

VU HPC Course

HPC CLOUD



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Nuno Ferreira
2017.11.13



Informatie-
technologie



Agenda



09:30 Welcome

09:40 Presentation & Demo: Introduction to the HPC Cloud (Nuno Ferreira)

10:10 Hands-on: Parts A & B

12:00 Break

13:00 Presentation: Cloudifying - parallelism & API (Ander Astudillo)

13:45 Hands-on: Extras

17:00 End

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19th Nov. : access to SURFsara HPC Cloud service

SURFsara services

Expertise | Consultancy | Training | Visualisation | Optimisation



High Performance Computing

- Supercomputing
- Cluster computing
- HPC Cloud



Data processing

- Data analytics
- HPC Cloud
- Grid services
- Visualisation



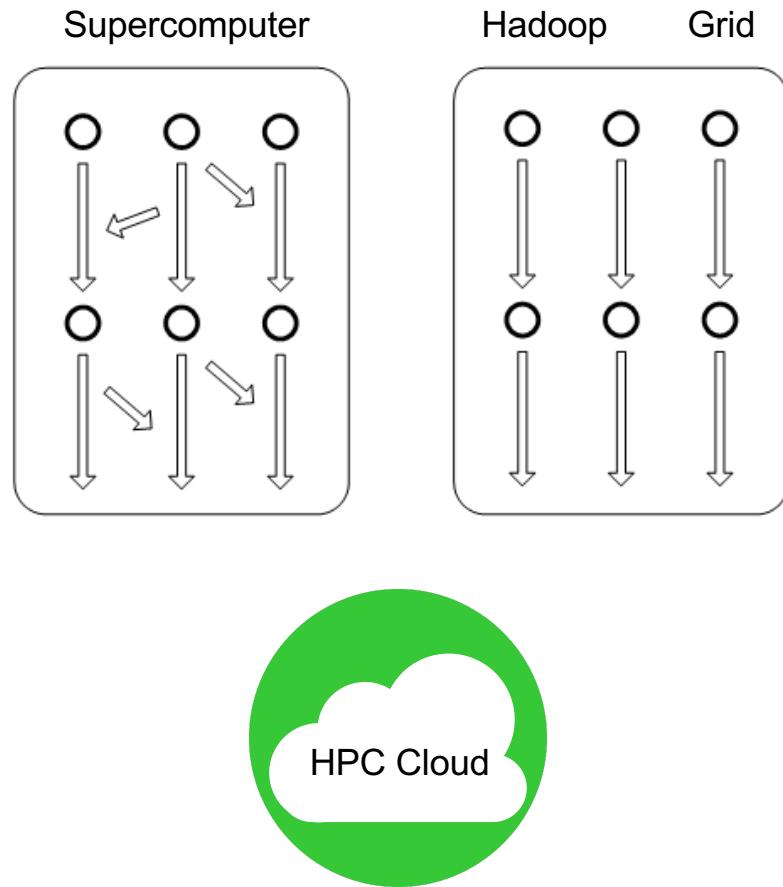
Data services

- 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

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

Service Models

[Infrastructure, Software, Platform] as a Service : **IaaS, SaaS, PaaS**



National Institute of Standards and Technology
Technology Administration, U.S. Department of Commerce

Say Cloud one more time ...



Pizza as a Service

You Manage

Vendor Manages

Home Made

Dining Table

Drinks

Electric / Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Take & Bake

Dining Table

Drinks

Electric / Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Pizza Delivery

Dining Table

Drinks

Electric / Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Restaurant

Dining Table

Drinks

Electric / Gas

Oven

Fire

Pizza Dough

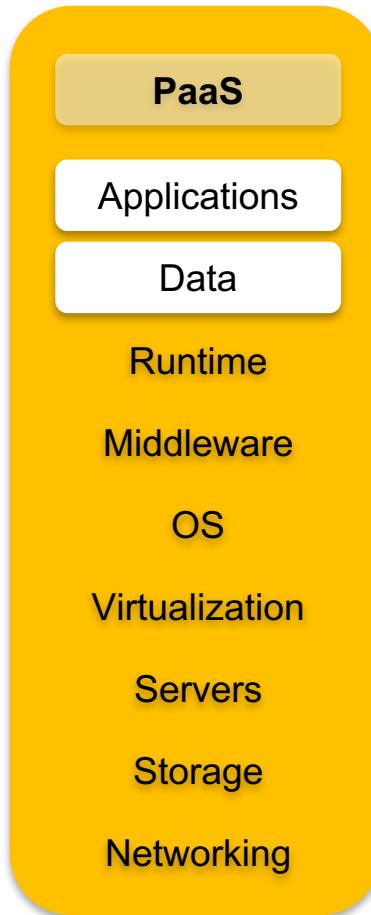
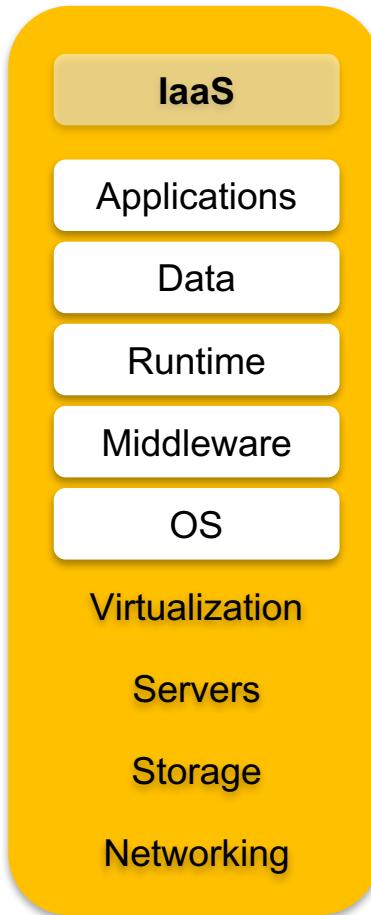
Tomato Sauce

Toppings

Cheese

Cloud Service Models

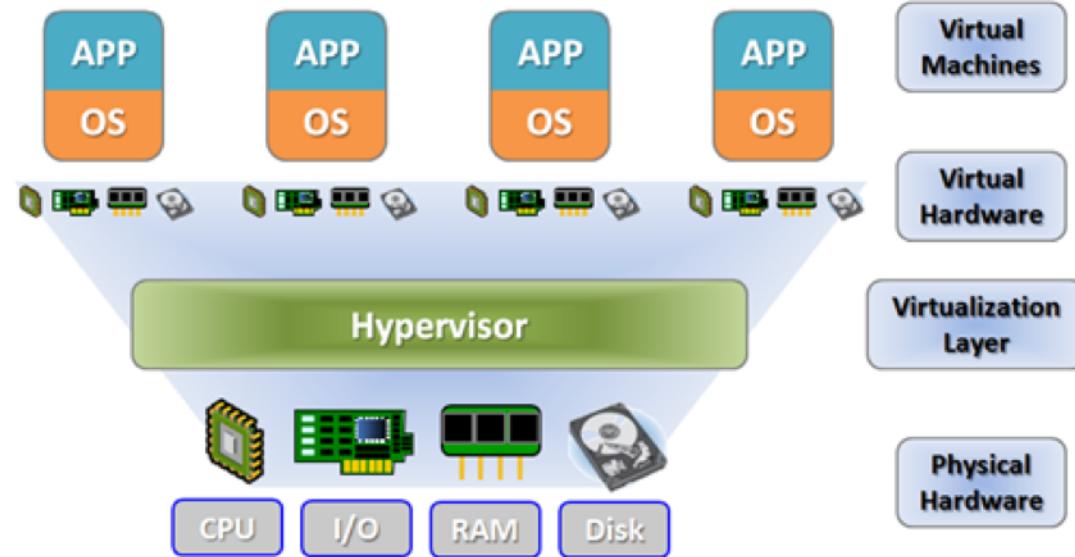
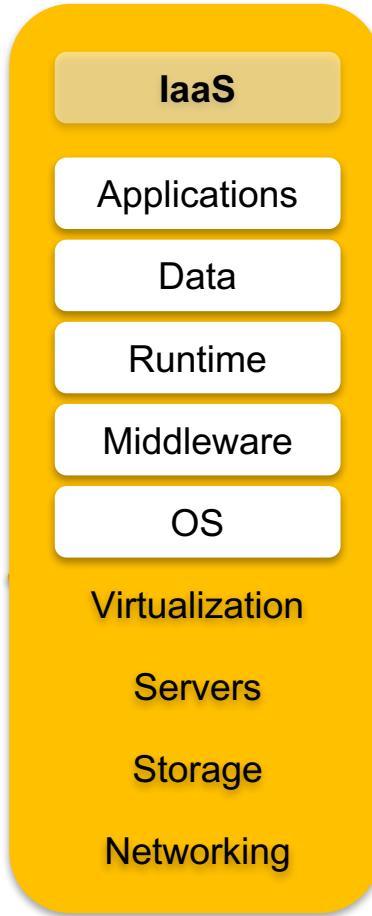
You Manage



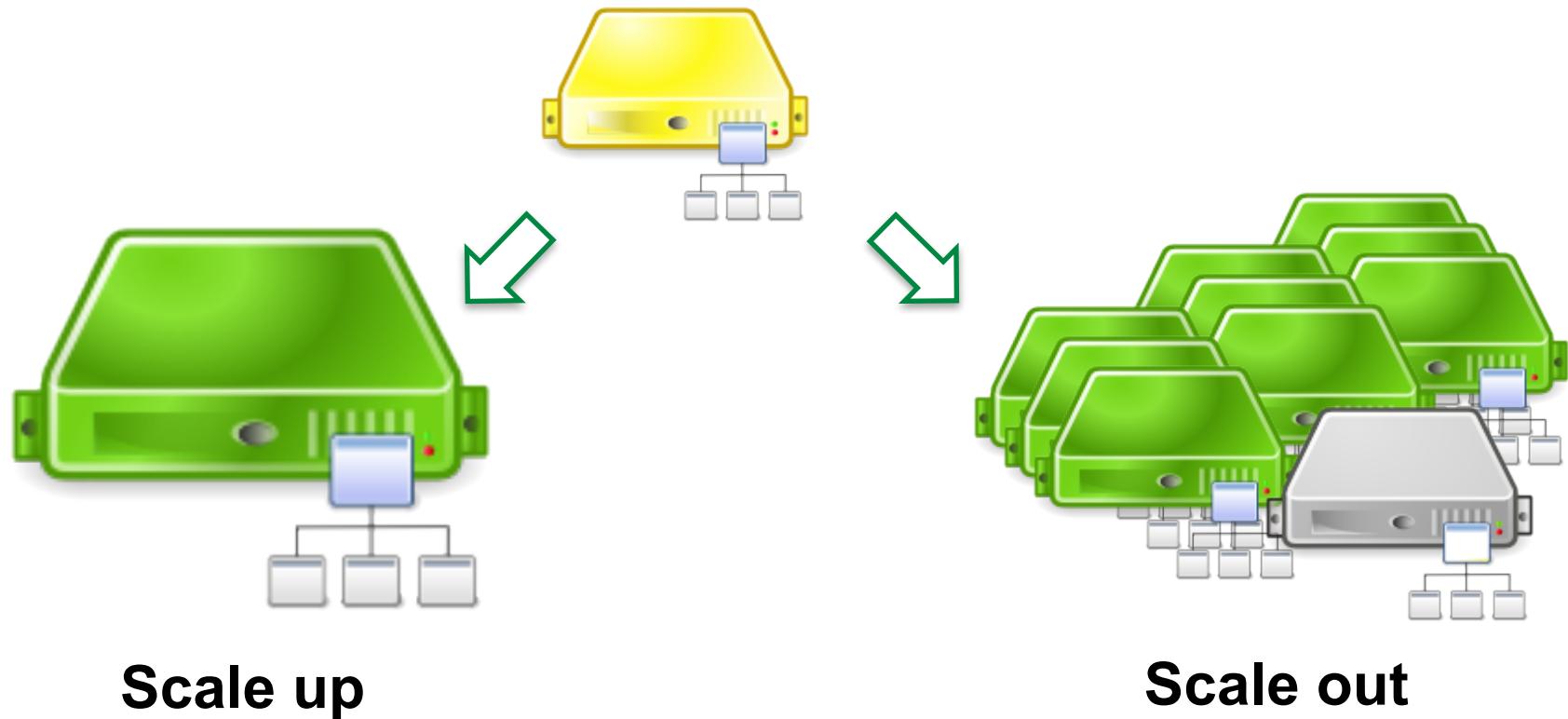
Infrastructure as a Service

You Manage

Vendor Manages



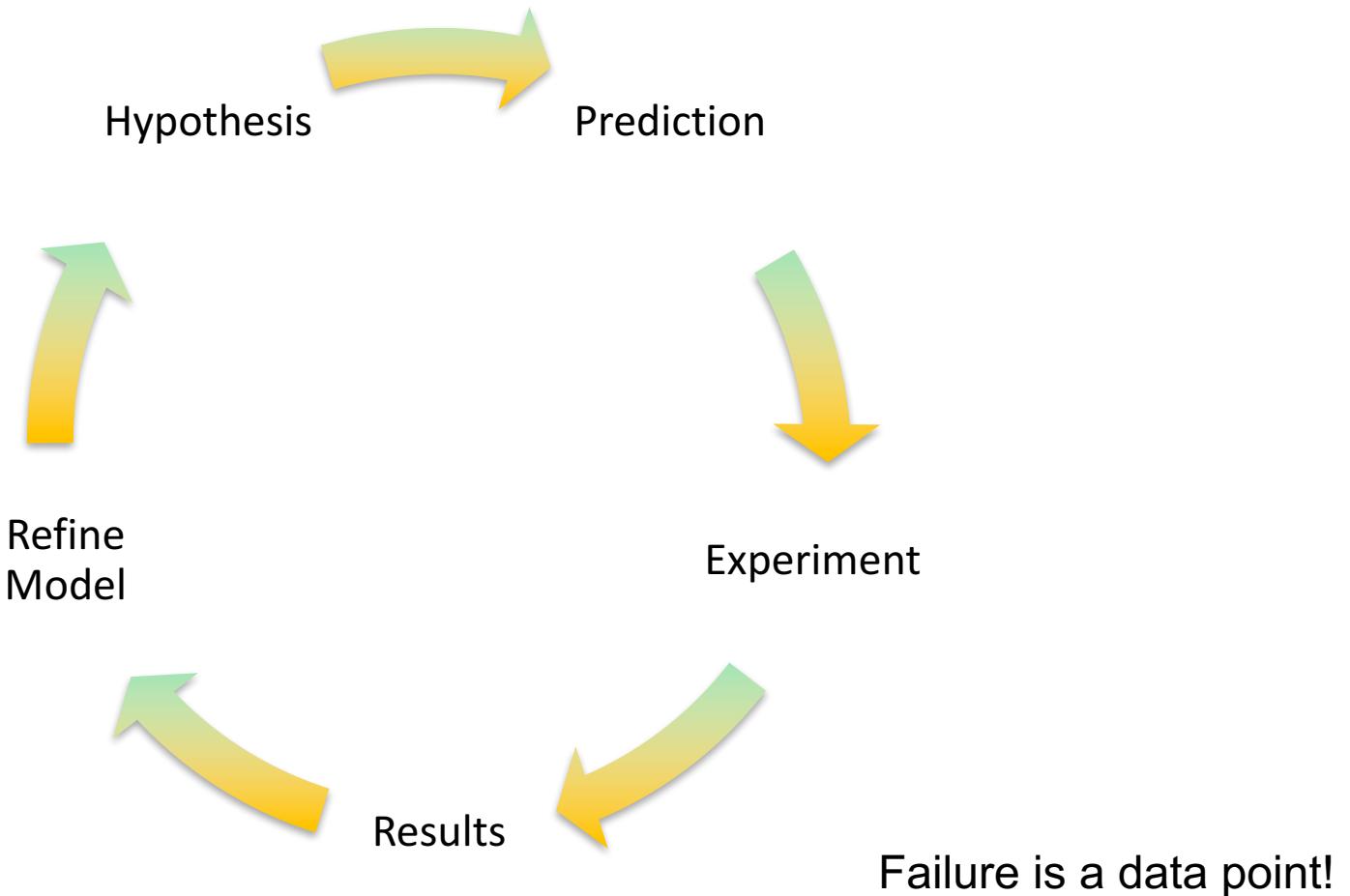
Flexibility



Scale up

Scale out

The Scientific Method



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 behavior
- 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



HPC Cloud Resources

Compute Nodes

- 32 CPU : 64 vCPU, 256 GB RAM, 3.2 TB SSD
- 10 CPU : 80 vCPU, 512 GB RAM, 3.5 TB SSD
- 12 GPU GRIDK2 : 32 vCPU, 256 GB RAM, 800 GB SSD
- 2 GPU P100 : 16 vCPU, 128 GB RAM, 800 GB SSD
- 1 High Memory : 40 vCPU, 2 TB RAM, 3.2 TB SSD

Storage Nodes

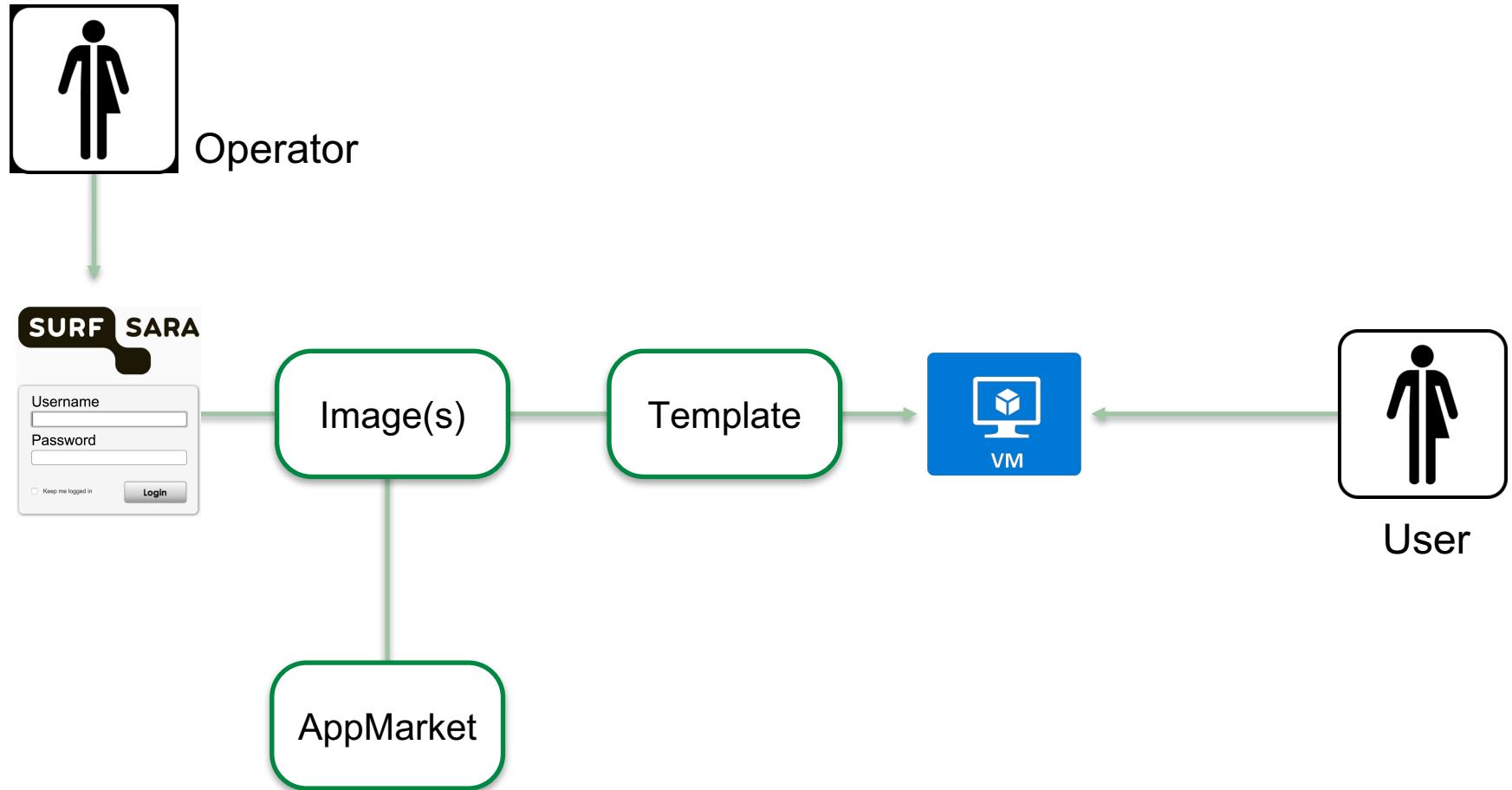
- 900 TB Ceph net * 3 redundancy : 2.7 PB total

Network

- 2*10 Gbit / node



Interacting with the HPC Cloud



Demographic

<https://doc.hpccloud.surfsara.nl/VU-20171113/>

Ready



Username: Provided by the course facilitators

Password: Provided by the course facilitators

Steady

At your own pace!
Advice as a Service

Go