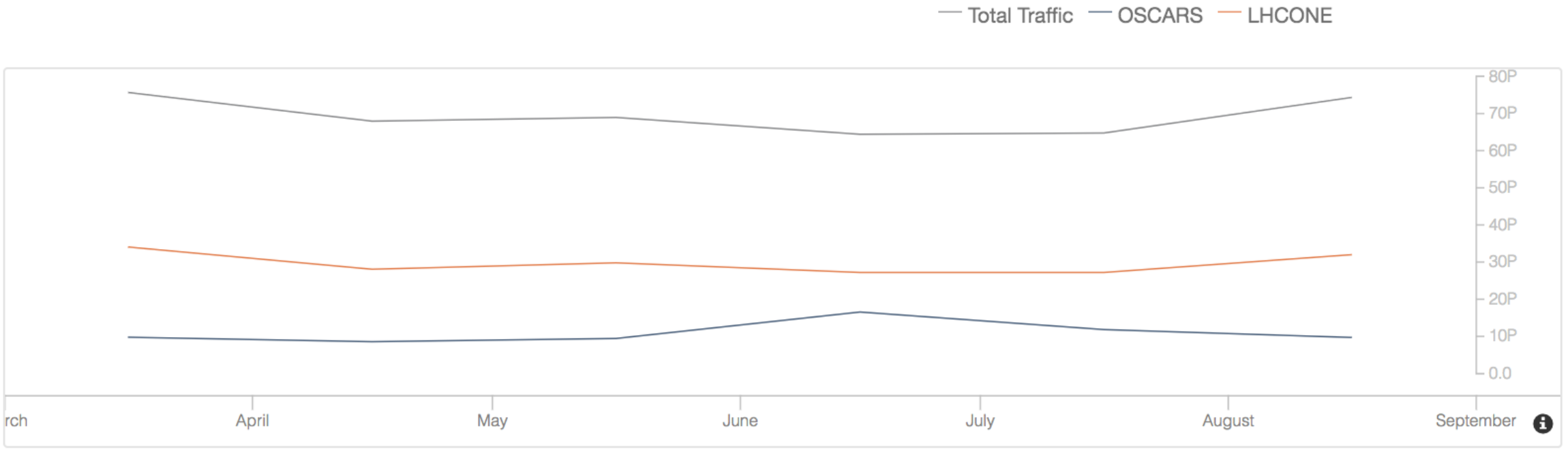

IPv6

# GÉANT overall



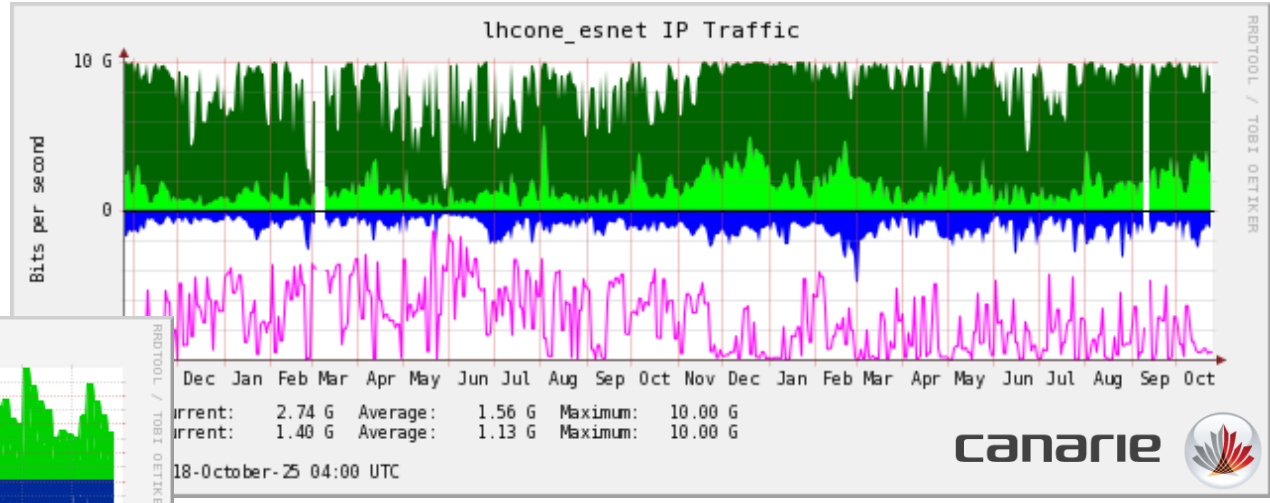
ESnet

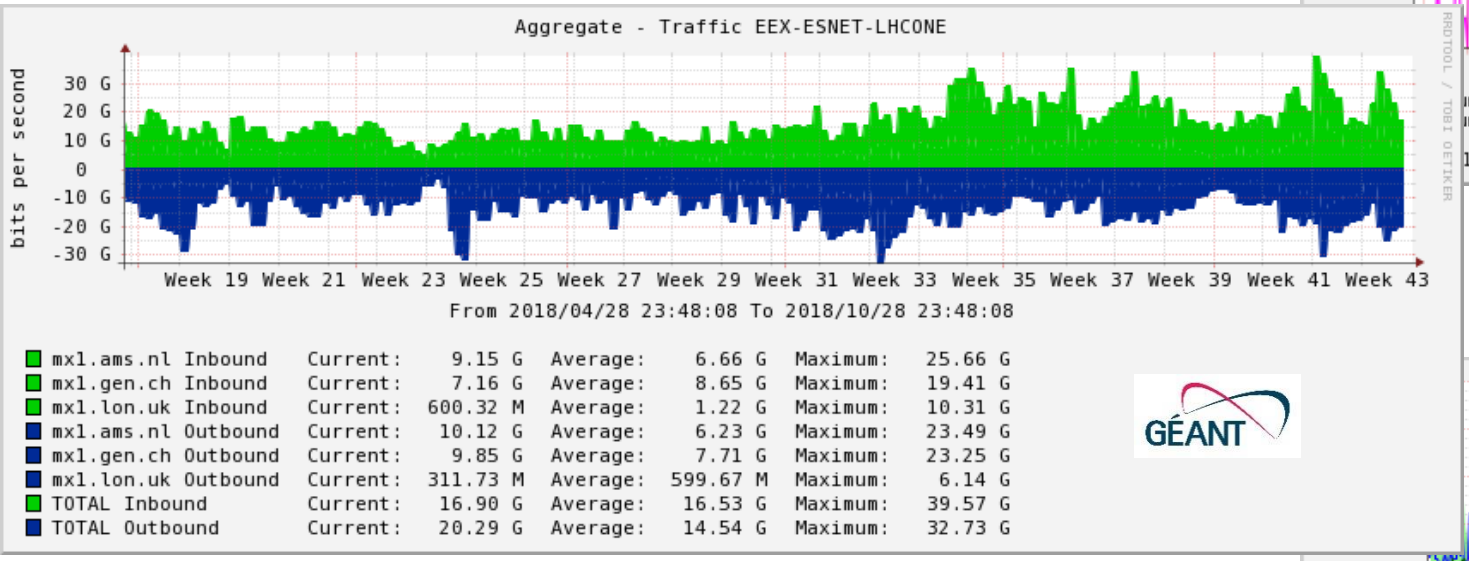



## September 2018

| | Bytes | Percent of Total | One Month Change | One Year Change |
|---|---|---|---|---|
| **OSCARS** | 13.18PB | 15.2% | +38.7% | +13.5% |
| **LHCONE** | 34.33PB | 39.5% | +7.87% | +19.8% |
| **Normal traffic** | 39.47PB | 45.4% | +20.4% | +57.5% |
| **Total** | 86.99PB | | +17.3% | +33.2% |

# ESnet


lhcone_esnet IP Traffic
10 G
0
Bits per second
Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
2.74 G Average: 1.56 G Maximum: 10.00 G
1.40 G Average: 1.13 G Maximum: 10.00 G
18-October-25 04:00 UTC
canarie
RRDTOOL / TOBI OETIKER


Aggregate - Traffic EEX-ESNET-LHCONE
bits per second
30 G
20 G
10 G
0
-10 G
-20 G
-30 G
Week 19 Week 21 Week 23 Week 25 Week 27 Week 29 Week 31 Week 33 Week 35 Week 37 Week 39 Week 41 Week 43
From 2018/04/28 23:48:08 To 2018/10/28 23:48:08
mx1.ams.nl Inbound Current: 9.15 G Average: 6.66 G Maximum: 25.66 G
mx1.gen.ch Inbound Current: 7.16 G Average: 8.65 G Maximum: 19.41 G
mx1.lon.uk Inbound Current: 600.32 M Average: 1.22 G Maximum: 10.31 G
mx1.ams.nl Outbound Current: 10.12 G Average: 6.23 G Maximum: 23.49 G
mx1.gen.ch Outbound Current: 9.85 G Average: 7.71 G Maximum: 23.25 G
mx1.lon.uk Outbound Current: 311.73 M Average: 599.67 M Maximum: 6.14 G
TOTAL Inbound Current: 16.90 G Average: 16.53 G Maximum: 39.57 G
TOTAL Outbound Current: 20.29 G Average: 14.54 G Maximum: 32.73 G
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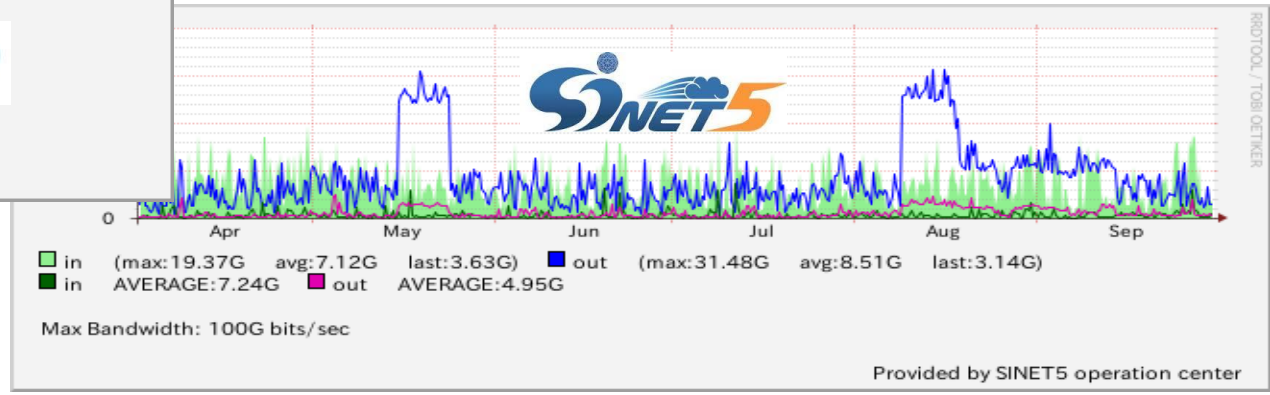
0
Apr May Jun Jul Aug Sep
in (max:19.37G avg:7.12G last:3.63G) out (max:31.48G avg:8.51G last:3.14G)
in AVERAGE:7.24G out AVERAGE:4.95G
Max Bandwidth: 100G bits/sec
Provided by SINET5 operation center
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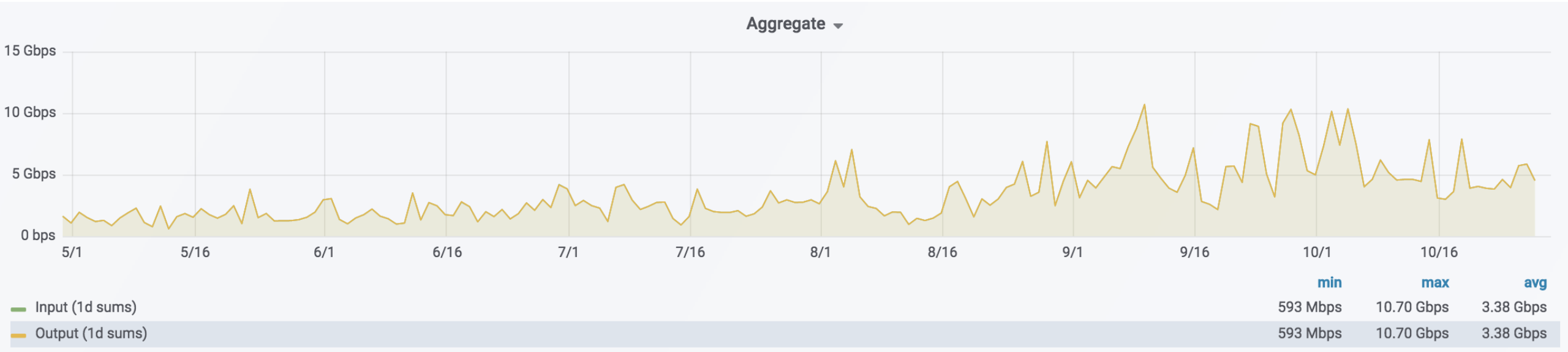
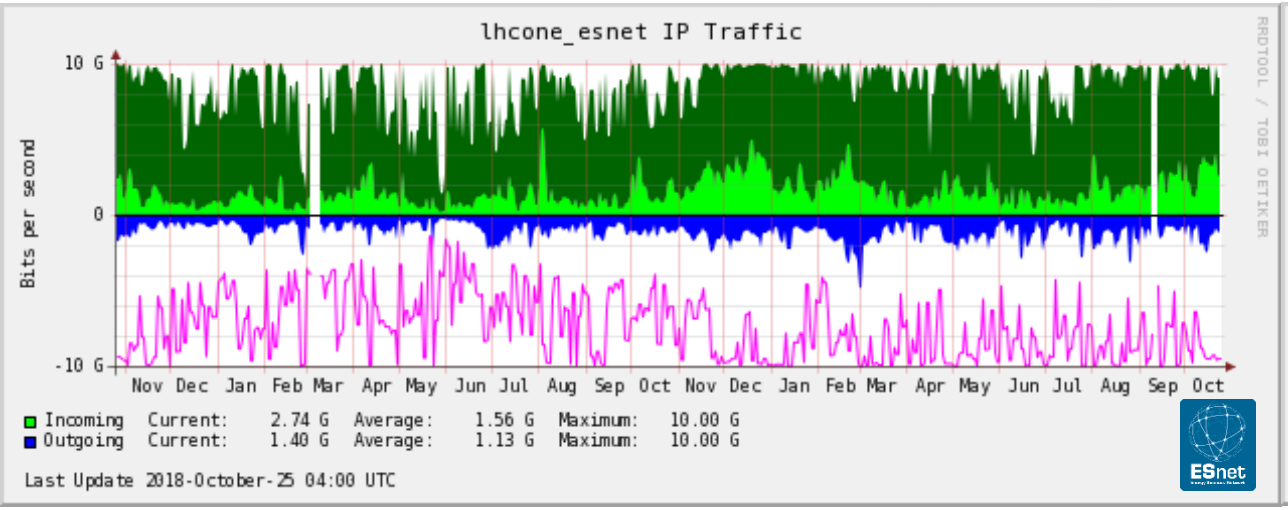
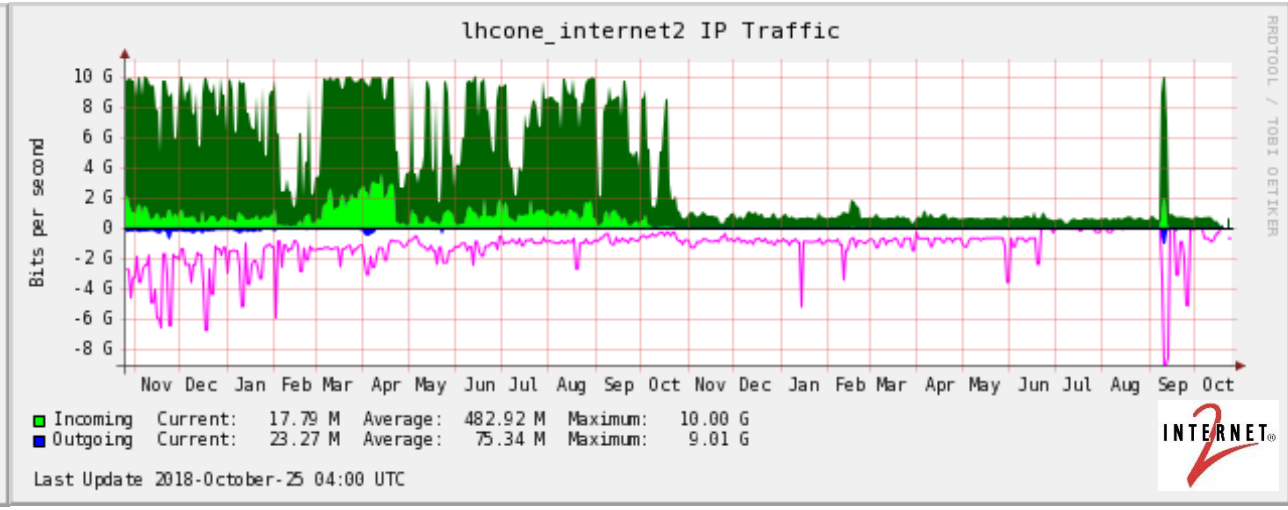
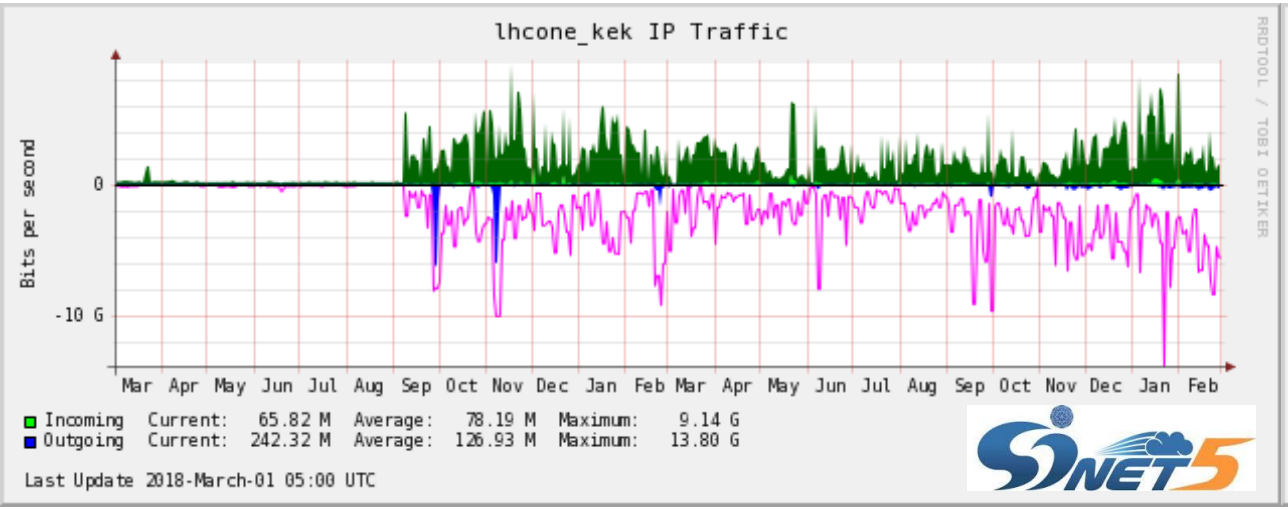
# Internet2


Aggregate
15 Gbps
10 Gbps
5 Gbps
0 bps
5/1
5/16
6/1
6/16
7/1
7/16
8/1
8/16
9/1
9/16
10/1
10/16
min
max
avg
Input (1d sums)
593 Mbps
10.70 Gbps
3.38 Gbps
Output (1d sums)
593 Mbps
10.70 Gbps
3.38 Gbps


lhcone_esnet IP Traffic
Bits per second
10 G
0
-10 G
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Incoming Current: 2.74 G Average: 1.56 G Maximum: 10.00 G
Outgoing Current: 1.40 G Average: 1.13 G Maximum: 10.00 G
Last Update 2018-October-25 04:00 UTC
ESnet
RRDTOOL / TOBI OETIKER


lhcone_internet2 IP Traffic
Bits per second
10 G
8 G
6 G
4 G
2 G
0
-2 G
-4 G
-6 G
-8 G
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Incoming Current: 17.79 M Average: 482.92 M Maximum: 10.00 G
Outgoing Current: 23.27 M Average: 75.34 M Maximum: 9.01 G
Last Update 2018-October-25 04:00 UTC
INTERNET2
RRDTOOL / TOBI OETIKER


lhcone_kek IP Traffic
Bits per second
0
-10 G
Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb
Incoming Current: 65.82 M Average: 78.19 M Maximum: 9.14 G
Outgoing Current: 242.32 M Average: 126.93 M Maximum: 13.80 G
Last Update 2018-March-01 05:00 UTC
SINET5
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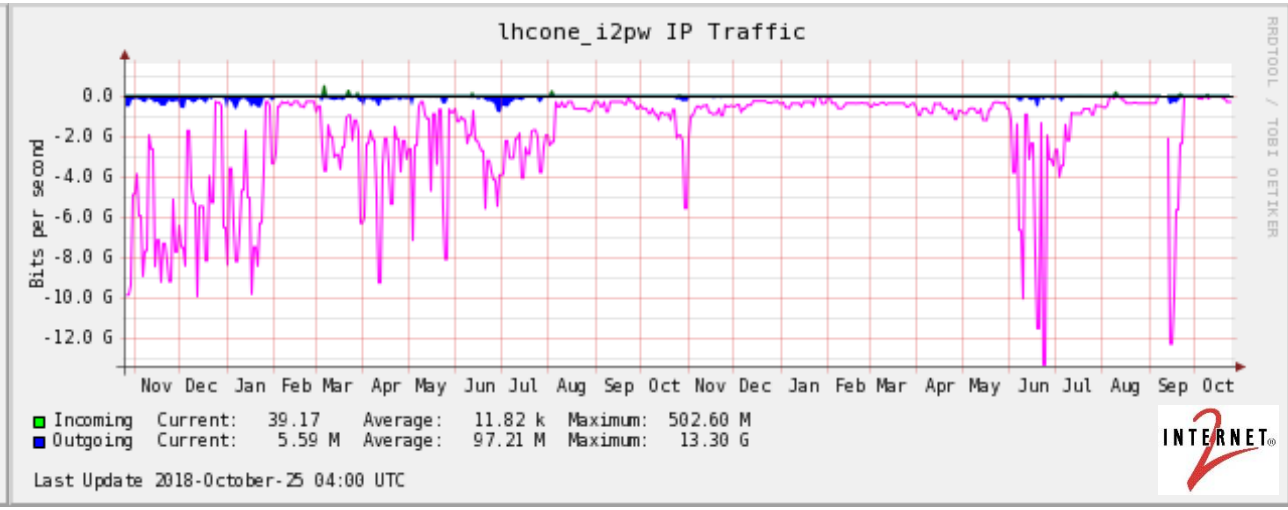
lhcone_i2pw IP Traffic
Bits per second
0.0
-2.0 G
-4.0 G
-6.0 G
-8.0 G
-10.0 G
-12.0 G
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Incoming Current: 39.17 Average: 11.82 k Maximum: 502.60 M
Outgoing Current: 5.59 M Average: 97.21 M Maximum: 13.30 G
Last Update 2018-October-25 04:00 UTC
INTERNET2
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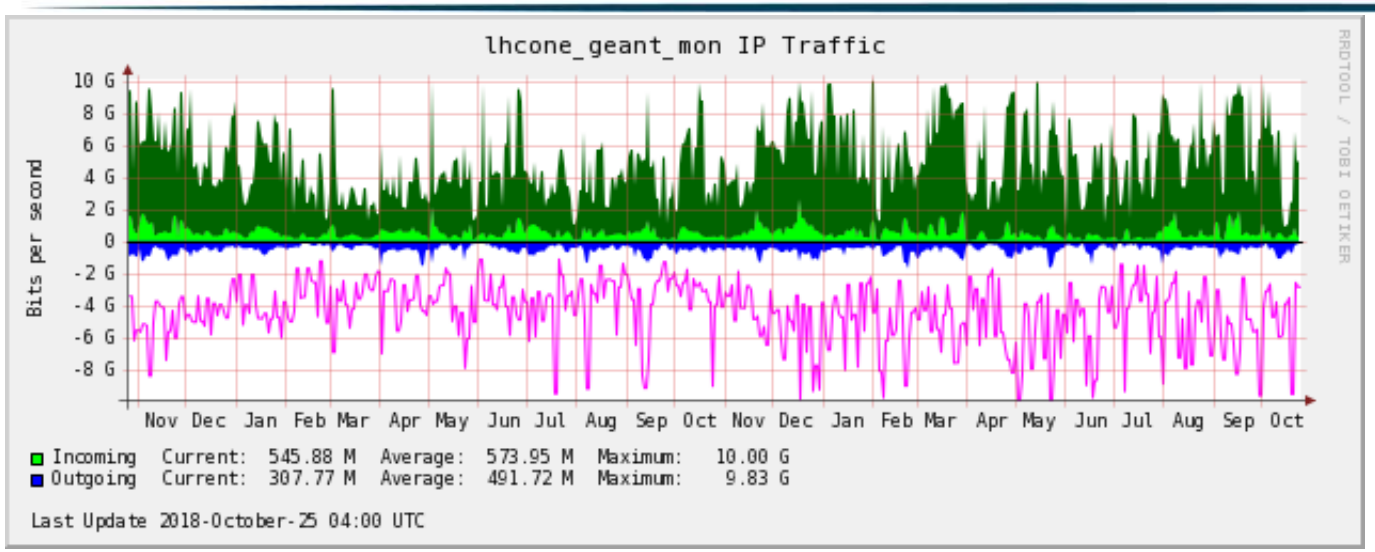
lhcone_geant_mon IP Traffic
Bits per second
10 G
8 G
6 G
4 G
2 G
0
-2 G
-4 G
-6 G
-8 G
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Incoming Current: 545.88 M Average: 573.95 M Maximum: 10.00 G
Outgoing Current: 307.77 M Average: 491.72 M Maximum: 9.83 G
Last Update 2018-October-25 04:00 UTC
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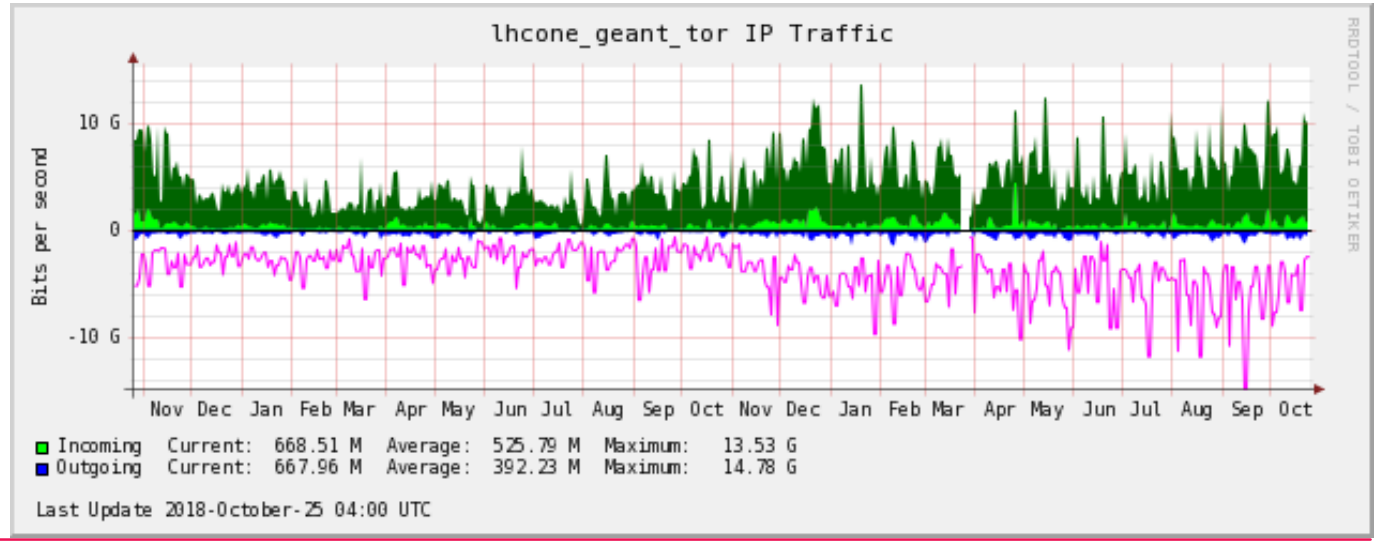
lhcone_geant_tor IP Traffic
Bits per second
10 G
0
-10 G
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Incoming Current: 668.51 M Average: 525.79 M Maximum: 13.53 G
Outgoing Current: 667.96 M Average: 392.23 M Maximum: 14.78 G
Last Update 2018-October-25 04:00 UTC
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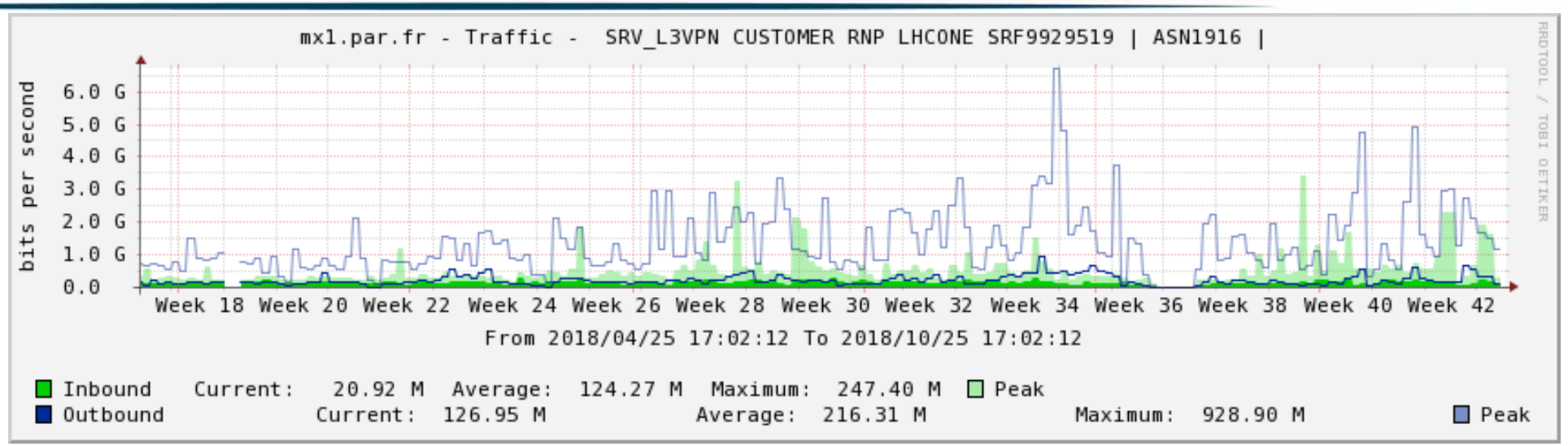
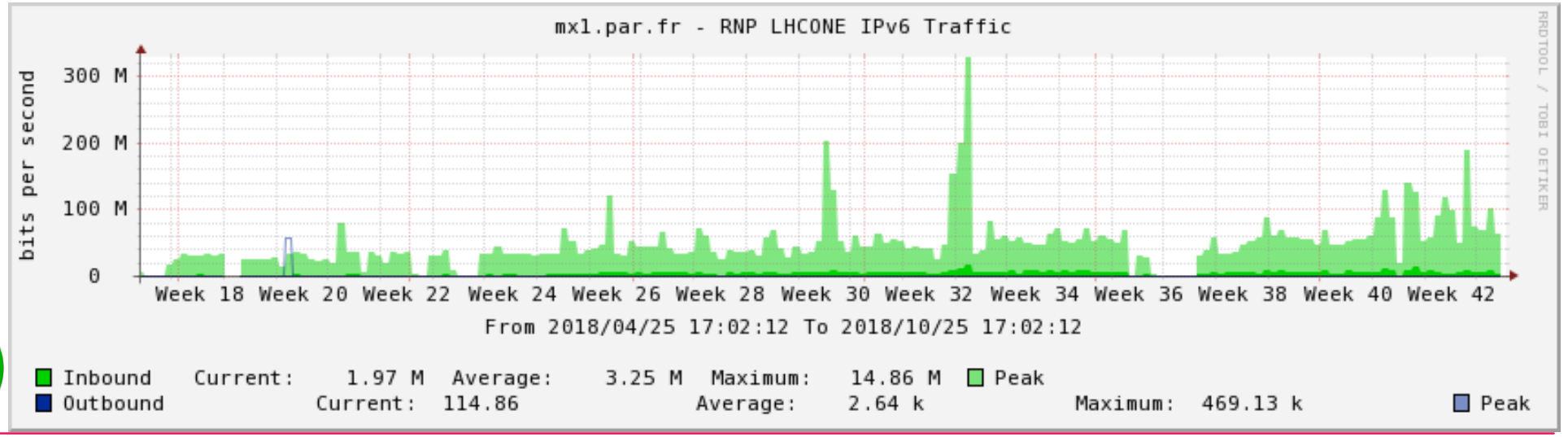
# Latin America



# Questions?

vincenzo.capone@geant.org

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