

ENEA-GRID usage, examples and case studies

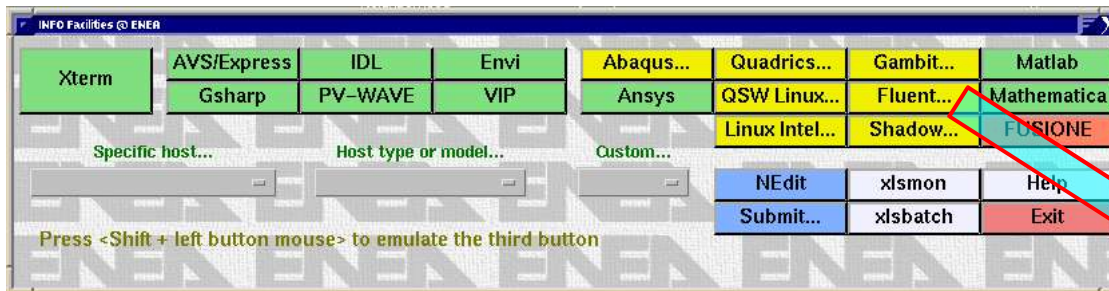
650 registered users

2 TB stored software/data out of 4 TB available in enea.it AFS cell

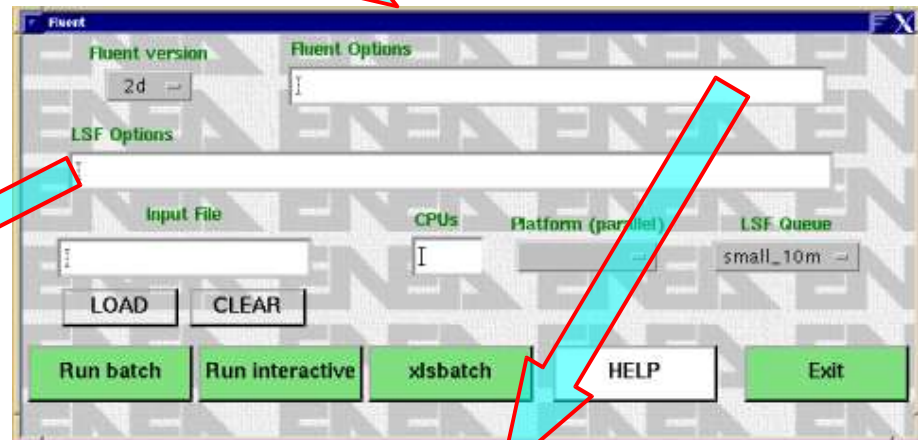
Examples and case studies

- Running FLUENT on ENEA GRID
- Support to department experimental research:
 - Biotechnology
 - Electron microscopy
 - Nuclear fusion research

FLUENT (CFD) code batch submission



A FLUENT case can be run from a dedicated GUI for submission



LSF Options

- o *filename.%J* - output file
- w "*done(idjob)*" - start after *idjob*
- u *e-mail userid* - output by E-mail
- b *begintime* - job start time

....

```
-cl following argument passed to fluent.  
-cxarg following argument passed to cortex.  
-cx host:plip2 connect to the specified cortex process.  
-driver [ gl | opengl | null | pex | sbx | x11 | xgl ],  
sets the graphics driver (available drivers vary by platform).  
-env show environment variables.  
-g run without gui or graphics.  
-gu run without gui.  
-gr run without graphics.  
-help this listing.  
-i journal read the specified journal file.  
-nocheck disable checks for valid license file and server.  
-post run a post-processing-only executable.  
-project x write project x start and end times to license log.  
-r list all releases.  
-rx specify release x.  
-v list all versions.  
-vx specify version x.  
-n no execute.  
-hcl following argument passed to fluent host.  
-loadx load app from host x.  
-manspa manually spawn compute nodes.  
-ncl following argument passed to fluent node.  
-px specify communicator x.  
-pathx specify root path x to Fluent, Inc.  
-tx specify number of processors x.
```

Monitoring job status by xlsbatch (LSF)

xlsbatch information

Jobid

Users

Job status

Queues

Submission host

Run host

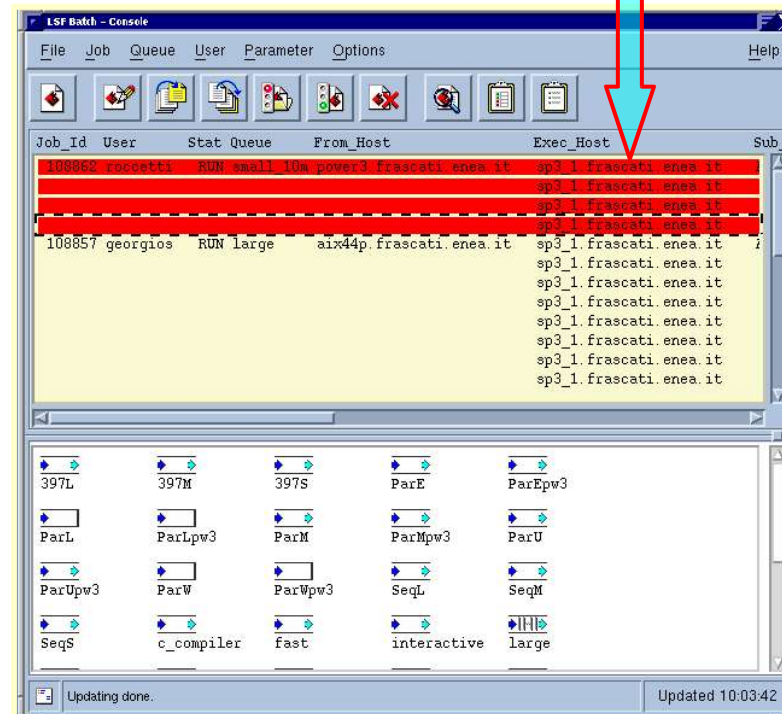
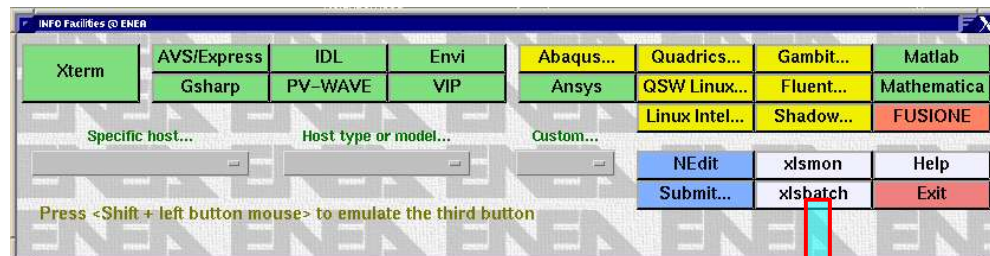
Submission time

Submission command

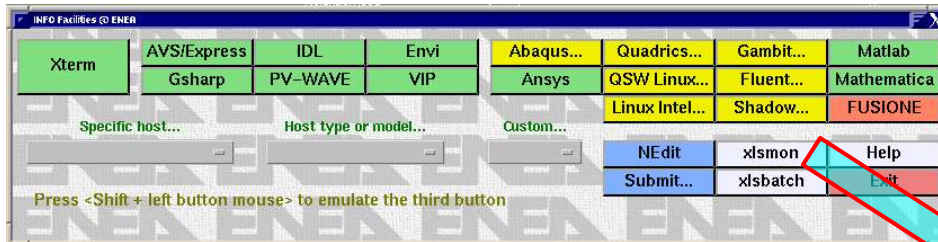
.....

Job status:

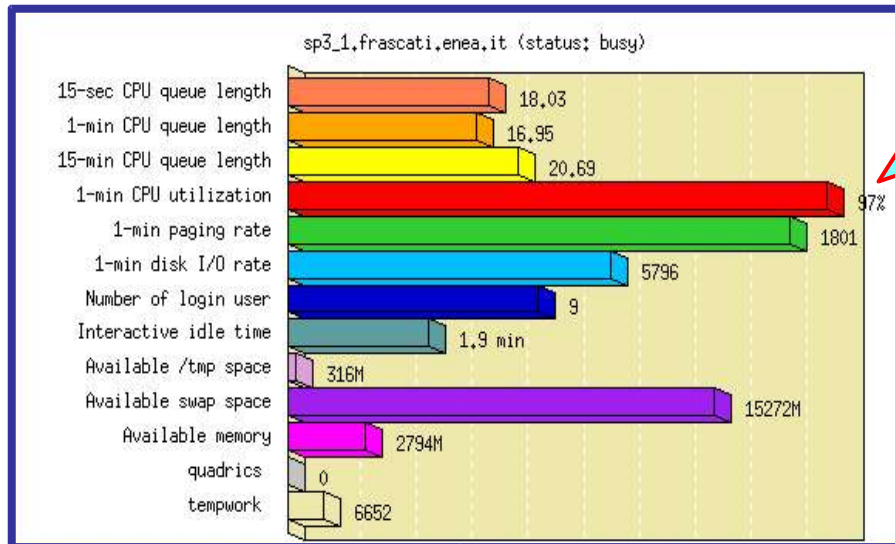
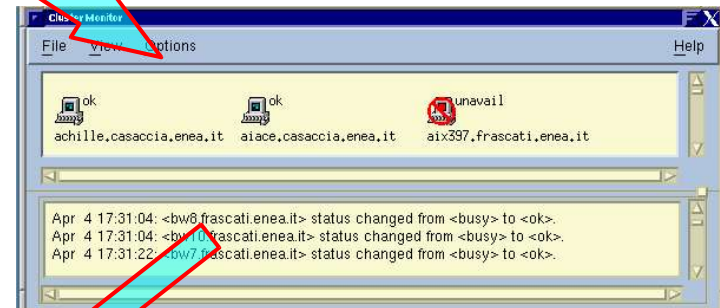
- ☒ running
- ☒ done
- ☒ exit
- ☒ zombi
- ☒ pending
- ☒ suspended
- ☒ unknown



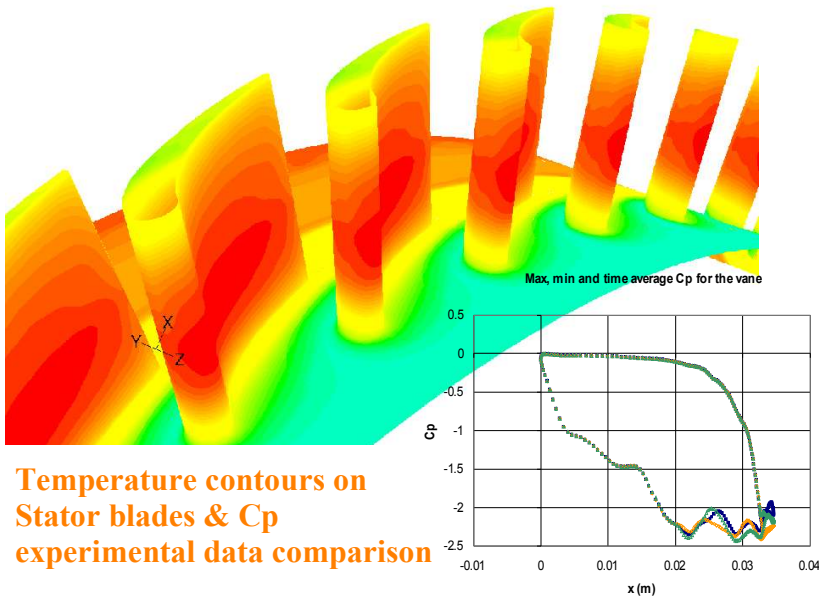
Monitoring host status by xlsmon (LSF)



Status of sp3-1 host using
xlsmon utility

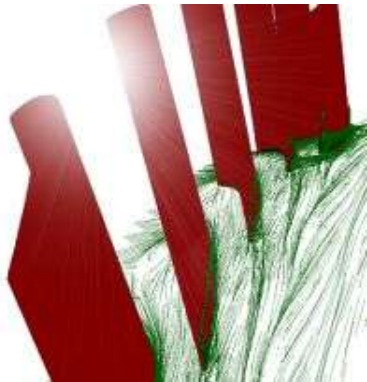


3D CFD Simulation on Aircraft Axial Turbin Stage with Wake & Vortex Shedding Analysis on Turbine Blades [FLUENT]

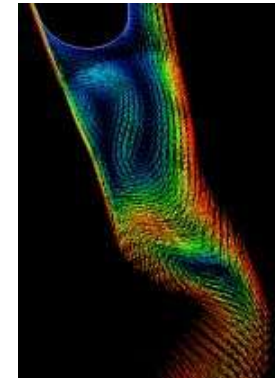
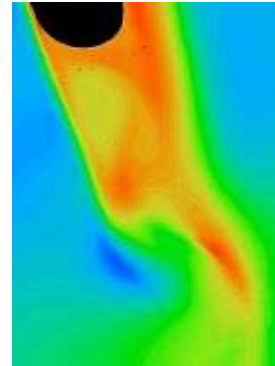


Temperature contours on Stator blades & Cp experimental data comparison

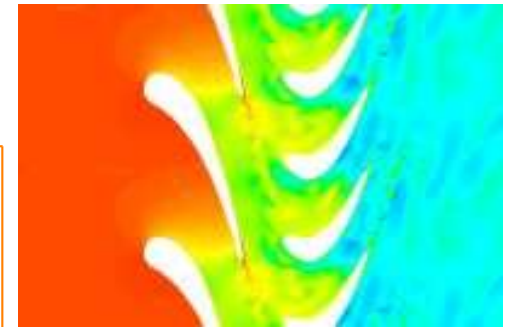
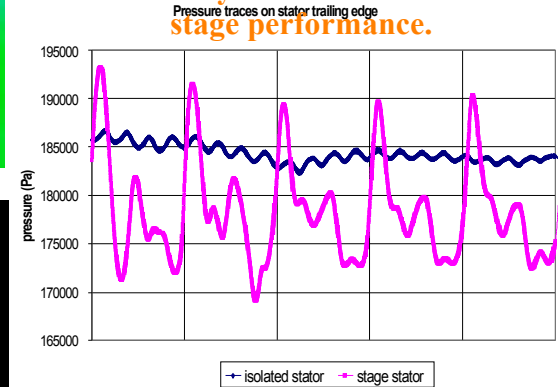
Secondary flow prevision and 3D Path Lines analysis



Mesh: 1 million cells
CPU Time: 6000 hours
Elapsed Time:
525 hours on
12 IBM SP3 platforms



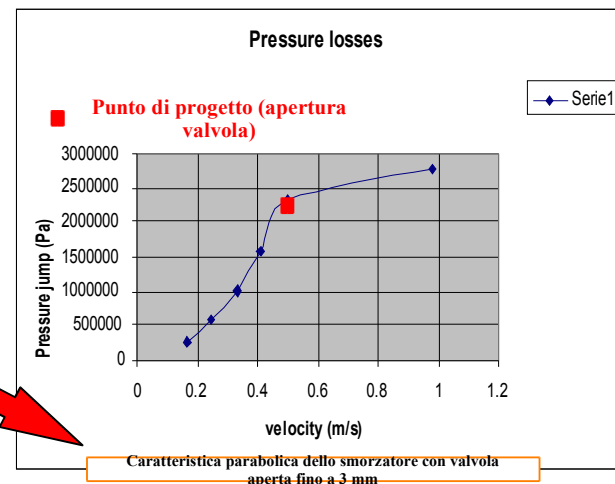
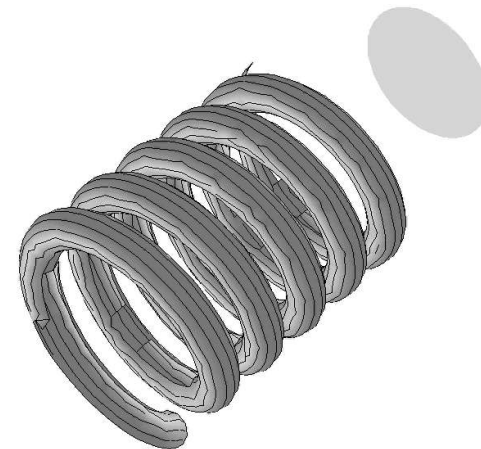
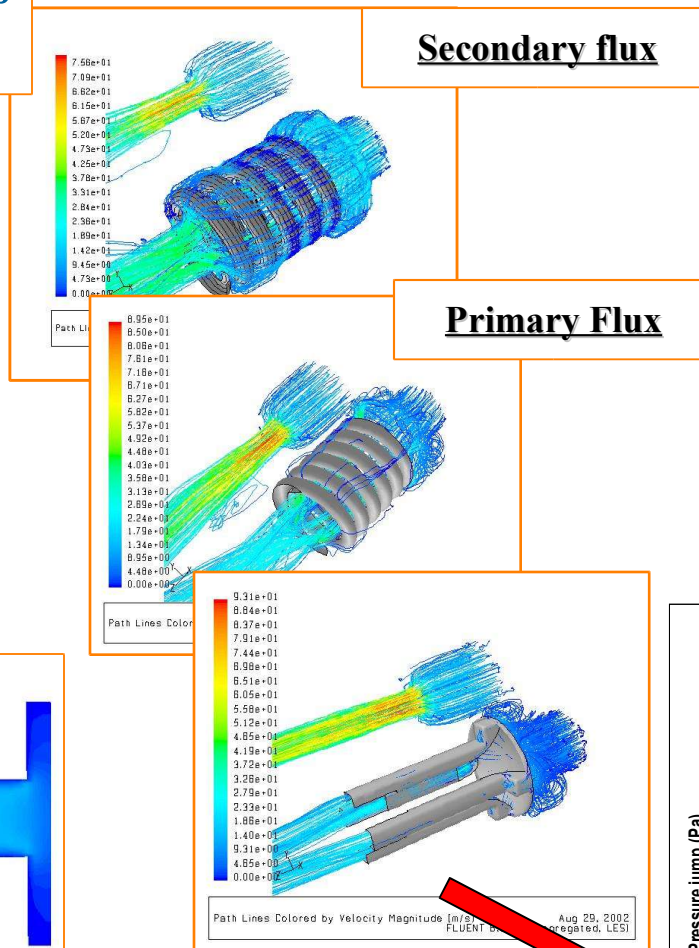
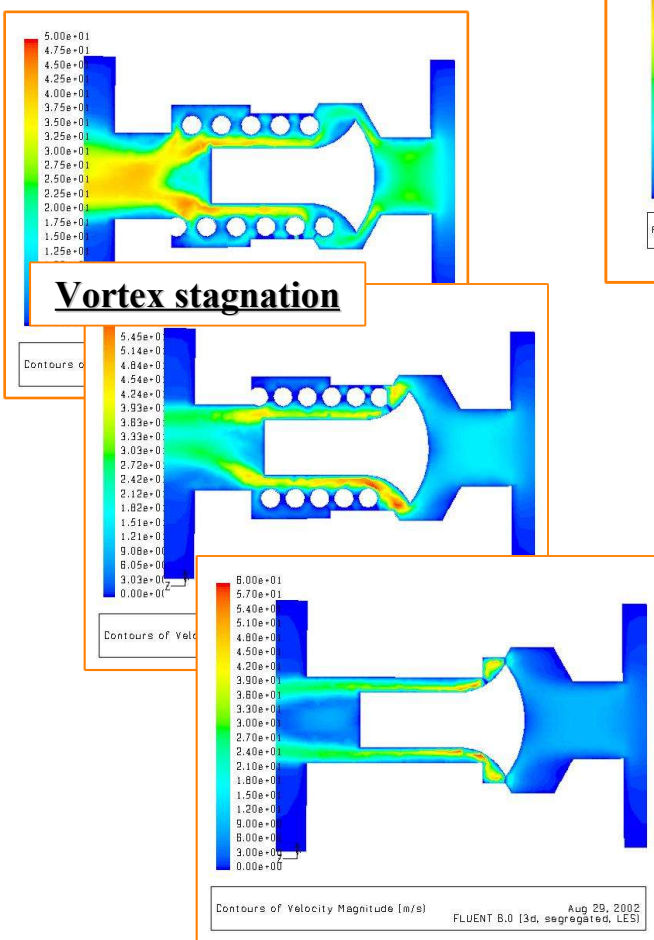
Large Eddy Simulation (LES) provides high resonable results on wake analysis and turbine stage performance.



Temperature & wakes interactions

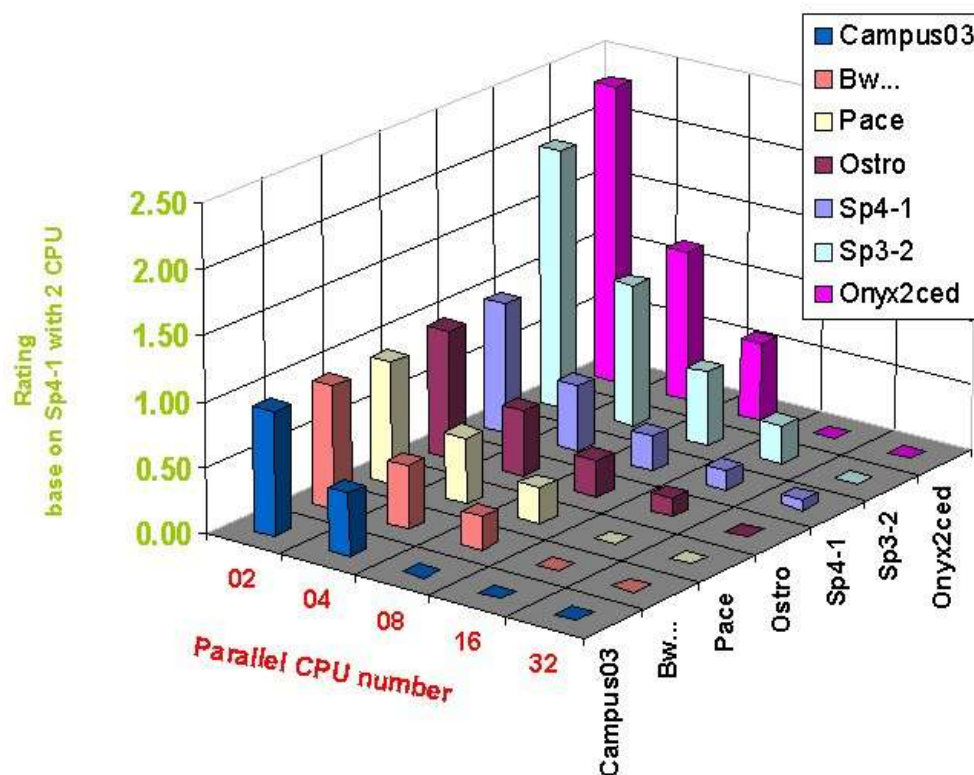
Mesh: 600,000 cells
CPU Time: 960 hours
Elapsed Time: 130 hours
on 8 Linux platforms

CFD Analysis of a fluid dumper [FLUENT]



FLUENT performance on different platforms in ENEA GRID

FLUENT Performance Rating on ENEA's Grid Computing

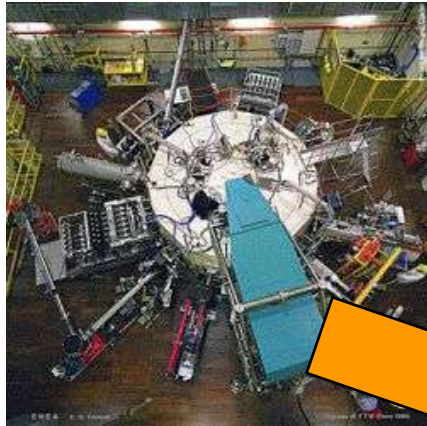


Scaling with #CPU & platform type

	#CPU	GHz
AIX		
Sp3-1	16	.375
Sp4-1	32	1.1
Ostro	16	1.3
Pace	8	1.3
Linux		
C..03	4	3
bw	8	1.8
IRIX		
Onyx.	8	0.4

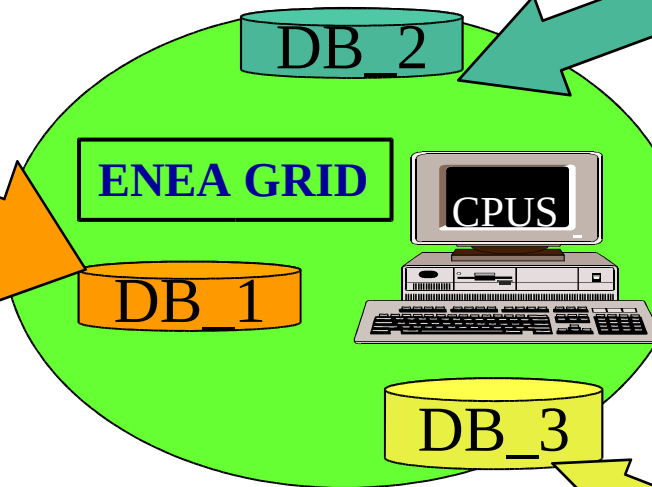
Cpu time normalized to the case: Sp4-1, 2 CPUs

ENEA GRID and experimental facilities



**Controlled Nuclear Fusion:
FTU
Frascati Tokamak Upgrade
Video Acquisition**

**DNA Sequence
system
(ABI Prism 3700)
Trisaia**



**Electronic Microscope
(Brindisi)
300 Kev**

