

Nordic resource exchange



NORDIC E-INFRASTRUCTURE COLLABORATION

NeIC's Dellinger project is investigating the implementation of a lightweight framework for resource sharing across the Nordics.

The first Dellinger pilot was launched in July 2017 and provided 20 users (chosen from 23 applications) with 2.4M core-hours spread over nine months. To date four scientific papers within climate and material science have resulted from this pilot. The successful implementation of the pilot demonstrated the viability of efficient sharing of resources (compute, network and storage infrastructures for shared High Performance Computing Systems) across the national boundaries of **DK, EE, FI, IS, NO* and SE**.

The second pilot, a **Cross-Border Resource Sharing Service**, is getting launched during the second half of 2019 (<https://dellinger.neic.no/apply/>) and will also contribute to establishing a framework for sharing resources across the Nordic countries. From the user perspective, in particular the resource access process (see Fig. 1) will be improved. The Waldur cloud brokerage framework (<https://share.neic.no>) will be used for applying for resources, as well as for tracking resource usage and outcomes. Based on the gained experiences and the valuable feedback gathered from user queries throughout the first pilot suggested simplifications (regarding authentication and authorisation infrastructure, the usage of digital signatures instead of physical passport photocopies, joint workload manager accounting, benchmarking and automatic reporting) and improvements (like having GDPR-compliant descriptions for processing personal data and agreements regarding data exchange) will be implemented. Further inspiration, for example, when it comes to handling projects that use only part or none of their allocated quota, will be taken from the PRACE DECI programme** intended for larger allocations than what Dellinger aims at. In addition VAT considerations will be investigated. The allocation process will use billing units (BU) as a common currency.

*: with restrictions **: prace-ri.eu

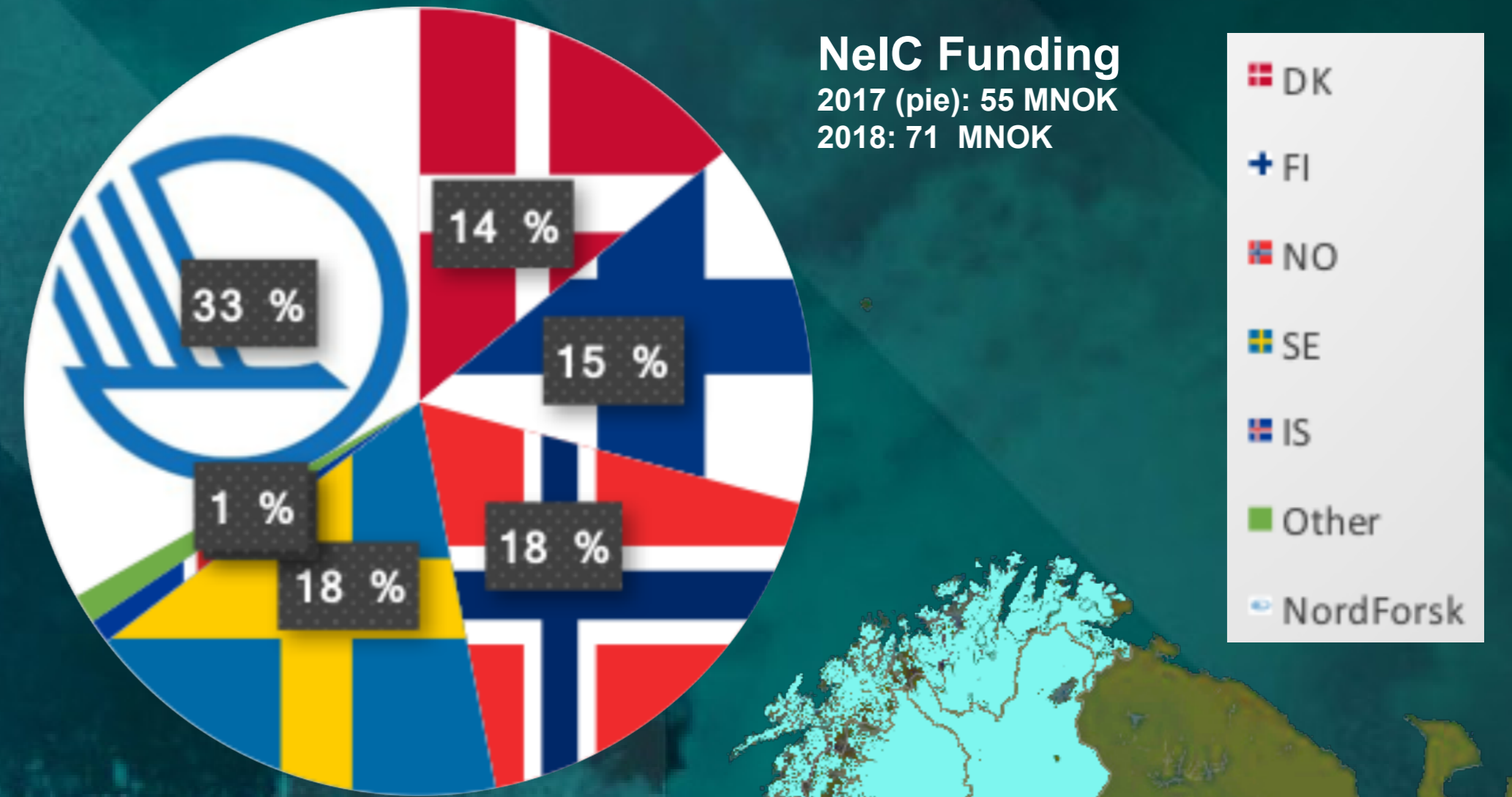
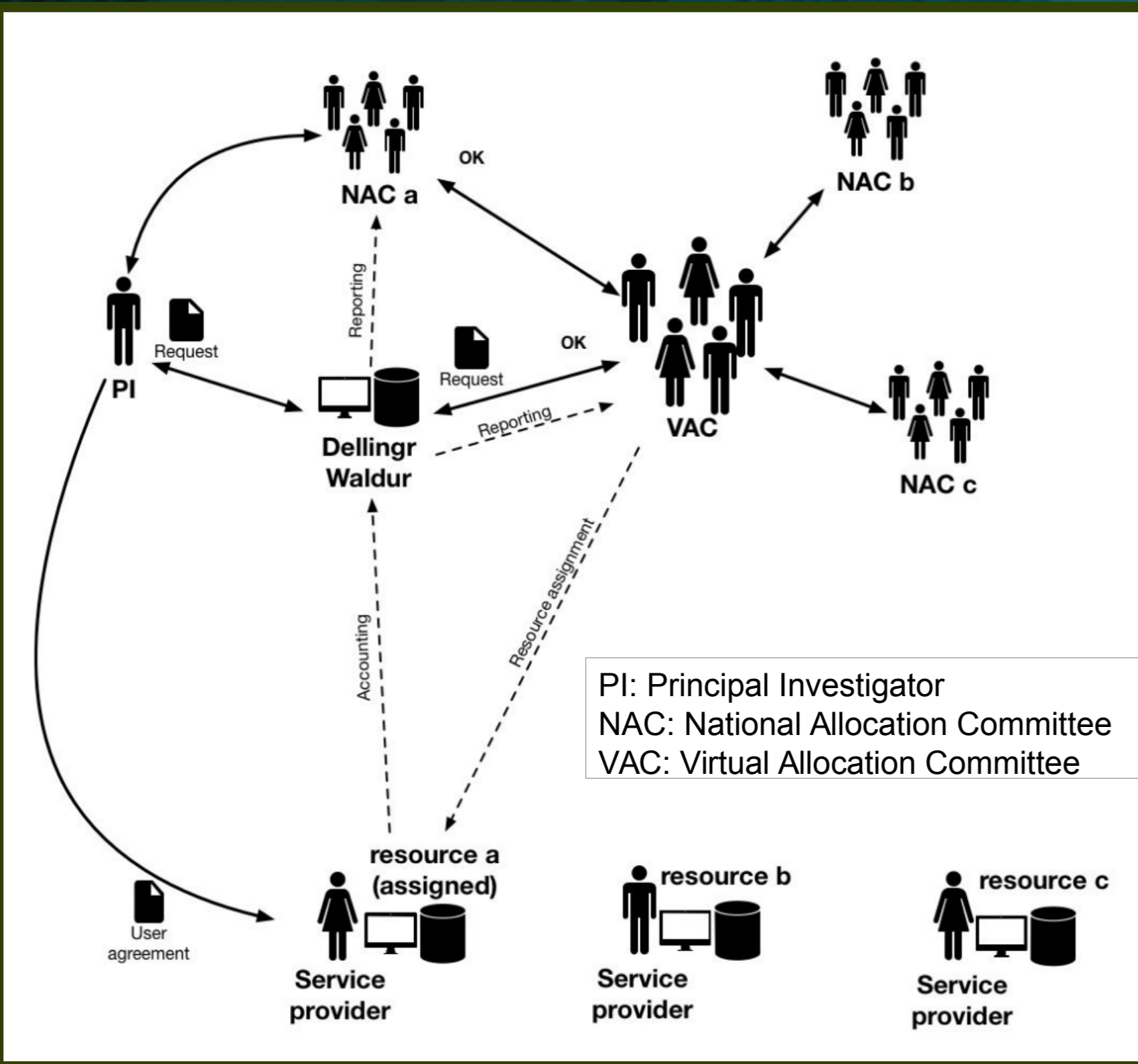


Fig. 1: The process for improved resource allocation within Dellinger



Dellinger 1st Pilot Usage Analysis

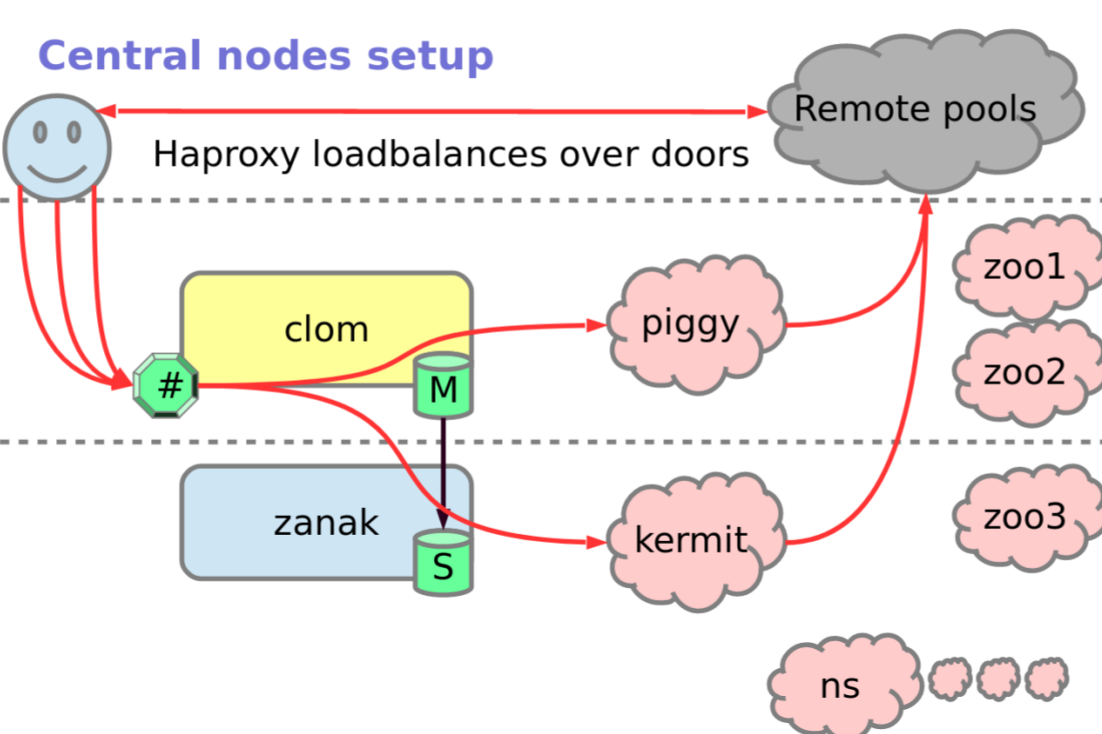
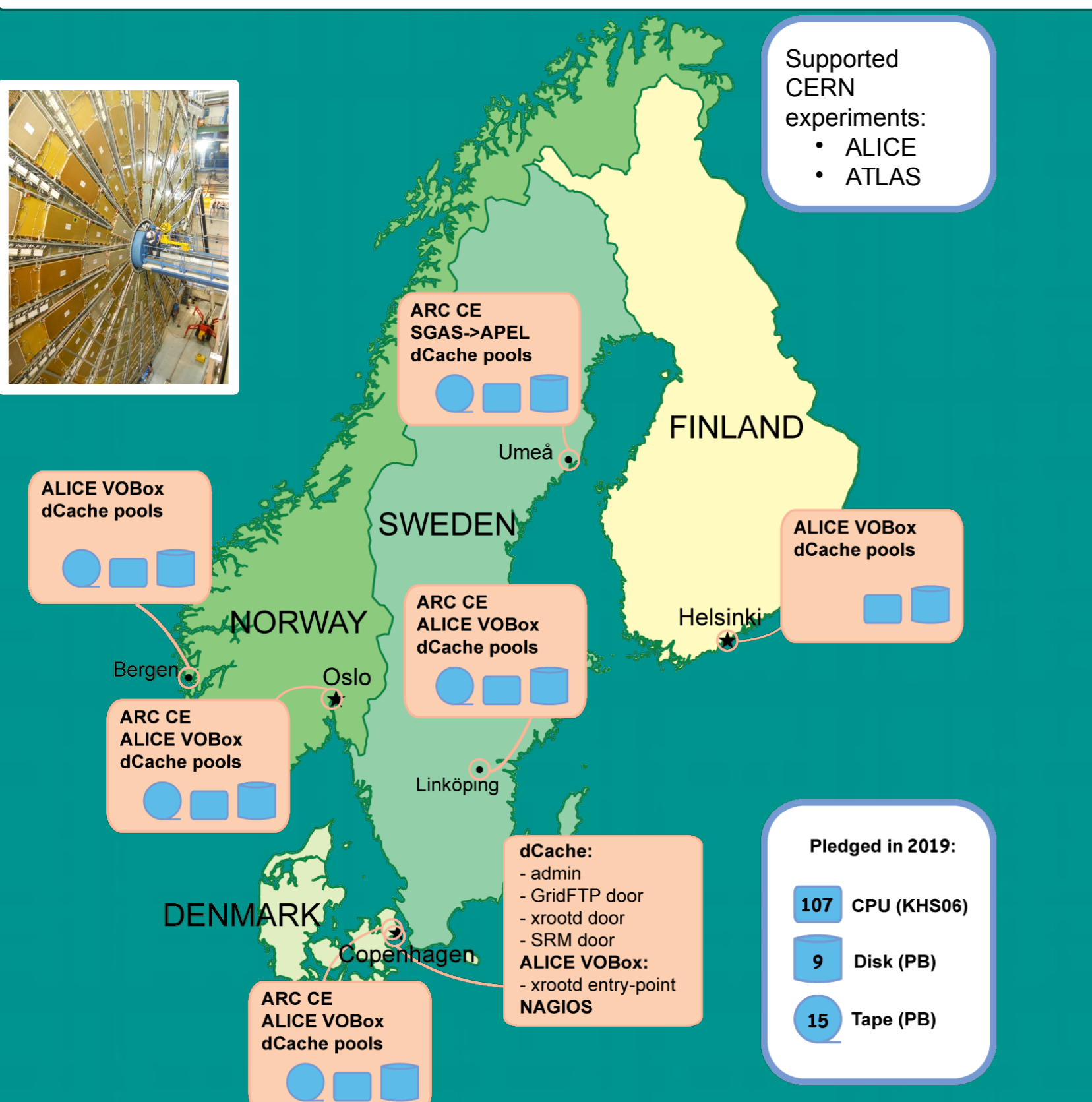
Together the Nordic countries are tackling e-infrastructure challenges that are beyond individual national capabilities

- NeIC as part of NordForsk since 2012
- Funding: joint proposals with national e-infra providers following 10-year MoU not just 50% co-funding ("finding sweet spot of collaboration")
European funding: EOSC-Nordic project starts 2019-09-01
- Transition towards annual open calls for collaboration projects
professional project steering methods (Tieto PPS)
- Open process for 2020-2025 strategy
future focus: Societal impact, sustainability, realisation of benefits

Highly-available storage within Nordic LHC Tier-1

The Nordic Tier-1 (NT1) contributes to Large Hadron Collider (LHC) computing and to high-energy physics research in general.

The NT1 evolved out of a challenging project that was conceived in 2002 to create a single facility for LHC computing by coordinating the resources of six separate computing centres in four countries (DK, FI, NO, SE). The resulting distributed supercomputing infrastructure has proven to be a sustainable model for a distributed international infrastructure in all aspects and now serves as a role model for the Asian Tier-1 facility. The Nordic Tier-1 has currently the second largest ATLASDATADISK among Tier-1 sites. With the High-Availability (HA) features within dCache, storage provision within the NT1 has been following new routines for system updates since the end of 2016. HA storage provision means that there is **no need for planning or scheduling downtimes** and no perceived user inconvenience due to upgrades. Tape storage matters within NT1 look promising, too: Successful 1 Gbyte/s restores from tape make NT1 well suited for future tape carousels.



NT1 is running Ubuntu with frequent and early kernel patches, requiring typically a couple of reboots per month for Linux kernel security updates or dCache upgrades. The tools applied to do these upgrades without the user noticing are:

- HA features within dCache
- ucarpd for automatic Internet Protocol fail-over
- HAProxy to balance the load over the doors
- Ganeti & repmgr for managing virtual machines
- HA PostgreSQL

A potential improvement to the current set-up would be the use of a third headnode to enable automatic fail-over.

A selection of NeIC projects with partners and associates:

Nordic Tier-1 (aka NDGF)

NORDUnet (Nordic Gateway for Research & Education)

dCache.org

ARC

WLCG (Worldwide LHC Computing Grid)

Tryggve (2)

elixir

Glenna (2), iOBS

PhenoMeNal (Large-Scale Computing for Medical Metabolomics)

Norwegian Meteorological Institute

SMHI

MetCoOp

FMI

ECMWF

CodeRefinery (2)

THE CARPENTRIES

DeepDive

LifeWatch ERIC

EISCAT 3D (Data) Support

EISCAT

