

Science Park, Amsterdam

HPC Cloud

Introduction course

A definition: cloud computing

Essential characteristics:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

Service models:

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)



Examples?

Agenda

- 1.- SURFsara's HPC Cloud **service**
- 2.- **User** experience
- 3.- Demo

SURFsara's HPC Cloud service



SURF SARA

What do we (SURFsara) want to offer?

Services for **scientists**

...scientists \nrightarrow systems gurus

... complex users' problems

- **Data:** big, dirty, non-structured...
- **Computation:** complex (e.g.: modeling, simulation)
- **Libraries nightmare**
 - 3rd party, incompatibility, maintenance...

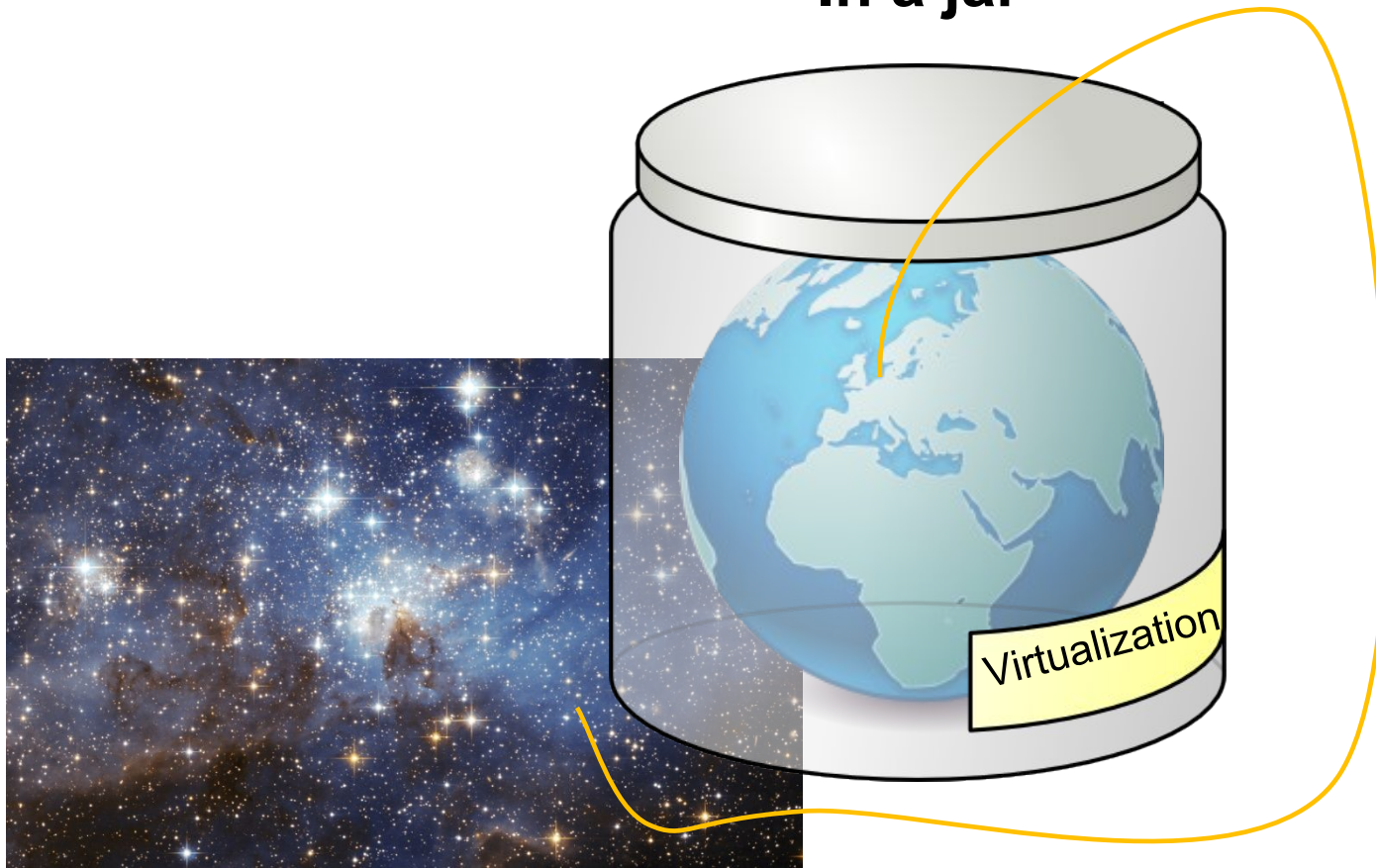


Familiar?

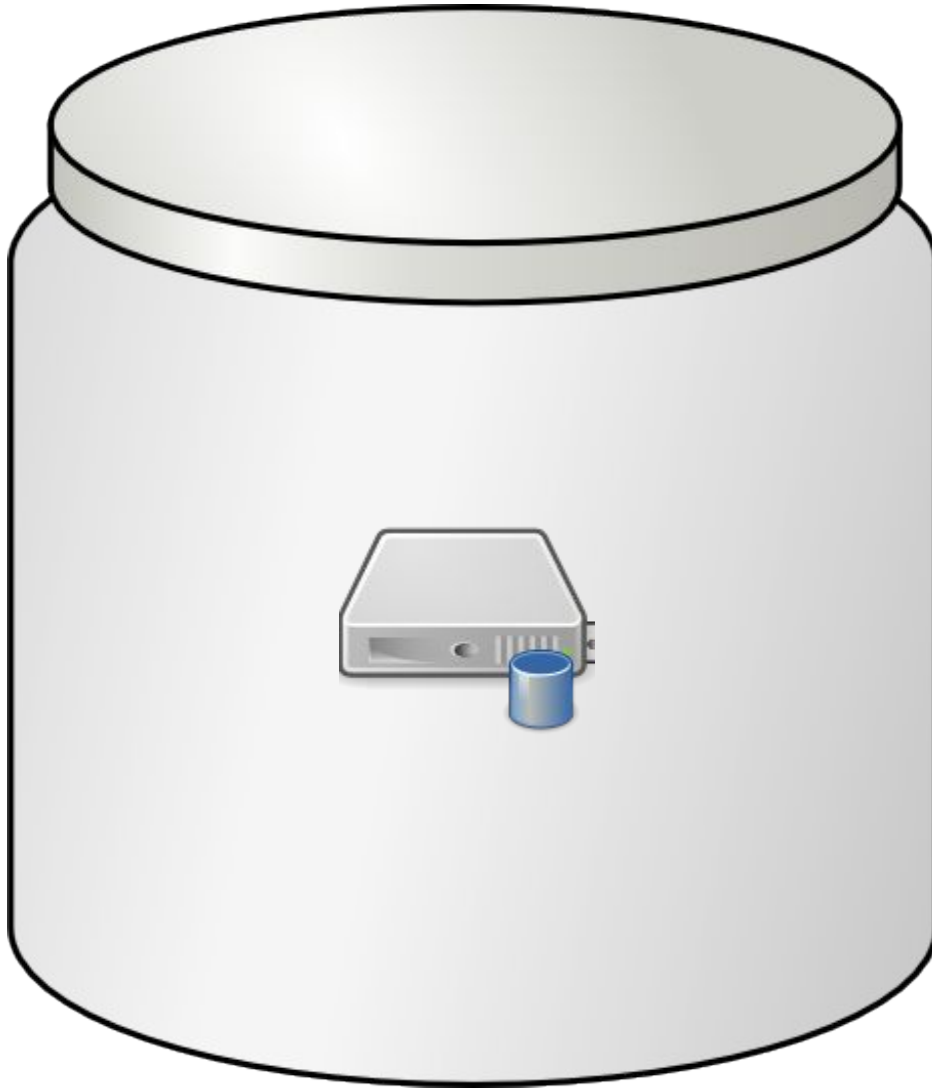
... trial and error ... share ... cooperate
... test ... scratch ... show ... flexibility ... privacy

What does our HPC Cloud offer?

In a jar



What do you see, as a user?

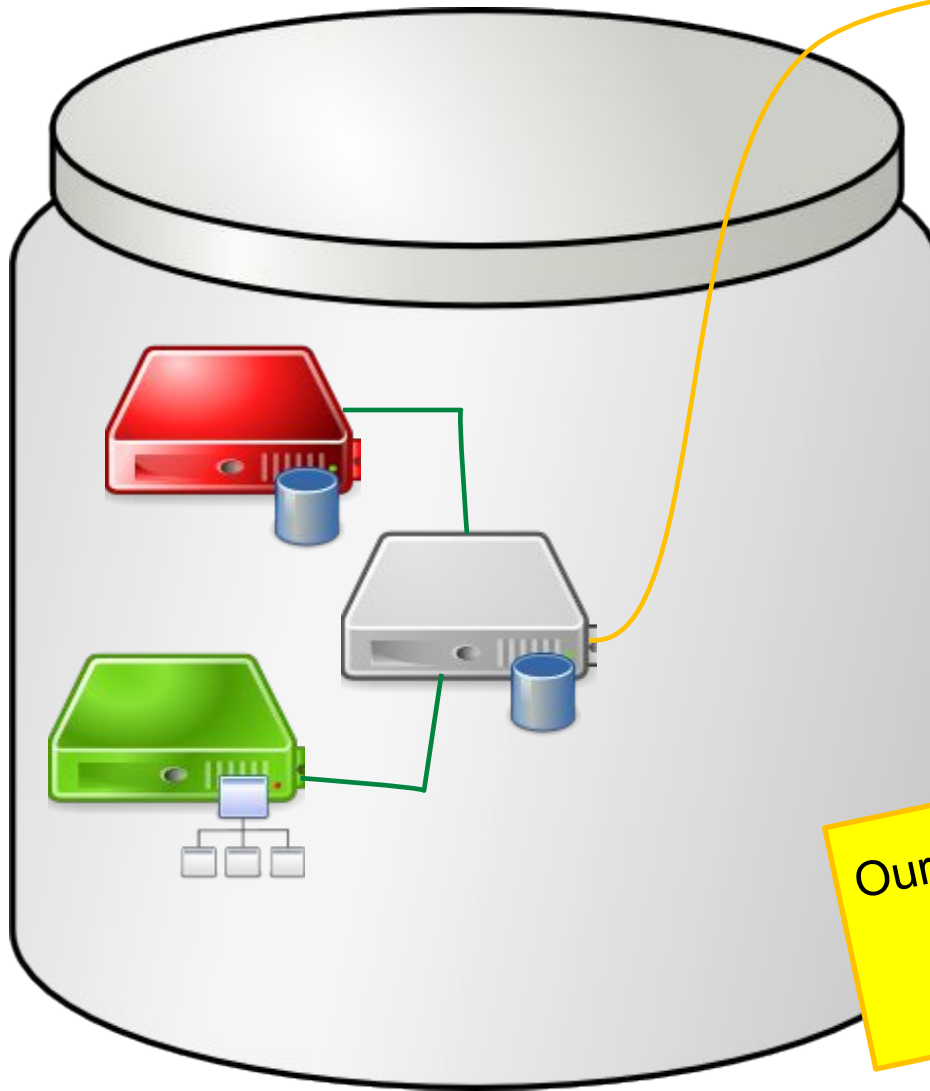


A place to build a running system

Build your own (virtual) machine:

- Hardware
 - CPU
 - Memory
 - Input/Output
 - Disk
 - Network interfaces
- Software
 - Operating System
 - Programs
 - Libraries

What do you see, as a user? (and II)



A place to build a bunch of systems

Build your own cluster:

- Private network
- Internet access



Our say:

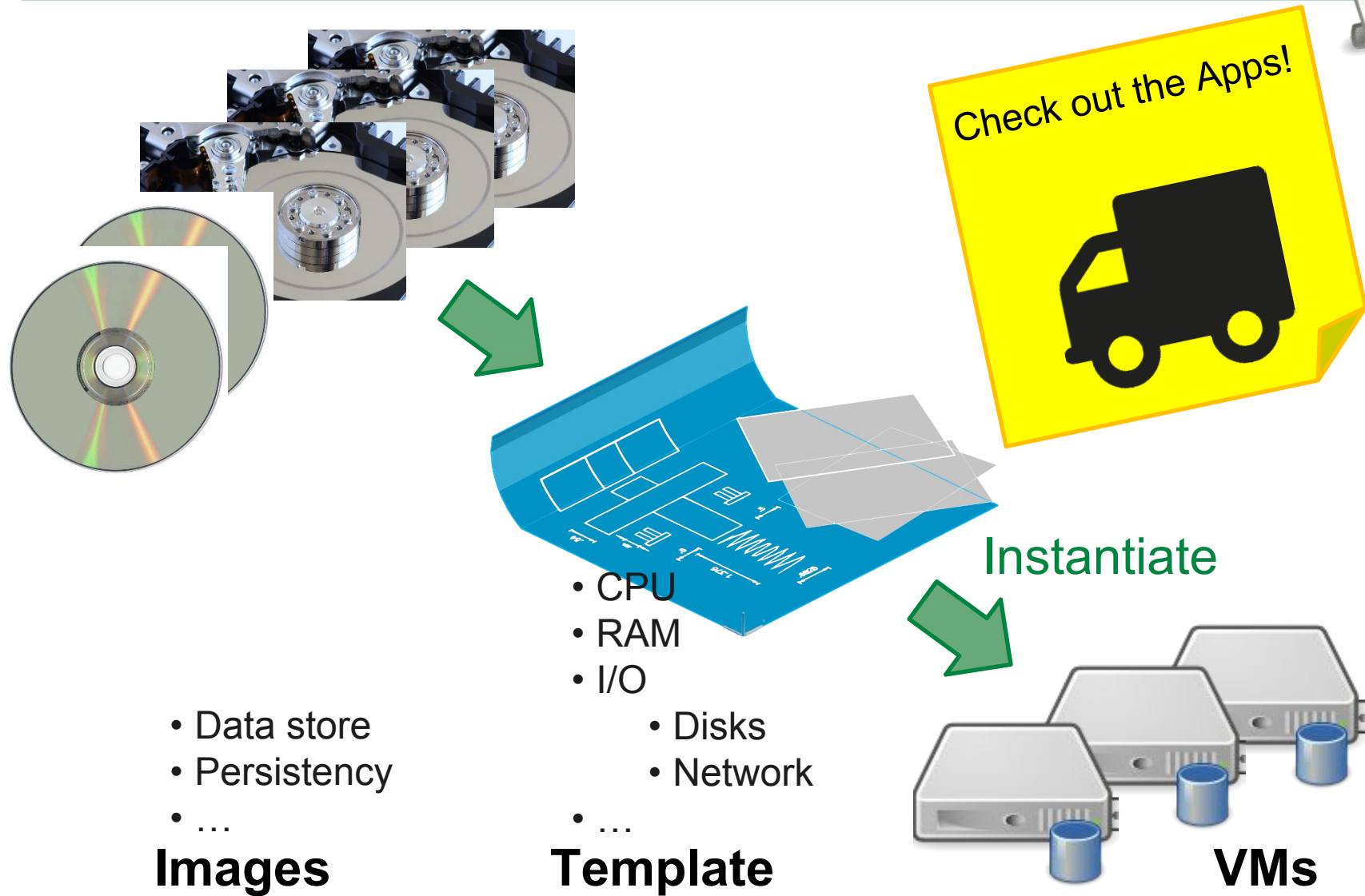
IaaS

Powered by...
OpenNebula

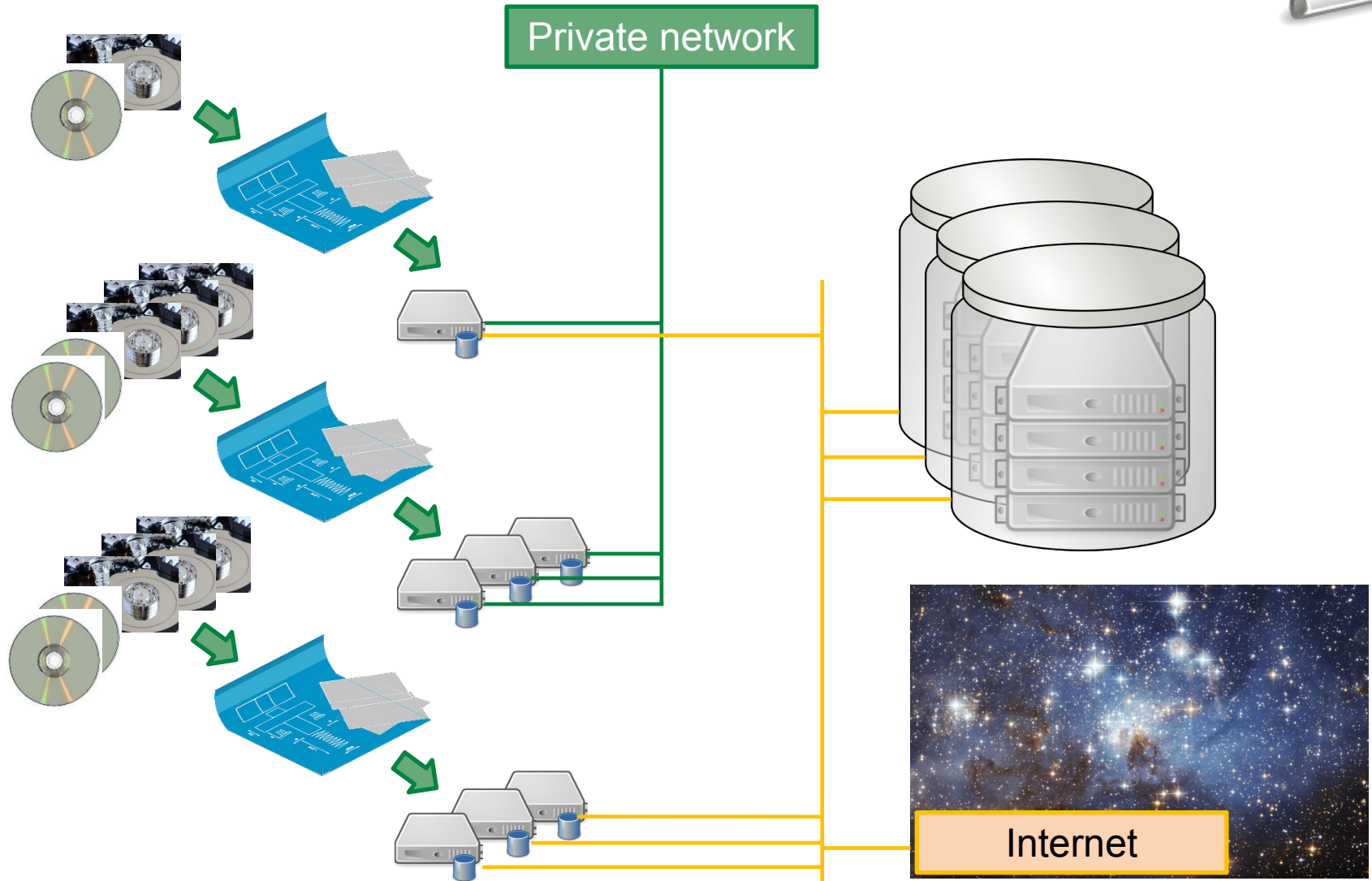
User experience



IaaS: Your place to run VMs



IaaS: your interconnected VMs





HPC

- **Many** nodes
 - **Big** nodes
- **Fast** interconnect
- **Plenty** of storage
 - **Diverse** storage
- **Large** memory

Cloud

- Multi-purpose **versatility**
- Shape **elasticity**
- **Self-service** on-demand

Service

- Project-based
 - Own quotas
 - Private network
 - Block storage
- Dynamic DNS
- Documentation
- Support

OpenNebula

- Web interface
- User groups
- Pre-built Apps
- Accounting

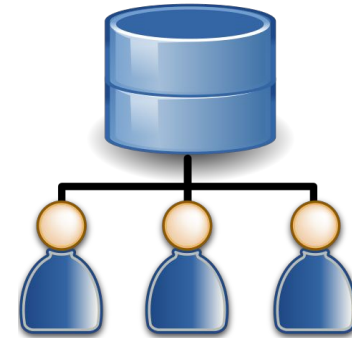


Per **project**



User accounts

**CEPH =
Network
storage**



CPU time

Local SSD





Users **like** & **leverage**...

- Flexible software **mix**
- **Big** VMs
- **Elasticity**
- Provide their own service to **their own users**
- Software that requires **licenses**
- Set up, test and deploy **workflows**
- Deliver training; **courses**
- **Intensive** computing

...from diverse **fields**:

- Biology
- Genetics
- Informatics
- Chemistry
- Ecology
- Linguistics
- Robotics
- Business
- Social sciences
- Engineering
- Humanities
- Water management

Demo

3



Request: <https://e-infra.surfsara.nl>
UI: <https://ui.hpccloud.surfsara.nl>
Doc: <https://doc.hpccloud.surfsara.nl>

Credits

Images: Wikipedia, Science Park, RRZE icons,
NIST, nVidia, Ceph
Slides: SURFsara colleagues

<<EOF

SURF SARA