

# NIHAM GRID site & Analysis Facility

**Claudiu Schiaua**

IFIN-HH, Department of Theoretical Physics  
NIHAM Centre of Excellence

# NIHAM

- “**Nuclear Interactions and Hadronic Matter**” Centre of Excellence
- The group is doing **research in many areas of nuclear physics**
- Core members of the group were involved in the past or are involved now in many international physics collaborations, such as **DRACULA** (designed by the group), **CHIMERA**, **FOPI**, **ALICE**, and also in the preliminary phase of **CBM**
- Members of the group were involved in the development of **ALICE-TRD detector** and **frontend electronics**
- NIHAM produce now ~**25%** of **ALICE-TRD chambers**
- Members of the group are involved in **EGEE** project
- **NIHAM GRID site & NAF**

# ***NIHAM computing facility***

Past:

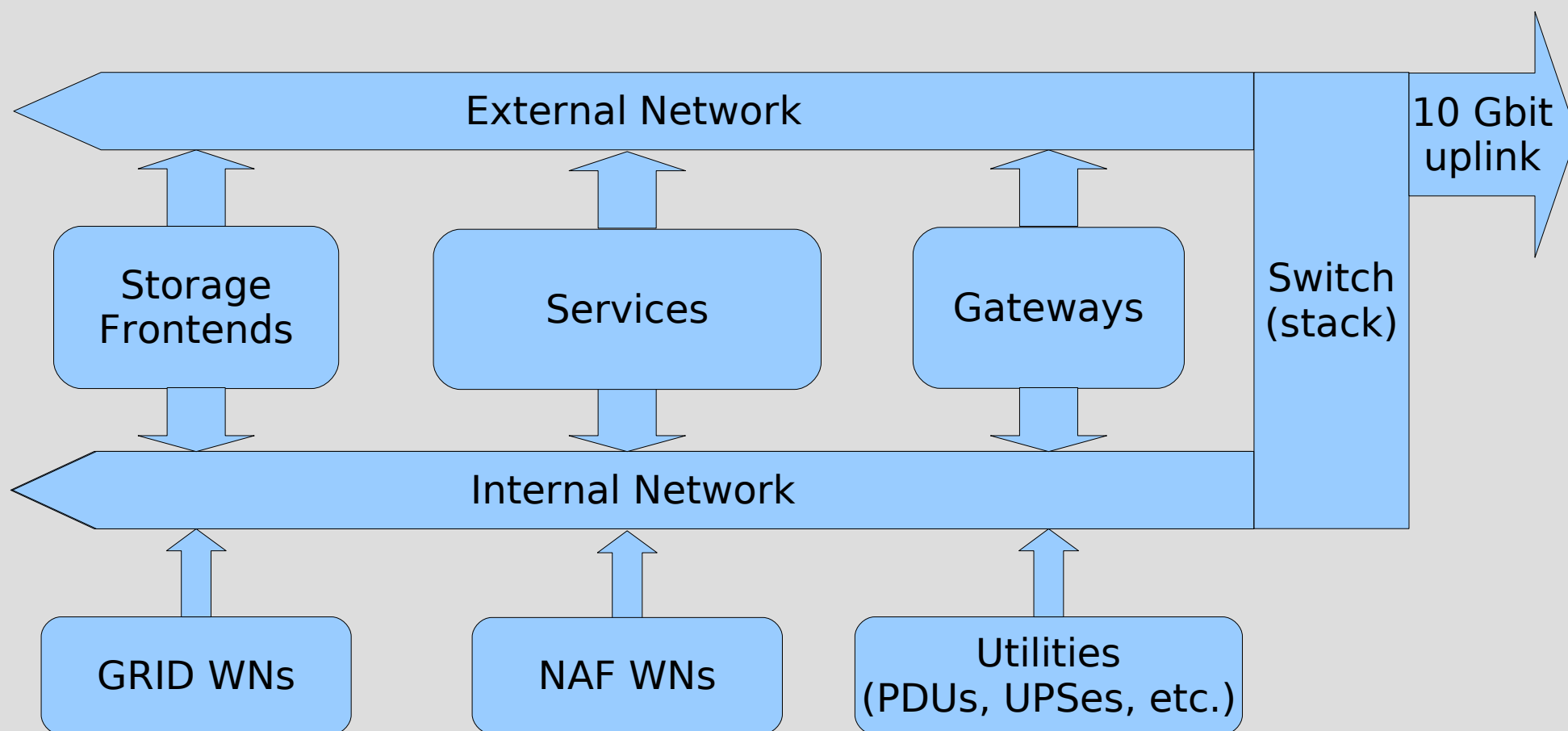
- 2002 - AliEn 1 site
- 2005 - AliEn 2 site (12 CPU cores, 1.5 TB storage)

Present:

- ~720 CPU cores
- ~140 TB raw (~120 TB effective) storage
- 10 Gbit/s uplink, 1Gbit/s internal network
- ~240 (3x80) KVA UPS
- Diesel generator
- 3 cooling units (~150 kW cooling power)
- Room : ~ 120 sq. m, expandable

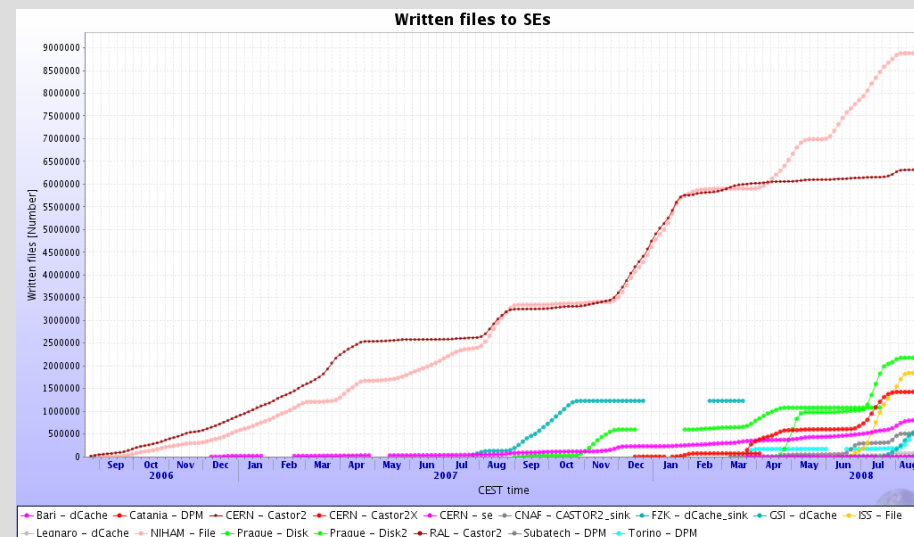
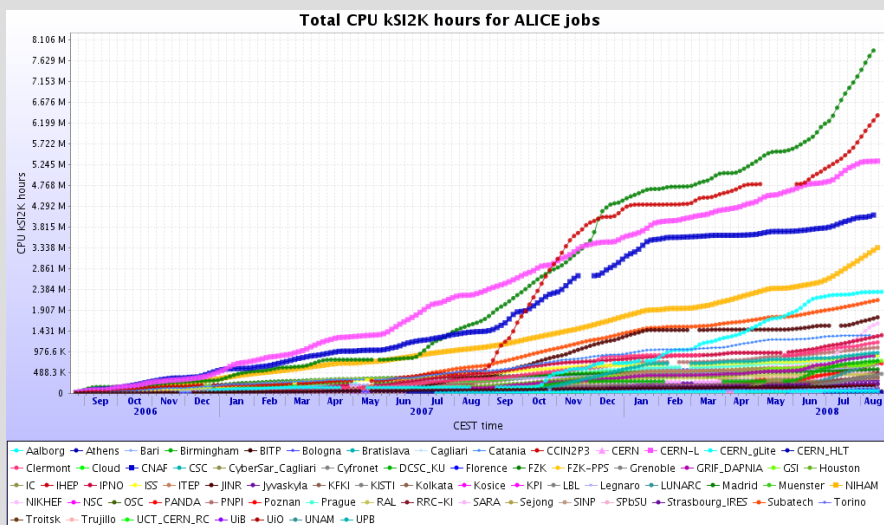


# Cluster structure



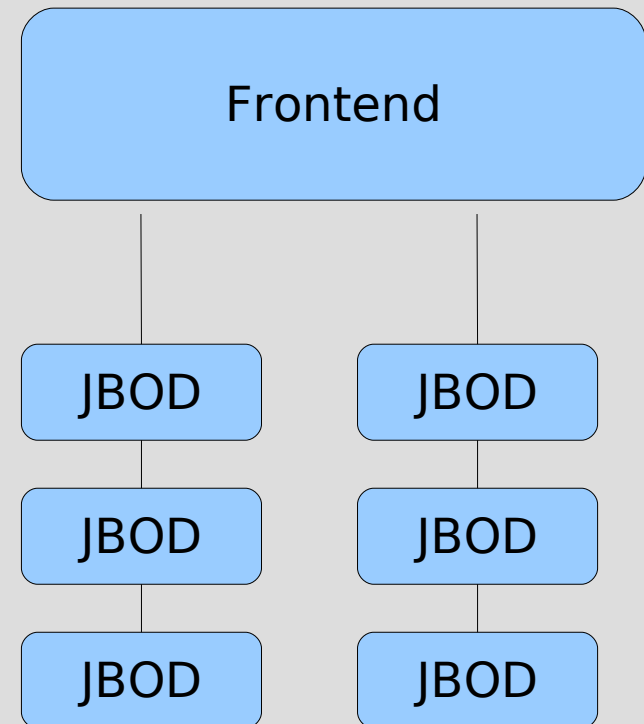
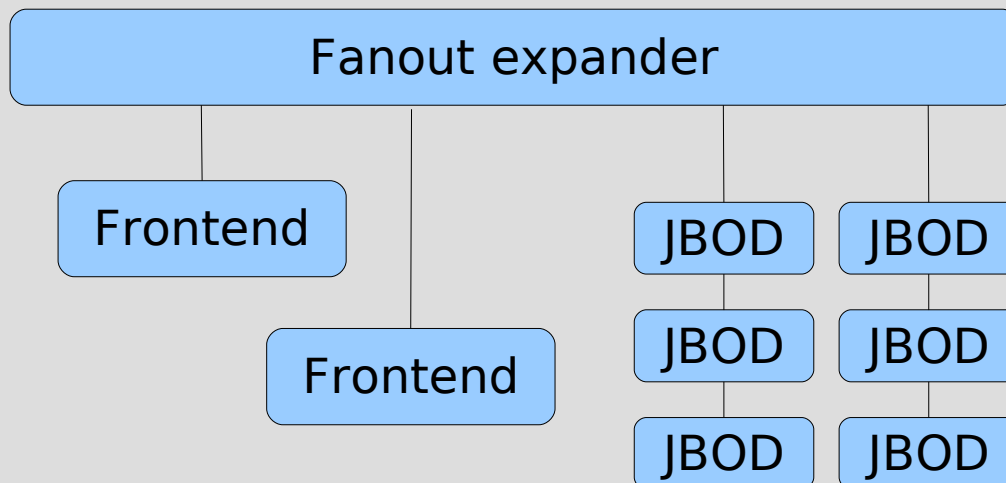
# GRID site

- ~840 kSI2k installed CPU
- 120 TB storage (disk, xrootd)
- ~3 M kSI2k hours delivered in the last 2 years (~6% of ALICE, ~60% of ROT2F)
- ~8.8 M files written on NIHAM SE
- Services availability (AliEn, last 2 years), >97%



# Storage

- SAS, with external JBODs
- Excellent price/performance, but new technology
- SAS is capable of SAN, but key components not yet widely available



# ***NIHAM Analysis Facility (NAF)***

- 16 nodes, 128 CPU cores, 2GB RAM/core
- ~750 GB / node available for files
- Also used for batch jobs (but not for ALICE production)
- Recently deployed

# ***Current developments***

- Capacity expansion: until the end of the year, 2xCPU cores, almost 3x storage.
- Comprehensive monitoring & control of the infrastructure.  
~10000 data sources, ~1000 control channels.
- Automatic fire extinguisher : in construction.
- Surveillance system (done).
- Control room.

# ***Future developments***

- 24X7 operator (manpower available)
- Capacity expansion: next year we will reach ~ 2000 CPU cores, ~ 1PB (raw) disk storage
- SAN (when available)
- Participation in other VOs (CBM)

# ***Conclusions***

- Basic infrastructure already deployed
- Very good usage of the equipment
- Good development plan, due to good financing for equipment acquisition
- Main concern: financing of M&O, long term financing is needed.