LHCONE L3VPN status update

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Head of Research Engagement and Support

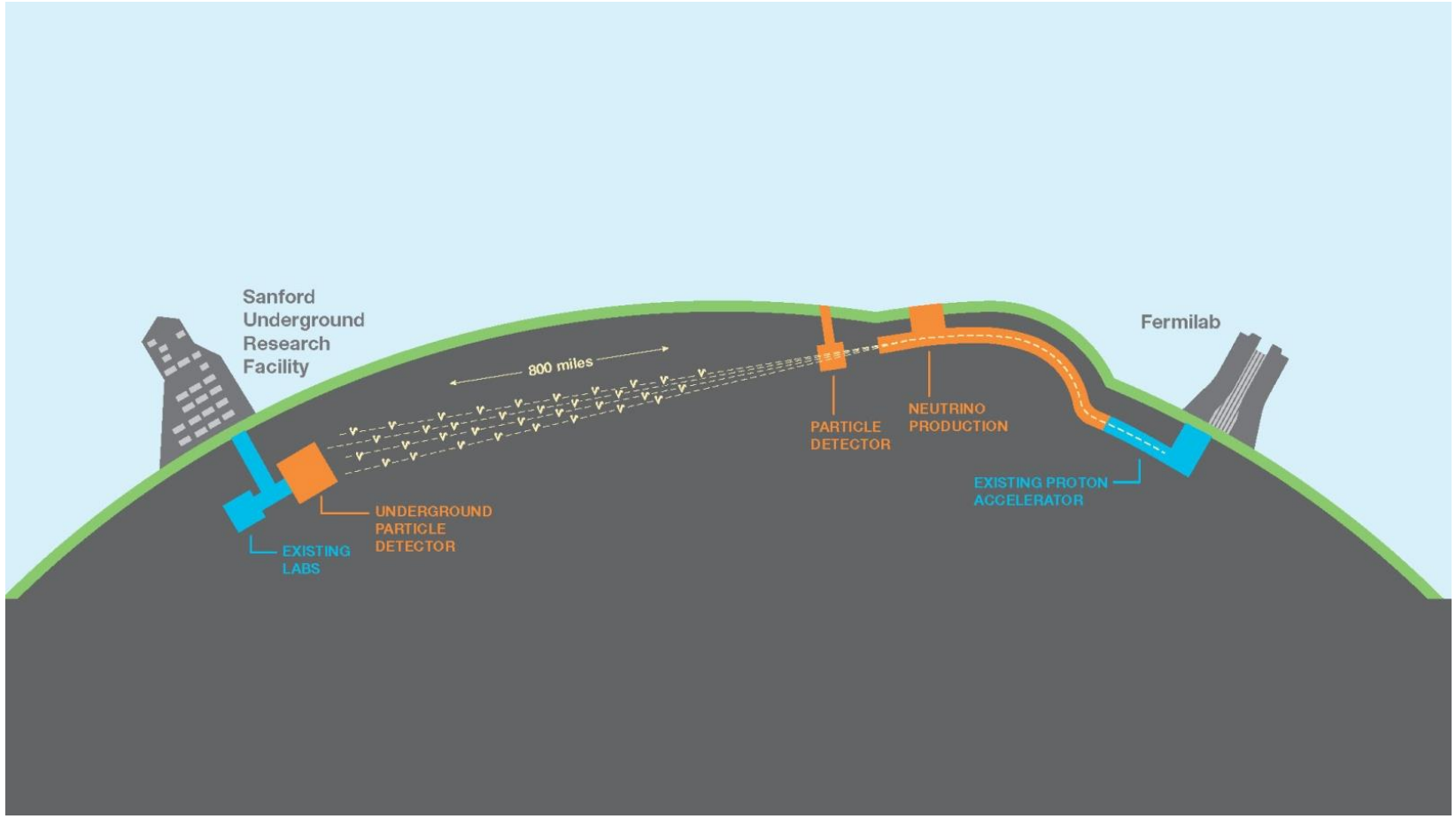
LHCONE-OPN Meeting @ HEPIX2023

18th October 2023

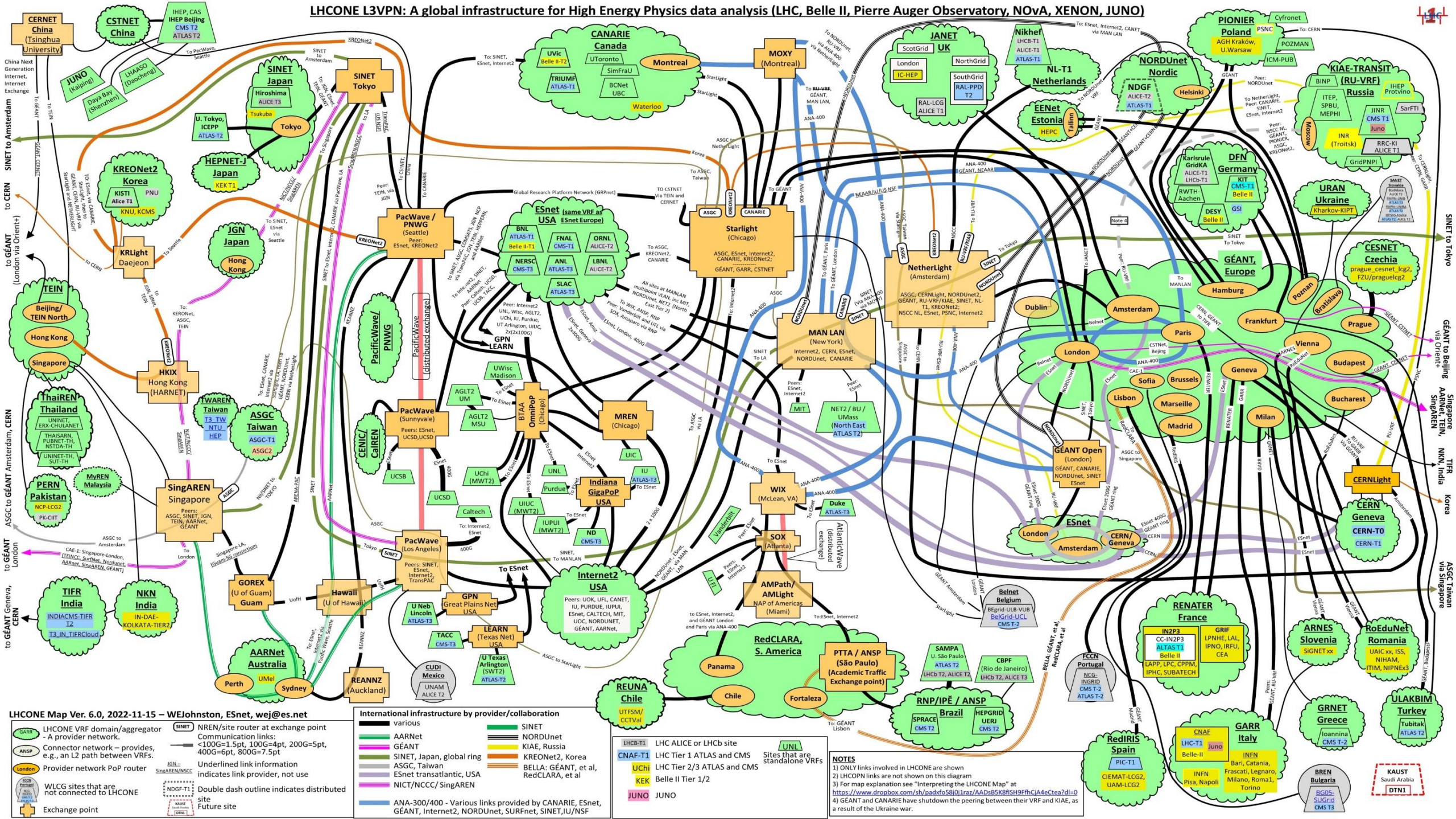
LHCONE around the world

New experiment supported!

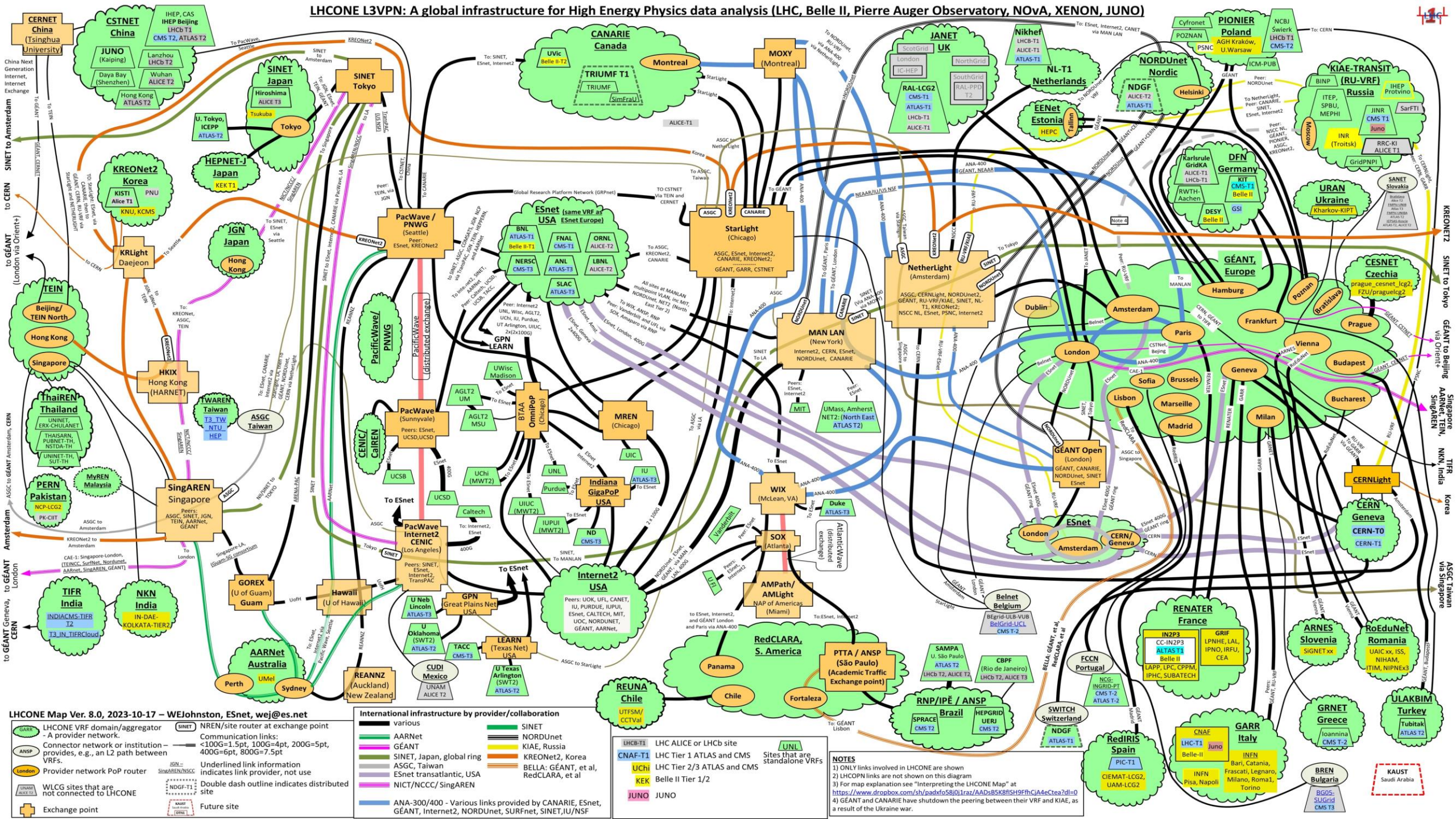
DEEP UNDERGROUND NEUTRINO EXPERIMENT



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

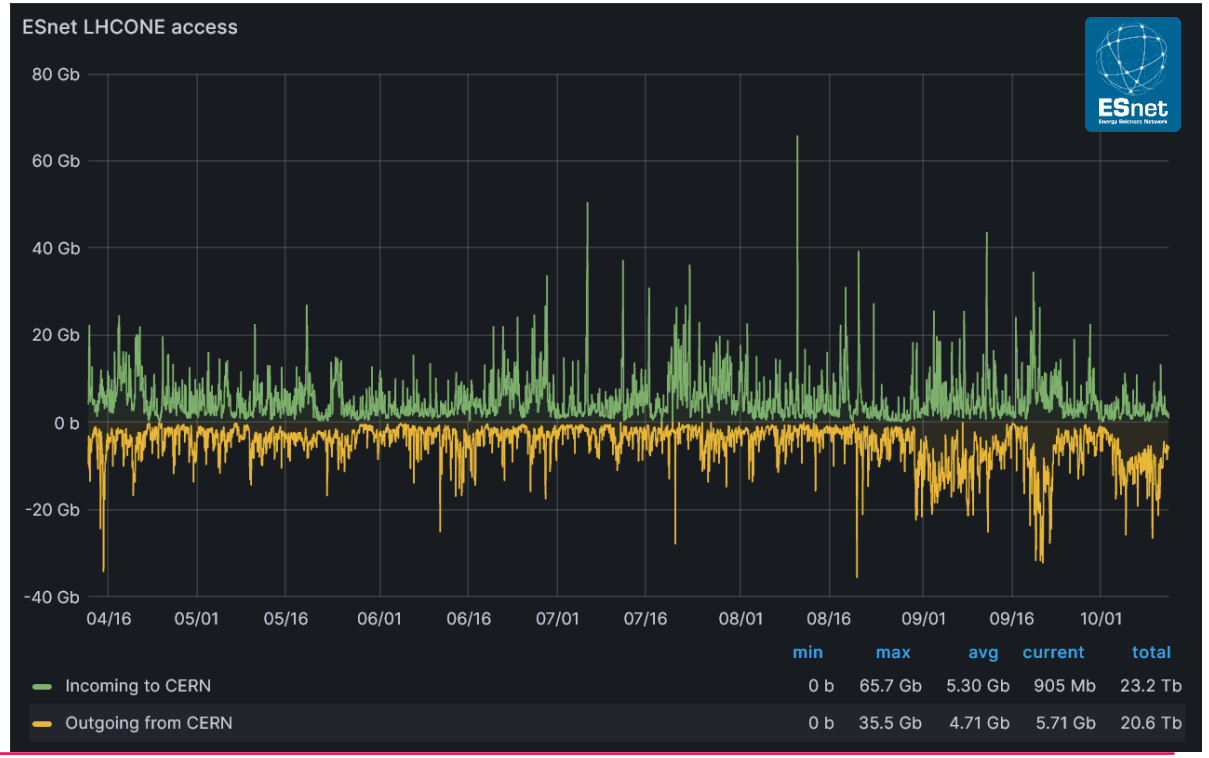


LHCONE L3VPN: A global infrastructure for High Energy Physics data analysis (LHC, Belle II, Pierre Auger Observatory, NOvA, XENON, JUNO)

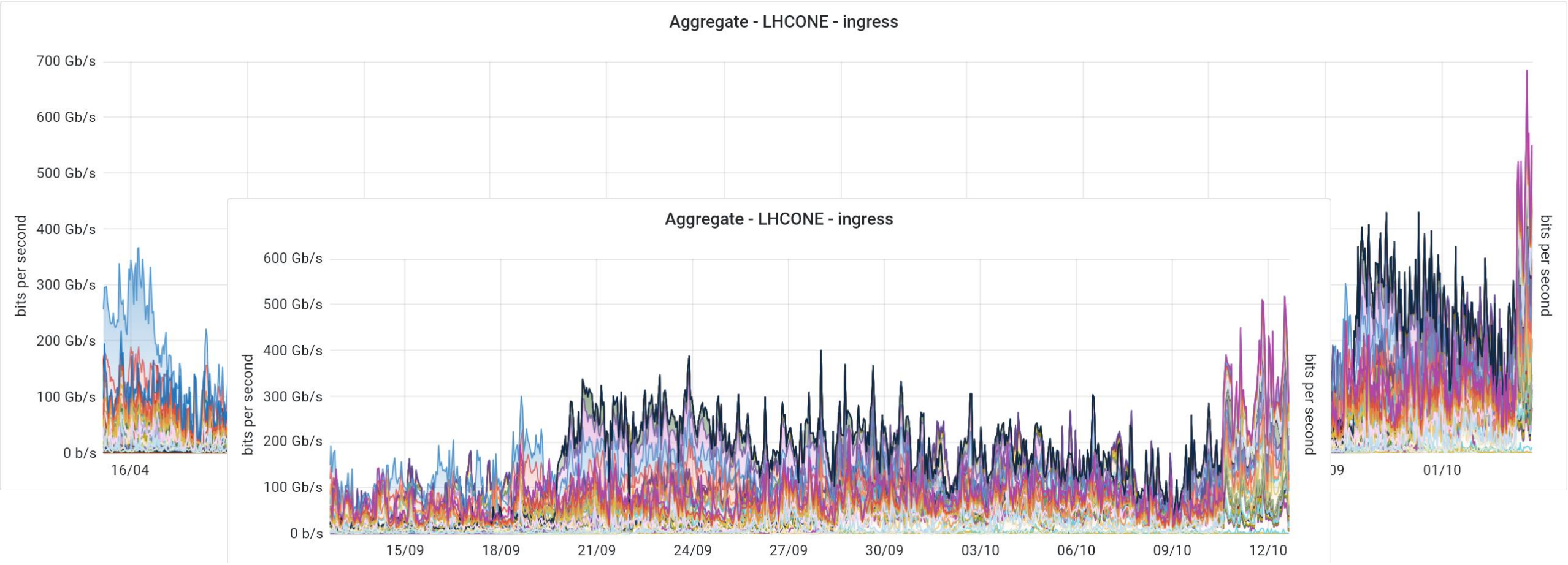


CERN

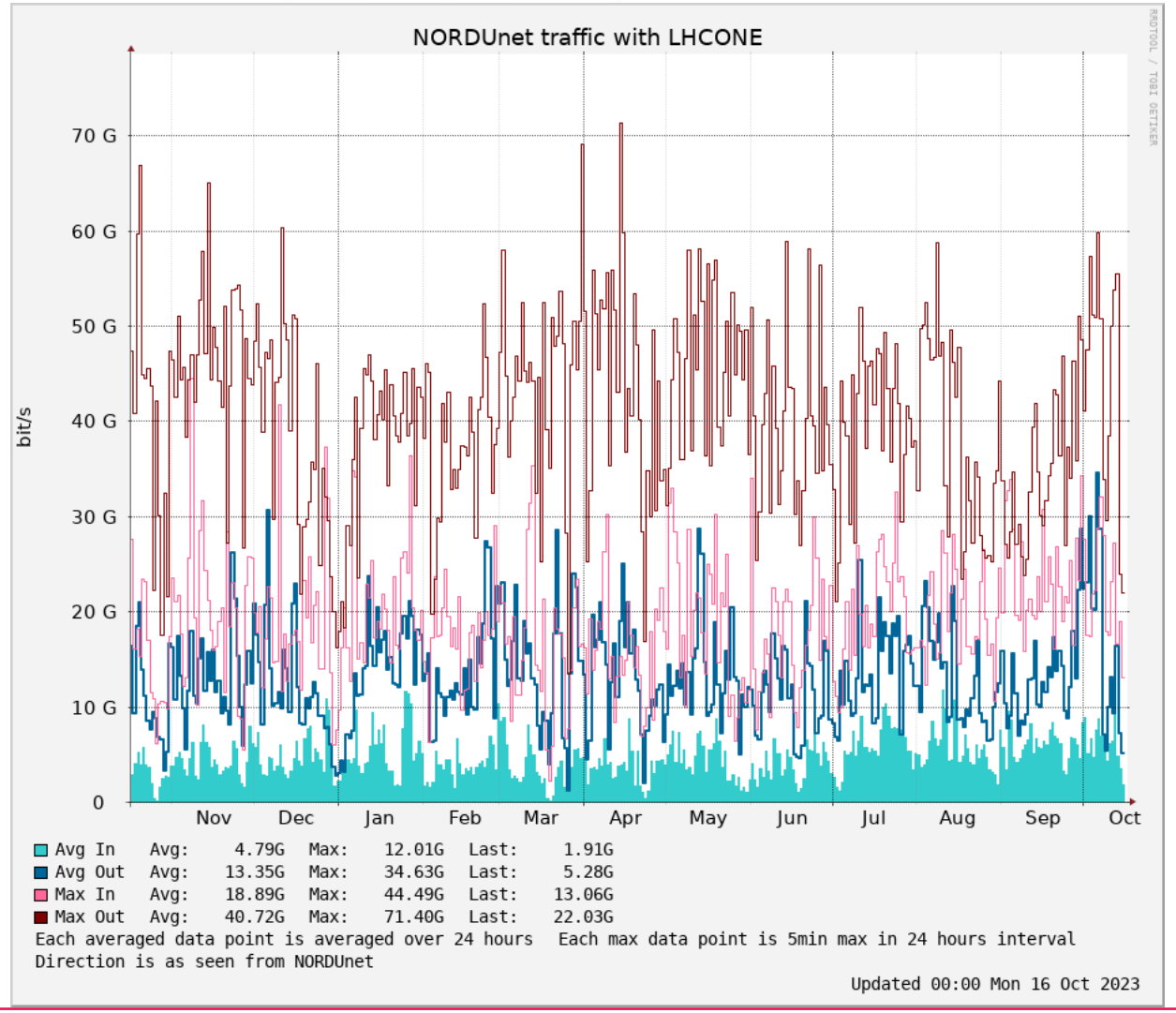
GEANT LHCONE access
150 Gb
100 Gb
50 Gb
0 b
-50 Gb
-100 Gb
-150 Gb
-200 Gb
-250 Gb
04/16
05/01
05/16
06/01
06/16
07/01
07/16
08/01
08/16
09/01
09/16
10/01
min max avg current total
Incoming to CERN 970 Mb 124 Gb 13.3 Gb 5.52 Gb 58.1 Tb
Outgoing from CERN 0 b 195 Gb 48.0 Gb 48.6 Gb 210 Tb


ESnet LHCONE access
80 Gb
60 Gb
40 Gb
20 Gb
0 b
-20 Gb
-40 Gb
04/16
05/01
05/16
06/01
06/16
07/01
07/16
08/01
08/16
09/01
09/16
10/01
min max avg current total
Incoming to CERN 0 b 65.7 Gb 5.30 Gb 905 Mb 23.2 Tb
Outgoing from CERN 0 b 35.5 Gb 4.71 Gb 5.71 Gb 20.6 Tb

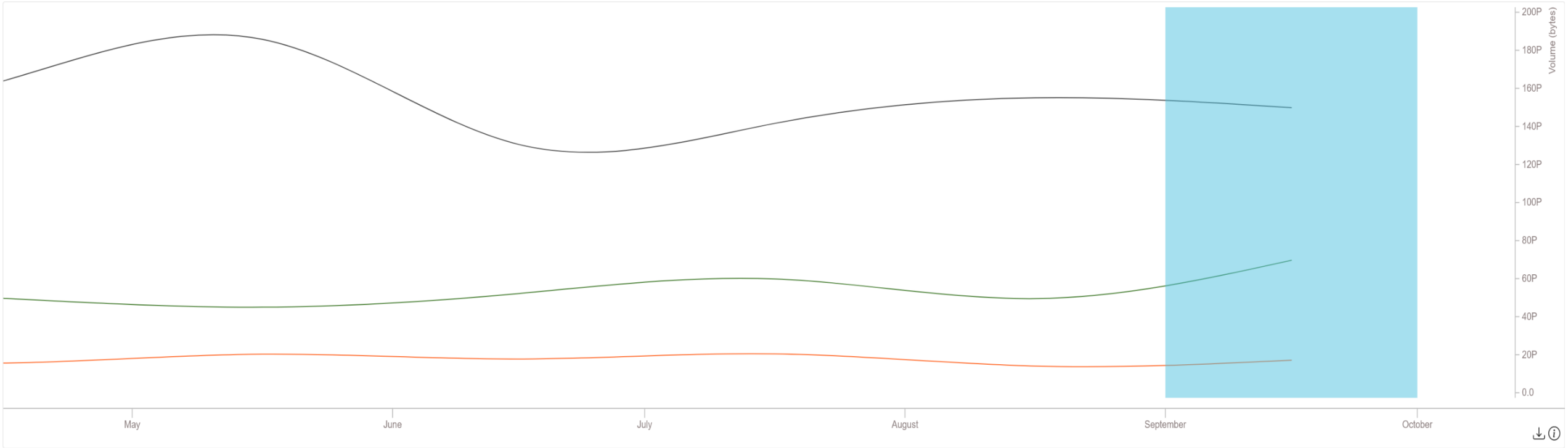
GÉANT overall



NORDUNet

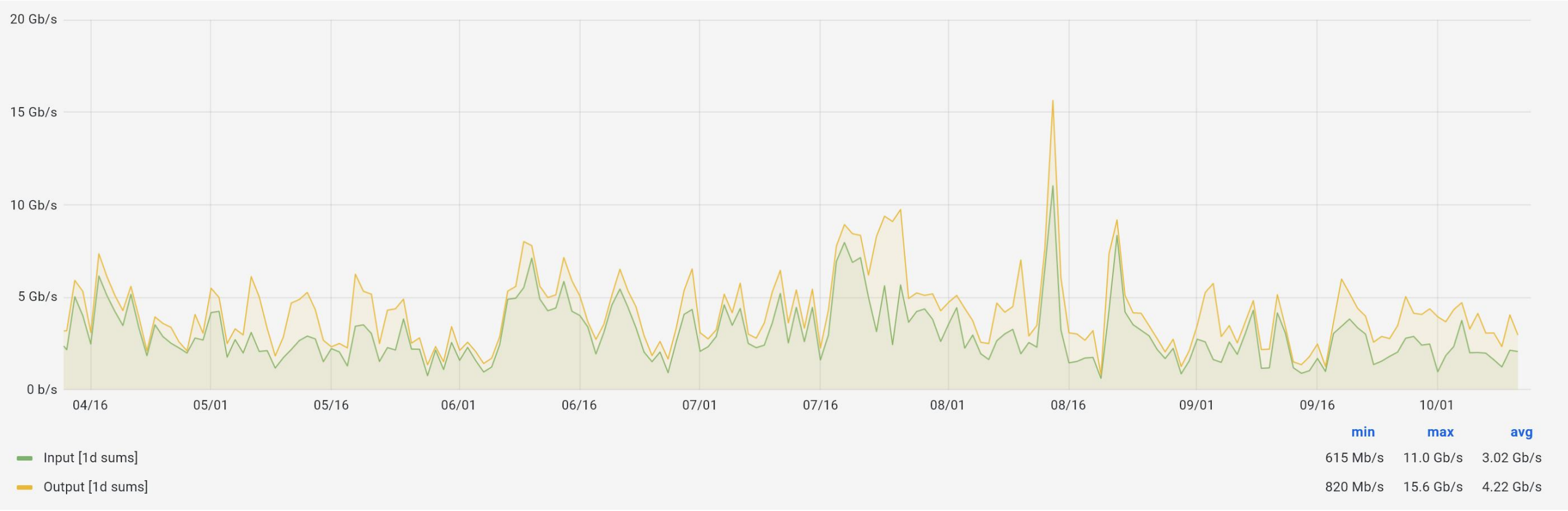

NORDUnet traffic with LHCONE
bit/s
70 G
60 G
50 G
40 G
30 G
20 G
10 G
0
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Avg In Avg: 4.79G Max: 12.01G Last: 1.91G
Avg Out Avg: 13.35G Max: 34.63G Last: 5.28G
Max In Avg: 18.89G Max: 44.49G Last: 13.06G
Max Out Avg: 40.72G Max: 71.40G Last: 22.03G
Each averaged data point is averaged over 24 hours Each max data point is 5min max in 24 hours interval
Direction is as seen from NORDUnet
Updated 00:00 Mon 16 Oct 2023

ESnet

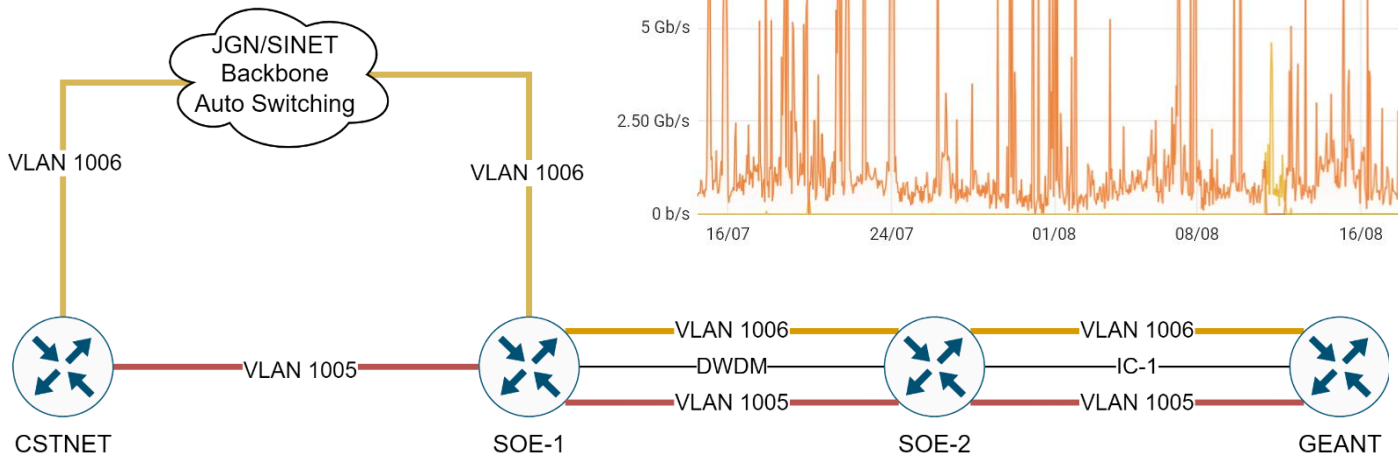


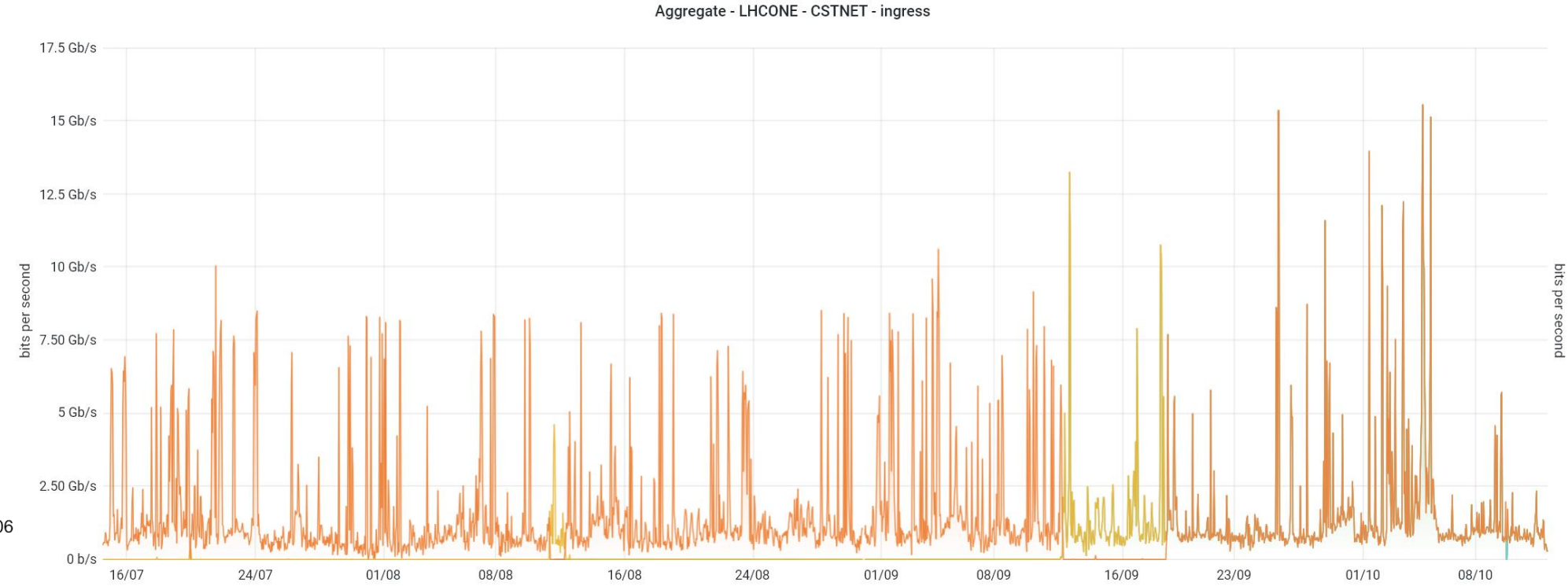
	Bytes	Percent of Total	One Month Change	One Year Change
OSCARS	17.16PB	11.5%	+22.2%	+55.7%
LHCONE	69.68PB	46.5%	+40.7%	+52.9%
Normal traffic	63.02PB	42.1%	-31.1%	+40.6%
Total	149.86PB		-3.35%	+47.8%

Internet2

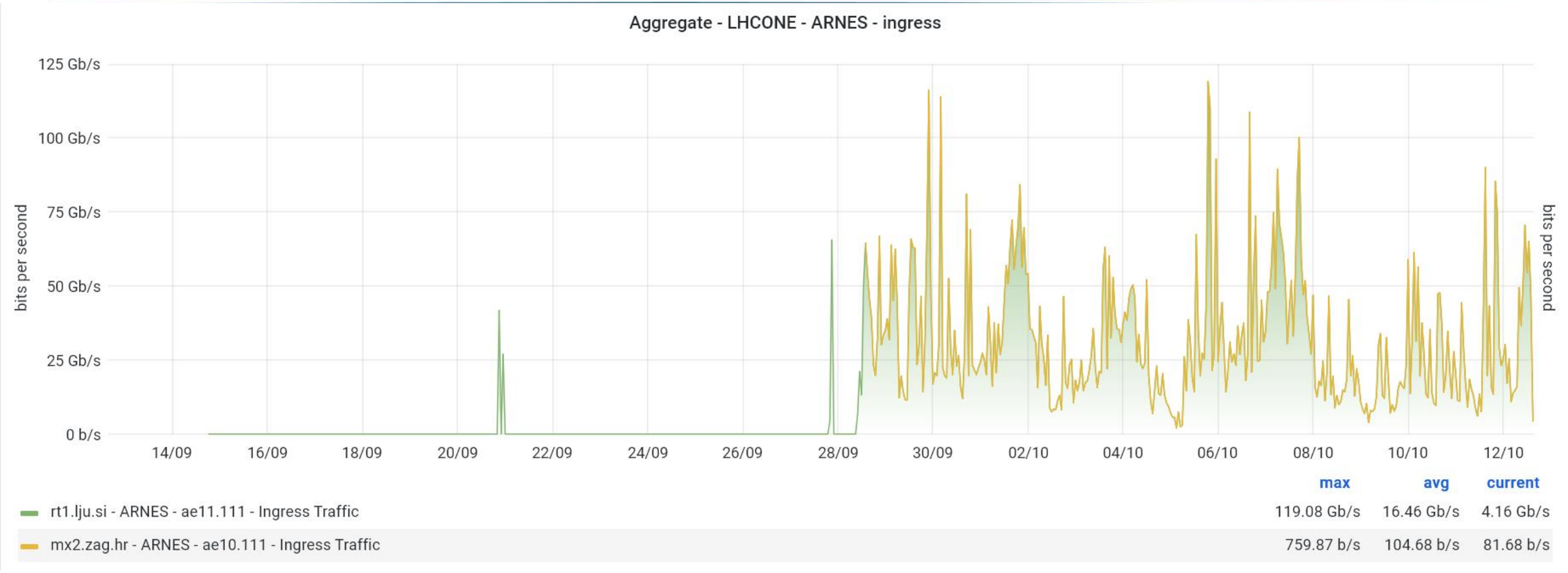

20 Gb/s
15 Gb/s
10 Gb/s
5 Gb/s
0 b/s
04/16
05/01
05/16
06/01
06/16
07/01
07/16
08/01
08/16
09/01
09/16
10/01
min
max
avg
Input [1d sums]
615 Mb/s
11.0 Gb/s
3.02 Gb/s
Output [1d sums]
820 Mb/s
15.6 Gb/s
4.22 Gb/s

CSTNET

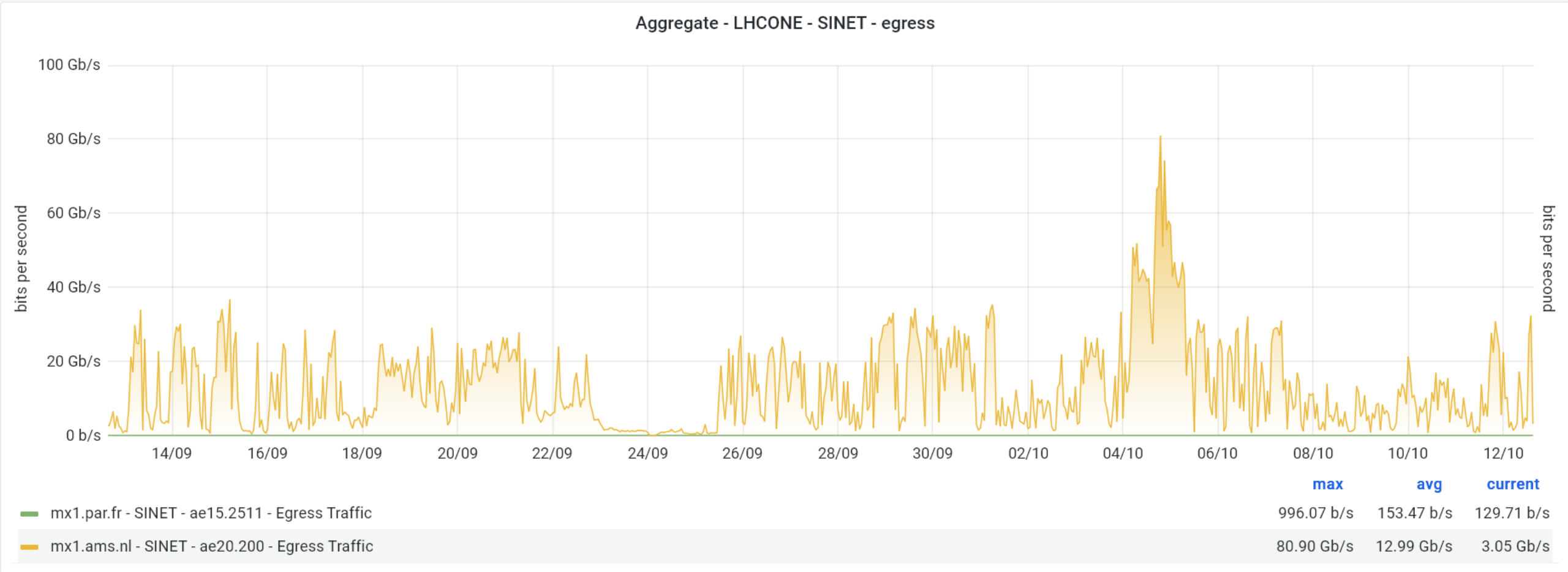

JGN/SINET
Backbone
Auto Switching
VLAN 1006
VLAN 1006
VLAN 1005
VLAN 1006
DWDM
VLAN 1005
VLAN 1006
IC-1
VLAN 1005
CSTNET
SOE-1
SOE-2
GEANT


Aggregate - LHCONE - CSTNET - ingress
17.5 Gb/s
15 Gb/s
12.5 Gb/s
10 Gb/s
7.50 Gb/s
5 Gb/s
2.50 Gb/s
0 b/s
bits per second
bits per second
16/07
24/07
01/08
08/08
16/08
24/08
01/09
08/09
16/09
23/09
01/10
08/10

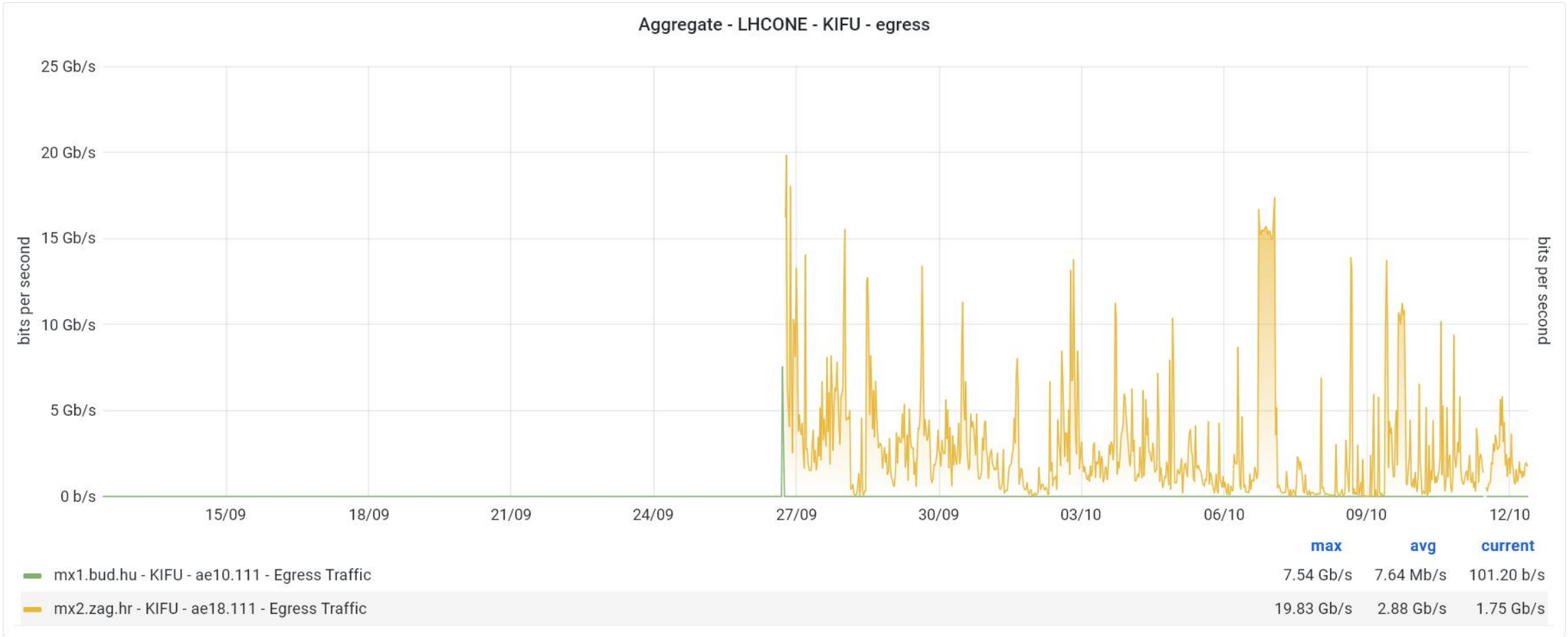
Highlights


Aggregate - LHCONE - ARNES - ingress
125 Gb/s
100 Gb/s
75 Gb/s
50 Gb/s
25 Gb/s
0 b/s
bits per second
bits per second
14/09
16/09
18/09
20/09
22/09
24/09
26/09
28/09
30/09
02/10
04/10
06/10
08/10
10/10
12/10
max
avg
current
rt1.lju.si - ARNES - ae11.111 - Ingress Traffic
119.08 Gb/s
16.46 Gb/s
4.16 Gb/s
mx2.zag.hr - ARNES - ae10.111 - Ingress Traffic
759.87 b/s
104.68 b/s
81.68 b/s

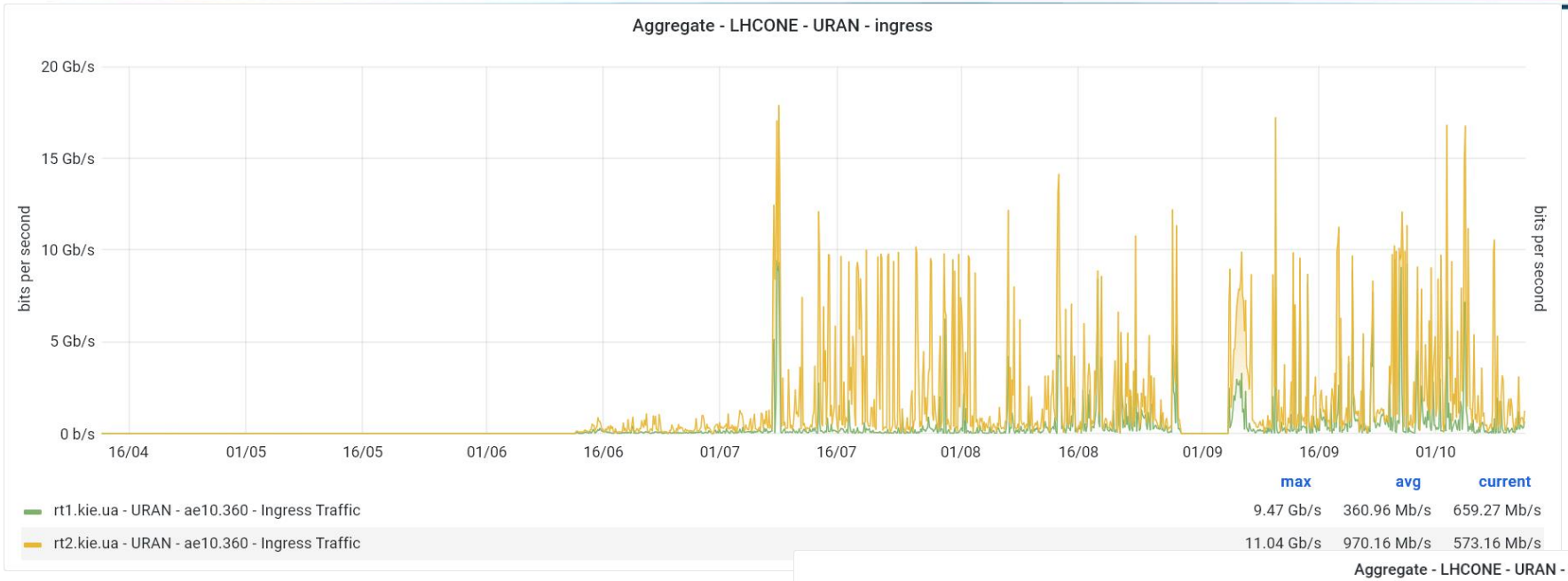
Highlights

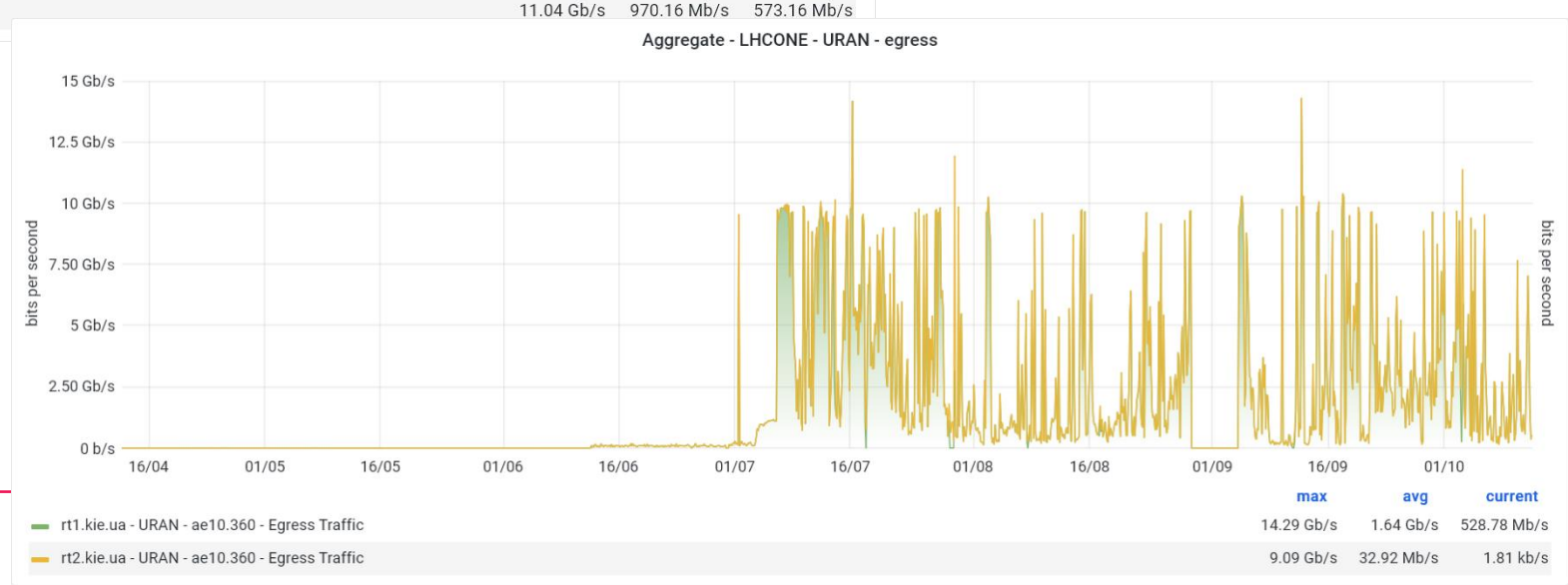

Aggregate - LHCONE - SINET - egress
100 Gb/s
80 Gb/s
60 Gb/s
40 Gb/s
20 Gb/s
0 b/s
bits per second
bits per second
14/09
16/09
18/09
20/09
22/09
24/09
26/09
28/09
30/09
02/10
04/10
06/10
08/10
10/10
12/10
max
avg
current
mx1.par.fr - SINET - ae15.2511 - Egress Traffic
996.07 b/s
153.47 b/s
129.71 b/s
mx1.ams.nl - SINET - ae20.200 - Egress Traffic
80.90 Gb/s
12.99 Gb/s
3.05 Gb/s

Highlights


Aggregate - LHCONE - KIFU - egress
25 Gb/s
20 Gb/s
15 Gb/s
10 Gb/s
5 Gb/s
0 b/s
bits per second
bits per second
15/09
18/09
21/09
24/09
27/09
30/09
03/10
06/10
09/10
12/10
max
avg
current
mx1.bud.hu - KIFU - ae10.111 - Egress Traffic
7.54 Gb/s
7.64 Mb/s
101.20 b/s
mx2.zag.hr - KIFU - ae18.111 - Egress Traffic
19.83 Gb/s
2.88 Gb/s
1.75 Gb/s

Highlights


Aggregate - LHCONE - URAN - ingress
20 Gb/s
15 Gb/s
10 Gb/s
5 Gb/s
0 b/s
bits per second
16/04
01/05
16/05
01/06
16/06
01/07
16/07
01/08
16/08
01/09
16/09
01/10
max
avg
current
rt1.kie.ua - URAN - ae10.360 - Ingress Traffic
9.47 Gb/s
360.96 Mb/s
659.27 Mb/s
rt2.kie.ua - URAN - ae10.360 - Ingress Traffic
11.04 Gb/s
970.16 Mb/s
573.16 Mb/s

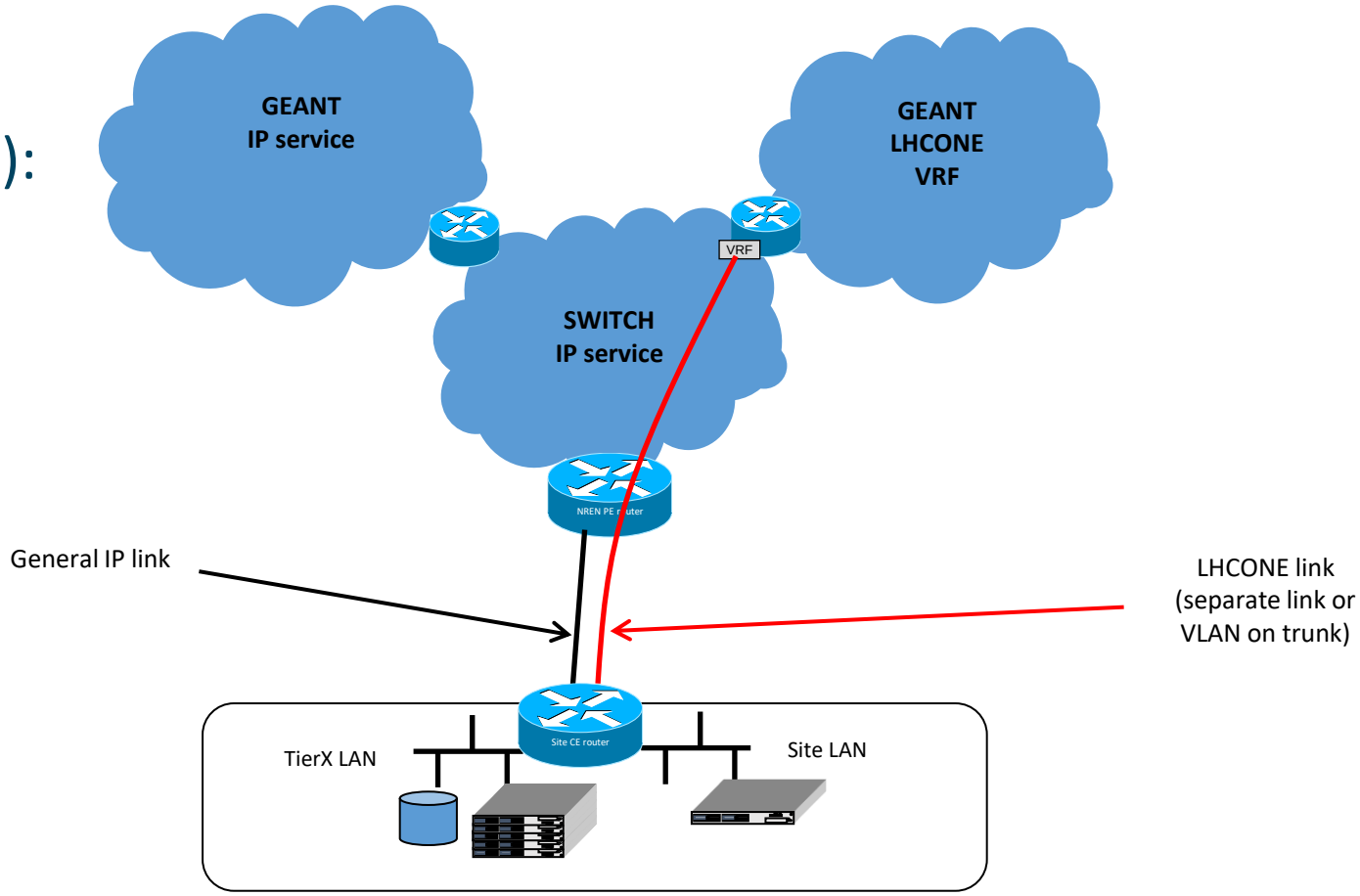

Aggregate - LHCONE - URAN - egress
15 Gb/s
12.5 Gb/s
10 Gb/s
7.50 Gb/s
5 Gb/s
2.50 Gb/s
0 b/s
bits per second
16/04
01/05
16/05
01/06
16/06
01/07
16/07
01/08
16/08
01/09
16/09
01/10
max
avg
current
rt1.kie.ua - URAN - ae10.360 - Egress Traffic
14.29 Gb/s
1.64 Gb/s
528.78 Mb/s
rt2.kie.ua - URAN - ae10.360 - Egress Traffic
9.09 Gb/s
32.92 Mb/s
1.81 kb/s

Sites news

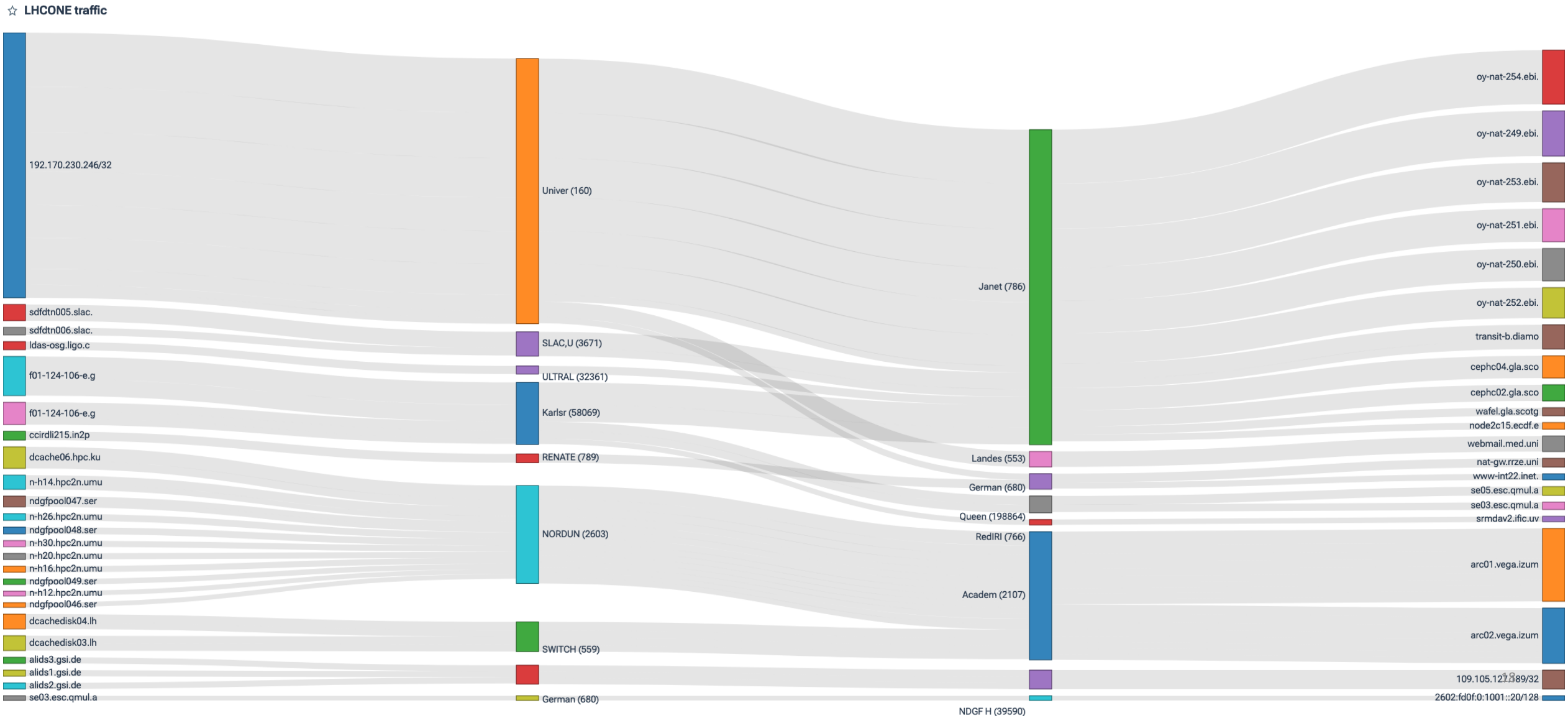
- CERN LHCOPN/ONE connection to ESnet have been upgraded to 400G (400G for each pair of routers, so 2x400G in total)
- RAL-LCG2 has started deploying hosts under the new IPv6 2001:630:54::/52 prefix
- PIC upgraded to 100G from 70G
- INFN-NAPOLI upgraded to 100G

NRENs news

- New LHCONE joiners (not yet completed):
  - SWITCH (University of Bern-LHEP)*
  - FCCN (NCG-INGRID-PT)
- CSTNET-GÉANT peering moved to 100G London-Singapore-Beijing link
- Fixed GÉANT-I2 and GÉANT-ESnet IPv6 peering in London and Paris



Flow analysis (stay tuned…)



Thank you!

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