IT Infrastructure for Research
many roads on one map

Nikhef

PCGWI site visit Nikhef

2018-10-24

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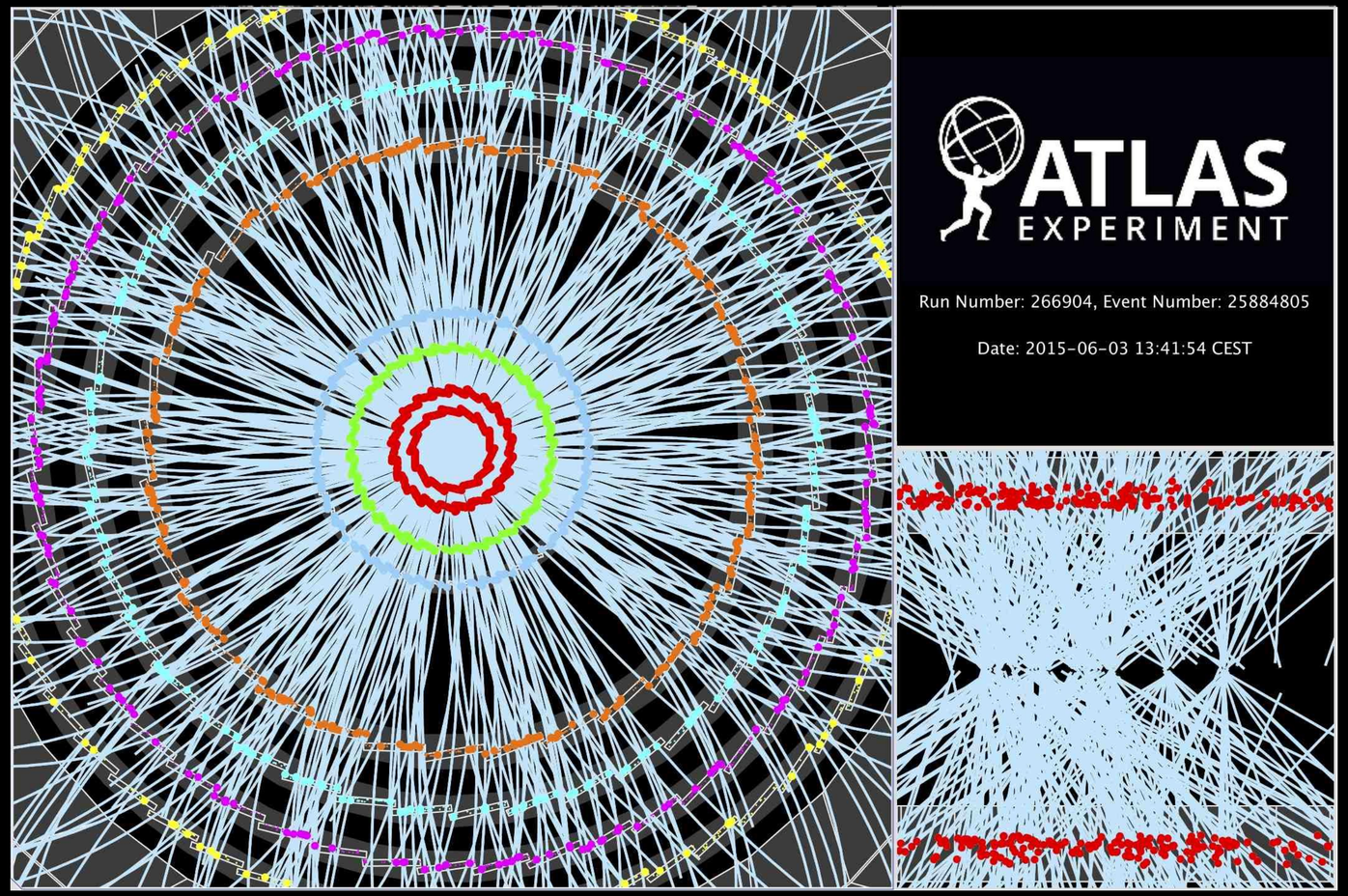
Computing: for the LHC and more

*~ 10 seconds to a compute a **single event** at ATLAS for 'jets' containing ~30 colllisions*



Event processing time: v19.0.1.1 as per Jovan Mitrevski and 2015 J. Phys.: Conf. Ser. 664 072034 (CHEP2015)
Display of a proton-proton collision event recorded by ATLAS on 3 June 2015, with the first LHC stable beams at a collision energy of 13 TeV

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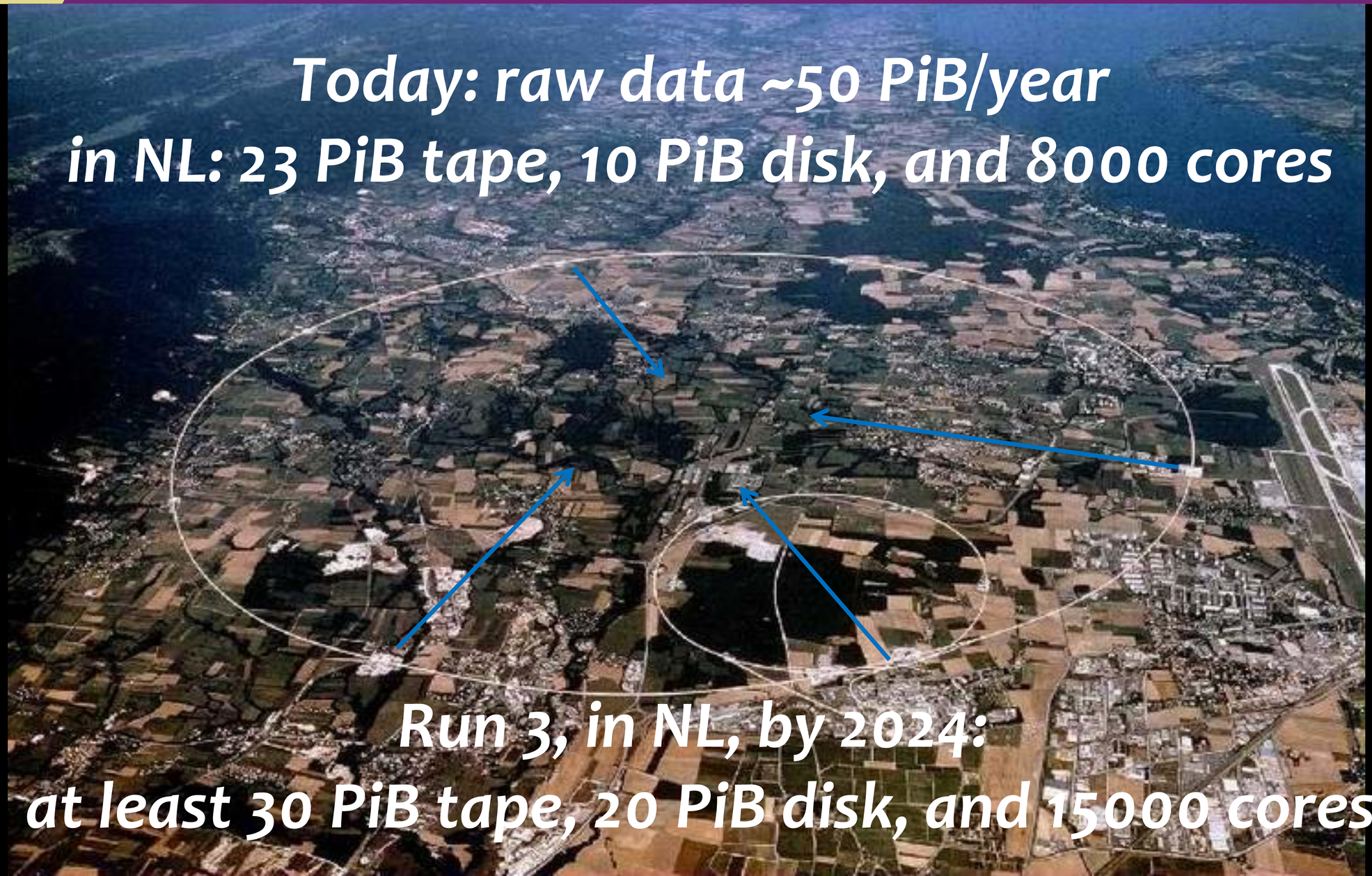
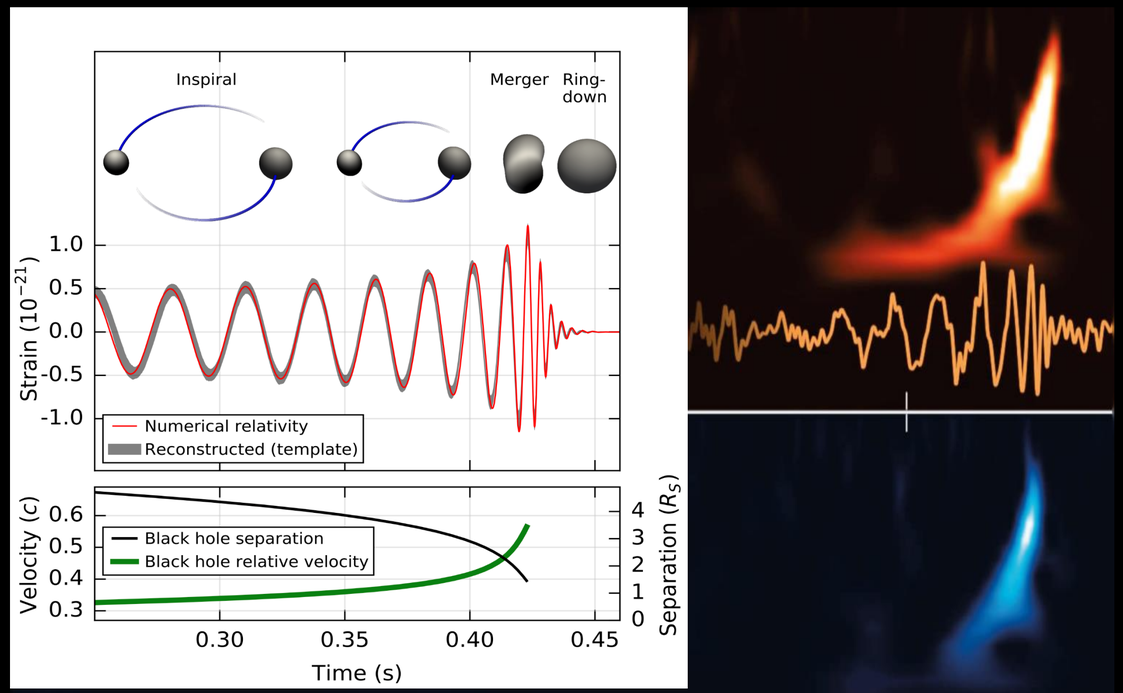
LHC computing



GW: compute-bound detection



wave form generation

template bank contruction

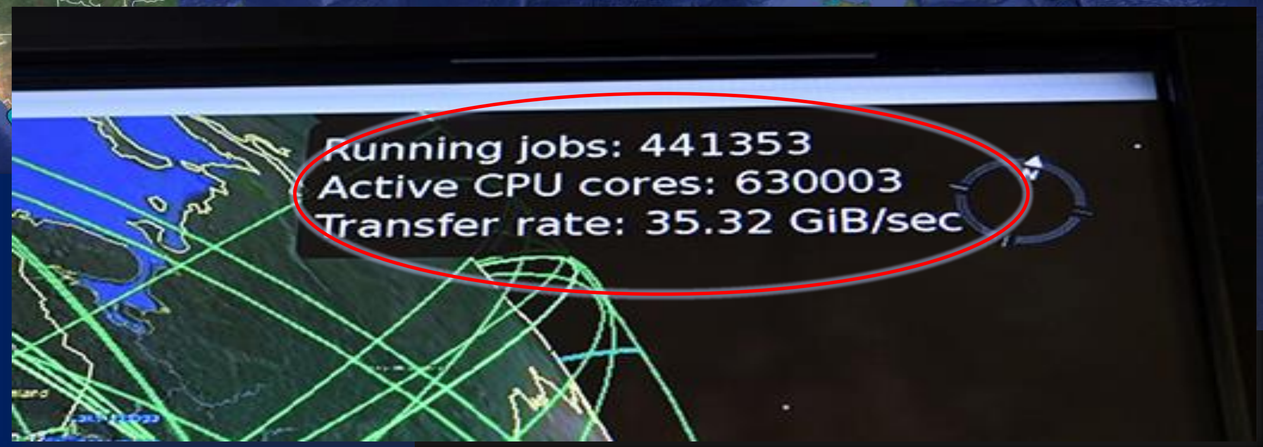
run over GW data taken

find chirps that match model

For NL means at least ~1400 cores and ~1 PiB disk (basic capability)

Research is global and ‘enduring’

Worldwide LHC Computing
170 institites in
42 countries and economies
growing since ~2001



- *CPU: ~ 350,000 cores*
- *Disk 310 PiB*
- *Tape 390 PiB*

Strong together: from BiG Grid to SURF

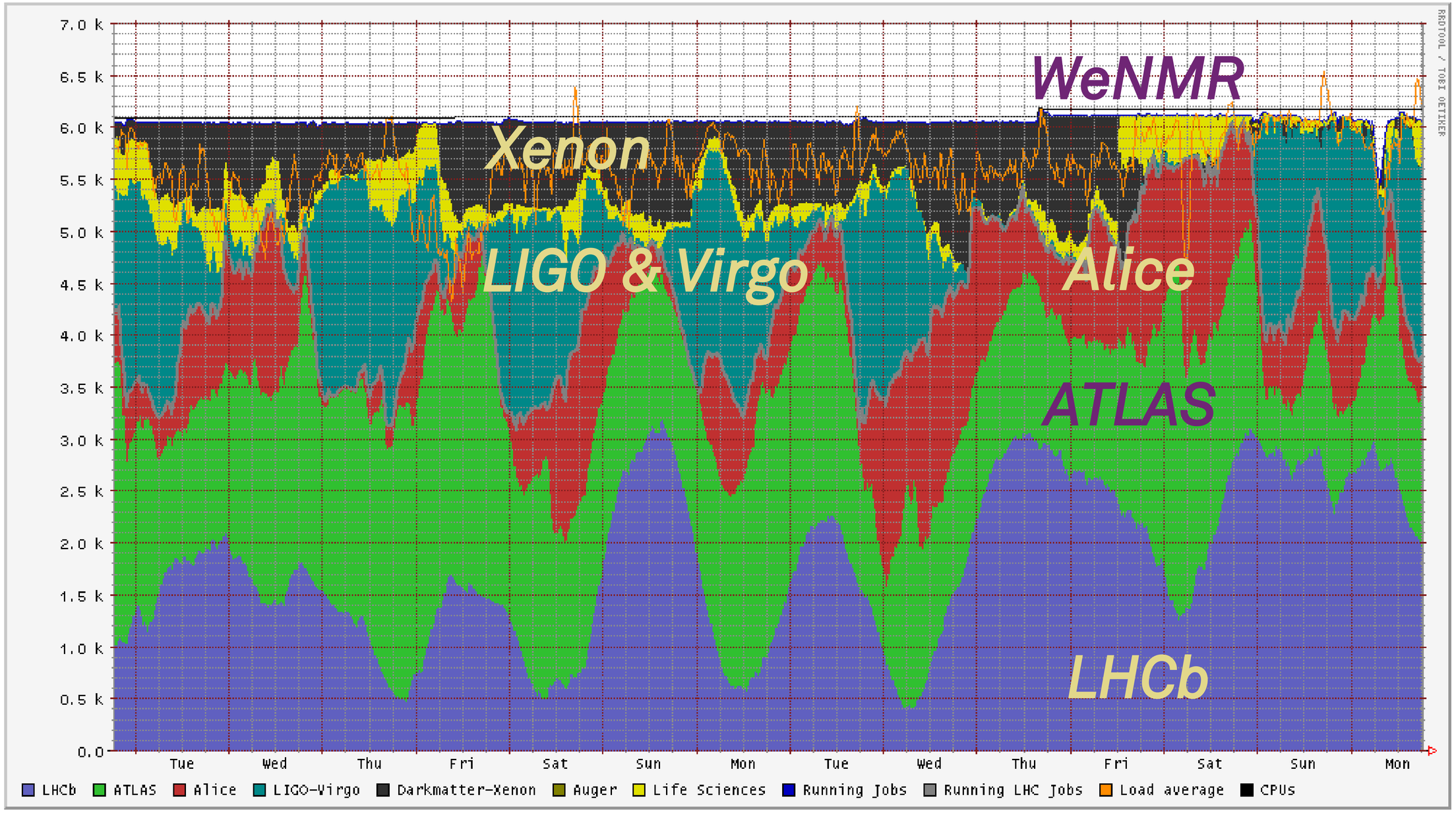
BiG Grid (2005, 2007-2013)
from data processing 'project'
to a national e-Infrastructure

- we're in this together: Nikhef, NWO, NBIC
- solve common challenges
- invest in both hardware and peopleware

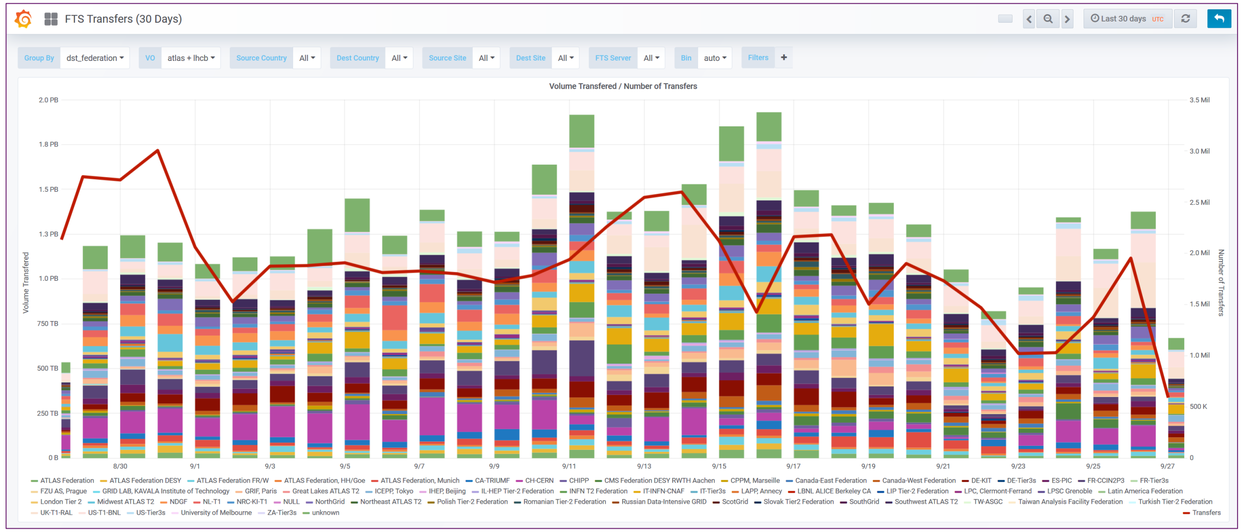
Dutch National e-Infrastructure (2013-)
coordinated by SURF

- national collaboration brings great results
- ensure continuation of BiG Grid success
- more effective and cost-efficient,
  and of ensured quality

Shared computing @Nikhef

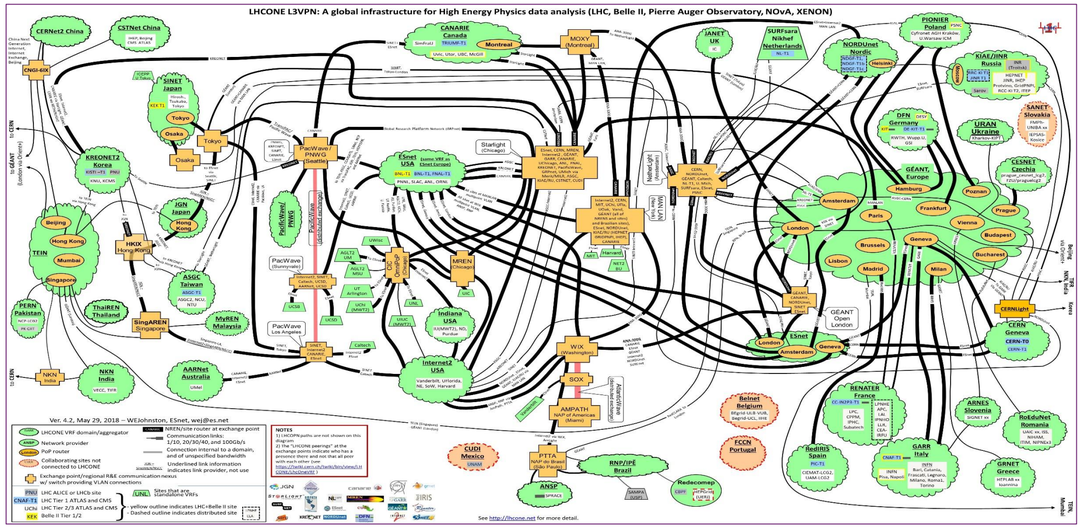


Balanced Infrastructure: disk & net



Data transfer and storage

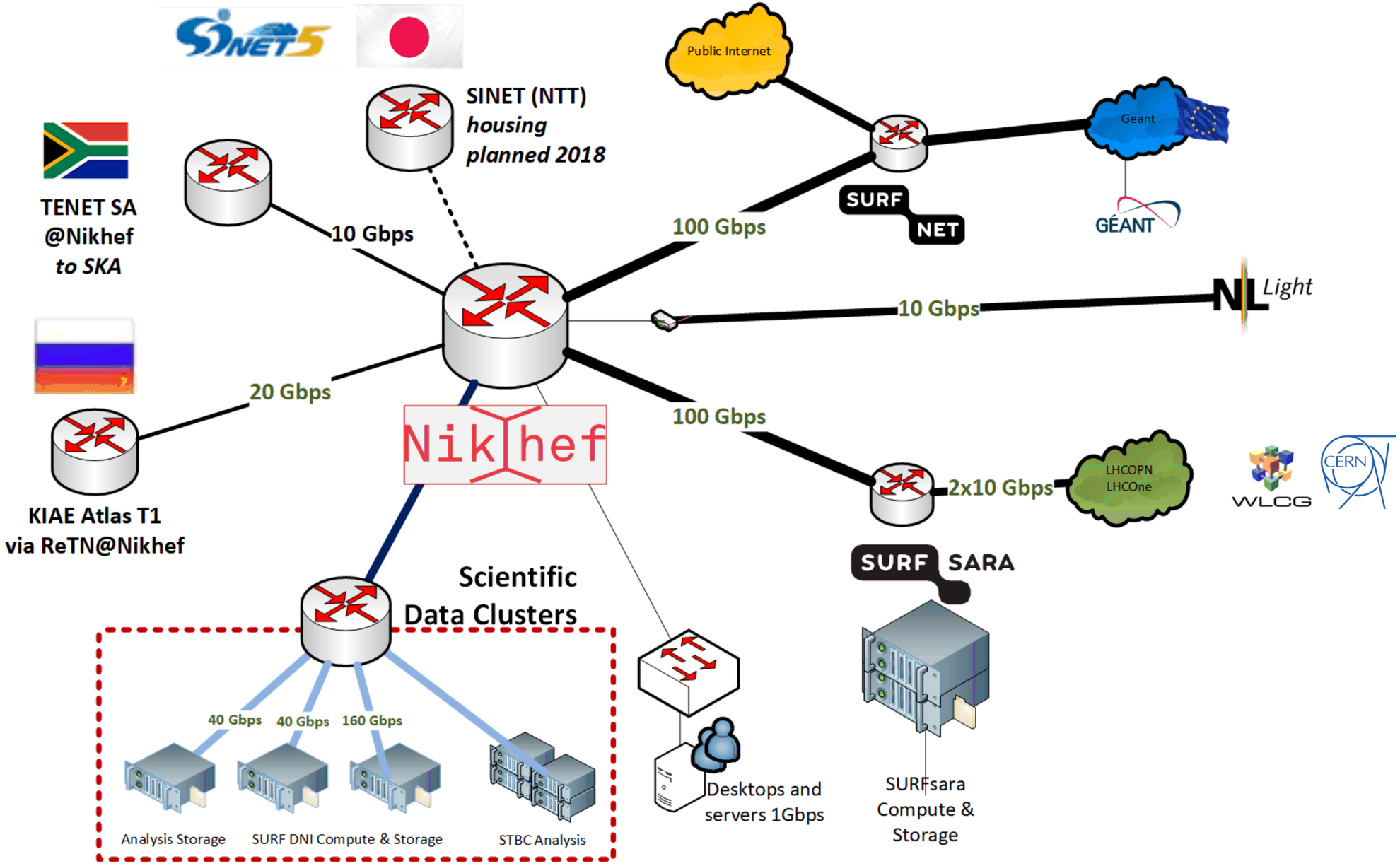
- with guaranteed throughput
- able to ‘feed’ the processing algorithms



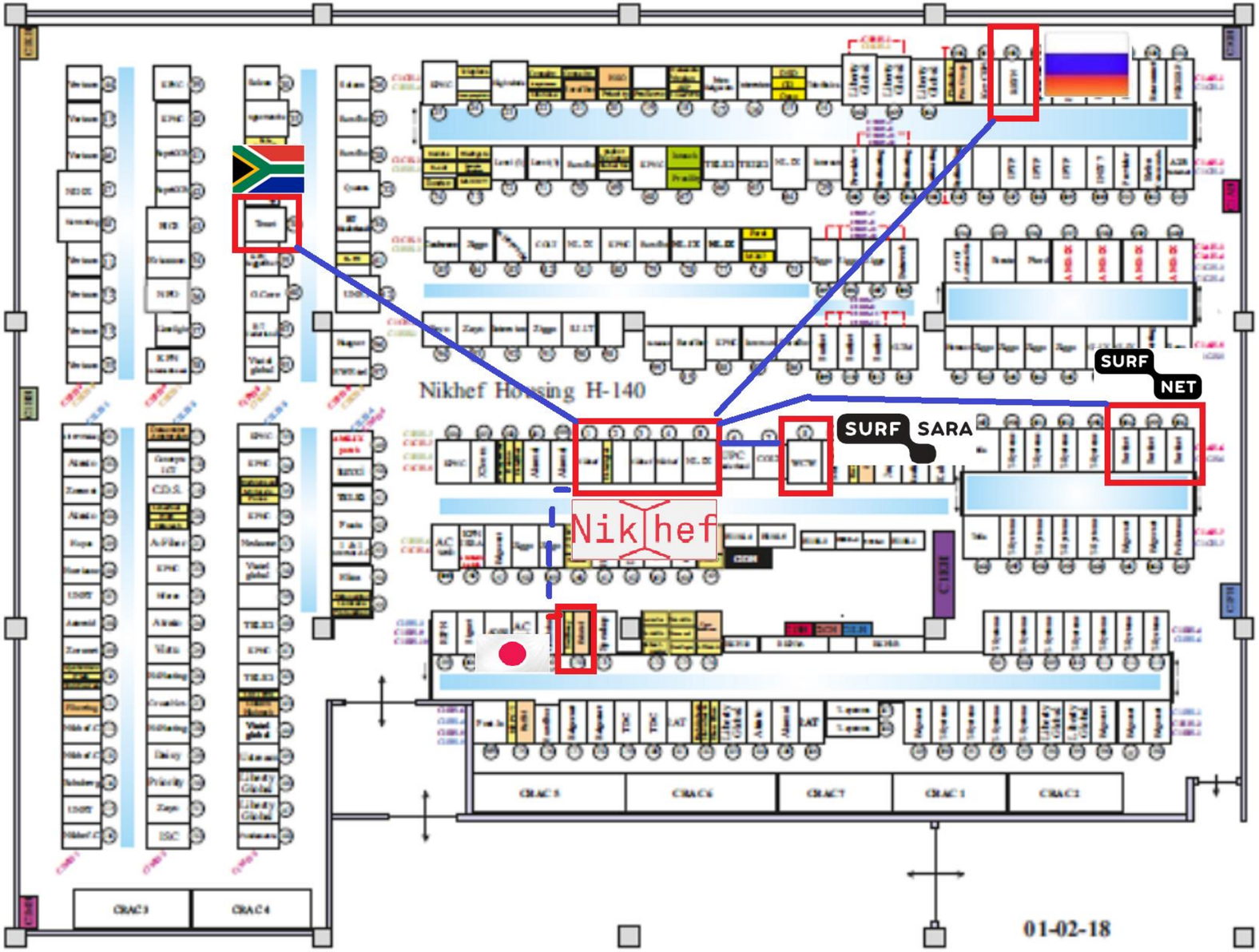
100+ Gbps networking globally

- general-purpose internet expensive
- LHCOne now used for more than LHC

Network infra for ‘big data’

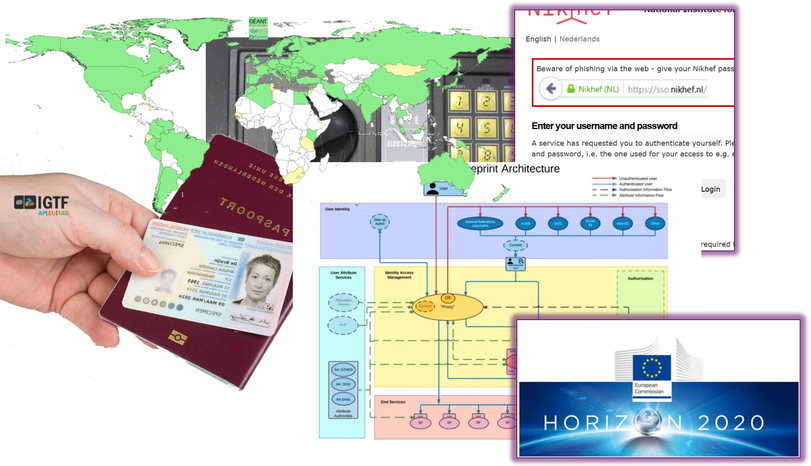


NikhefHousing's unique capability



Nikhef ICT for Research: *people* make progress

Infrastructure for Collaboration



Authentication and Authorization for Research Collaboration

AAI and federation design

Operational Security

Information Security Policy Coordination

Advanced Computing Technologies

Looking ahead 3-5 years

Joint development programme with global stakeholders & vendors

Evaluate and influence

Applied Advanced Computing

Improving physics results by advancing computing capabilities

Resource-limited computing

Systems-Algorithm interaction

The Nikhef Data Processing Facility

Characteristics

- integral part of the ‘SURF’ Dutch National e-Infrastructure
- permits ‘rapid experimentation’ environments for innovation
- designed for balanced high-throughput data processing
- very cost-effective at its Quality of Service level
- basis for more than just LHC, GW and KM3NET

Hardware indicators:

8000 cores, 4.5 PiB disk, 1.2Tbps network, 240 Gbps global
400 kW, PUE 1.21, 3500GJ WKO capacity

Tour time ...

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