HPC Cloud at SURFsara

— Offering cloud as a service

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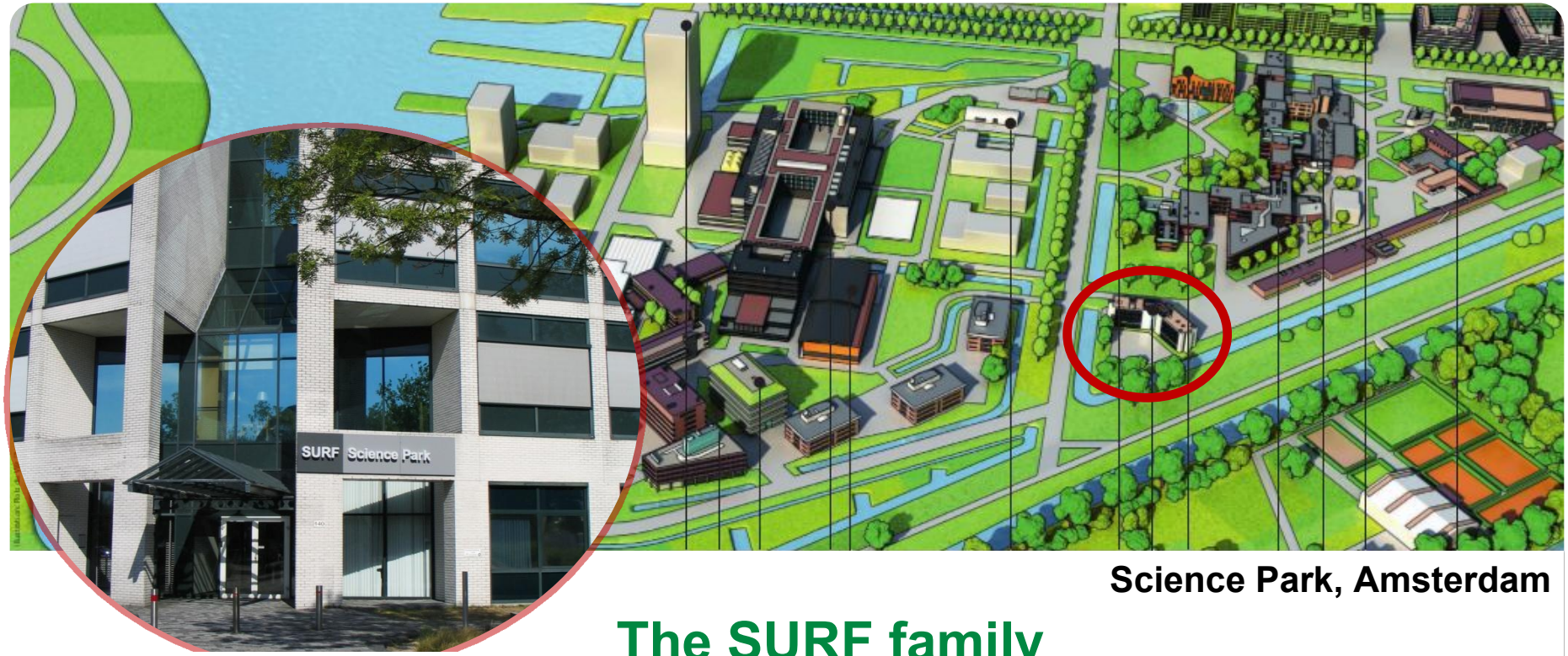


Science Park, Amsterdam

The SURF family

SURF

SURF SARA

SURF NET

SURF MARKET

netherlands eScience center

NWO Nederlandse Organisatie voor Wetenschappelijk Onderzoek

A definition: cloud computing

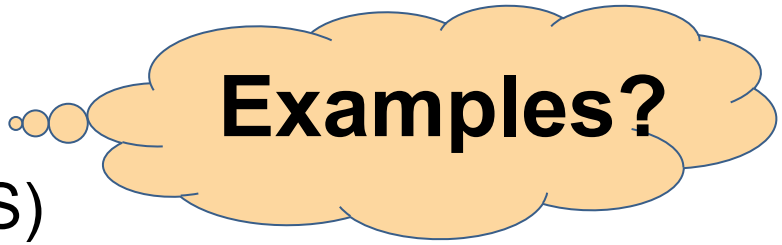
NIST
National Institute of Standards and Technology
U.S. Department of Commerce

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)



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Agenda

1.- SURFsara's HPC Cloud **service**

2.- **User** experience

3.- Demo

SURFsara's HPC Cloud **service**

1

What do we (SURFsara) want to offer?

Services for scientists

…scientists ≠ systems gurus

… complex users' problems

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

Familiar?

… cooperate

… share

… trial and error

… show

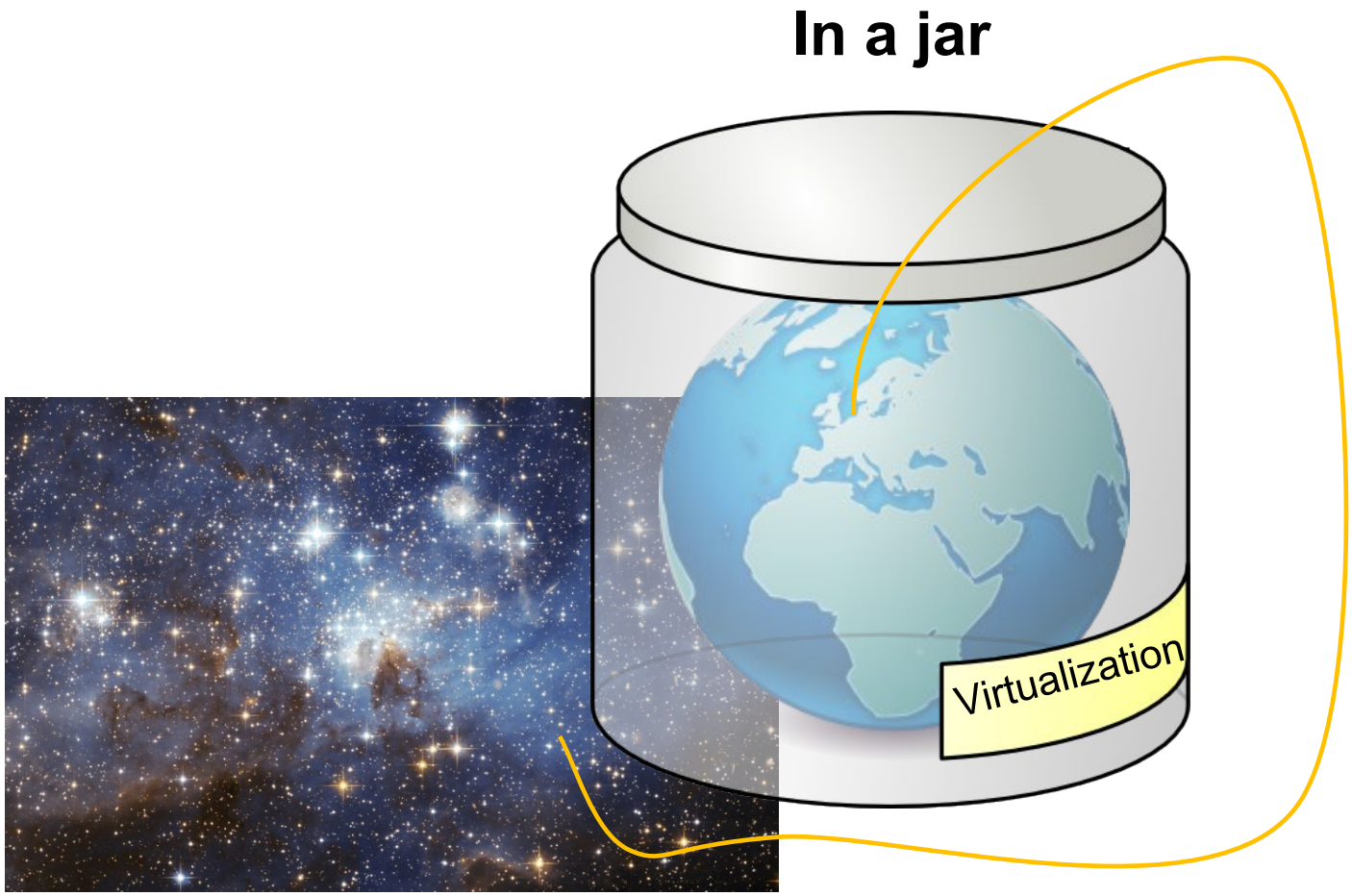
… test

… scratch

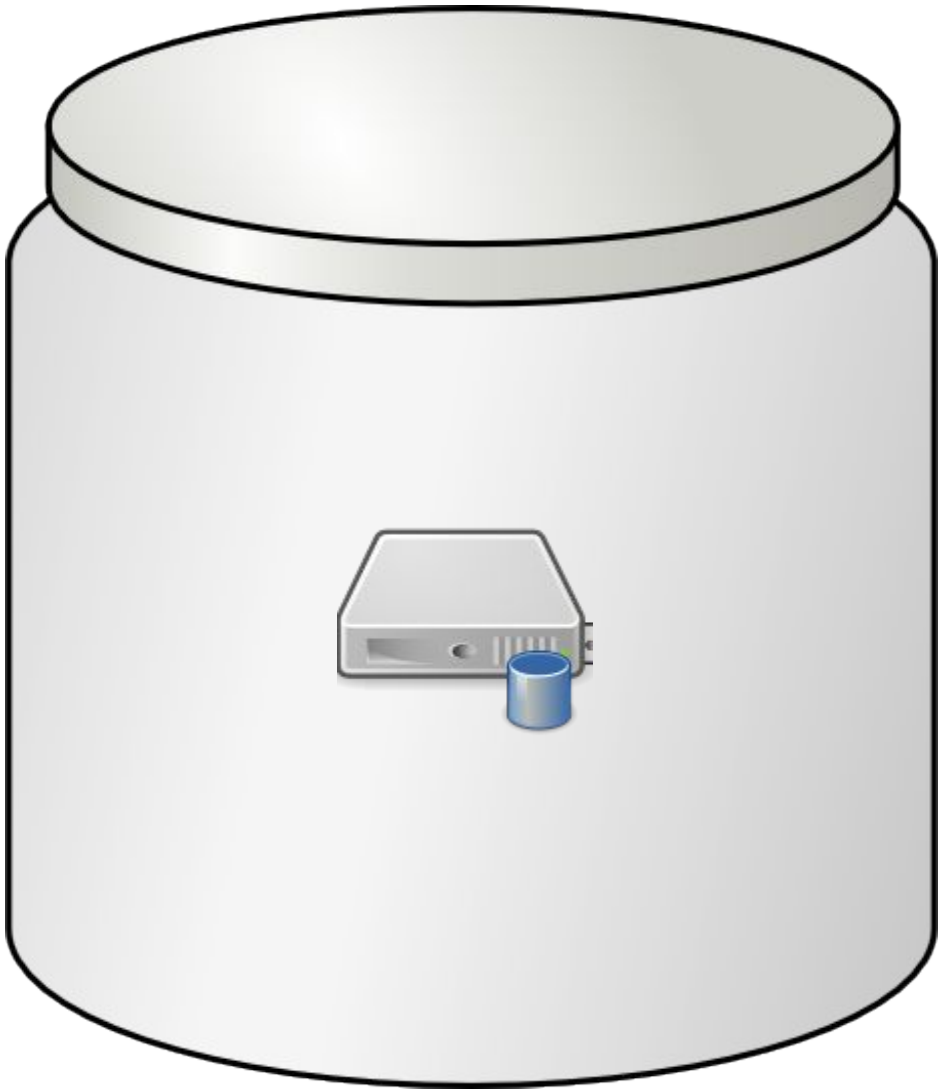
… flexibility

… privacy

What does our HPC Cloud offer?



What do you see, as a user?

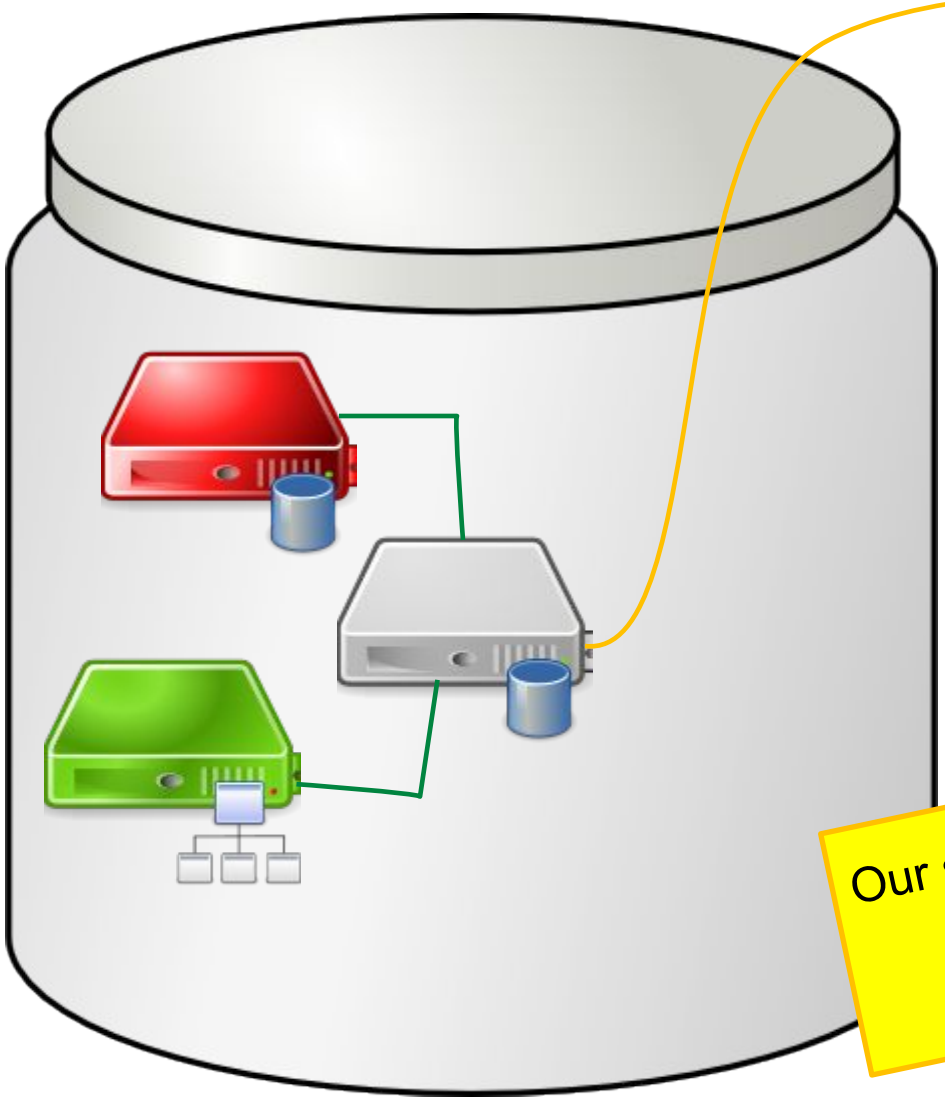


A place to build a running system

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

2

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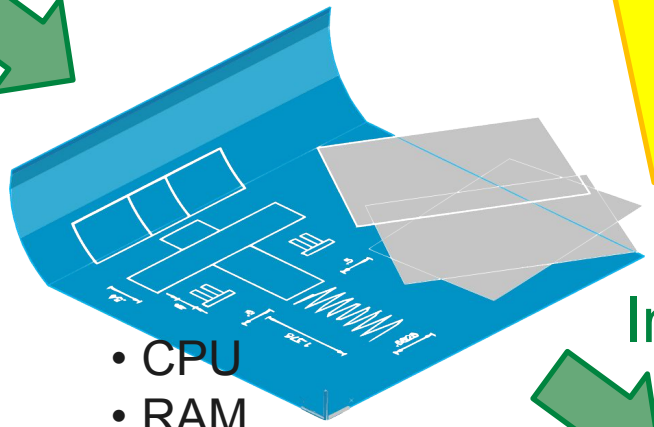
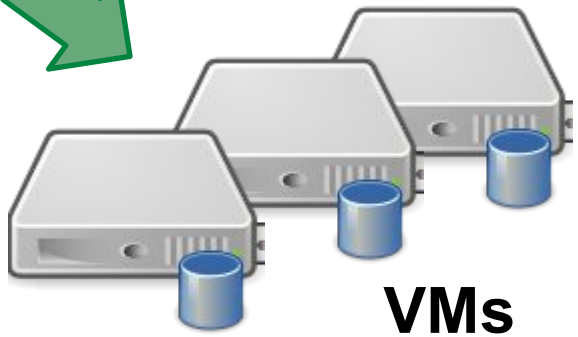
IaaS: Your place to run VMs



Instantiate



- Data store
- Persistency
- …

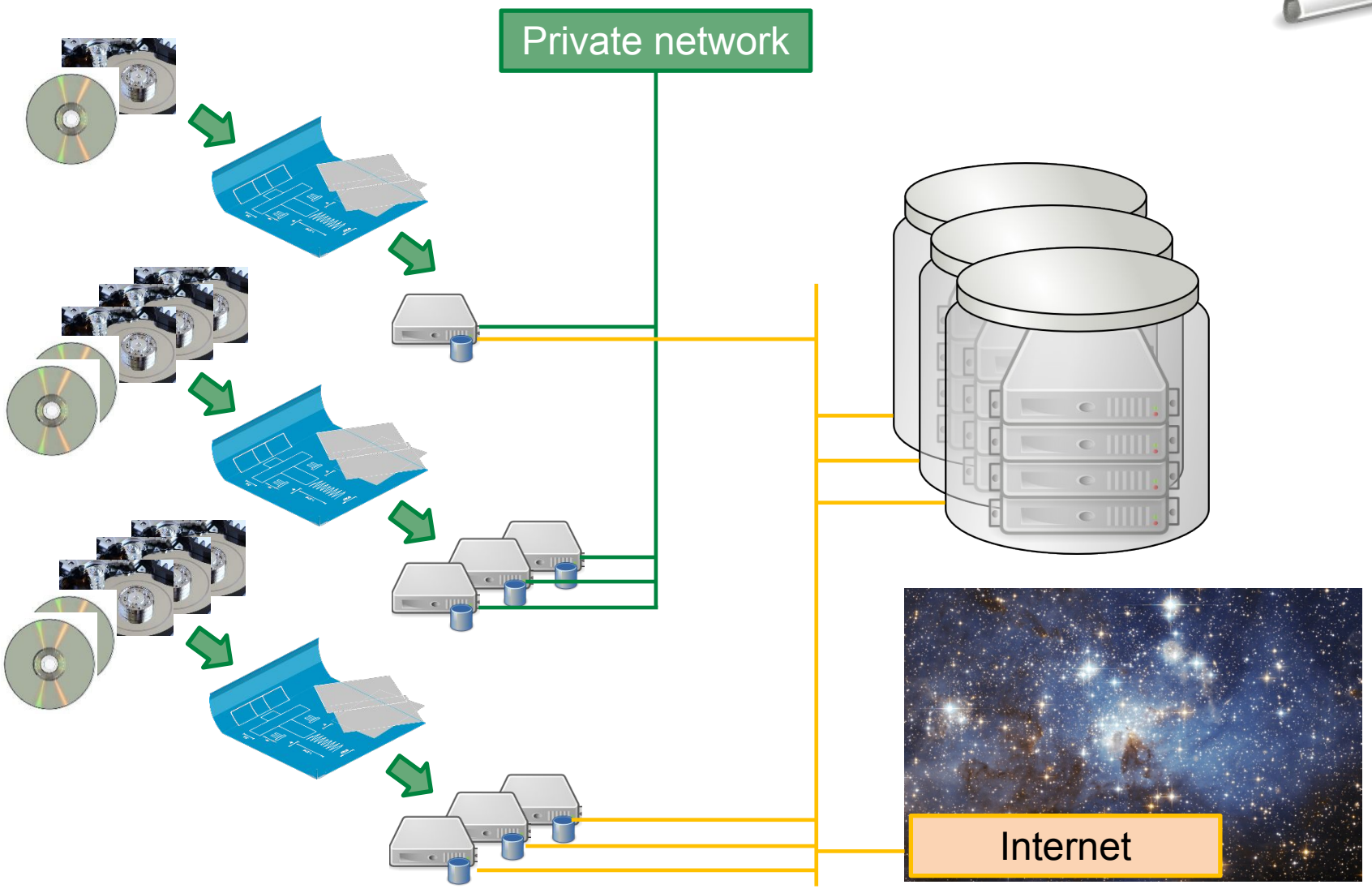
Images

- CPU
- RAM
- I/O
  - Disks
  - Network
- …

Template

VMs

IaaS: your interconnected VMs



You get

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

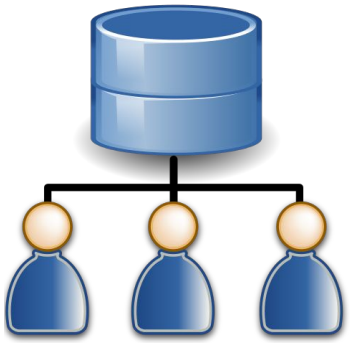
- Web interface
- User groups
- Pre-built Apps
- Accounting

Accounting

Per project

User accounts

Ceph



CPU time

Local SSD

User applications

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
- …

Organic evolution

Recently **added**

and near **future** features:

- **Latest release** of OpenNebula
- **Ceph storage; expansion**
  - Distributed object store and file system
  - Cope with increasing load

- **GPU processing**
  - Highly parallel structure
  - Program specifically to use it

- **SURFcontext; federated authentication**

Demo

3

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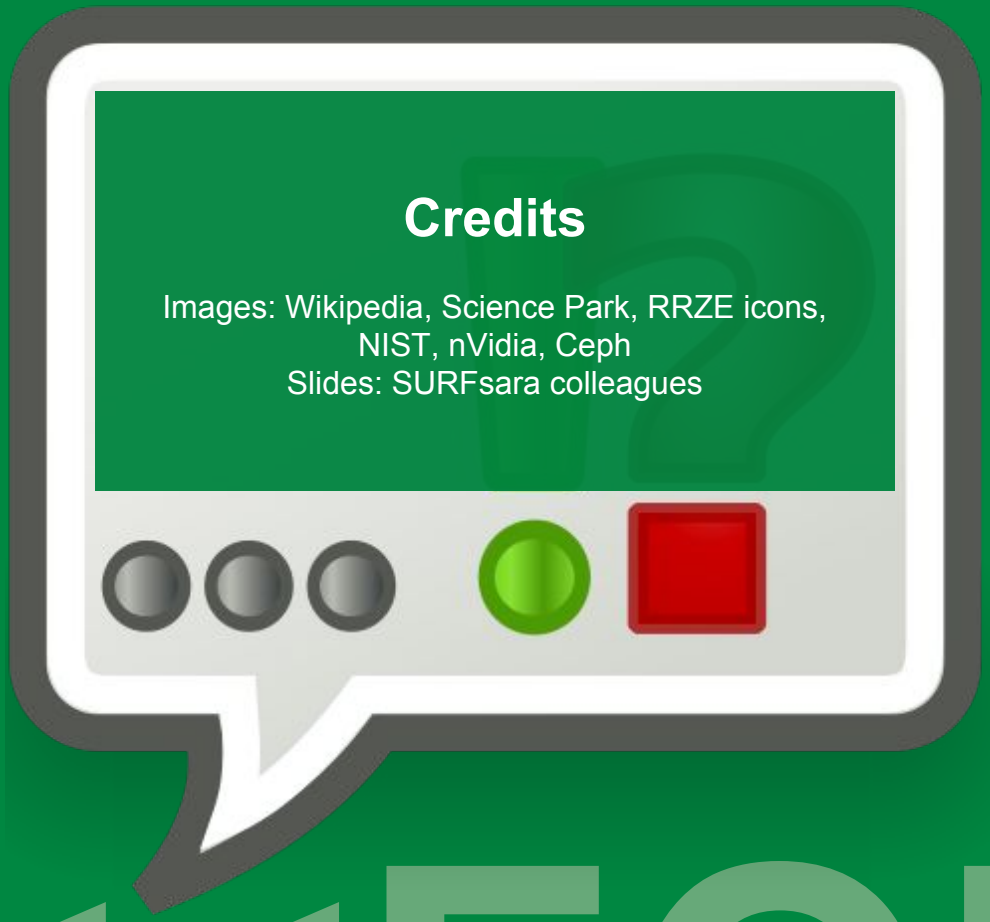
Request: https://e-infra.surfsara.nl

UI: https://ui.hpccloud.surfsara.nl

Doc: https://doc.hpccloud.surfsara.nl



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