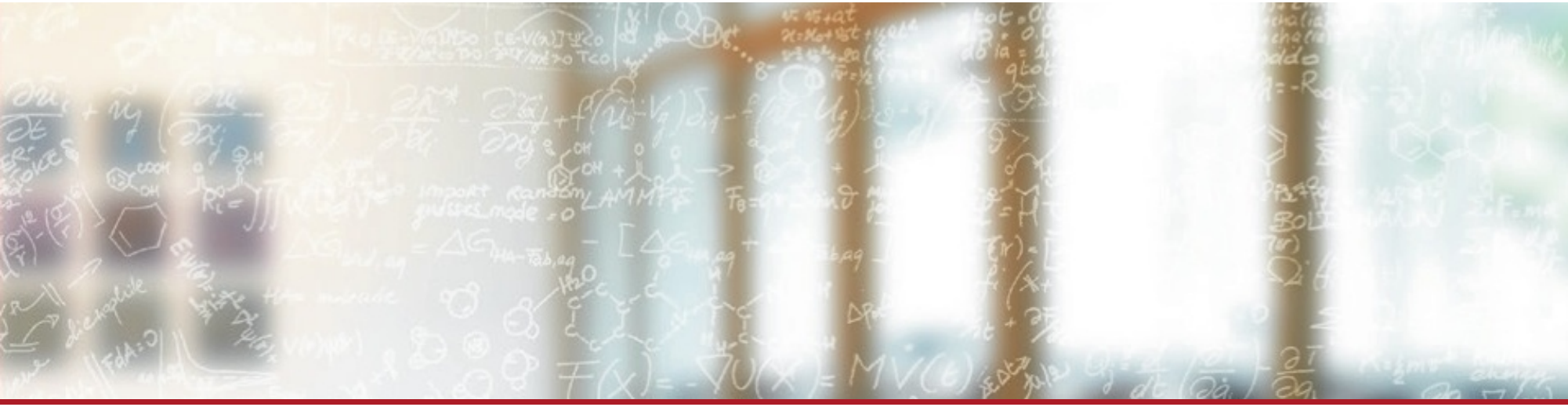
CSCS
Centro Svizzero di Calcolo Scientifico
Swiss National Supercomputing Centre

ETH zürich

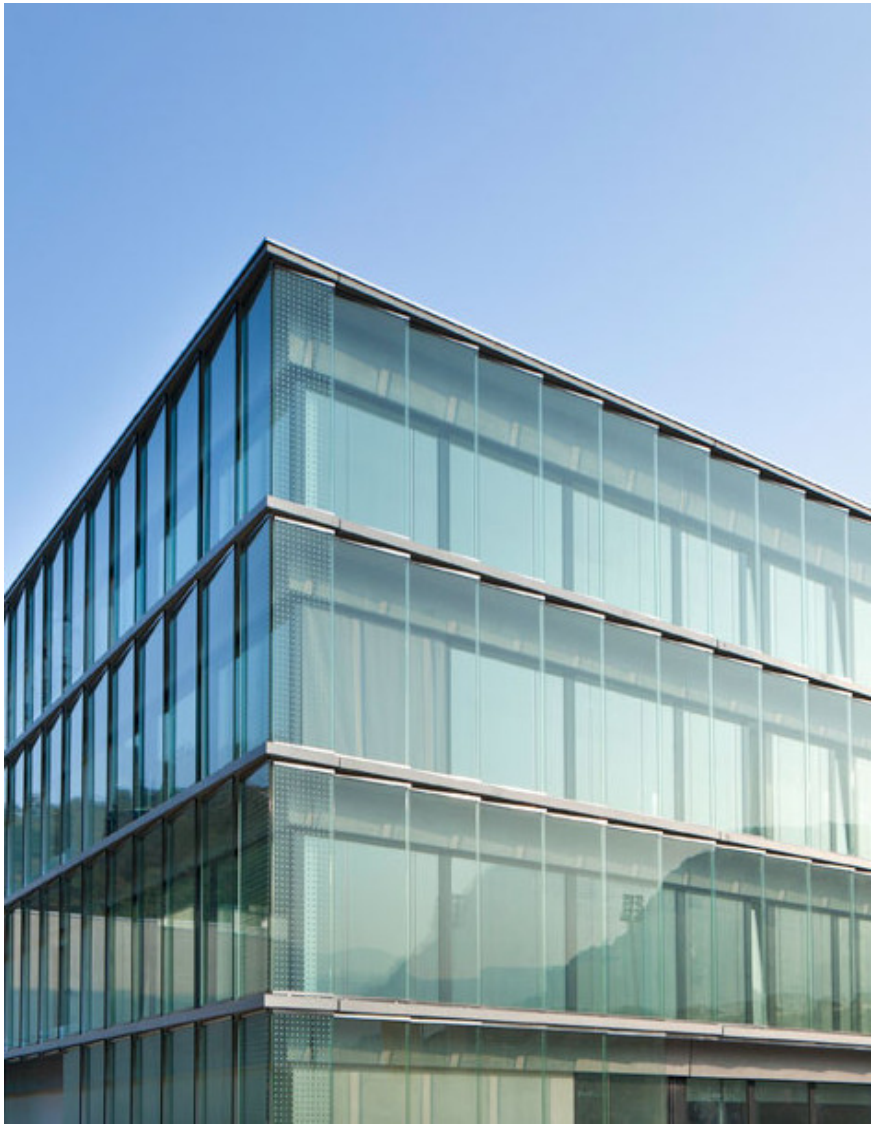


Shifter hands-on

SI-S

June 8, 2017

Agenda



- Introduction to containers, Docker and Shifter (10 min)
- Live demo (40 min)
- Technical setup (15 min)
- Break (10-15 min)
- Hands-on (60+ min)
- Slides and code available at https://github.com/Madeeks/shifter-hands-on

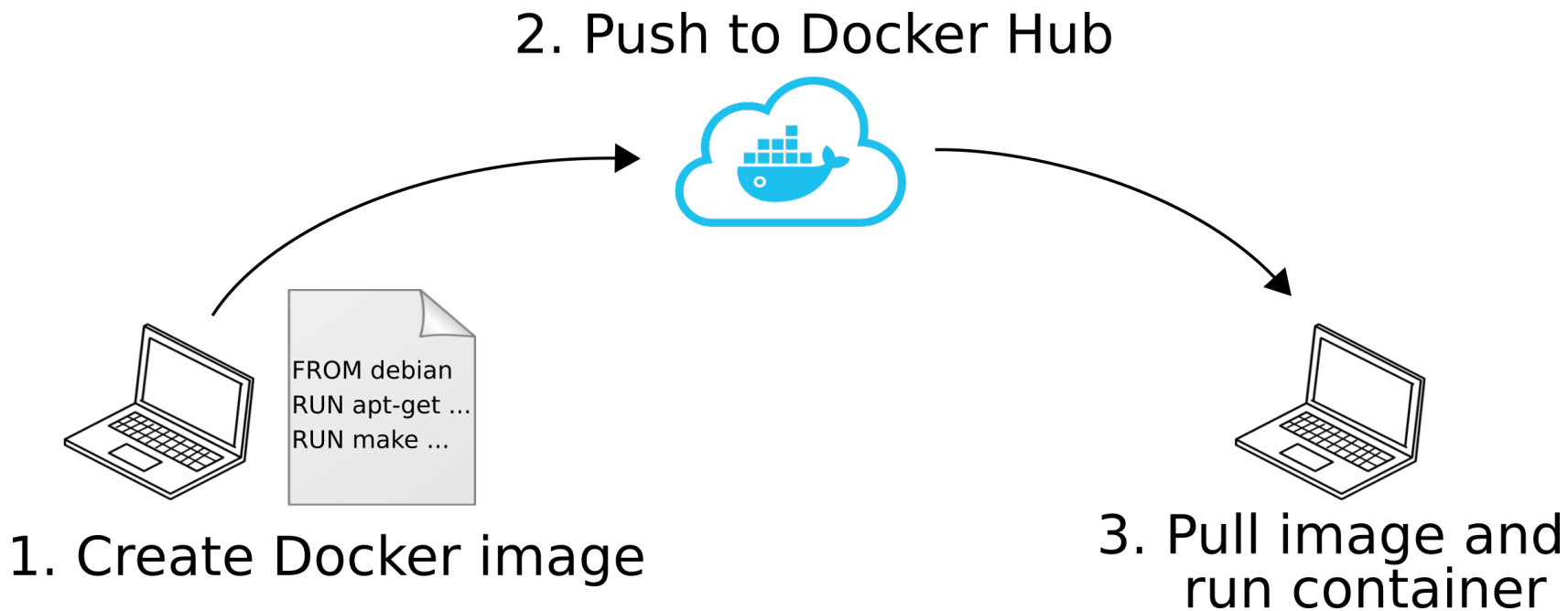
Use case: deploying scientific applications

- Running an application on a supercomputer requires:
  - Preparing and transfering the dataset to the system
  - Preparing the configuration files for the experiment
  - Building the application to leverage the specific features of the machine

- Software containers are a way to make application deployments
  - Simpler (application, configuration and data bundled in a single package)
  - Reproducible
  - Portable

Docker

- Docker is currently the most popular container implementation
- An image is created according to instructions in a *Dockerfile*
- Cloud repositories are a central element in the Docker workflow to redistribute images.
- Docker Hub is a public repository of container images.



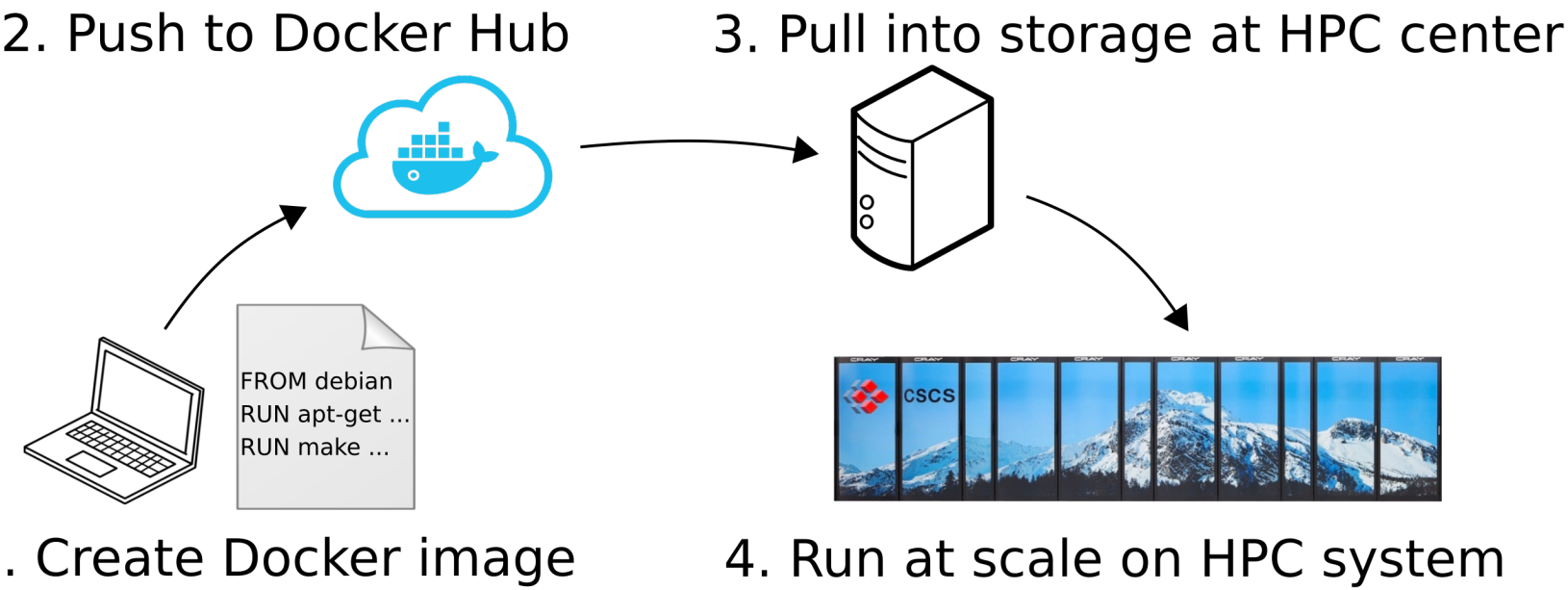
Key terms

- **Image:** lightweight, stand-alone, executable package that includes everything needed to run a piece of software (code, runtime, libraries, environment variables, config files).

- **Container:** runtime *instance* of an image what the image becomes in memory when actually executed. It runs completely isolated from the host environment by default, only accessing host resources if configured to do so.

Docker + Shifter

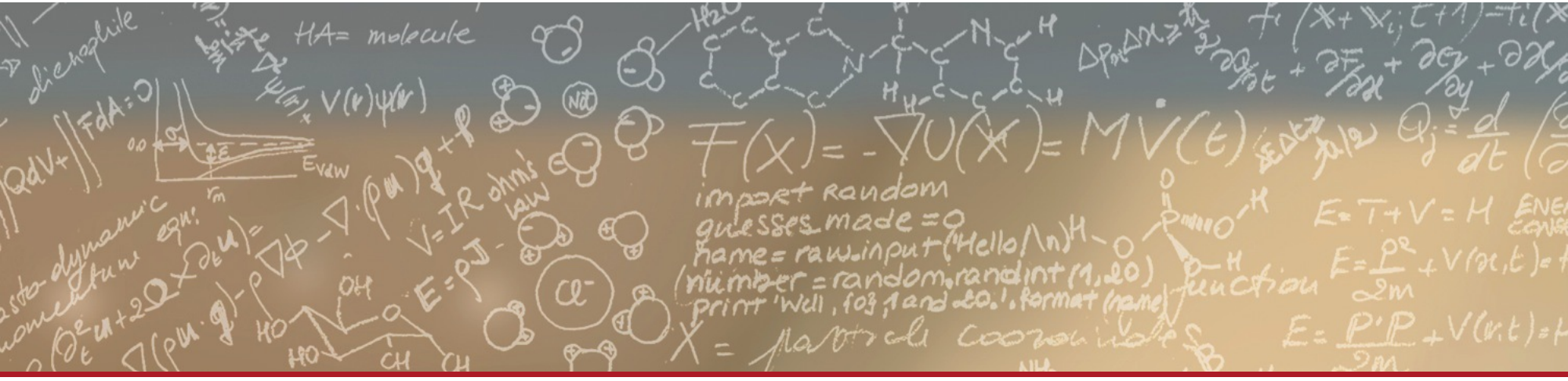
- Using Docker in HPC has several drawbacks:
  - Security
  - Accounting
  - Use of specialized hardware
  - WLM integration
- Shifter provides a *Docker-compatible* container runtime specifically developed for HPC.



Live demo!

Cheatsheet

Docker	Shifter
`docker pull <image:tag>`	`shifterimg pull <image:tag>`
`docker run <image:tag> <command>`	`srun shifter --image=<image:tag> <command>`
`docker run -it <image> bash`	`srun --pty shifter --image=<image:tag> bash`
`docker run <image:tag> mpiexec -n 2`	`srun -n 2 shifter --mpi --image=<image>`
`docker images`	`shifterimg images`
`docker build -t <user/repo:tag> .`	*No image build in Shifter*
`docker login`	*No login to remote repos in Shifter*
`docker push <user/repo:tag>`	*No image pushing in Shifter*



Thank you for your attention!

Backup

Containers vs Virtual Machines