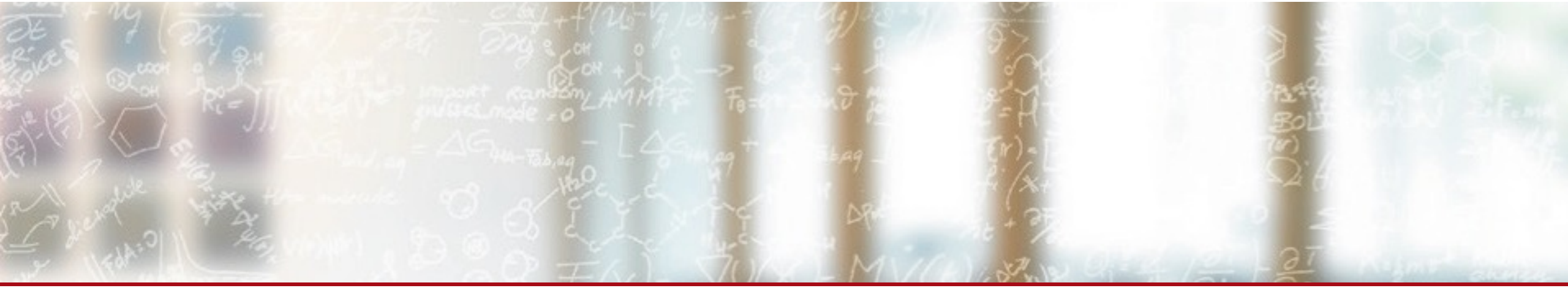
CSCS
Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH zürich



Computing Platforms and Infrastructure Program Update

Swiss SKA Days @ Geneva, 4th of September, 2024

Pablo Fernandez

Agenda

- Alps upgrade
  - Infrastructure, upgrade, platforms and why is this important to you?
- SRC
- Other info

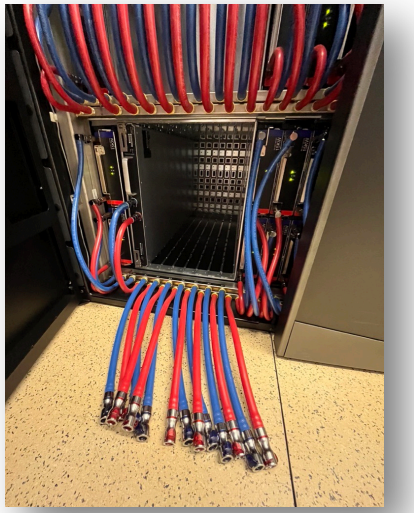
Alps Hardware Infrastructure at CSCS

- Alps is an HPE Cray EX supercomputer is our new flagship infrastructure, the largest supercomputer for open science in Europe.

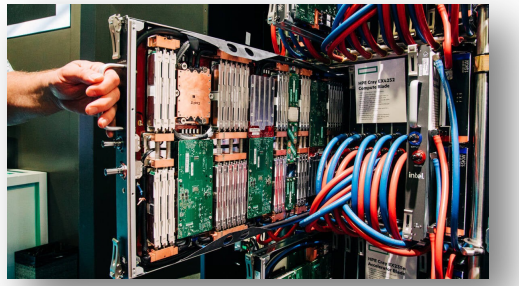
- Multi-phase installation started in 2020

- Some specs
  - *2688x* GraceHopper (4xGH200) nodes
  - 1024x MC nodes (AMD Rome 7742) 256/512GB RAM
  - 144x nVIDIA A100 GPU nodes
  - 32x AMD MI250x GPU nodes
  - 128x AMD MI300 GPU nodes

  - Slingshot network
  - Two availability zones (HA, non-HA)
  - 100% liquid cooled (to the chips themselves)



Water cooled blades



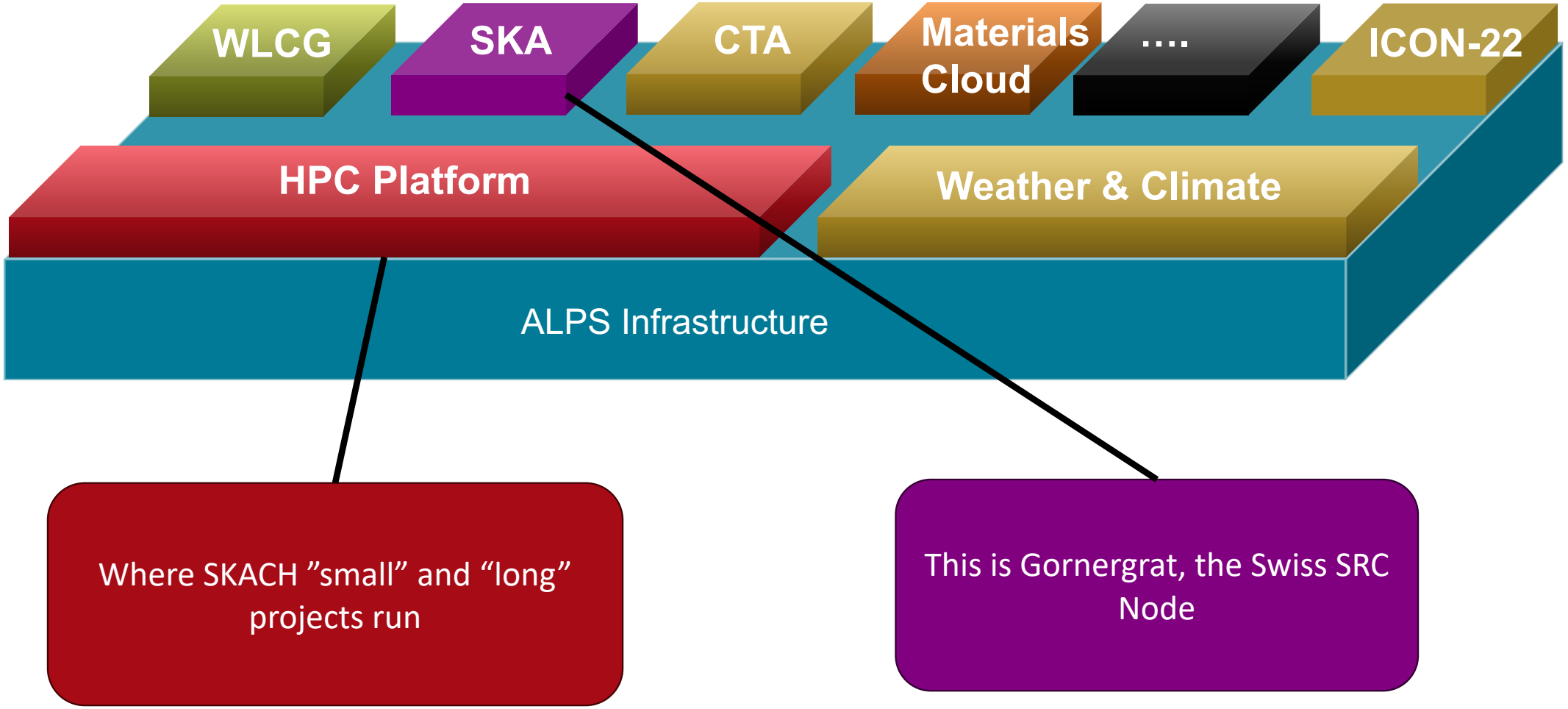
Alps Grace-Hopper upgrade

Came with plenty of software and hardware upgrades starting from last year

- Moving forward three versions of the management stack
  - Including a major OS upgrade in all nodes
- Firmware upgrades all across the board – including network
- Addition of 2688 Grace-Hopper nodes (and other nodes as well)
  - CSCS is the launch customer for HPE for GH nodes
- Re-cabling of the whole Alps
- Facilities work as well, to support increased cooling needs
- Acceptance tests… and much more

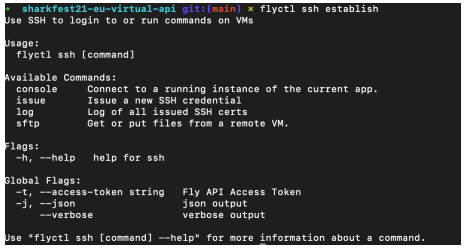
Inauguration on the 13th and 14th of September, check https://www.cscs.ch/

Software-defined Platforms in Alps



HPC Platform on Alps

- The CSCS' HPC Platform provides a generic environment to run scientific codes at scale. It focuses on performance and scalability
  - Aimed at thousands of users from all scientific domains.
  - High performance hardware and libraries
  - Enables automated workflows via REST APIs and containers
  - Features interactive computing, data-movers, compilers, debuggers, job schedulers, parallel file systems, etc. for the convenience of all users.



Moving SKACH to Alps

So, what does this mean for you?

- Most SKACH users are on ”small” projects on the old Piz Daint, which is moving away. It will be replaced by two vClusters:
  - Eiger with the Mult-core nodes. Migration from small MC projects is already completed
  - Piz Daint with the GH nodes. Migration will start as soon as the new Piz Daint is stable
- *Hardware will be different*
  - *ARM based (NVIDIA Grace CPU)*
  - *New NVIDIA GPUs (NVIDIA Hopper GPU)*
  - *AMD Rome processors instead of Intel (on MC)*
- *Software stack “feels” slightly different*
  - *Based on Spack and Stackinator*
  - *Uses squashfs images*
- *Suggest you write ReFrame tests for your applications and workflows*

Resources for the Swiss SRC node

Currently the Swiss SRC is a prototype, moving into v0.1 at the end of 2024

The goal is to be ”in the game” of the SRCnet

- *Moving from OpenStack VMs to Kubernetes*
  - *Development platform (SKACH-TDS) is done*
  - *Integrating Kubernetes and Alps nodes is ongoing (experimental)*
    - *Plan B is to use “Diablons”, our production Kubernetes infrastructure*
- Size of v0.1 is small, just 3-4 multi-core nodes and ~400 TB
  - Looking for funds to make this larger!
  - Shared resource between users world-wide
- There are still many details to discuss, keep tuned!

Other relevant activities

- *Work on getting vCluster running on Pawsey, Australia - MWA collaboration*
  - Goal is to facilitate access to precursor data and provide input for developing the SRCnet
  - *Deploying a development vCluster at CSCS for software migration – current plan is to provide AMD GPUs*

- *Integrate JupyterHUB with FirecREST*
  - Goal is to enable HPC workflows coming from “external” JupyterHub services
  - Work is on its final stage

- *Participated as a facility partner in both SDC3a and SDC3b data challenge*
  - *Three teams allocated at CSCS*
  - *Reserved 15’000 node hours on the HPC Platform*
  - *Supporting the different SKACH teams*

- *Develop guidelines for Secure Software Development Life Cycle with SKAO*

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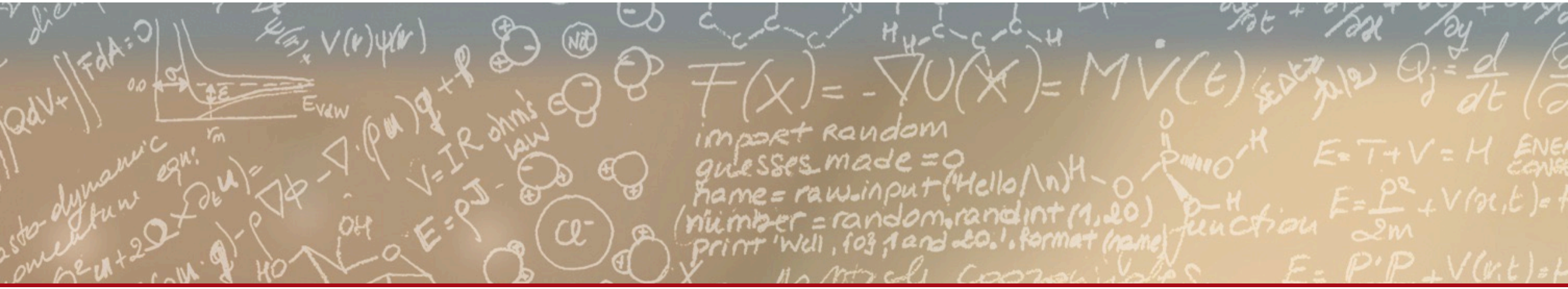
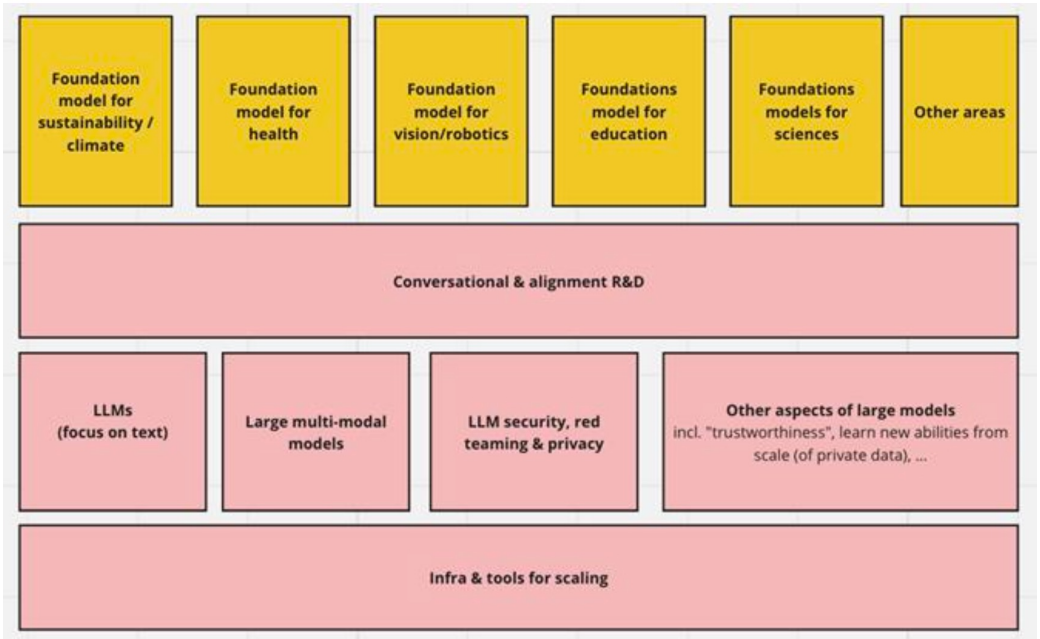


Thanks for your attention.

cscsch

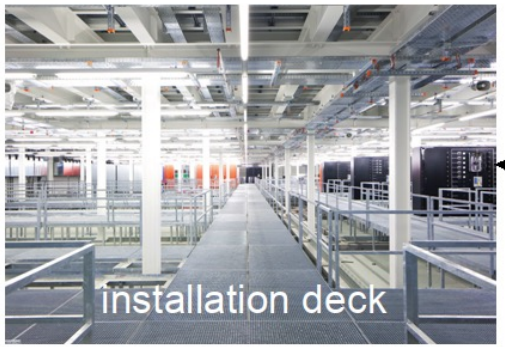
Machine Learning Platform on Alps (new!!)

- Alps will provide a dedicated Machine Learning Platform leveraging 1000s of Grace-Hopper GPUs.
- Alps is the underlying infrastructure for the Swiss AI Initiative

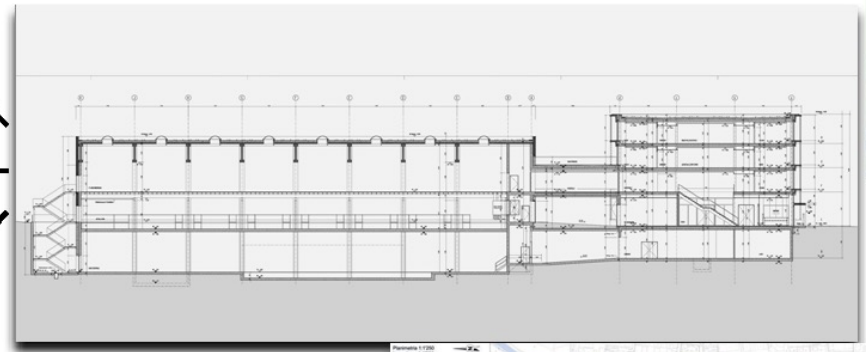


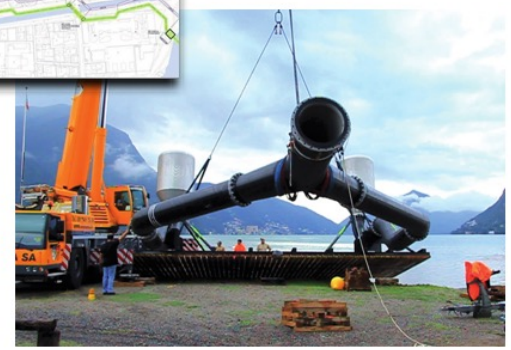
ETH Zurich and EPF Lausanne, teaming up with major universities in Switzerland

We need flexible infrastructure, since we can only predict that technology will change



Power/cooling: 12 MW
(upgradable to 25MW)
Current (2018) load ~3.5 MW
Current power use efficiency: <1.2





ETH Board: CHF 62.5 million for the building
Canton Ticino: CHF 5 million for lake water cooling
City of Lugano: donated the land
ETH Zurich: CHF 12.5 million for an extension **+ CHF ~10 million extension**

cscs2go – A gateway to our HPC Platform

- Highly standardized offering
  - Clearly defined packages with different price tags
  - Access to our service catalog
- Low entry barriers
  - Online creation of accounts and payments (goal: immediate access)
  - Free entry level package for testing
  - Reduced bureaucratic load

https://2go.cscs.ch/