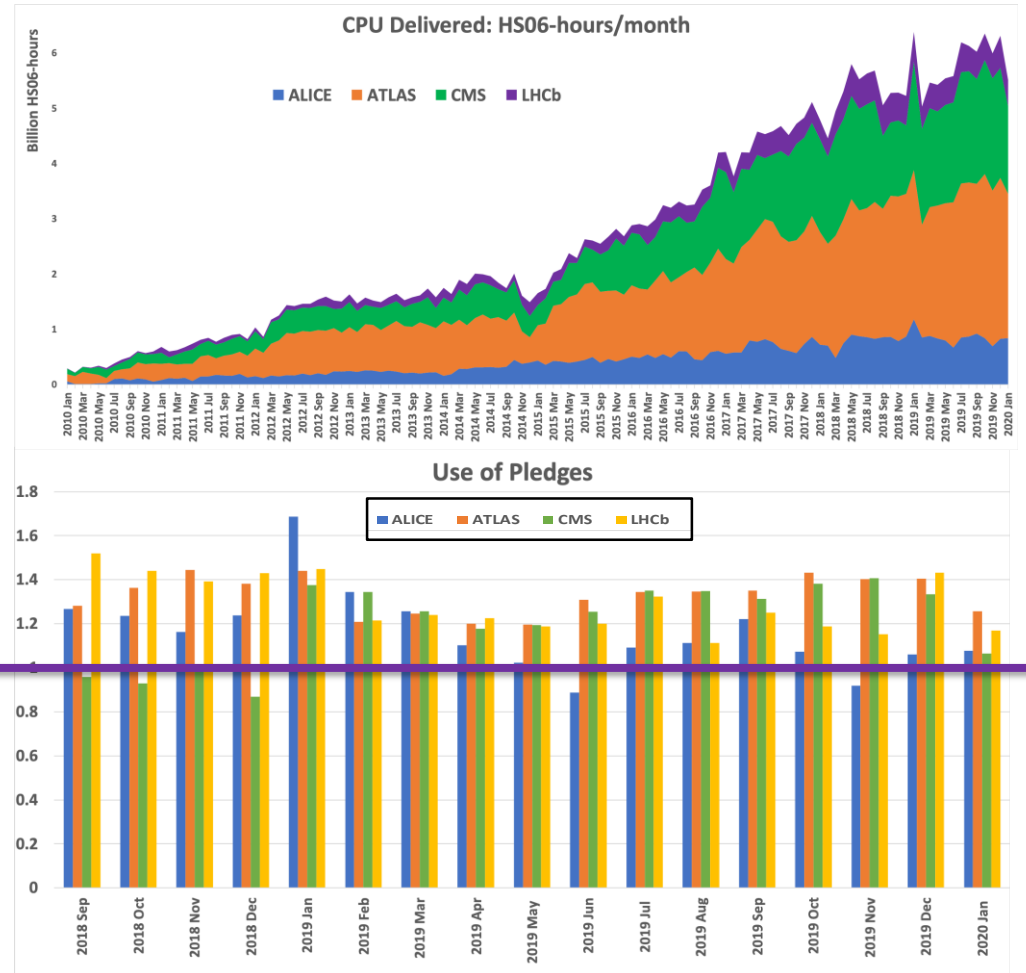


WLCG Status

LHCC Computing Referees meeting

S. Campana (CERN)

WLCG Resource Usage



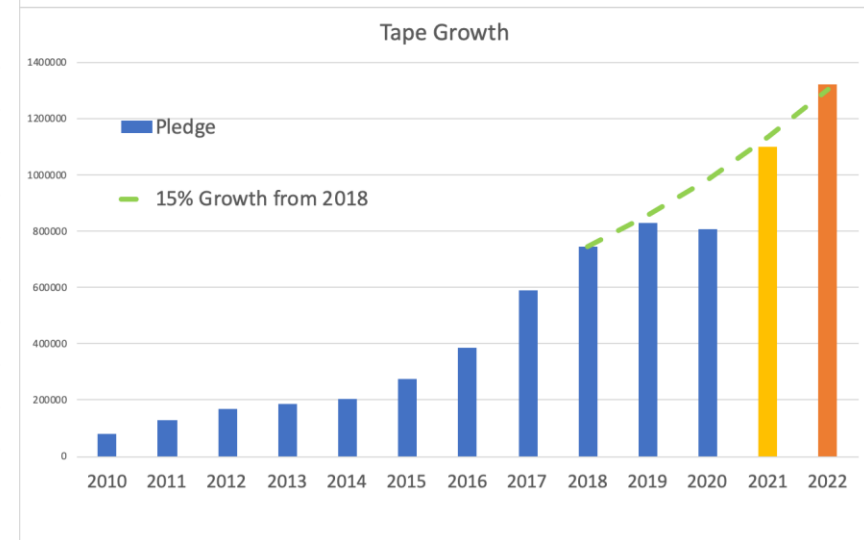
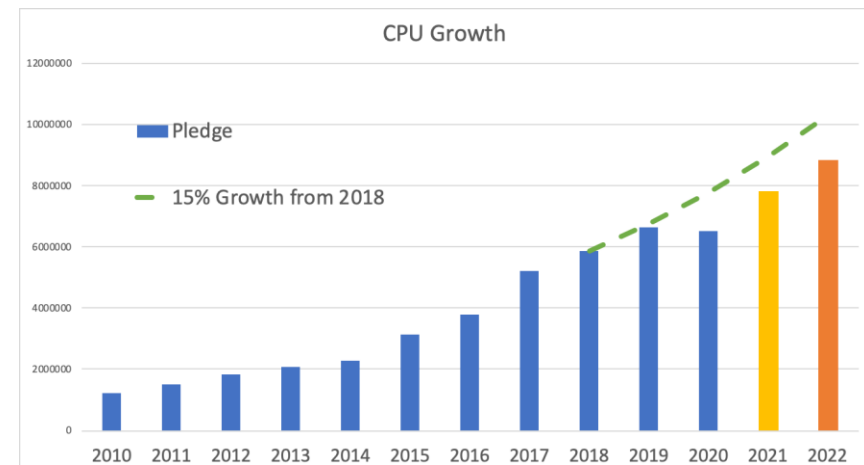
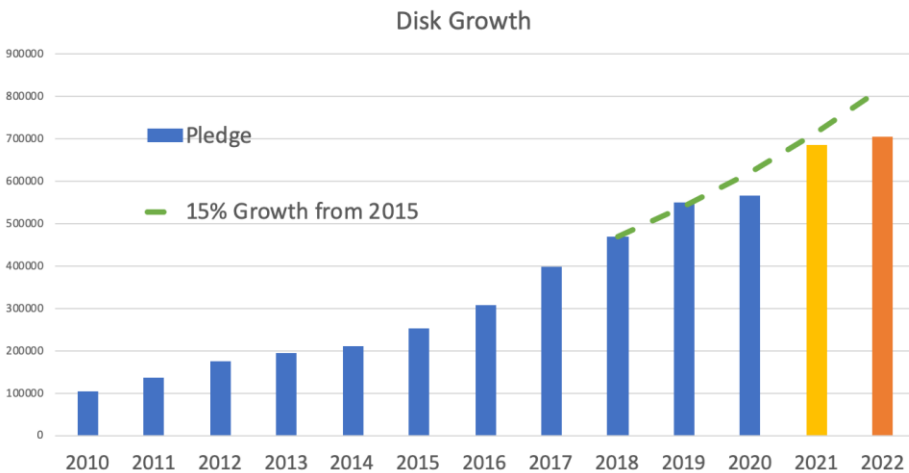
Pledged resources continue being fully used and some opportunistic ones continue being available. Not including most of HPCs/Clouds/HLTs

Preparing for Run-3

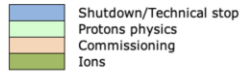
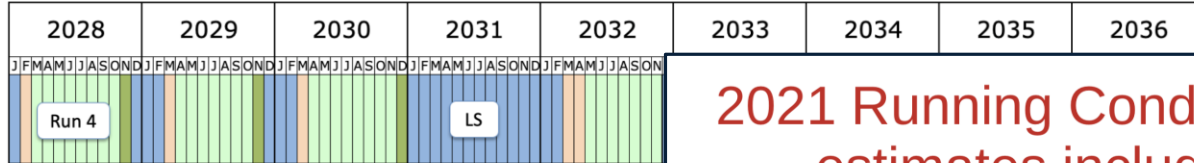
2010-2020: what has been pledged

2021: agreed at Oct. 2019 RRB (will be finalized in April)

2022: 1.5 times 2020



Preparing for Run-3 at the April RRB



Summary from the LPC,
following the discussion
on the LHC schedule

Disclaimer: contingency is
included

2021 Running Conditions for Computing estimates including contingency



- ATLAS/CMS luminosity: 20/fb
- ATLAS/CMS average pile-up: 35
- LHCb luminosity: 3.5/fb
- ALICE luminosity: 45/pb
- Running time pp: 3×10^6 seconds
- Running time ions: 1.2×10^6 seconds

Numbers assume 50% stable beam time

HL-LHC computing review

Following the charge, we are preparing the supporting documents

- One from ATLAS and one from CMS
- DOMA
- Common Software
- Facilities

Editors identified, process started

The common software aspects will be reviewed in detail in Fall 2021

HL-LHC Computing review

Technical Design Reports (TDR) will be developed by ATLAS and CMS to document the plans for Computing and Software in the HL-LHC era. The timeline for delivery of these documents are currently understood to be in the second half of 2023 for a review in early 2024. Under the auspices of the LHCC, a review panel will assess the TDRs, similar to the process for reviewing detector TDRs.

Prior to the review of the Computing TDRs, several preparatory meetings with the review panel will take place, with the first meeting scheduled for May 18-20, 2020. This initial meeting will focus on experiment specific issues and on long range R&D including Data Organization, Management and Access (DOMA). The outcome of the meeting will be a short summary assessing the state of the plans.

The documents and presentations should cover the following areas:

- Establish a baseline computing model. Using the best available knowledge concerning data rates, the size of output formats and the processing time of production processing tasks, scenarios for computing and storage projections should be presented. Where applicable, estimated resources for user analysis can be included. The baseline computing model should outline basic assumptions about data access and placement, and hardware evolution.
- From the baseline computing model, establish anticipated cost drivers and infrastructure assumptions. The roles of the WLCG data centers should be outlined, including the expected technical specifications such as network connectivity.
- The major technological risks and uncertainties should be outlined as well as any necessary programs of research and development that are underway to mitigate the risks and/or introduce new methodologies and technical advances.

In addition, the May 2020 meeting will include short presentations on common tools and community software (such as ROOT, Geant4 and event generators and the broader aspects of heterogeneous architectures) to assess the plans and timelines for HL-LHC functionality.

Supporting documentation (each 20 pages or less) will be made available by May 1, 2020 and will include:

- overviews from the perspective of ATLAS and CMS,
- outline of DOMA and necessary technology R&D
- common tools and community software
- Facility issues, including the role of the Tiers, non-Grid resources such as HPC Centers and critical policy issues, e.g. authentication and authorization

Running Conditions for HL-LHC

We agreed a common set of conditions with ATLAS and CMS for the purpose of the HL-LHC computing review. Planning for a nominal year

Each experiment will produce a projection of the computing needs based on those

Live time (year): 7M seconds

Pileup: $\mu=200$

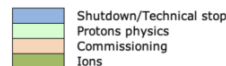
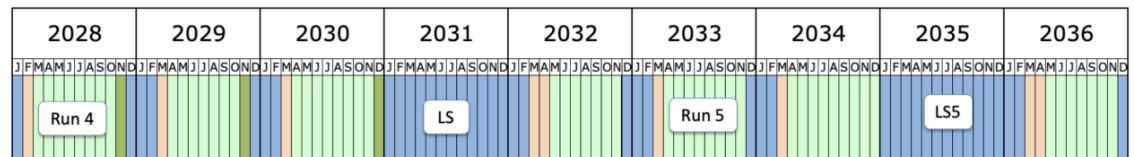
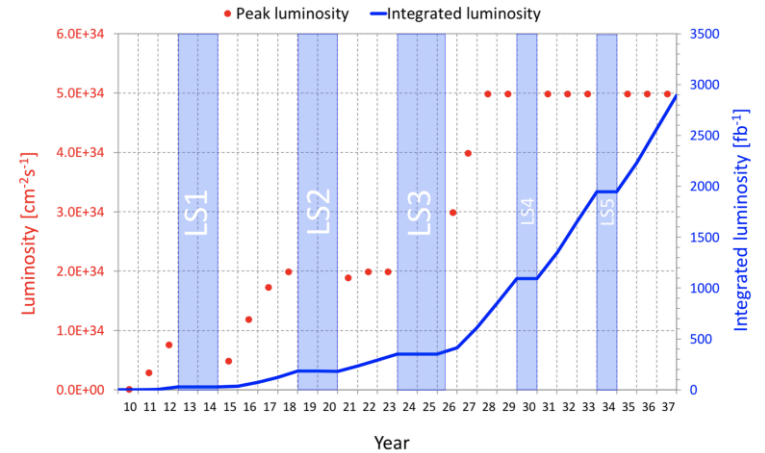
Energy: $E=14$ TeV

Trigger Rate: 10kHz

1st "production" year: 2028

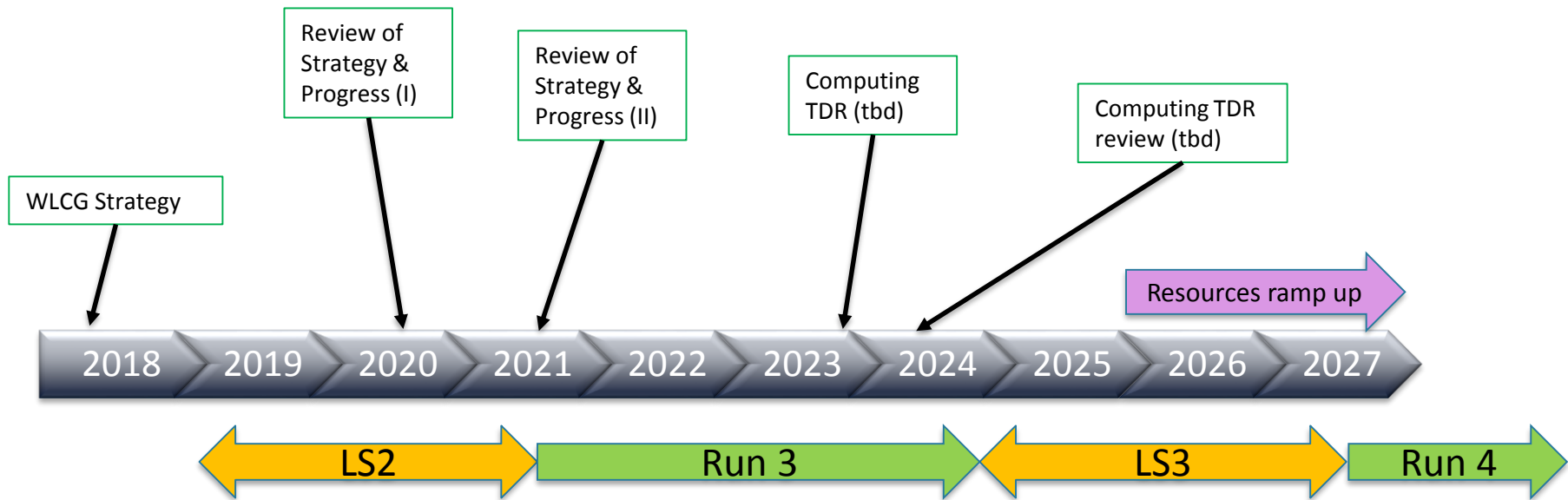
FF: +10% hardware/year

In addition, experiments might provide estimates based on the their own baseline parameters



<http://lhc-commissioning.web.cern.ch/lhc-commissioning/schedule/HL-LHC-plots.htm>

Computing road toward HL-LHC



Current (Feb 2020) timeline of the HL-LHC computing review and TDR process

LHCOPN/LHCONE workshop (Jan 2020)

Experiment computing models will reduce storage TCO increasing network use
Expect $\sim x10$ increase in network needs by HL-LHC, with hotspots

Desire for more network monitoring, interesting projects ongoing
Data marking (tagging) would improve the understanding of the traffic flow
and allow better network shaping.

Lively discussion about the future of LHCONE with respect of "new"
experiments (in HEP and other sciences)

A general concern about security and thrust in LHCONE for the future. A
dedicated working group being set up

https://indico.cern.ch/event/813757/contributions/3698521/attachments/1969608/3276108/LHCOPNE-20200114-CERN-meeting-report-v1.0.pptx_1.pdf

Key Messages

1. WLCG infrastructure running stably, increasing activity also during LS2
2. We discussed with the LPC and received a clear set of parameters for the April 2020 RRB computing discussion. We will ask for this also preparing future RRBs
3. At the moment we identified no resource issue for Run-3 (but we have not seen Run-3 yet)
4. We are preparing for the HL-LHC computing review in May 2020. We are on schedule. We are proposing a common set of conditions for the review
5. R&D activities are continuing in all areas