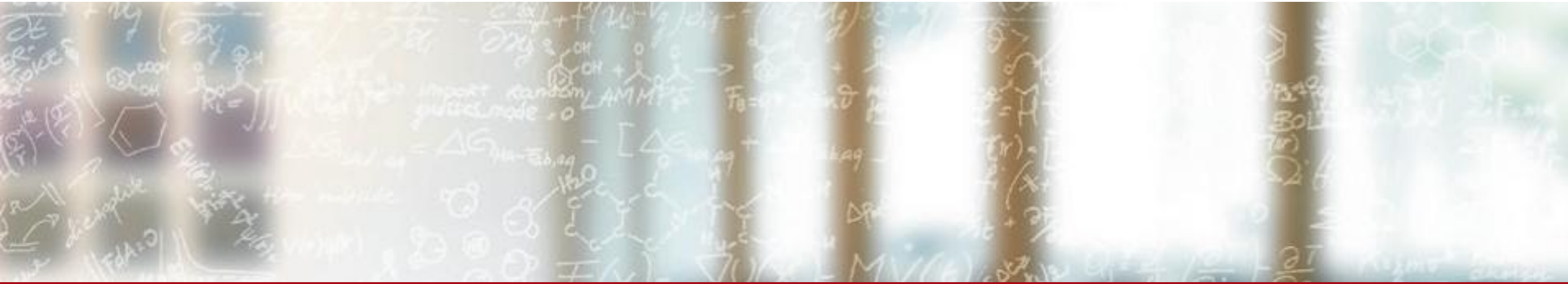




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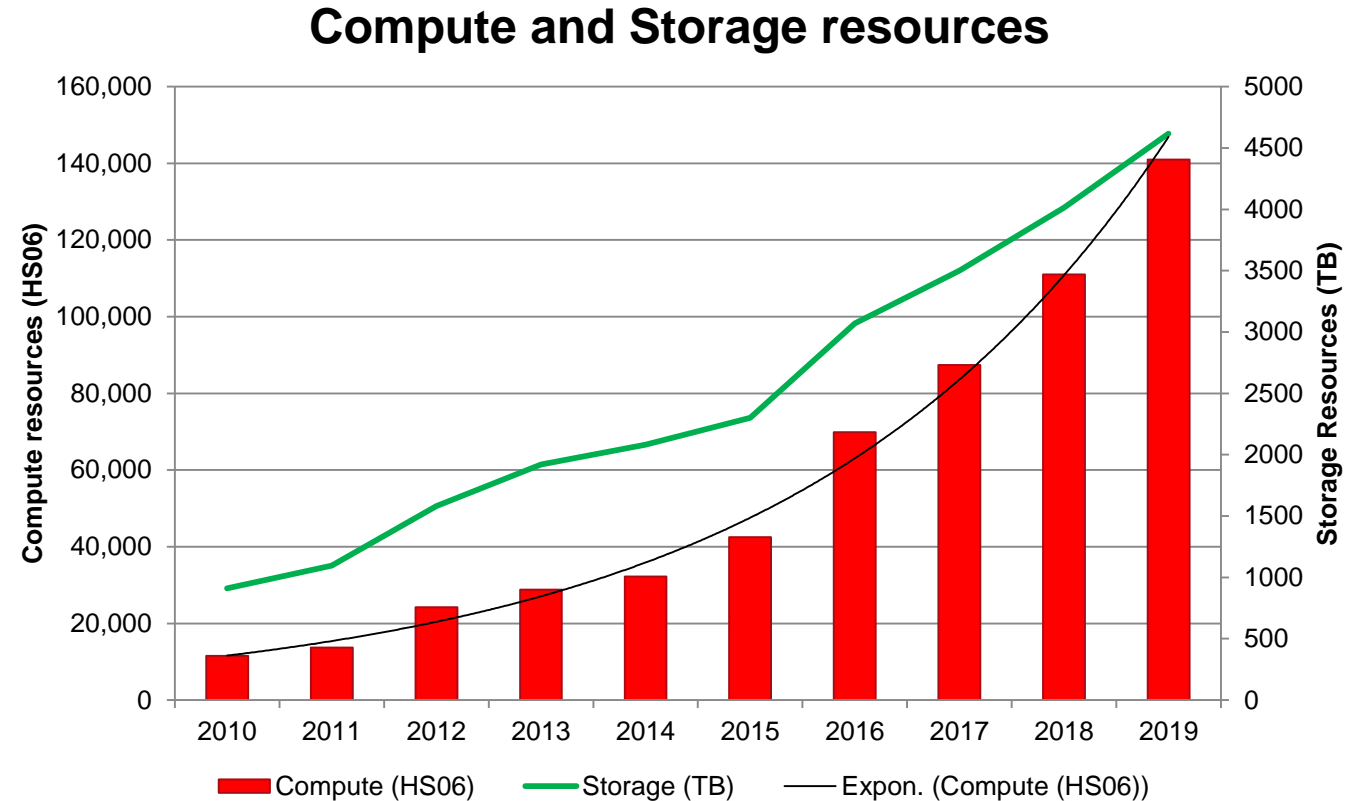
CHIPP-CSCS resource provisioning overview

Past, present and future

Pablo Fernandez, September 13th, 2019

Resource provisioning overview since 2010

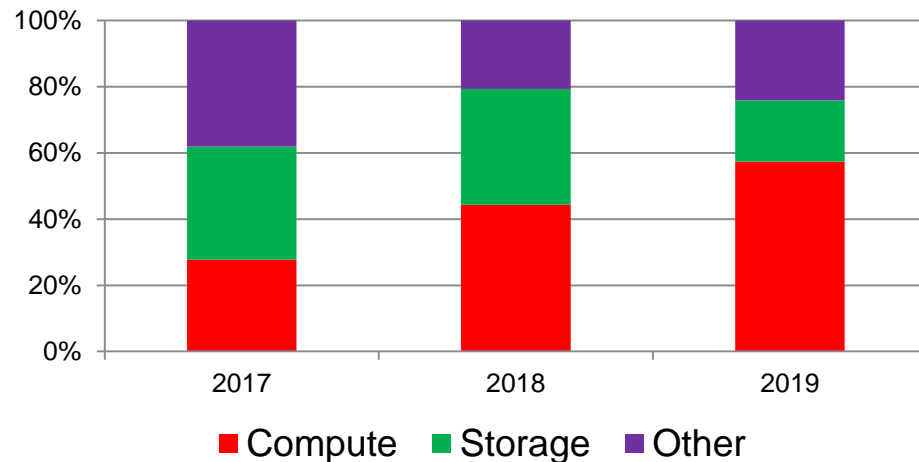
- Almost geometric trend for compute resources
- Storage growth is more linear
- 2007 – 2018 Phoenix cluster with dedicated resources
 - Storage until 2015
 - Compute until 2017
- Since 2019 – Fully provided on shared resources



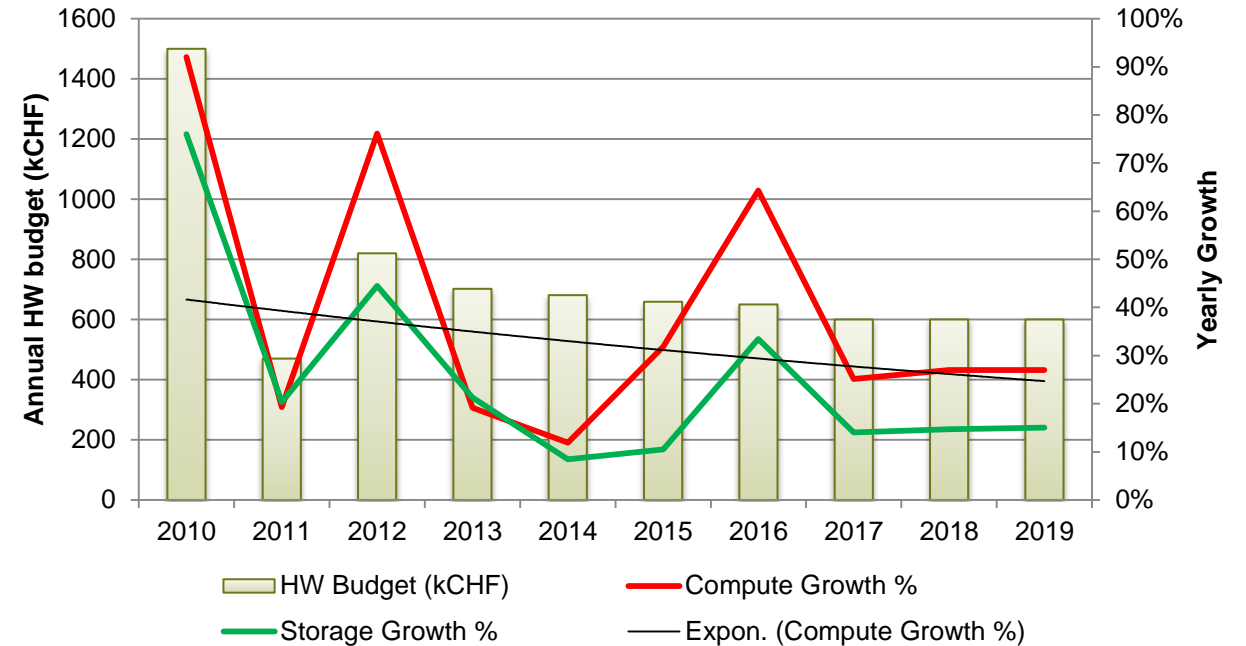
Budget & expenses

- Budget has decreased over time
- Resource growth trend has also slowed down

HW Cost balance



Resource growth ratio vs. HW budget



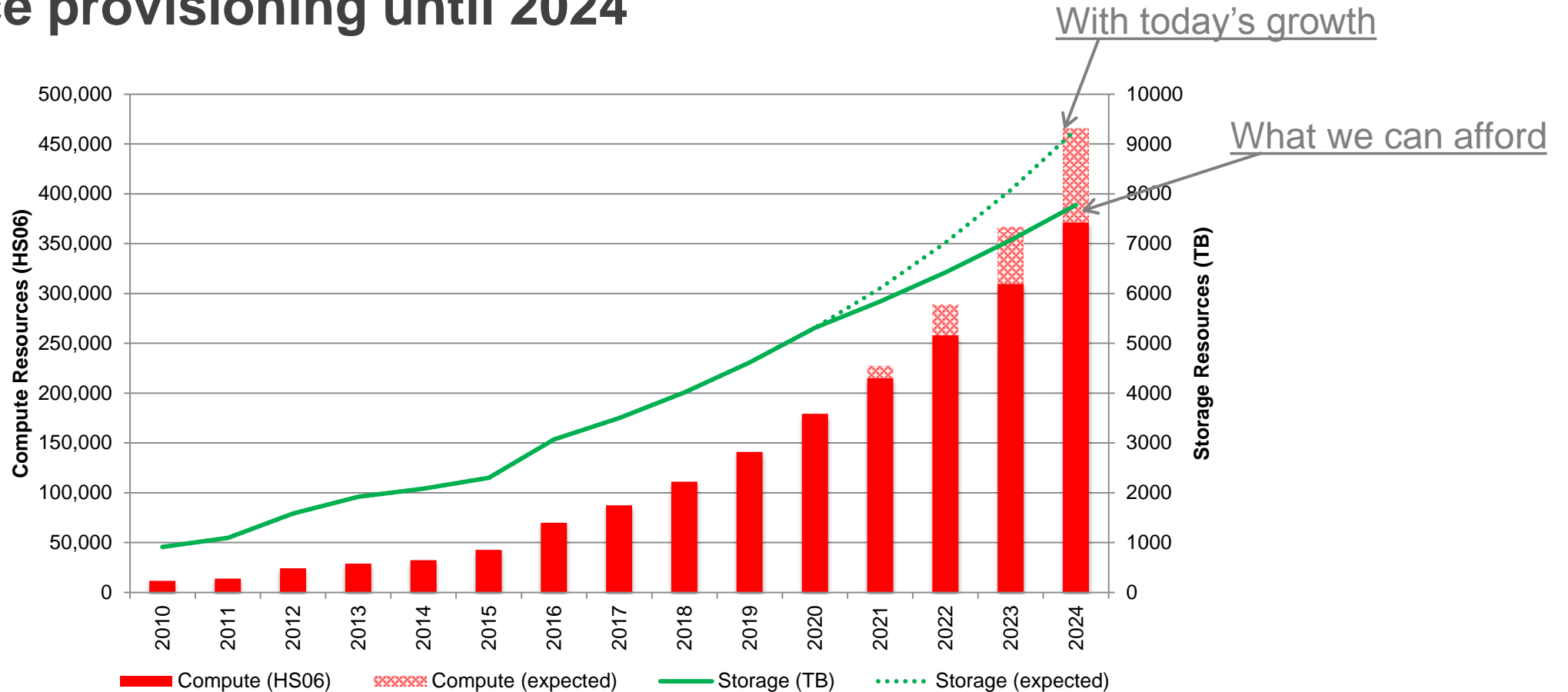
- The trend has been to spend more on compute than in storage
 - “Other” is middleware, scratch and licenses

2020-2025 preview

Assumptions

- 2020 goes on as planned
- CHIPP moves from Piz Daint to a new HPC machine in 2021
- The HS06 value of the new nodes is 5 times higher for the same price
- Storage price is reduced by 20% in 2023
- Everything else (e.g. budget) stays unchanged

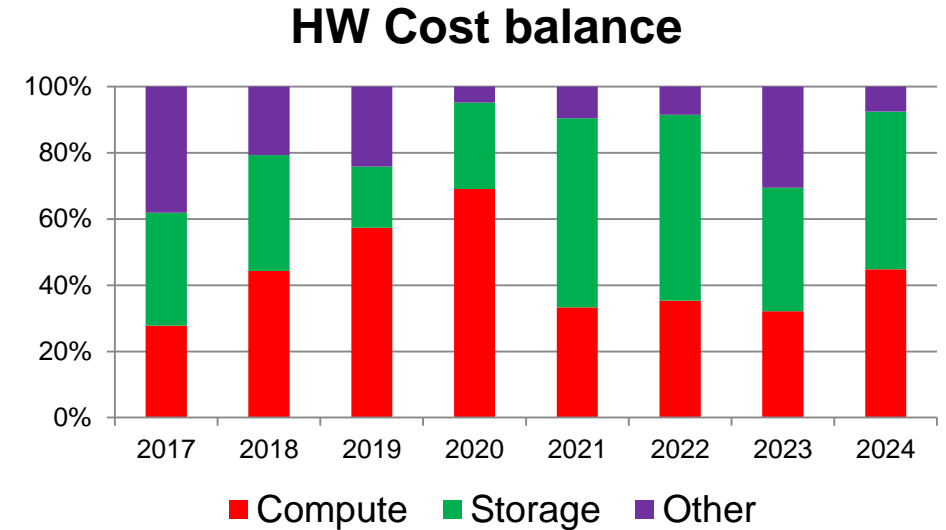
Resource provisioning until 2024



- Resource growth downward trend is maintained for the same budget
 - Compute goes from 27% (expected today) to ~20%
 - Storage goes from 15% (expected today) to ~10%

Compute/storage balance changes

- Storage costs are predominant after 2021
 - Even if the expected growth is lower
- Other costs (e.g. scratch, servers) are becoming less important
- Network bandwidth will grow much faster and become more important



Conclusions

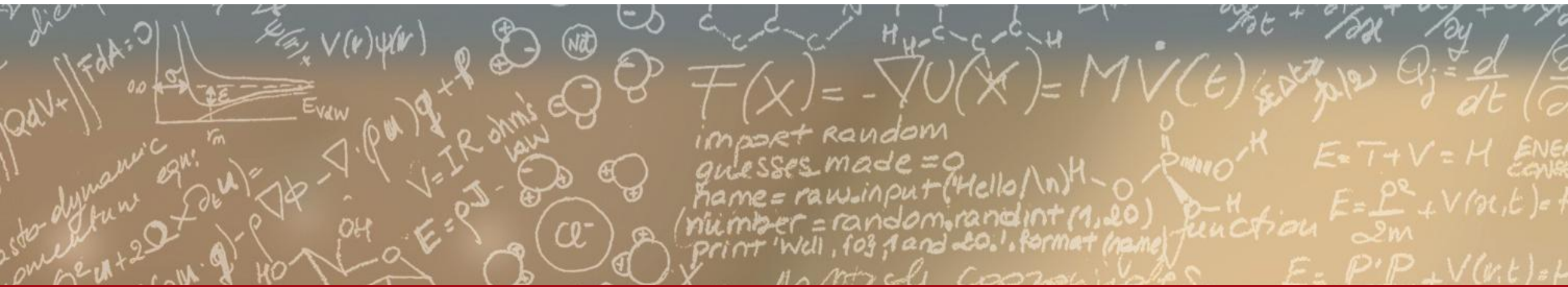
- Today's growth expectations on the long term are unrealistic
 - Moore Law: increase rate of computational power and storage is slowing down with the same budget
- Only a change of paradigm can fulfill a growth in future requirements
 - Using accelerators (GPU & FPGA's)
 - Invest in software & algorithm development
 - Rethinking the operational model
 - Less storage, pulling data as required (using the faster network available)
 - New architectures
 - Invest in R&D and manpower



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Thank you for your attention.