



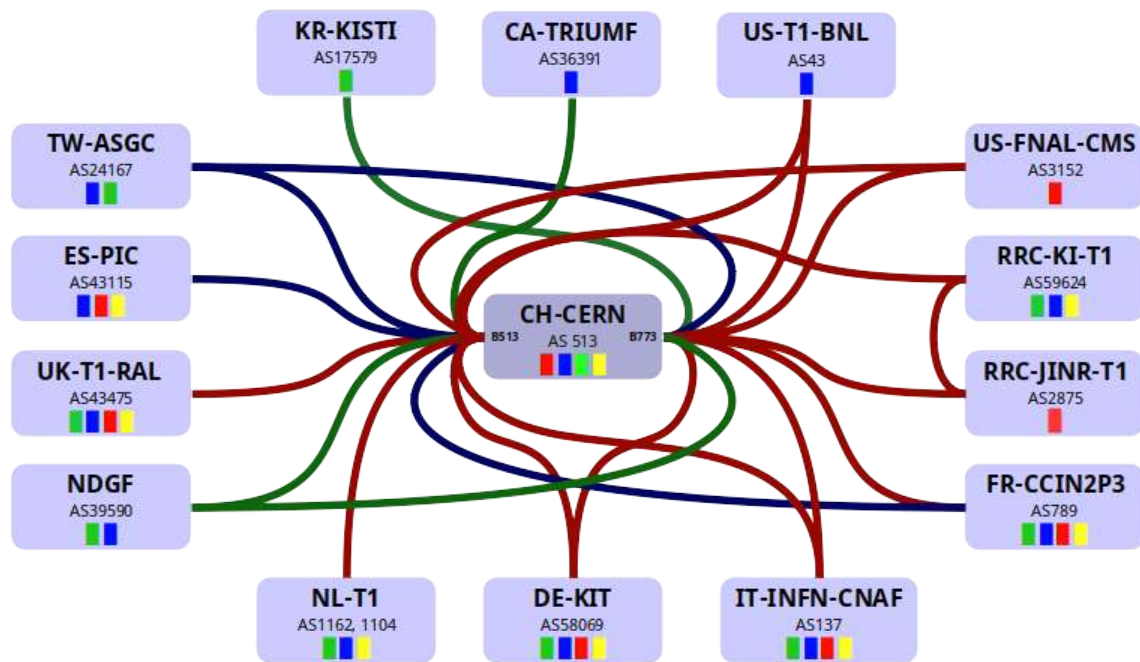
LHCOPN update

Edoardo Martelli

LHCOPN/ONE meeting #48

29th March 2022

LHCOPN



■ = Alice ■ = Atlas ■ = CMS ■ = LHCb

— 10Gbps
— 20Gbps
— 40Gbps
— 100Gbps

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

Numbers

- 14 Tier1s + 1 Tier0
- 12 countries in 3 continents
- Dual stack IPv4-IPv6
- 1.3 Tbps to the Tier0



Latest news

ES-PIC

- Waiting for GEANT to upgrade Madrid and Geneva POP to deploy new 100G link. Using load-balancing with LHCONE to temporarily increase capacity

CH-CERN:

- R&D link to Amsterdam being upgraded to 400G with option to test 800G.
New 400G switch installed in Amsterdam
- Deployed one new Juniper router PTX10001 to support 400G links on LHCOPN. Testing 400Gbps with NIKHEF (temporary test link provided by SURF)
- ESnet will upgrade their equipment at CERN in May 2022 (ESnet6 upgrade)

Latest news

CH-CERN:

- New LHCOPN statistic web page based on Grafana; It will replace the long-lived but ageing netstat.cern.ch
 - Public page
 - Protected page (source)
- The PCC (Prévessin Computing Centre) contract has been signed. Construction has started, to be completed by mid-2023

CERN PCC



Rendering image

CERN PCC today



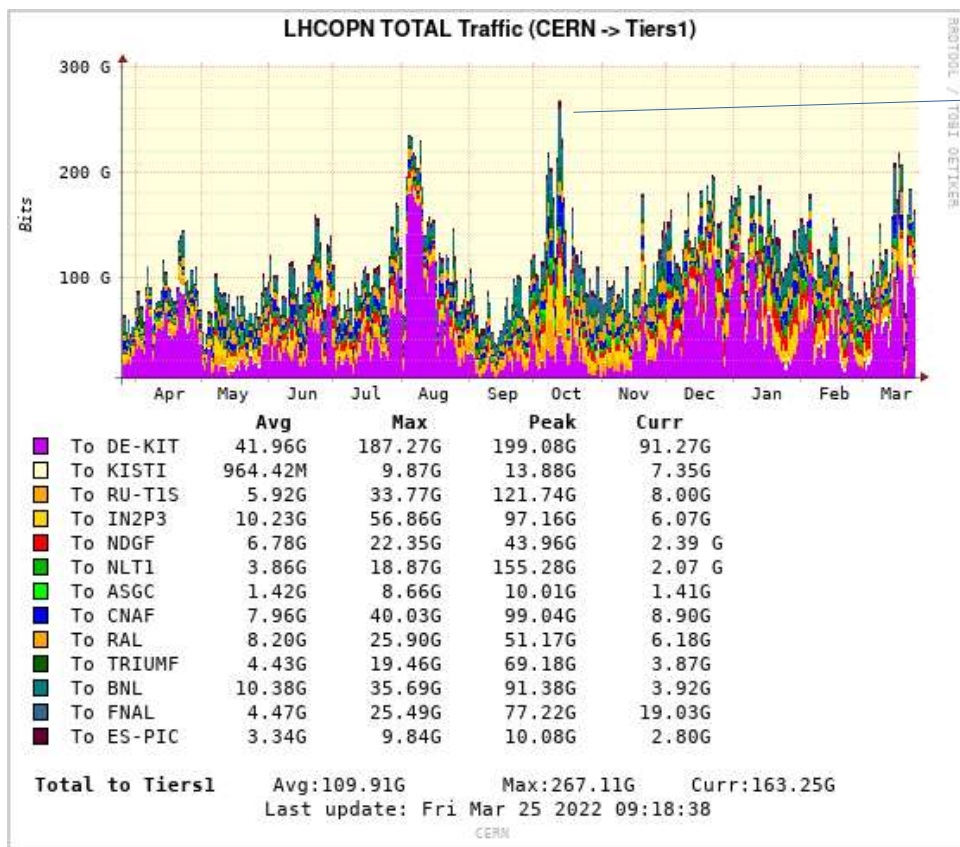
29-Mars-2022

Latest news

Other Tier1s

- [input from the audience]

LHCOPN Traffic – last 12 months



WLCG data
Challenge
~10 Oct 2021

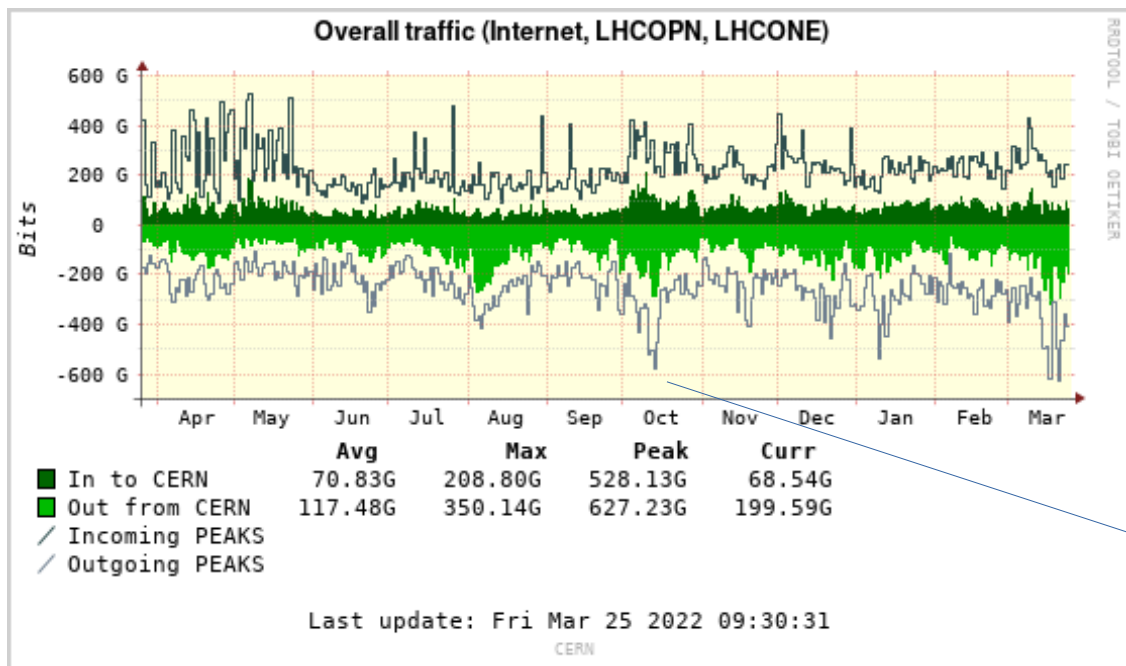
Numbers:

Moved ~433 PB in
the last 12
months

+60% compared
to previous year
(269PB)

Peak at ~270Gbps

CERN total traffic



WLCG data
Challenge
~10 Oct 2021

Numbers:

Sent out ~463 PB
in the last 12
months

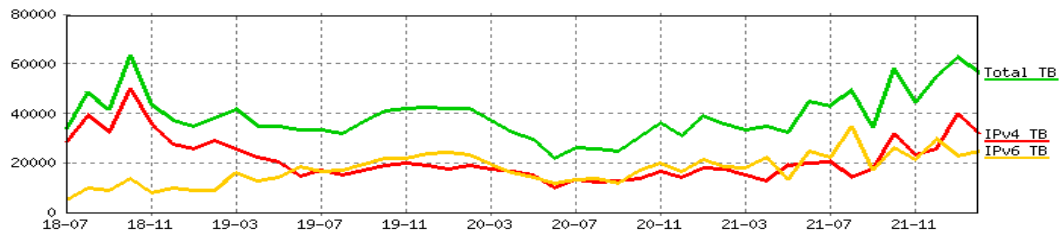
+68% compared
to previous year
(275PB)

Peak at ~630Gbps

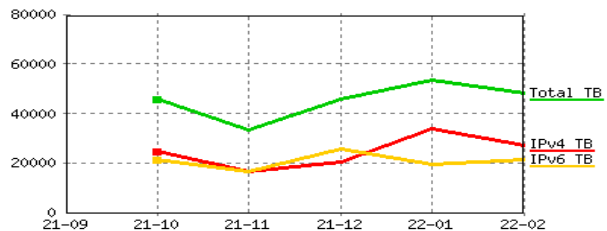
Ref: <https://netstat.cern.ch/monitoring/network-statistics/ext/?q=CERN&p=EXT&mn=01-Total-Internet-traffic&t=Yearly>

LHCOPN+LHCONE: IPv4 vs IPv6

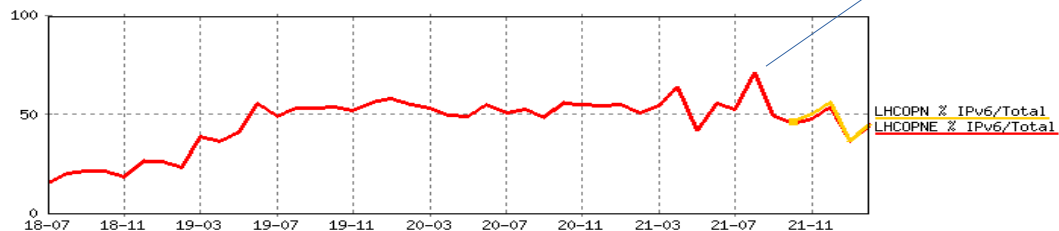
LHCOPN+LHCONE IPv4 and IPv6 traffic volumes month by month



LHCOPN IPv4 and IPv6 traffic volumes month by month



Percentage of IPv6 traffic over the total



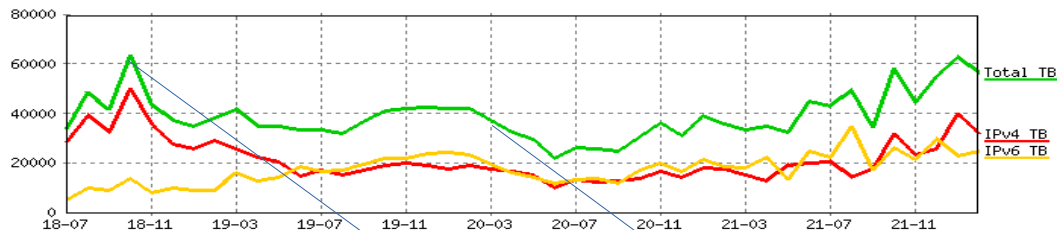
IPv6 peak at ~70%,
then down below 50%

v4/v6 as seen on
the CERN
LHCOPN/ONE
border routers

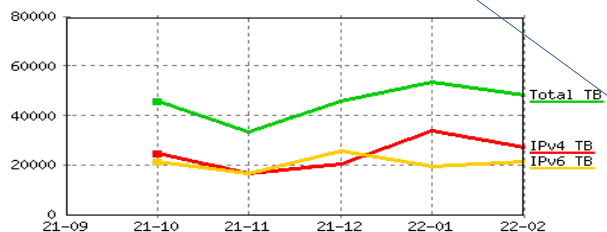


LHCOPN+LHCONE: IPv4 vs IPv6

LHCOPN+LHCONE IPv4 and IPv6 traffic volumes month by month



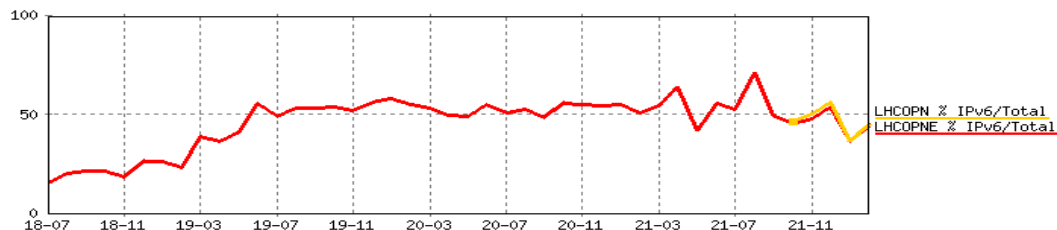
LHCOPN IPv4 and IPv6 traffic volumes month by month



Start of pandemic
March 2020

End of Run2
November 2018

Percentage of IPv6 traffic over the total

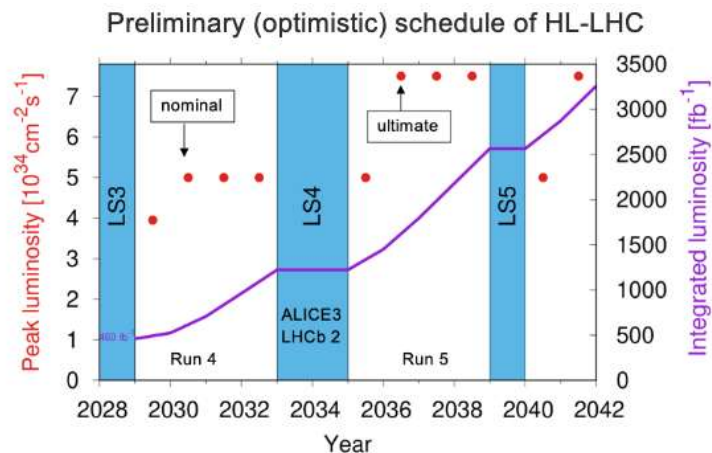


v4/v6 as seen on
the CERN
LHCOPN/ONE
border routers

Total traffic back
to the level of the
end of Run2



New HL-LHC Schedule



Shown integrated luminosities include 1 month/year of HI running and no MD or special runs after 2036

LS4 extended from 1 to 2 years (in view of ALICE and LHCb upgrades)

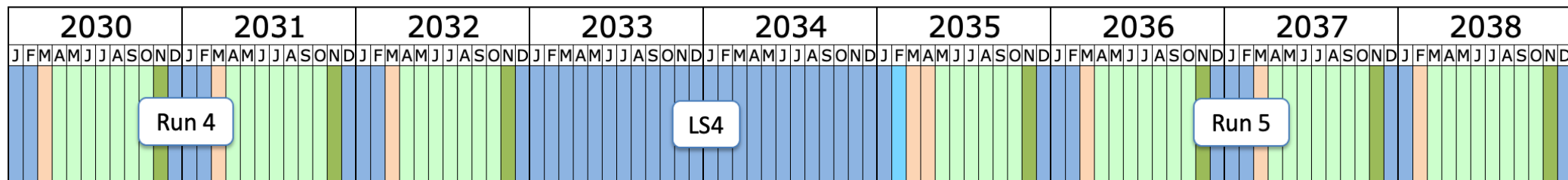
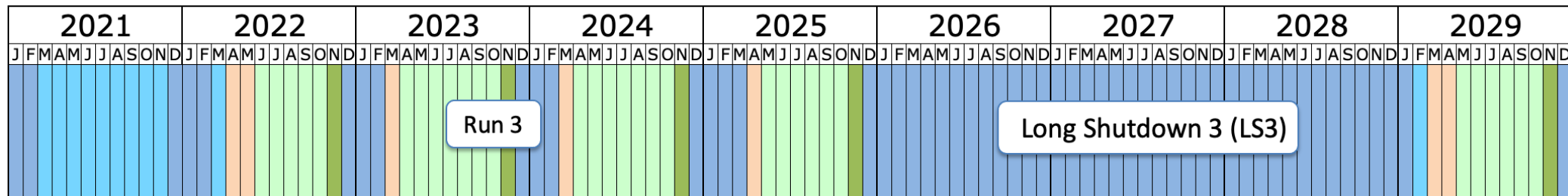
With proposed shift and extension of LS3, and inclusion of HI runs beyond LS3:

- 2500 fb^{-1} are expected by end 2038 (current end-date of HL-LHC)
- 3000 fb^{-1} (int. luminosity goal) would now be reached in ~ 2041

DG office, 28-01-2022: "The new schedule foresees long shutdown 3 (LS3) to start in 2026 (i.e. one year later than in the current schedule) and to last for 3 years (instead of 2.5 years)"

Impact of sanctions to Russia not yet estimated, though

LHC schedule

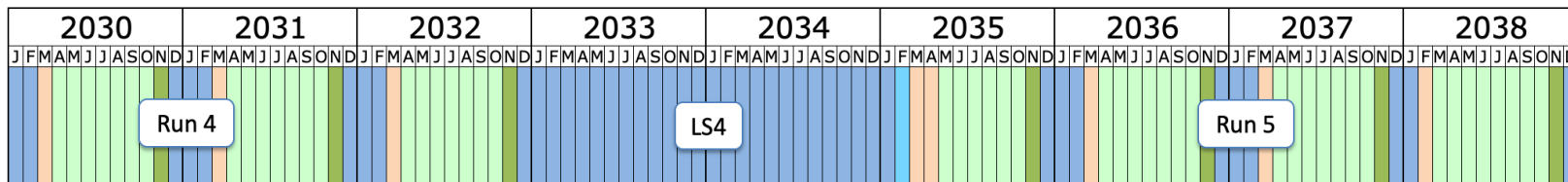
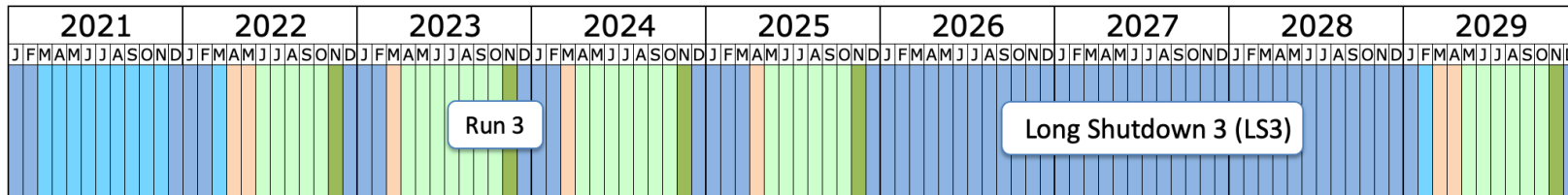


Last updated: January 2022

- Shutdown/Technical stop
- Protons physics
- Ions
- Commissioning with beam
- Hardware commissioning/magnet training



LHC schedules (comparison with previous)

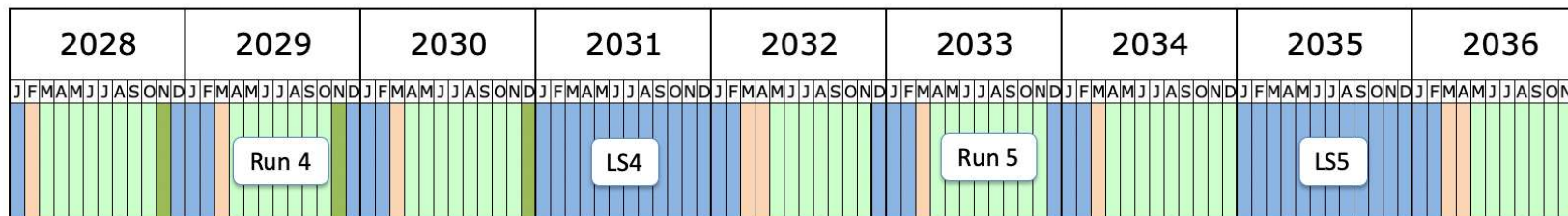


Last updated: January 2022

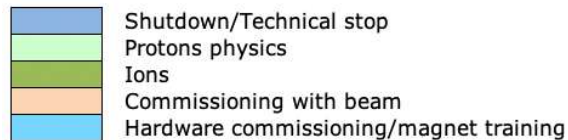
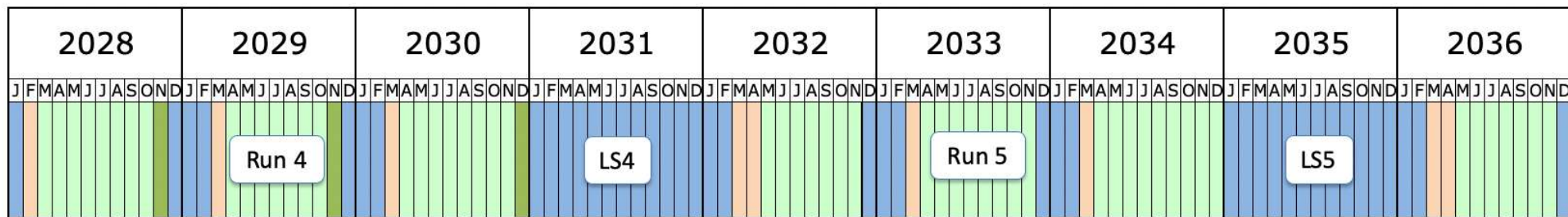
Last



Previous



Previous LHC schedule (for comparison)



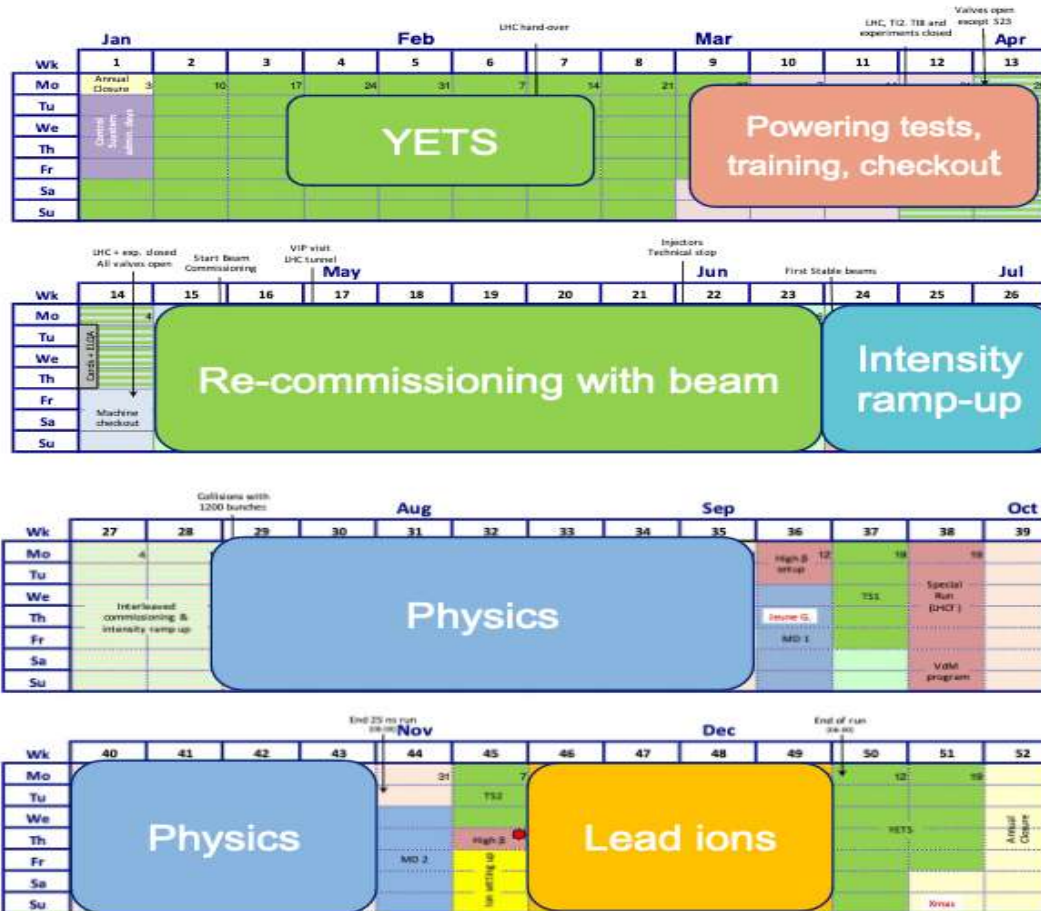
Last updated: June 2021

LHC Schedule 2022

RS

LHC Schedule 2022
Approval by Research Board of 1 December 2021

December 1, 2021
ver. 1.0



Questions?

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