SURF Research Bootcamp

COMPUTE TRACK - HPC CLOUD

Nuno Ferreira, 2017.06.15

TU/e Technische Universiteit Eindhoven University of Technology

SURF SARA

Compute Track Agenda

10:15 - 11:30 Introduction to UNIX

12:30 - 14:30 HPC Cloud (Ander Astudillo, Maithili Kalamkar, Nuno Ferreira)

12:30 Presentation: Introduction to the HPC Cloud

12:55 Demo: Web User Interface

13:00 Hands-on

15:00 - 17:00 Introduction to cluster computing

Access up to 18th June guaranteed

SURFsara services

Expertise | Consultancy | Training | Visualisation | Optimisation

High Performance Computing

- Supercomputing
- Cluster computing
- HPC Cloud

Data processing

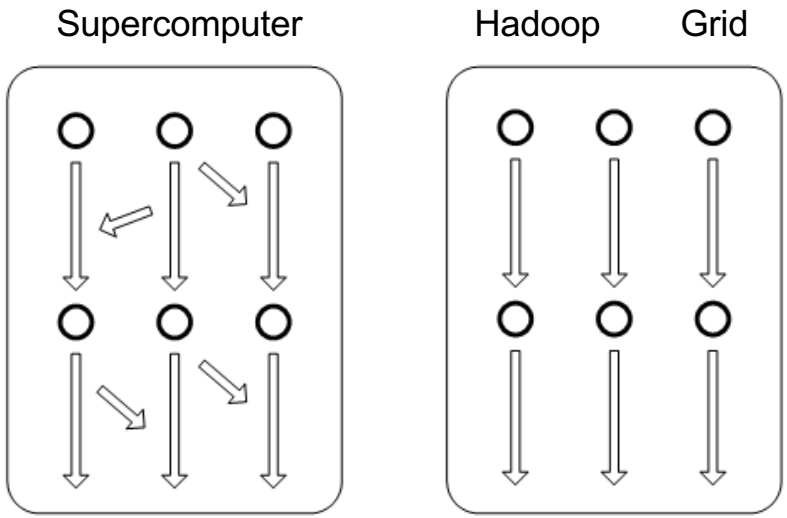
- Data analytics
- HPC Cloud
- Grid services
- Visualisation

Data services

- Mass Online Storage
- PID service
- Data management
- Preservation

Innovation & Collaboration

Why different services?



What is Cloud Computing?

“Ask 10 people what the cloud is, get 11 answers.” [?]

Essential Characteristics [1]

On-demand self-service, Network access, Resource pooling, Elasticity, Measured service

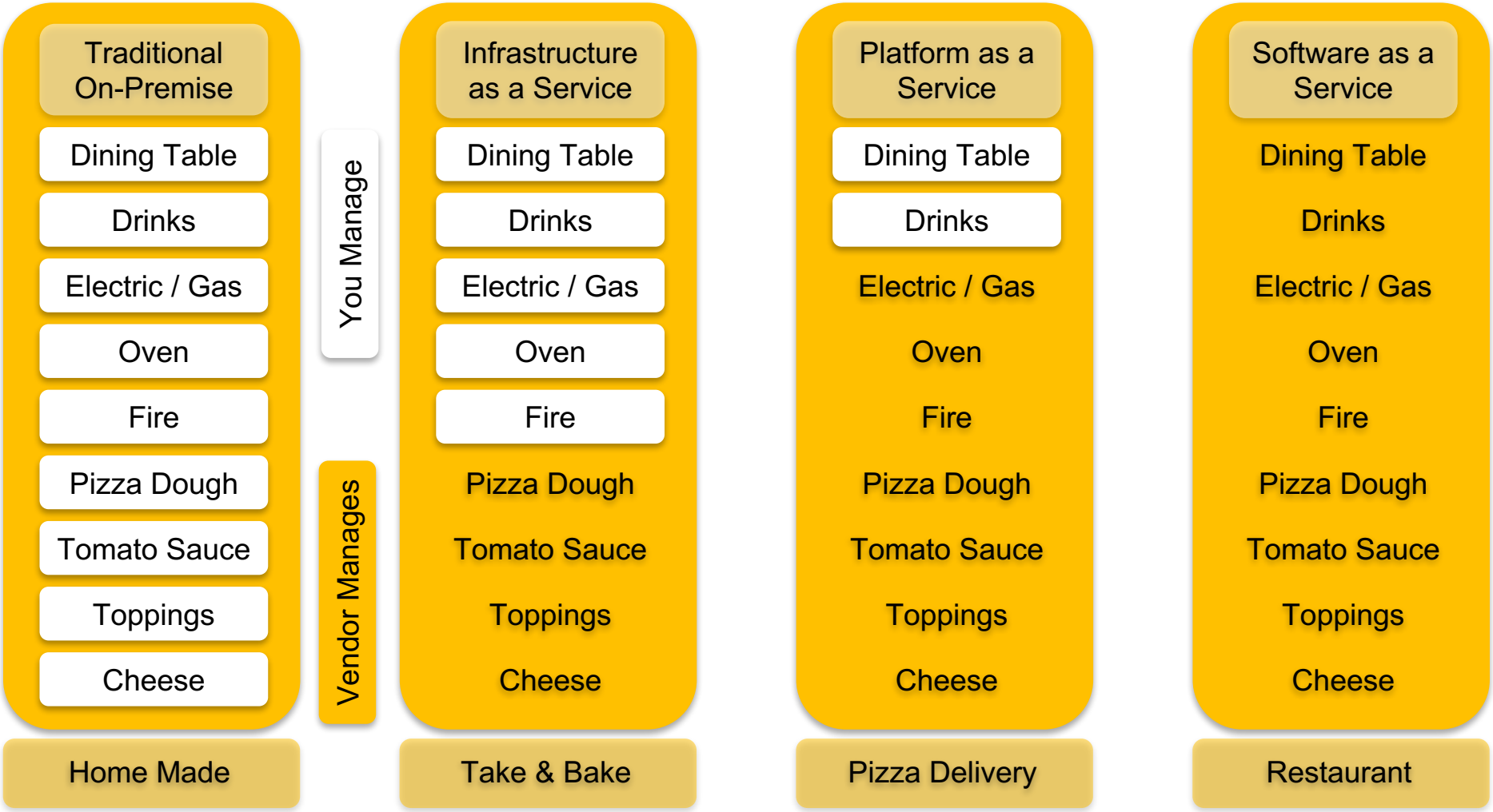
Service Models [1]

SaaS, PaaS, IaaS

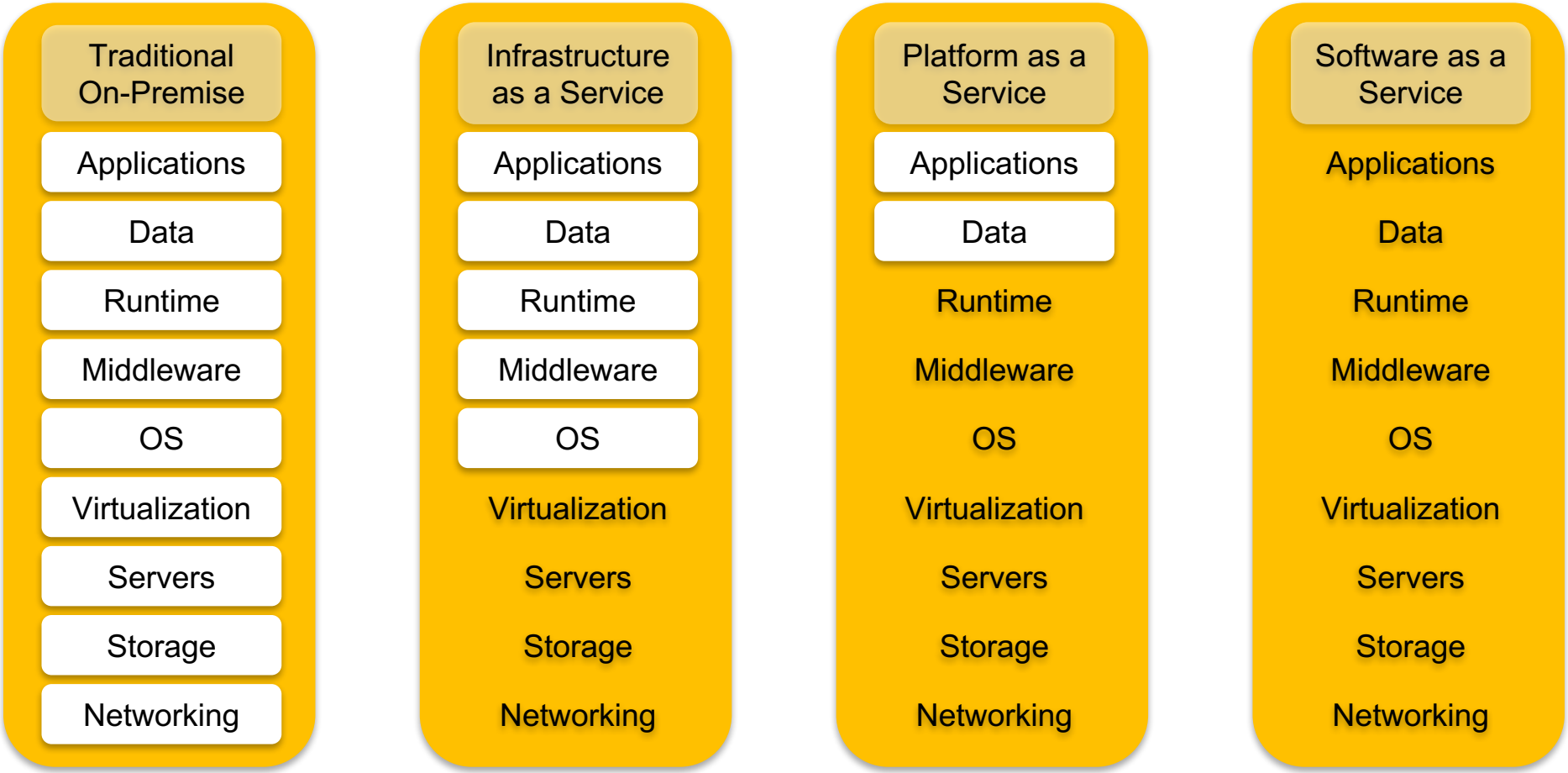
[1]. The NIST Definition of Cloud Computing

“Say Cloud one more time …”

Pizza as a Service



Service Models: XaaS , X = [I,P,S, …]



Infrastructure as a Service

Infrastructure as a Service

Applications

Data

Runtime

Middleware

OS

Virtualization

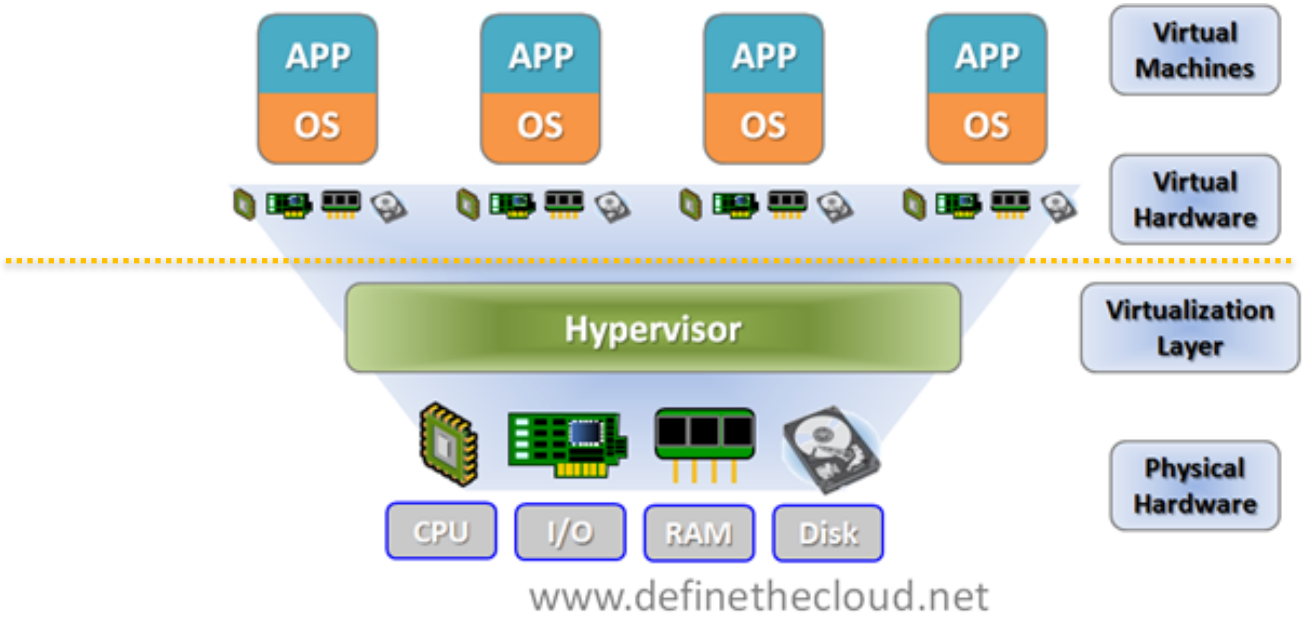
Servers

Storage

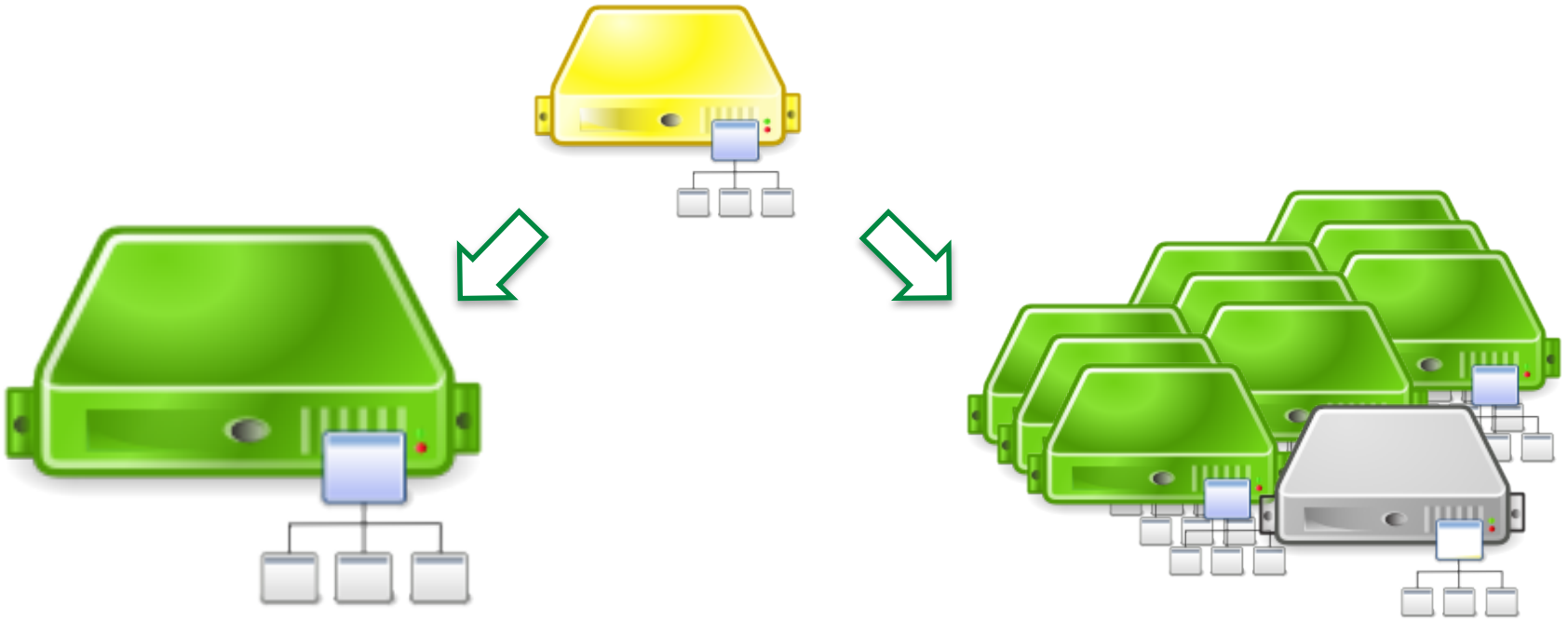
Networking

You Manage

Vendor Manages



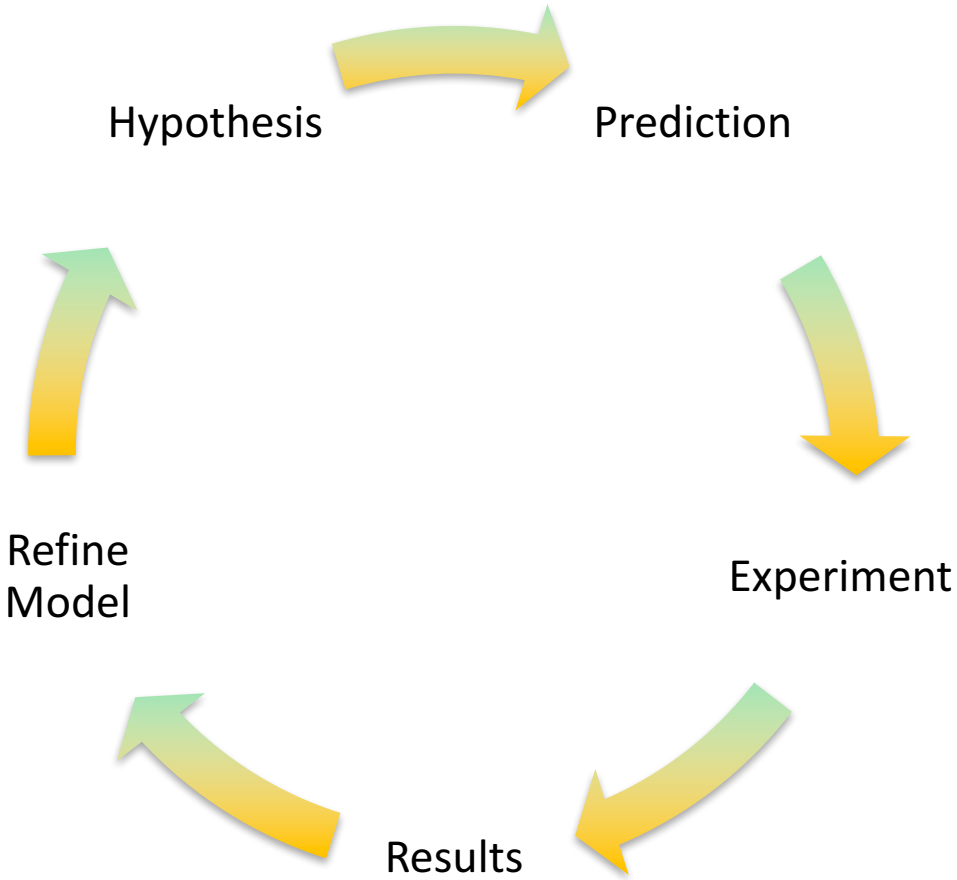
Flexibility



Scale up

Scale out

The Scientific Method



"Failure is a data point!"

HPC Cloud Running Projects

Research fields:

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

Use cases:

- Flexible software mix
- Big VMs
- Elasticity
- Provide a service to peers
- Software requiring licenses
- Set up, test and deploy workflows
- Training courses
- Intensive computing

HPC Cloud Benefits

General benefits

- Data & Computing in Dutch soil
- Data privacy inside your VM
- Unrestricted Internet access
- Collaborative work

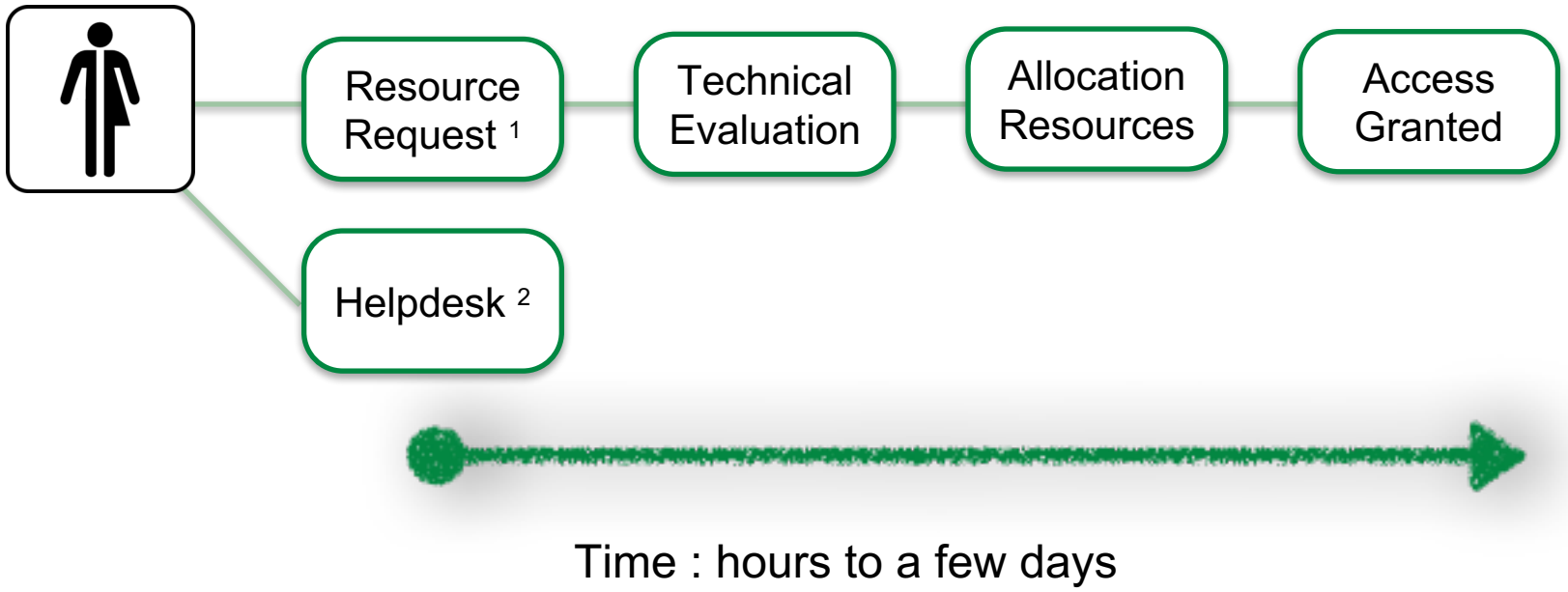
Technical benefits

- No overcommitting
- Tailor made your VM to your needs (flexibility)
- Root access!
- Controlled environment : choose your OS & packages
- Fast private network between VM's
- No maximum wall time!

HPC Cloud Shortcomings

- No Service Level Agreement
- No 24/7 Helpdesk service support
- You maintain everything in your VM
- You are responsible for all of your VM's beha
- You must protect yourself against threats from the Internet
- Accounting on VM uptime, not just compute time (like gas, light)
- No automatic backups
- Your laptop is faster than a 1 core VM

How to obtain an HPC Cloud account?



[1] Resource Request form

[2] helpdesk@surfsara.nl

HPC Cloud Resources

Compute Nodes

- 32 compute nodes: 64 vCPU, 256 GB RAM, 3.2 TB SSD
- 12 GPU compute nodes: 32 vCPU, 256 GB RAM, 800 GB SSD
- 1 High Memory Node: 40 vCPU, 2 TB RAM, 3.2 TB SSD
- More being installed

Storage Nodes

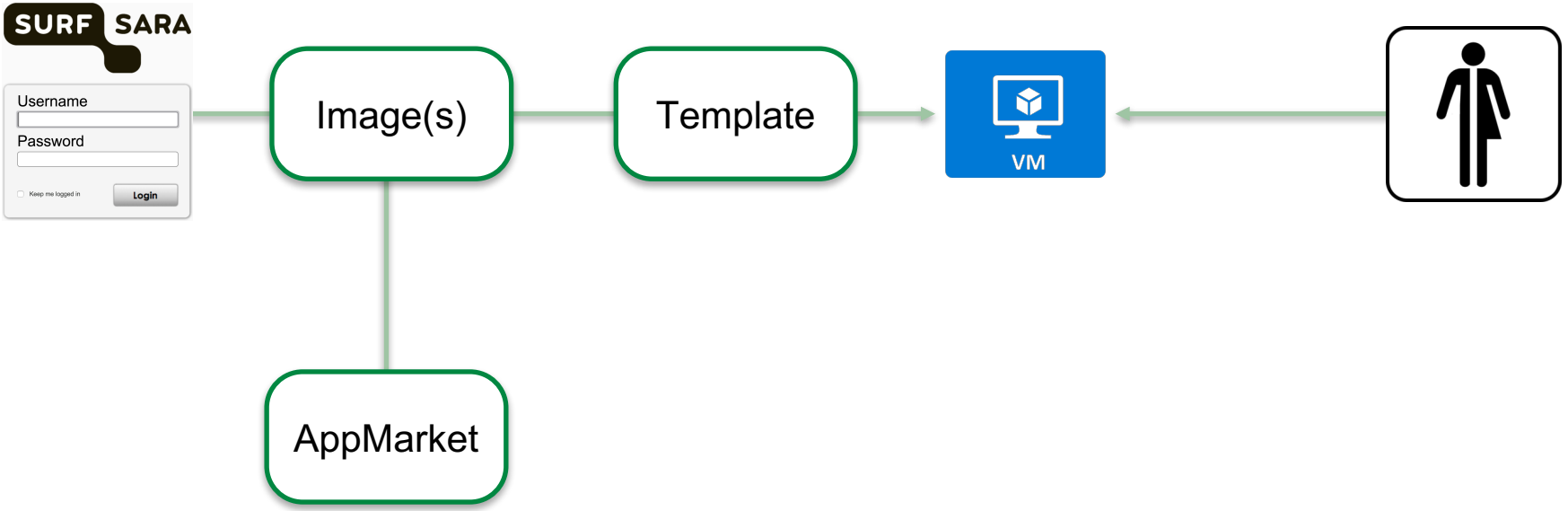
- 900 TB Ceph net * 3 redundancy : 2.7 PB total

Network

- 10 Gbit

Top 10 beautiful data centers, Datacenter Dynamics, 2017.06.05

Interacting with the HPC Cloud



Demo

Hands-On

UI : https://ui.hpccloud.surfsara.nl/
Username: s-campXY ; XY = [01, …]
Password: hpc@cloudXY
WWW : https://doc.hpccloud.surfsara.nl/bootcamp-20170615

Tips : At your own pace
Advice as a Service