

NorStore

for Norwegian research

Jan Meijer, Linköping, 15 October 2008



Jacko Koster

The Norwegian e-Infrastructure

The national e-Infrastructure is a **distributed** infrastructure with large-scale compute and storage resources and operations and support functions for science and research in Norway

The infrastructure provides resources and services for

- **education and research** at **all** Norwegian universities, university colleges and research institutes
- **operational forecasting** by the Meteorological institute
- research and engineering at research institutes and industry who contribute to the project

HPC: **Notur II**
(2005-2014)

Grid: **NorGrid** (start
3/2007)

Storage: NorStore (start
6/2007)

Network: **UNINETT**

Participating organisations



Norges forskningsråd



UNIVERSITETET
I OSLO



UNIVERSITETET
I BERGEN



UNIVERSITETET
I TROMSØ



NTNU



Meteorologisk
institutt
met.no

Metacenter: close to the user

staff for operations and support of the resources
and services in the e-Infrastructure

Tasks include:

- operation of facilities
- user support + (common) help desk
- support resource allocation to users
- optimize application performance
- support new users and applications
- optimize resource utilization
- coordinate software purchase
- dissemination

The Metacenter staff is distributed over four
universities

Establish and maintain a broad and sustainable infrastructure for the curation, archiving and preservation of scientific data.

Mission



- provide non-trivial services to scientific disciplines
- easy, secure and transparent access to distributed storage resources
- provide large aggregate capacities for storage and data transfer
- optimize the utilization of the overall resource capacity

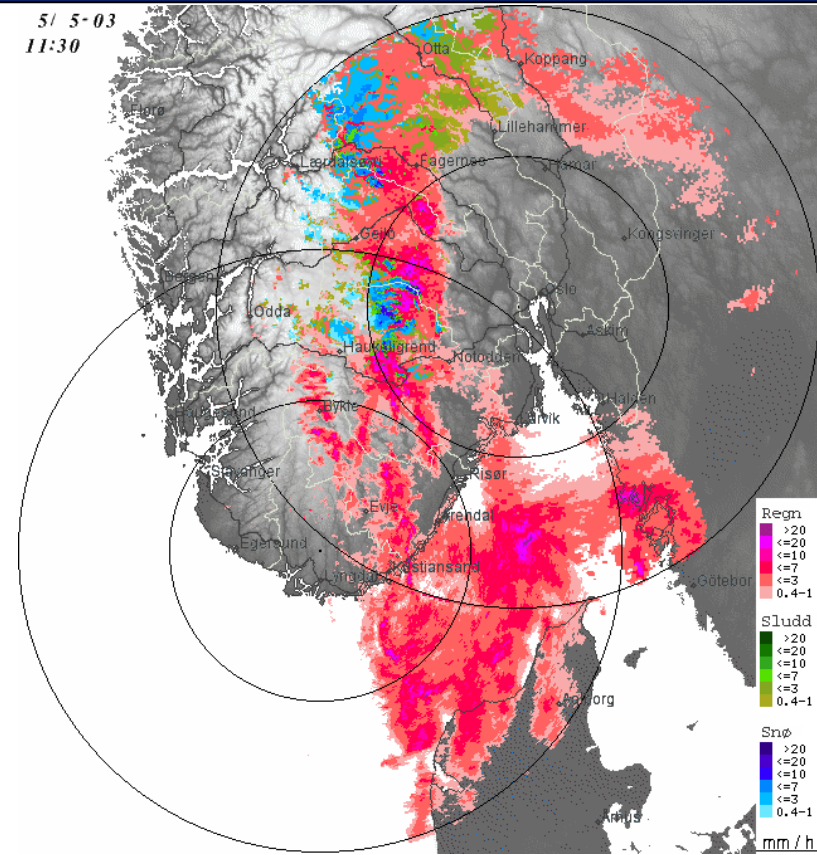
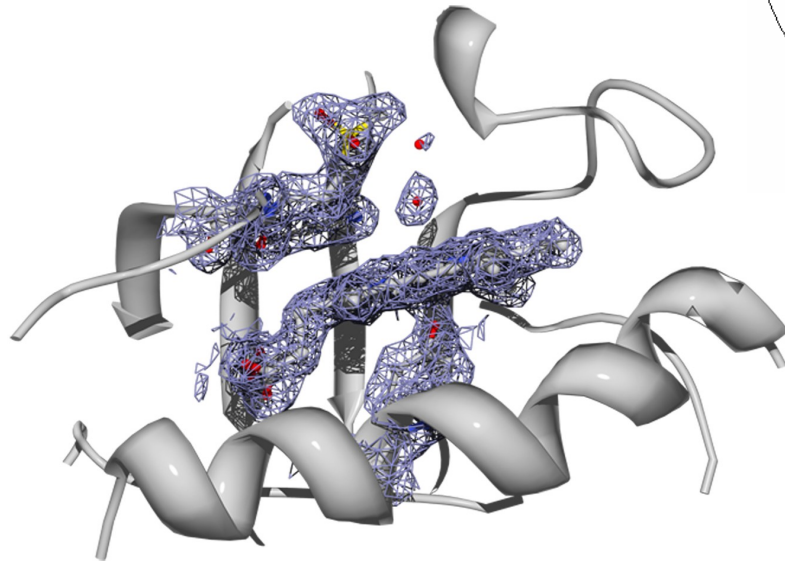
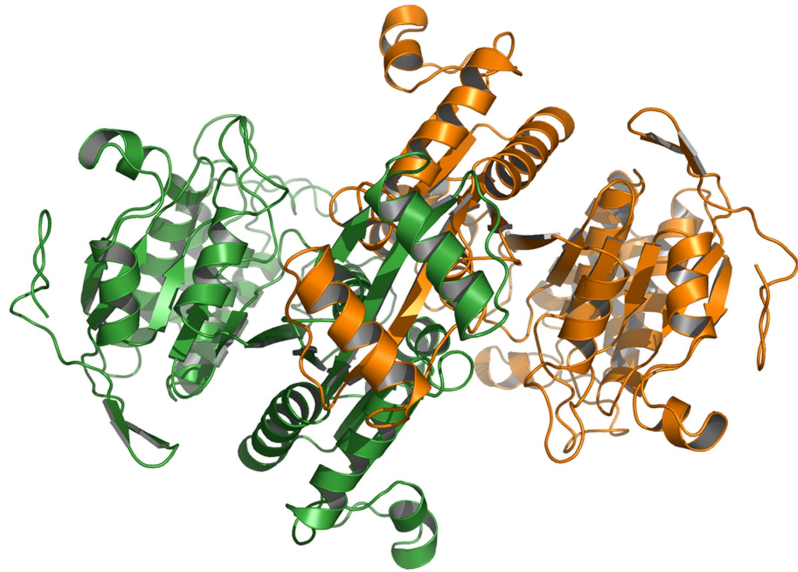
Long term objectives



- To operate a reliable national infrastructure for storage of digital data that is available for Norwegian research
- deploy and enable the development of services for data curation that add value to the existing e-Infrastructure
- provide capacity and services for the long-term storage of digital data
- to facilitate the establishment of digital scientific repositories in a broad range of scientific and technological applications
- to enable the Norwegian research community to (automatically) benefit from the advances in storage technologies
- contribute to the unification of interfaces to storage resources within Norway and abroad.

Features

5/ 5-03
11:30



User groups

The ca. 20 Centers of Excellence as established by the Research Council of Norway, i.e.

- Bjerknes Center for Climate Research
- Physics of Geological Processes
- Center for the Biology of the Memory
- Center for Molecular Biology and Neuroscience
- Center for Ecological and Evolutionary Science

Research organizations. E.g.,

- Meteorological Institute
- Institute for Marine Research
- Nansen Environmental and Remote Sensing Center

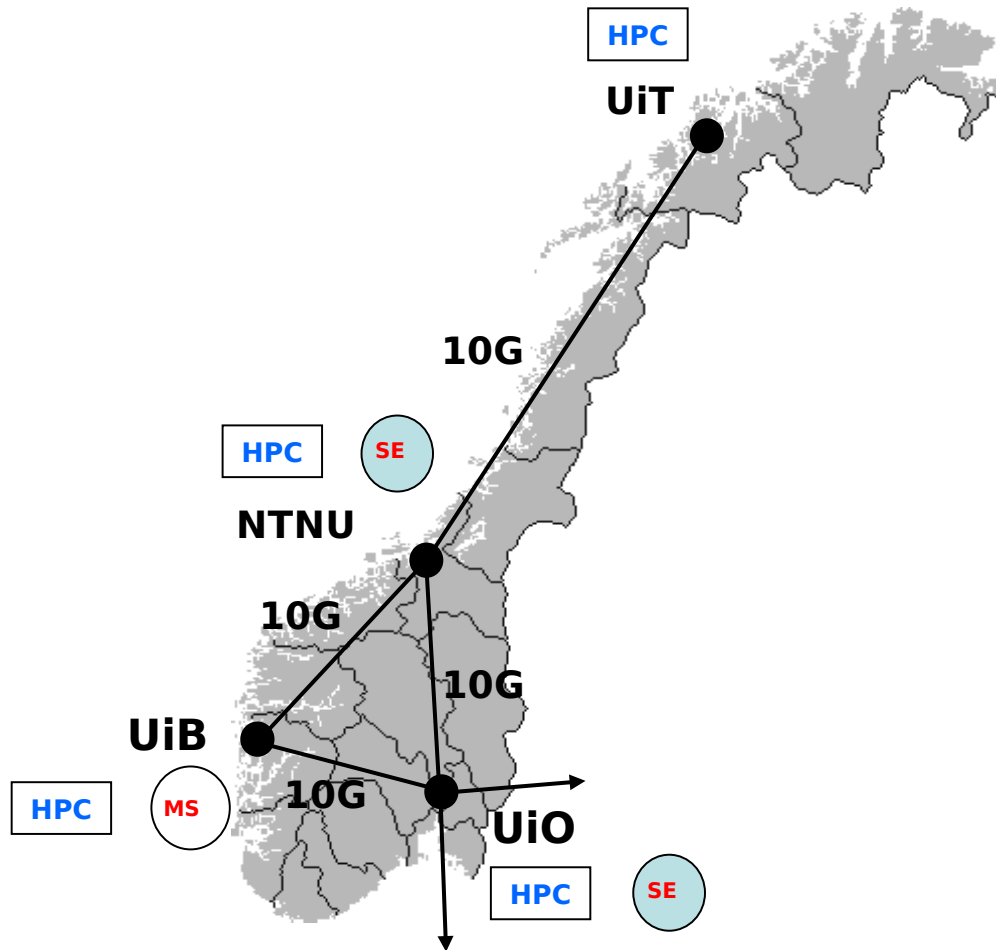
European research infrastructures with Norwegian participation

- CLARIN

What the users wanted



Distributed architecture



What we don't do (yet)



- single namespace
- virtualization of all resources
- HSM
- dCache, SRB, iRODS, multicluster GPFS, etc
- data preservation
- long term archiving
- 3rd copy

NorStore features

Classes of data:

- Project/community storage: 'data collections', permanent, backed up
- User storage: 'private area', permanent, backed up
- Temporary storage: not permanent, no backup

Priority to *open access* of data from public funded research

Dead or alive?



Active data: NorStore

Inactive data: ???

Data transfer



- SSH
- HPN-SSH
- GridFTP
- HTTP(S)
- maybe GPFS mounts

Implementation

Oslo: Five SUN StorageTek6540 racks

- 634 TB net capacity / 792 TB raw capacity
- Each 6540 rack consists of
 - 144x or 160x 1TB 7200RPM SATA
 - 16x 300GB 15KRPM SAS
 - 2 FC controllers

One login / file / application server rack

- 2 - HP DL 385, 16GB memory
- 4 - HP DL 385, 2 x FC-cards, 4GB m
- 10Gb cards

Div

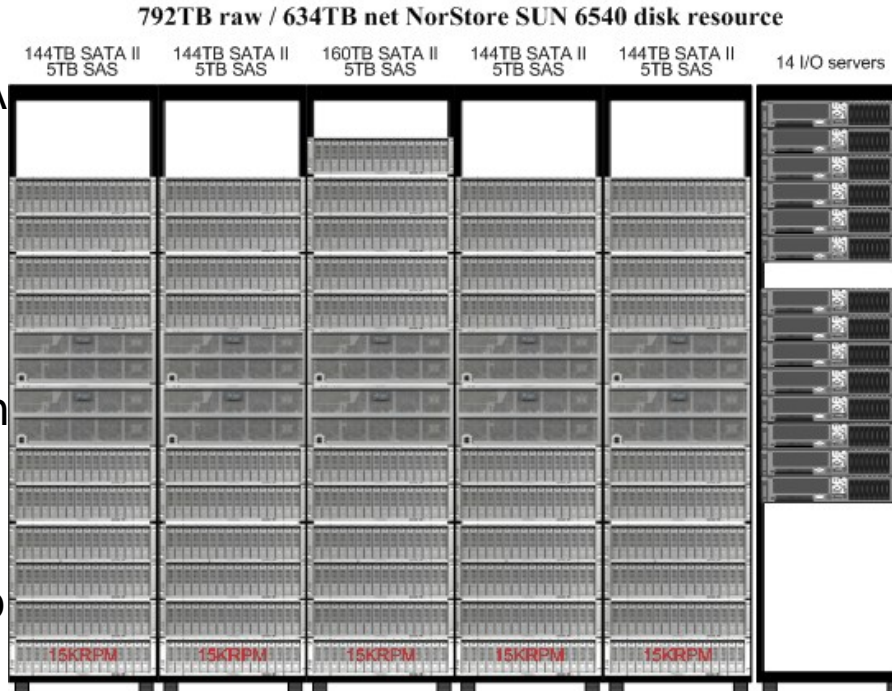
- 2 x 32 port FC4 switches, Fiber cab

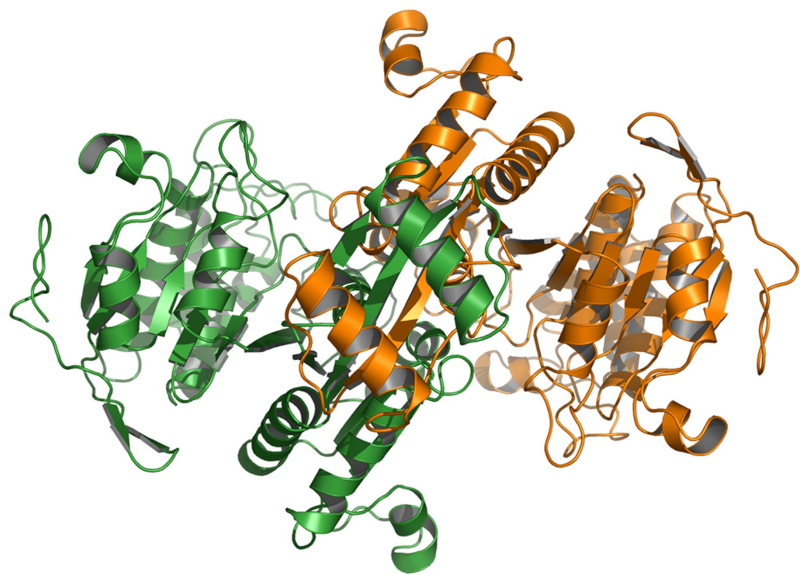
Oslo

- Two servers connected to CISCO 6509, fiber long range.
- Servers have HP NC510F PCIe 10Gbit ethernet cards

Trondheim

- Two servers connected to the CISCO 6509, copper
- Servers have HP NC510F PCIe 10Gbit ethernet cards



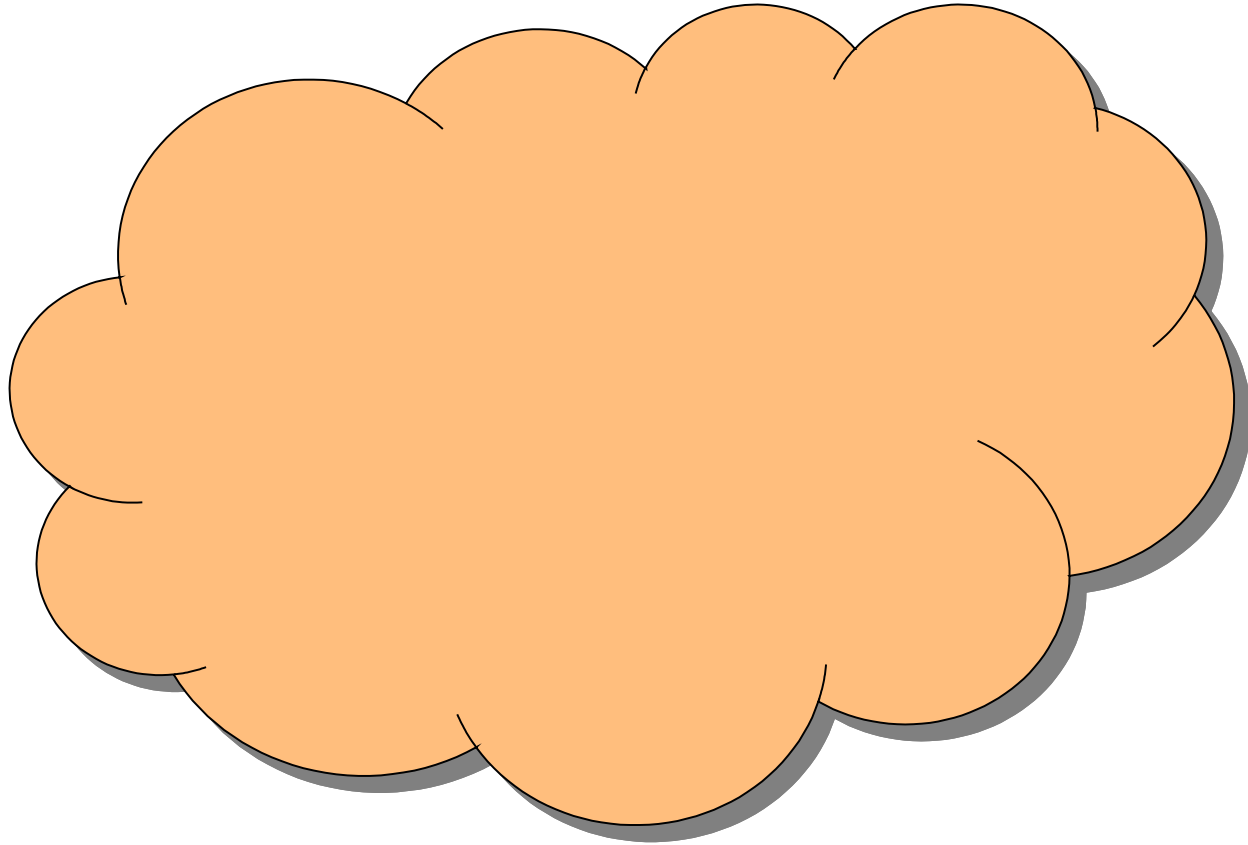


not alone



- Poland
- Sweden
- Latvia
- ...
- PARADE

Clouded future?



A photograph of a server room with rows of server racks. The racks are illuminated with green and blue lights, creating a futuristic atmosphere. The floor is dark and reflective.

Questions, comments?

<http://www.norstore.no/>

<http://www.notur.no/>

<http://www.norgrid.no/>

<http://www.uninett.no/>

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