LHCOPN update

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LHCOPN/ONE meeting #50

18th April 2023
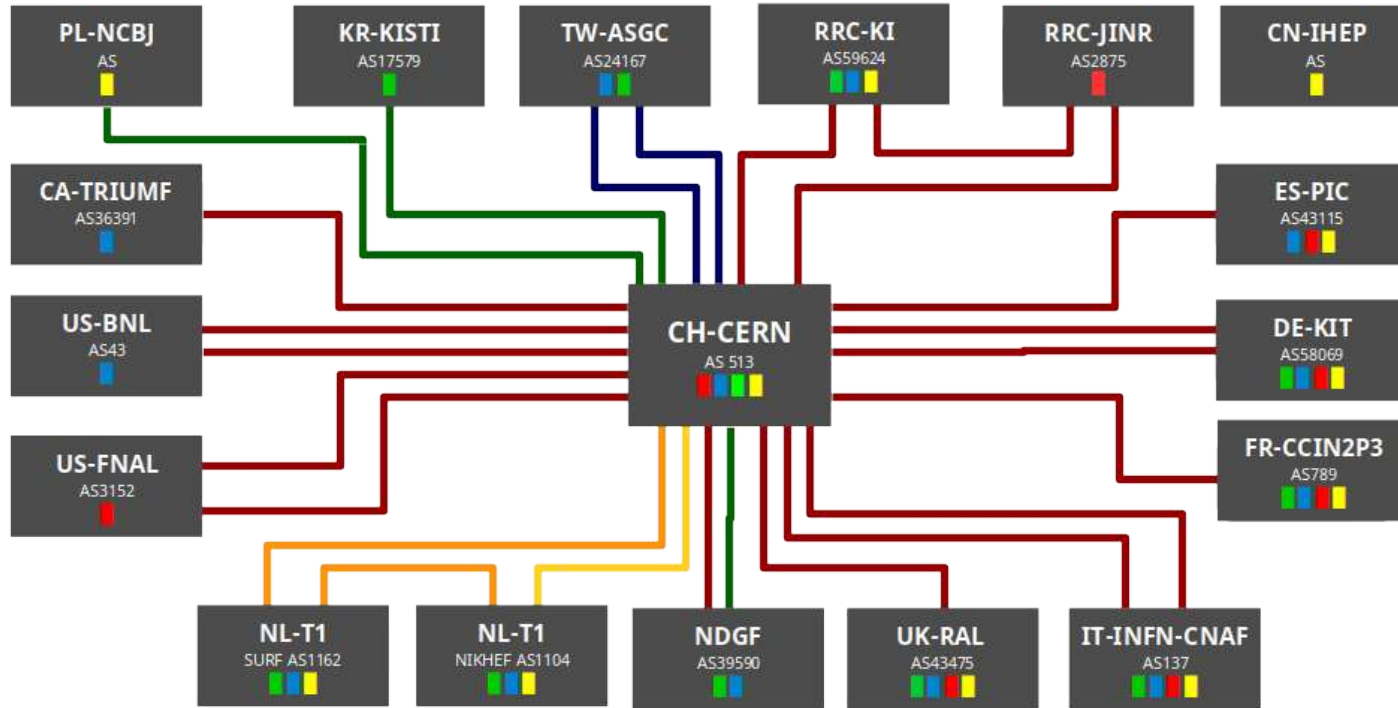
Numbers
- 14 Tier1s + 1 Tier0
- 2 new Tier1s soon joining
- 12 countries in 3 continents
- 2.1 Tbps to the Tier0

https://twiki.cern.ch/twiki/bin/view/LHCOPN/OverallNetworkMaps

Latest news

CH-CERN:

- Completed migration of second LHCOPN router from Juniper QFX-10002 to Juniper PTX-10001, to support 400Gbps connections
- LHCONE connections to GEANT upgraded to 2x 400Gbps in November
- Requested upgrade of connections to ESnet to 2x 400Gbps (LHCOPN and LHCONE)
- Construction of Prevessin Computer Centre is progressing well

CERN PDC status

Prévessin Data Centre (PDC, previously known as PCC):
- On target for being operational before the end of the year.

First round of purchases:
- 280x quads →
     1'120 compute nodes →
     143'350 cores (AMD Milan)
- Network routers and switches
     already delivered

LHCOPN latest news

NLT1:

- Implemented L3 transit via SURF to increase redundancy
- Link to SurfSARA upgraded to 2x 100Gbps.

CA-TRIUMF:

- Upgraded link via CANARIE, ANA and SURF to 100Gbps. Now primary link

ES-PIC

- Upgraded LHCOPN link to 100Gbps

Tier1s

- TW-ASGC no longer Tier1. Effective from October 2023
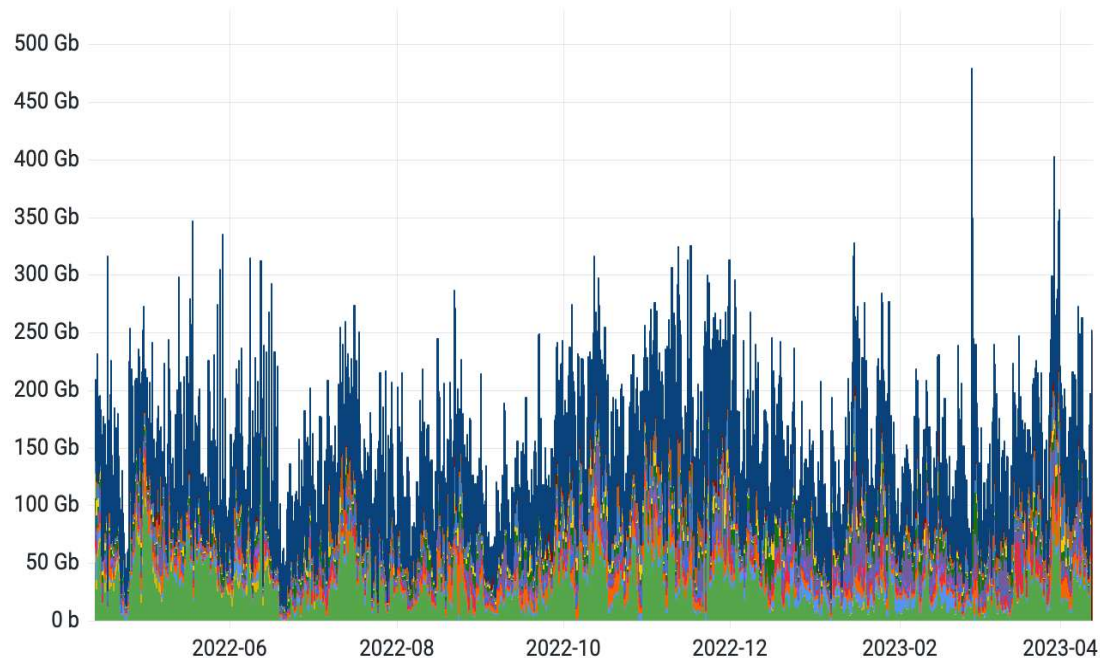- NBCJ (PL) and IHEP (CN) in the process to become Tier1s

Latest news

Other Tier1s

- [input from the audience]

LHCOPN Traffic – last 12 months

LHCOPN Total Traffic (CERN -> T1s)

		Mean	Max
●	Outgoing DE-KIT	49.9 Gb	251 Gb
●	Outgoing KR-KISTI	872 Mb	11.4 Gb
●	Outgoing RU-T1	5.34 Gb	46.0 Gb
●	Outgoing FR-IN2P3	10.4 Gb	86.7 Gb
●	Outgoing NDGF	6.54 Gb	83.3 Gb
●	Outgoing NL-T1	6.46 Gb	94.4 Gb
●	Outgoing TW-ASGC	1.71 Gb	9.69 Gb
●	Outgoing IT-INFN-CNAF	11.5 Gb	127 Gb
●	Outgoing UK-RAL	7.28 Gb	38.8 Gb
●	Outgoing CA-TRIUMF	4.96 Gb	75.7 Gb
●	Outgoing US-BNL	10.1 Gb	87.7 Gb
●	Outgoing US-FNAL	5.76 Gb	82.3 Gb
●	Outgoing ES-PIC	2.91 Gb	54.3 Gb
●	Total	124 Gb	479 Gb

Numbers:

Moved ~488 PB in the last 12 months

+12% compared to previous year (433PB)

Peak at ~479Gbps

Ref: https://monit-grafana-open.cern.ch/d/HreVOyc7z/all-lhcopn-traffic?orgId=16

LHCOPN: Long-term growth
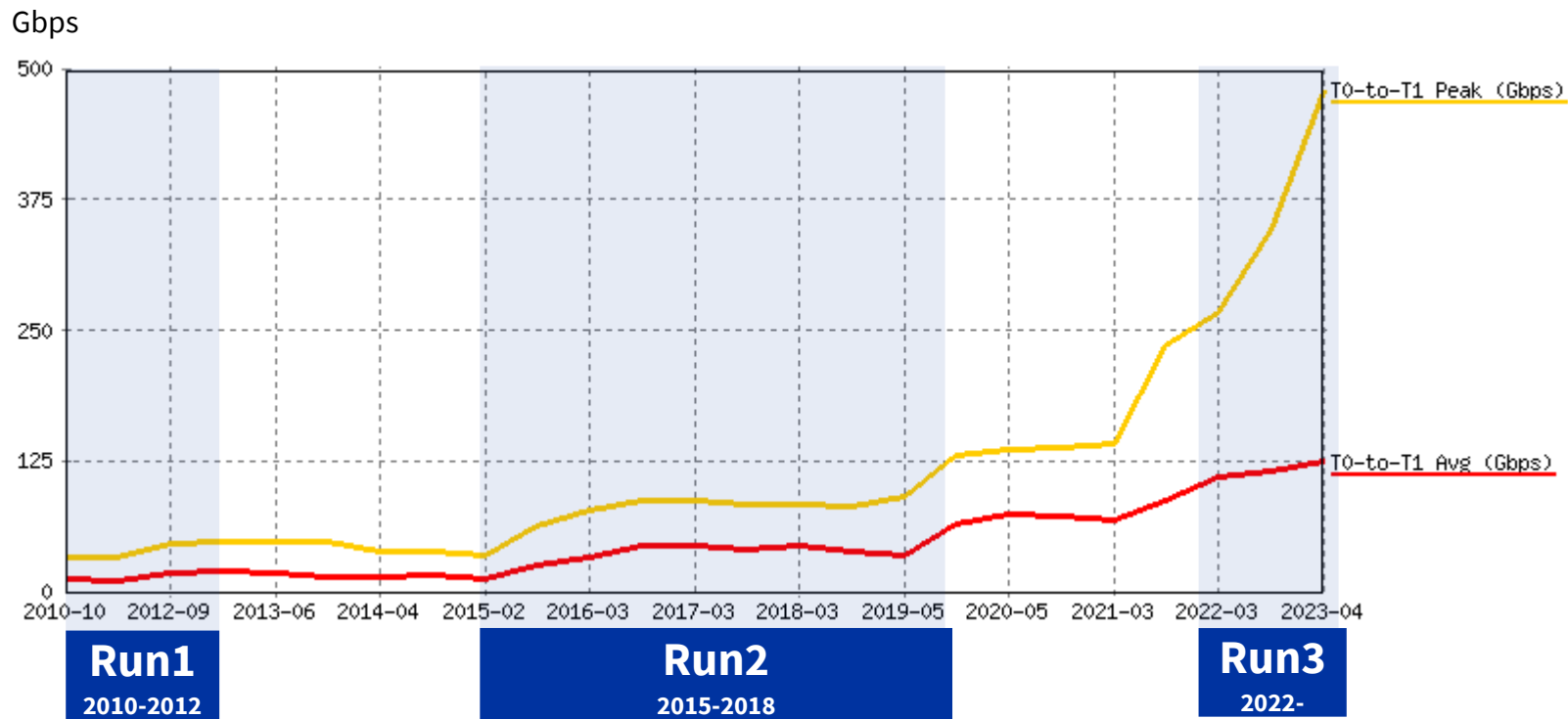
Gbps

Run1: 2010-2012
LS1:2013-2014
Run2: 2015-2018
LS2: 2019-2021
Run3: 2022-2025

Y-Axis: Gbps - Average bandwidth of previous 12 months

Ref: https://twiki.cern.ch/twiki/bin/view/LHCOPN/LhcopnStats

CERN total traffic

LHCOPN+LHCONE+Internet
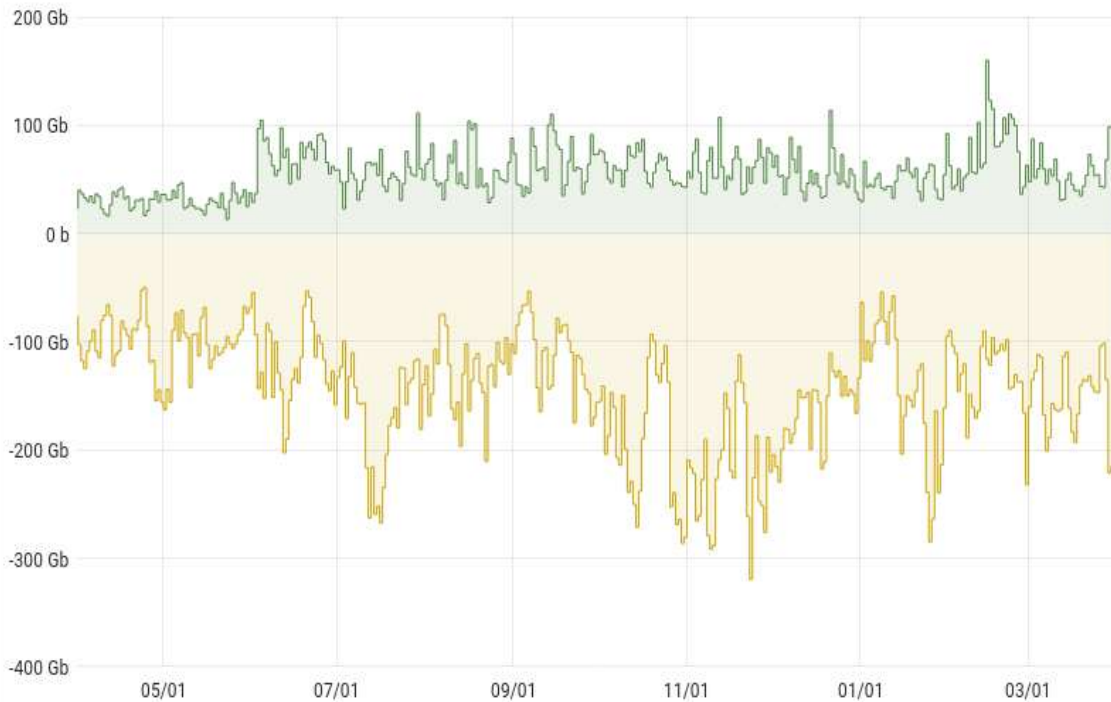
|	min	max	avg
Internet IPv4 In	0 b	13.7 Gb	5.52 Gb
Internet IPv4 Out	0 b	107 Gb	38.3 Gb
Internet IPv6 In	1.90 Gb	27.0 Gb	7.67 Gb
Internet IPv6 Out	1.47 Gb	38.5 Gb	8.10 Gb
Internet Total In	4.08 Gb	32.5 Gb	13.2 Gb
Internet Total Out	5.93 Gb	124 Gb	46.4 Gb
WLCG IPv4+IPv6 In	6.39 Gb	141 Gb	42.4 Gb
WLCG IPv4+IPv6 Out	13.6 Gb	223 Gb	97.8 Gb
Total In	12.9 Gb	160 Gb	55.6 Gb
Total Out	49.7 Gb	319 Gb	144 Gb

Numbers:

Sent out ~567 PB in the last 12 months

+22% compared to previous year (463PB)

Ref: https://monit-grafana.cern.ch/d/cScW82Tnz/00-overview?orgId=14&var-source=long_term&var-bin=1d&from=now-1y&to=now

LHC schedule

https://lhc-commissioning.web.cern.ch/schedule/LHC-long-term.htm
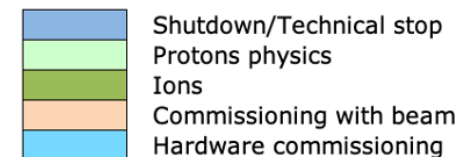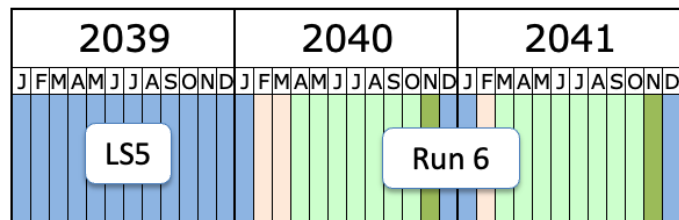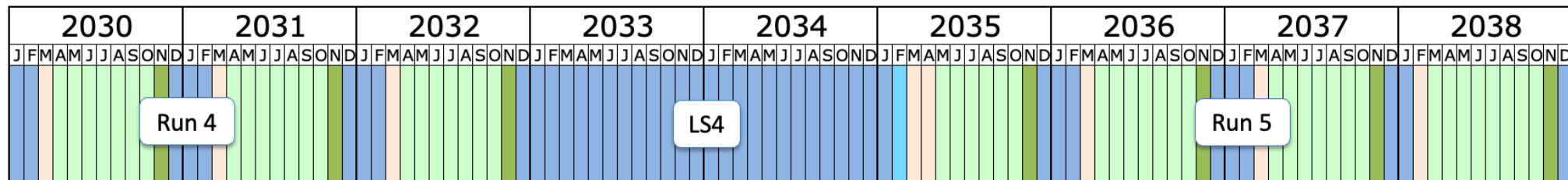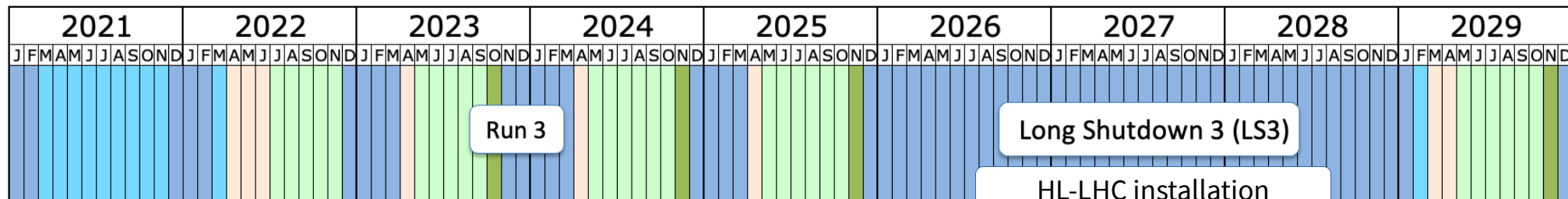
Questions?

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