The Grid:
a Powerful Tool for Physics
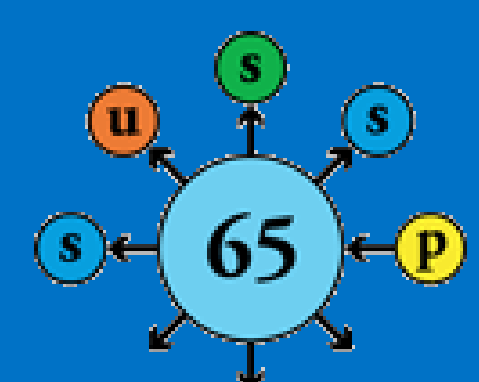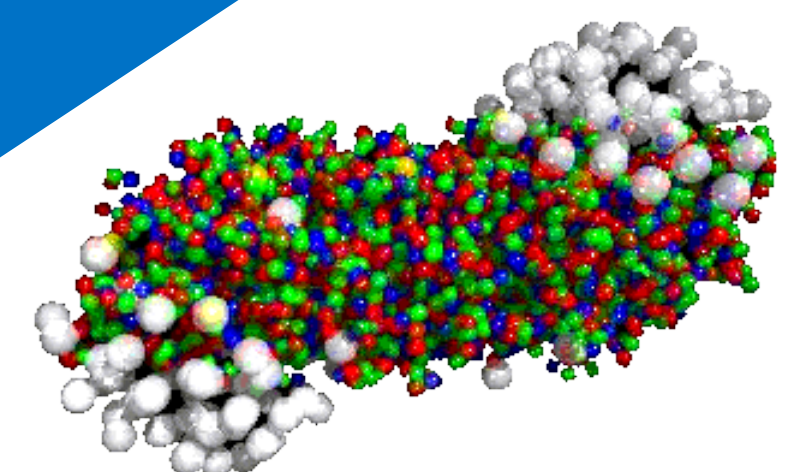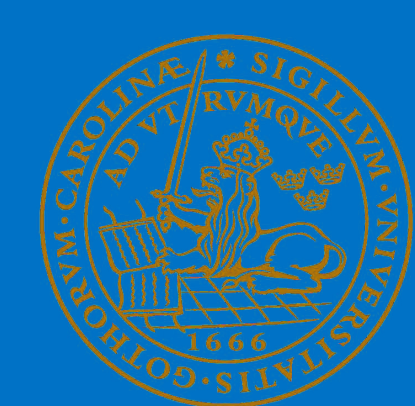
Time Projection Chamber (TPC)
Main detector in ALICE

Visualisation of a
simulated Pb-Pb collision

High Energy Physics in the 21st century has increasing requirements:
- Enormous amounts of data accessed for collaborators all over the world
- Very large computer power to treat the data

Solution developed thanks to improving data transfer:
The Grid
Send data and jobs to clusters of computer all over the
world, transparently for the user
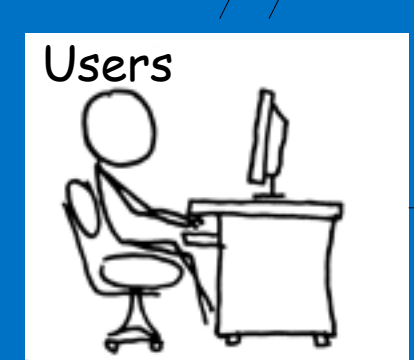Different strategies are used
Here are 2 examples

Calibrate Detectors

Simulate Events

ARC: Advanced
Resource Connector
- Initiated by the Nordic
countries, used in many more
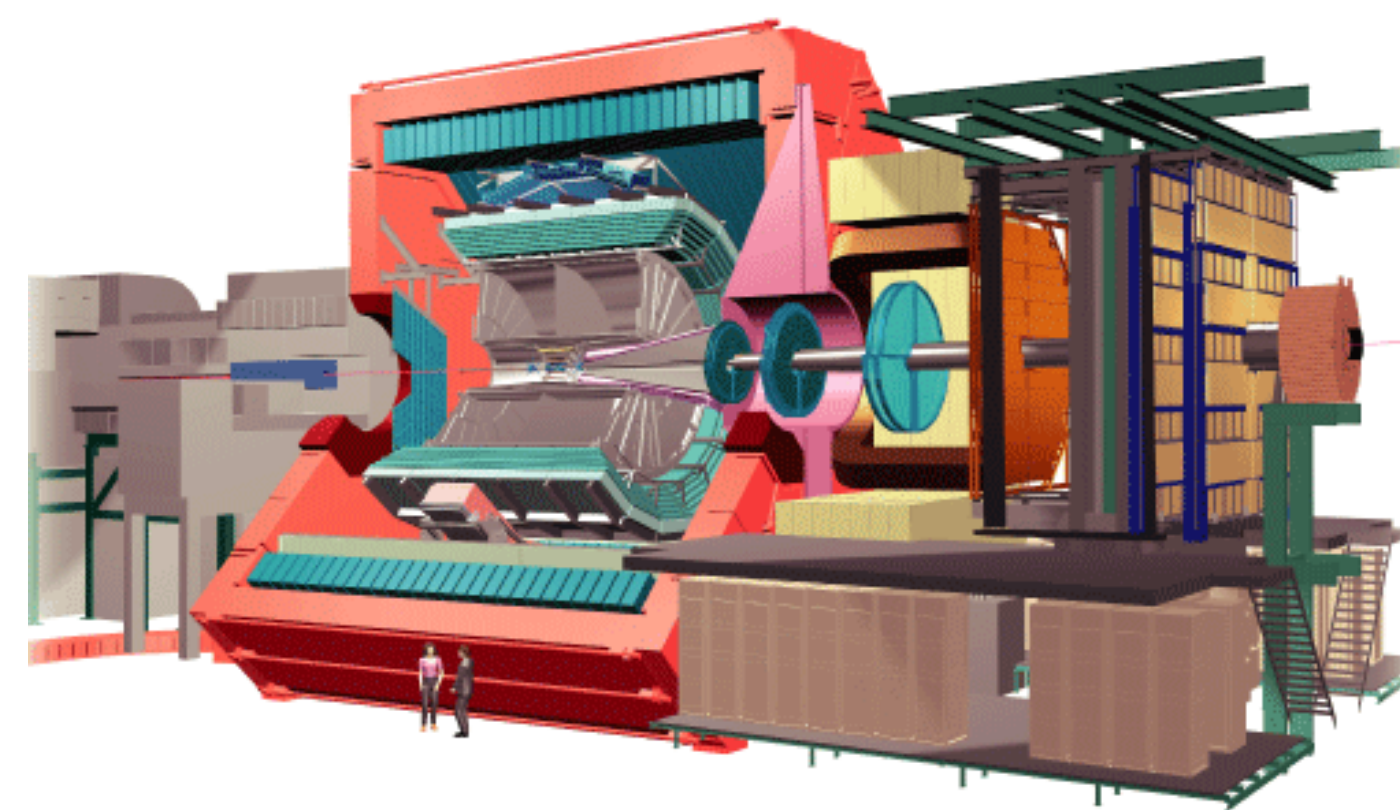- Highly distributed
- Used also for biology, chemistry...

Cluster of Worker Nodes

Front-end
machine
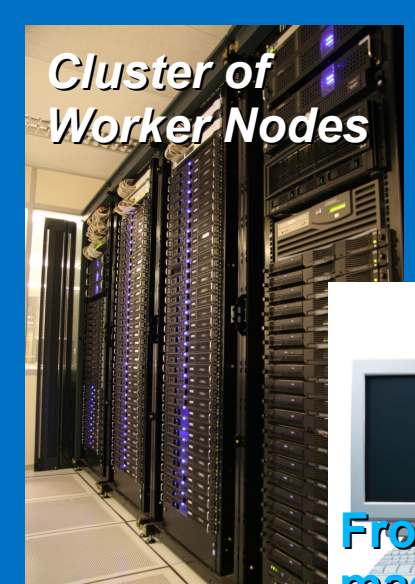
get/store data

Update status

Update status

Send job

Retrieve results

Users

Get Resources
Information

Distributed Information System

AliEn: ALICE Environment
Solution developed by ALICE
- centralised
- "job wrappers" on the nodes
pull "real jobs" and run them
- packages auto-installed

Cluster of Worker Nodes

Front-end
machine (VObox)
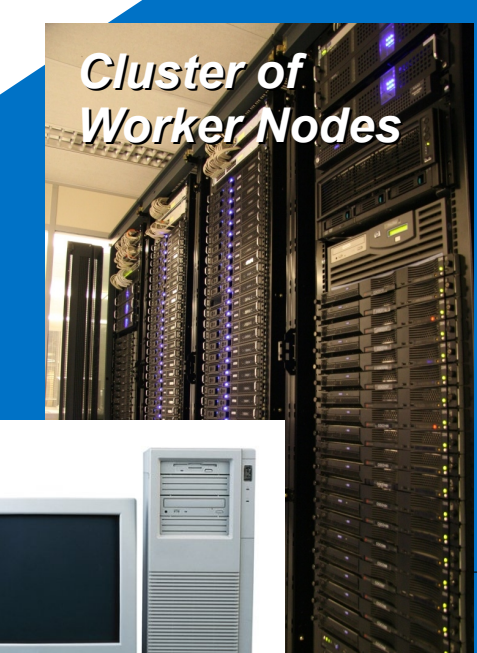
Get input

Send output

Update status

Get jobs

Update status

Send input / Get output

Central Services (CERN)

Send jobs

Users
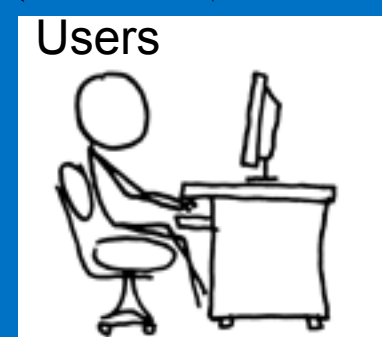
ALICE: A Large Ion Collider Experiment
Colliding lead ions in LHC to explore the Quark-Gluon Plasma

Reconstruct Events
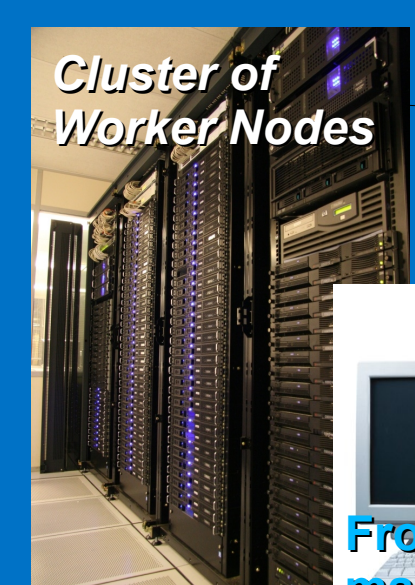
Analyse Data

Interoperation

Getting projects to work together.
The Nordic community wants to appear
as a single large site to the LHC Grid
The job distribution within the Nordic countries
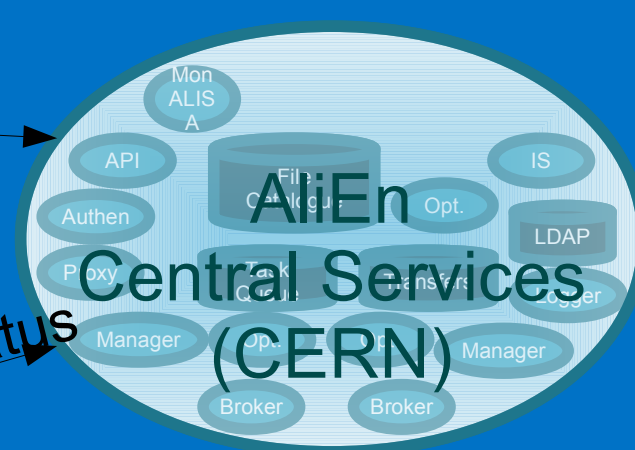should only be done with the local software ARC

Reconstructed cosmic
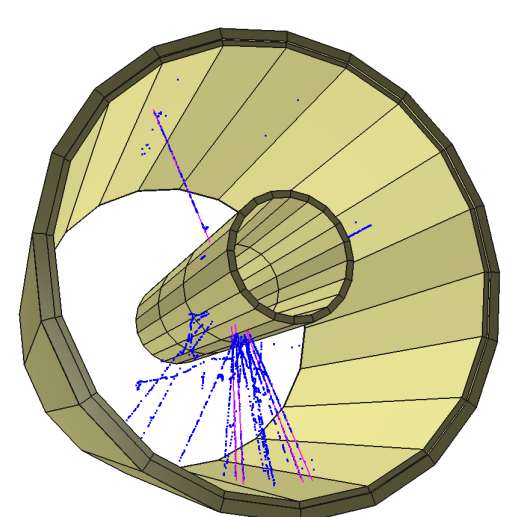event in the ALICE TPC

Cluster of Worker Nodes

Get real job

Front-end
machine

Send Jobs with ARC

- Install packages
- start job wrapper

Front-end
machine (VObox)

Update status

AliEn Central Services (CERN)

Send jobs

Users
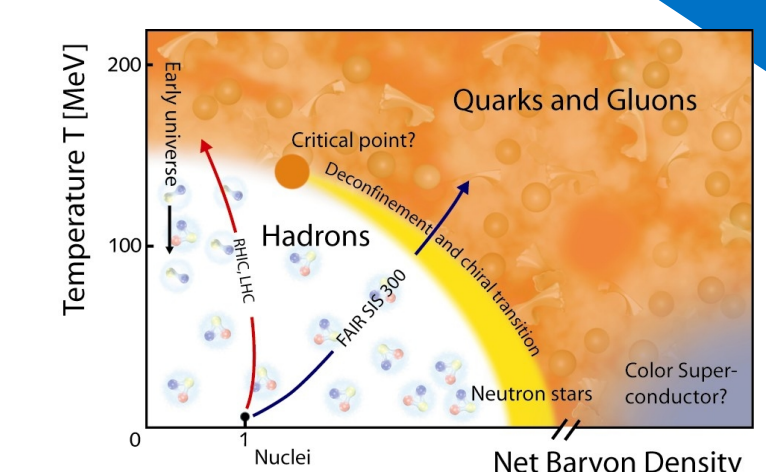
The Quark-Gluon Plasma:
Supposed state of matter
in the early Universe