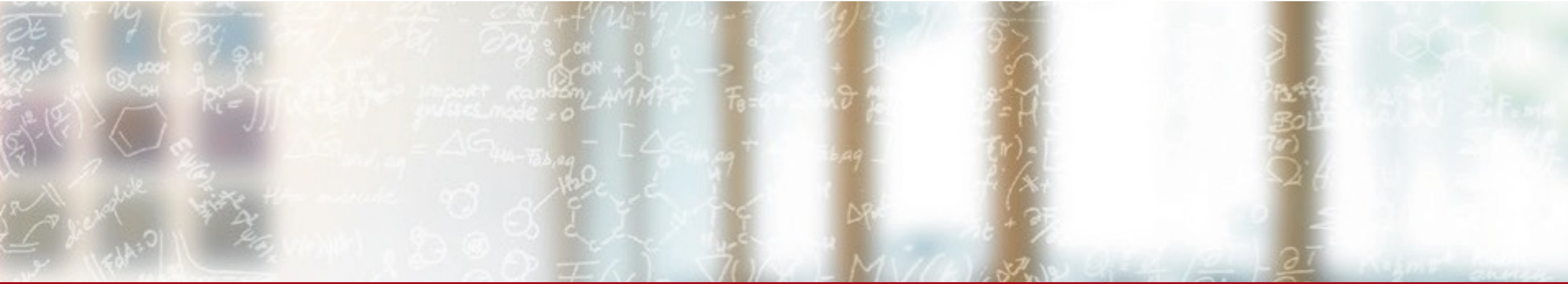




CSCS

Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH zürich



CSCS updates

HPC System Test: Towards Improving Availability and Portability of HPC Test Suites

SC'21 BoF

Vasileios Karakasis, CSCS

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CSCS systems

- Piz Daint
 - Cray XC40/XC50 Compute Nodes
 - Intel® Xeon® E5-2690 v3 @ 2.60GHz (12 cores, 64GB RAM) and NVIDIA® Tesla® P100 16GB - 5704 Nodes
 - Two Intel® Xeon® E5-2695 v4 @ 2.10GHz (2 x 18 cores, 64/128 GB RAM) - 1813 Nodes
 - Aries routing and communications ASIC, and Dragonfly network topology
 - 8.8 PB Scratch Lustre filesystem
- Alps
 - HPE Cray EX
 - AMD EPYC 7742 (2x sockets, 64x cores), 1024 nodes
 - HPE Cray Slingshot
- Arolla + Tsa (Meteoswiss)
 - 18 x GPU-compute nodes, each with:
 - 8 x NVIDIA® V100 GPUs (with 32 GB HBM memory each)
 - 2 x Intel® Xeon® Skylake 6134 CPUs (8-core, 3.2 GHz)
 - 384 GB DDR4 memory
 - 2 x 10 GbE interfaces
 - 20 x pre/post-processing compute nodes, each with:
 - 2 x Intel® Xeon® Skylake 6148 CPUs (20-core, 2.4 GHz)
 - 384 GB DDR4 memory

Testing and benchmarking at CSCS

- At CSCS we use ReFrame
 - <https://github.com/eth-cscs/reframe>
 - <https://reframe-hpc.readthedocs.io/>
- System configurations and tests are publicly available
 - `config/cscs.py`
 - `cscs-checks/`
- Run in CI/CD pipelines that are triggered after new PE installations and during staging of a newly built software stack
- Daily regression runs that feed performance data to Logstash, which are then visualized in Kibana
- Manual runs during maintenances or for diagnostic reasons

Advancements in ReFrame

- Improved and more intuitive test syntax
- Improved test parameterization
- Built-in Spack and EasyBuild support + improved container support
- More scheduler and parallel launcher backends (SGE, LSF, OAR)
- JUnit reports
- New more flexible way for defining sanity and performance checks
- Support for processor topology auto-detection
- Support for modifying tests from the command line

Towards truly reusable HPC tests (work in progress)

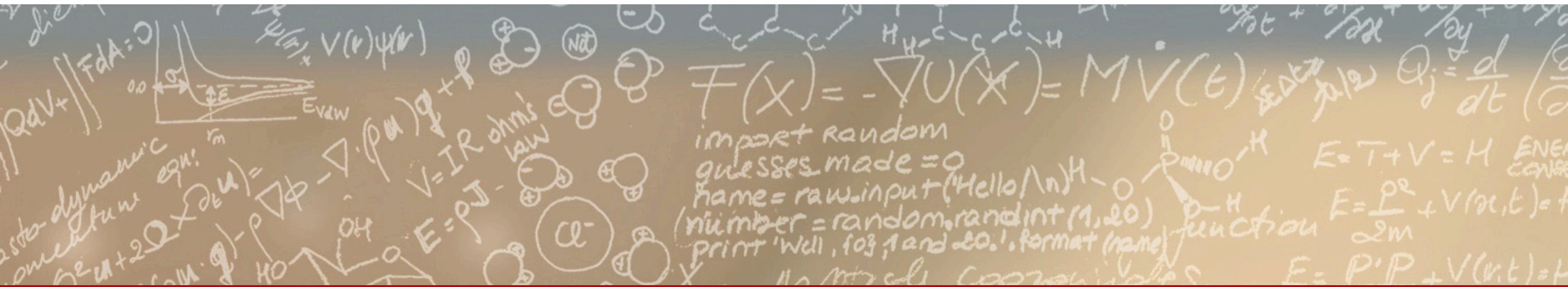
- We are building a fully site-agnostic test library out of the CSCS test suite that each site could extend at will or run out-of-the-box.
 - Tests contain only test-specific logic, i.e., no `valid_systems`, no `valid_prog_environments`, no modules etc.
 - Tests define the way to run the test, its validation and performance metrics
 - Sites can extend freely at will without needing to touch the library test
 - PoC: <https://reframe-hpc.readthedocs.io/en/stable/hpctestlib.html>
- Library can run out-of-the-box by specialising the tests from the command line:
 - `reframe <options> -n 'amber_nve_check.*cuda$' -S valid_systems=dom:gpu -S valid_prog_environs=builtin -S modules=Amber -S num_tasks=1 -r`
 - `reframe <options> -n 'amber_nve_check.*mpi$' -S valid_systems=dom:mc -S valid_prog_environs=builtin -S modules=Amber -S num_tasks=2 -r`



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Thank you for your attention.