

Welcome to the NL-TI and the Dutch National e-Infrastructure

LHCOPN-LHCOne workshop

October 2015



Nikhef *David Groep, Nikhef*

The Dutch National e-Infrastructure



operational partners



coordinated by **SURF**



David Groep
Nikhef
Amsterdam
PDP & Grid



SURF

SURF MARKET

SURF NET

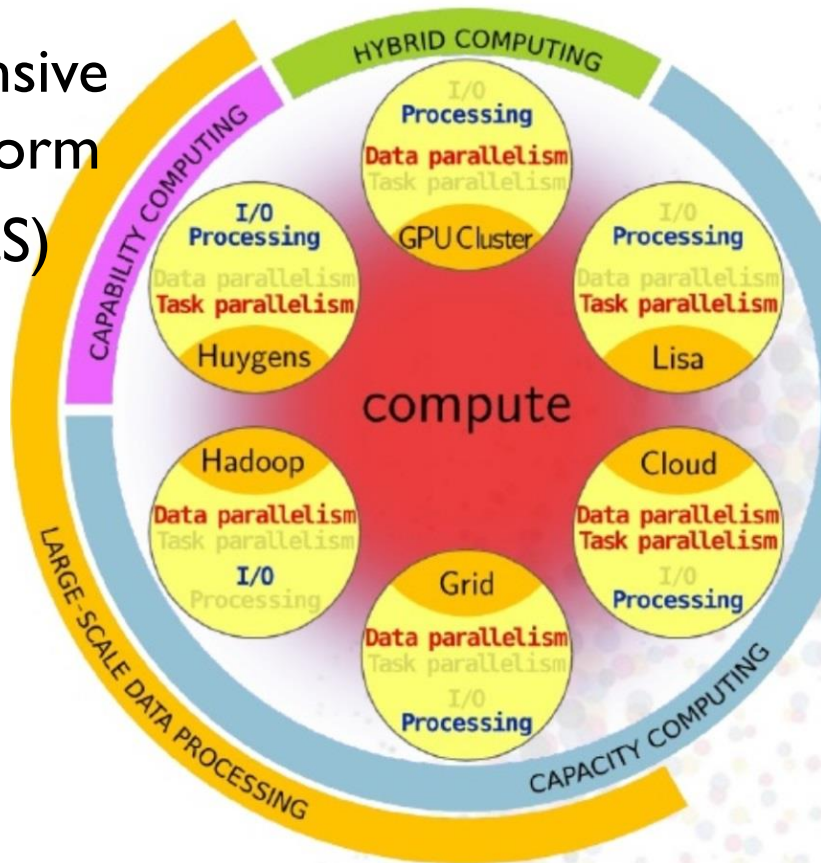
SURF SARA

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DNI data and compute services



- ‘Grid’ data intensive processing platform
- HPC Cloud (IaaS)
- Hadoop
- GPU
- BeeHub
- SURFdrive

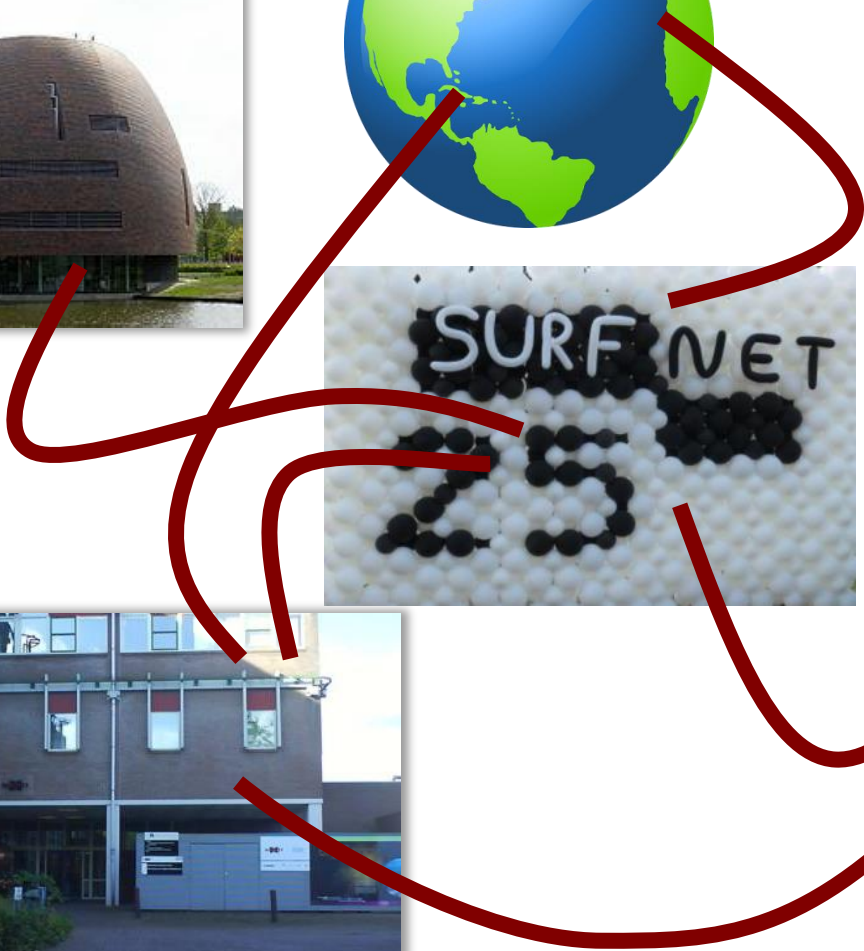
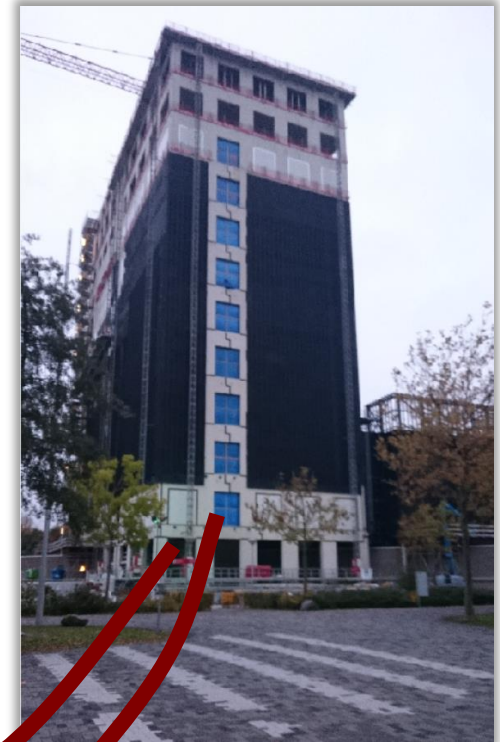
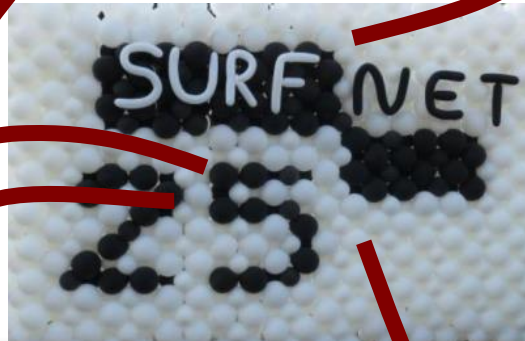
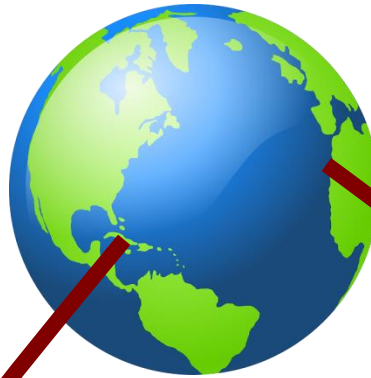


- *Data Ingest Service*
- High-throughput storage
- Long-term archival
- “Lisa” low-latency compute cluster
- Carthesius TI HPC
- HTC IaaS data processing Cloud (several, est: 2016)

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Nikhef
Amsterdam
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Connecting NL

infrastructure



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What do our users want? And if we Ask ?



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Nikhef
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Beyond our 'own' infrastructure?

- Increasing a meshed infrastructure appears: institutional private peering, metro-area fiber owned by e.g. universities



- Re-use of trigger farms for analysis: new flows!
- Dynamic commercial infrastructure: NHScienceCloud, green (or: cheap) computing

Wieringermeer, Noord Holland



Wieringermeer, Noord Holland



But why not here, where it's green?



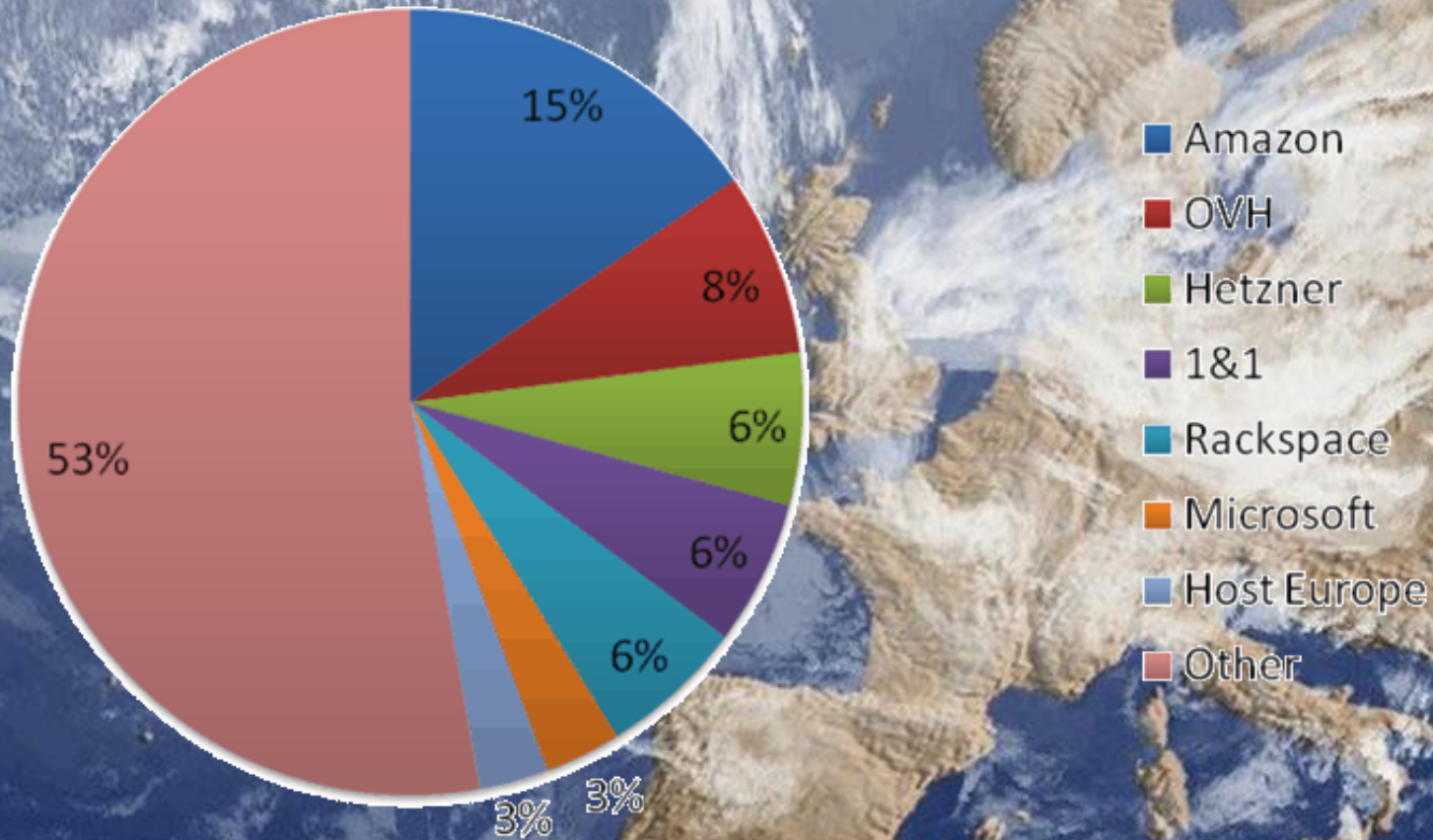
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Or here, where it's cheap?



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Cloud provider landscape in Europe



Source: the METISfiles Top 1000

<http://www.themetisfiles.com/2014/11/leading-iaas-partners-of-european-saas-isvs/>

Background imagery: MeteoFrance

A photograph of three young women sitting together, looking at a smartphone held by the woman in the middle. The woman on the left is wearing a pink hoodie, the woman in the middle is wearing glasses and a grey cardigan over a teal shirt, and the woman on the right is wearing a red hoodie. They are all smiling and appear to be engaged in a conversation about the phone. The background is slightly blurred, showing what looks like a public space with blue chairs.

Getting it to the end-user

photo: <https://www.flickr.com/photos/leaflanguages/8359270512> (CC-0)

This is what they have at home ...

4K displays
500+ Mbps to the home
but also 20+ms latency with DOCSIS

But:
do users know how to use networks?
... be it theirs, or our LHCOPN/One?



But what end-users need ...

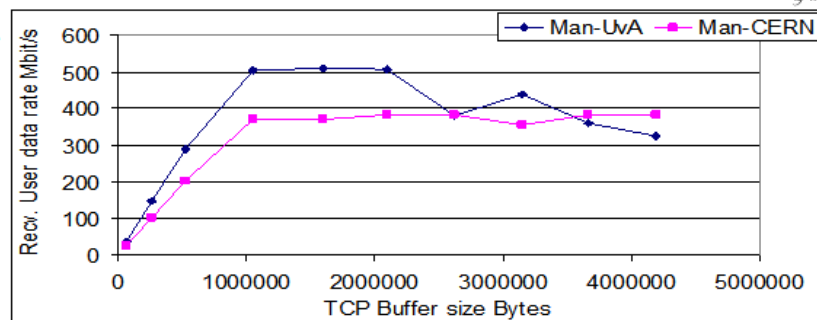
... may what we have by now forgotten ...



Gigabit TCP Throughput on the Production WAN



Throughput vs TCP buffer size



TCP window sizes in Mbytes calculated from $RTT \times \text{bandwidth}$

Link	Round trip time ms	TCP Window for BW 1 Gbit/s	TCP Window for UDP BW 750 Mbit/s	TCP Window for UDP BW 460 Mbit/s
Man – Ams	14.5	1.8	1.36	
Man - CERN	21.4	2.68		1.23

David Groep
Nikhef
Amsterdam
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Education!

get end-users to understand & comprehend enough
to use our 'goodies'
*and make sure all LHCOne participants
also know what to do (and what not ...)*

... but let's keep on dreaming: the users won't!