



Risorse CINECA per il calcolo scientifico @polimi

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CINECA - HPC and Innovation Unit
Italy



*5 e 11 novembre 2013
Politecnico di Milano*

Agenda

- CINECA 2.0
- Accesso alle risorse di calcolo HPC
- Convenzione di Ateneo POLIMI
- Accesso alle risorse: dettagli
- Esempio di utilizzo di applicativi ed ambienti presenti
- Domande aperte

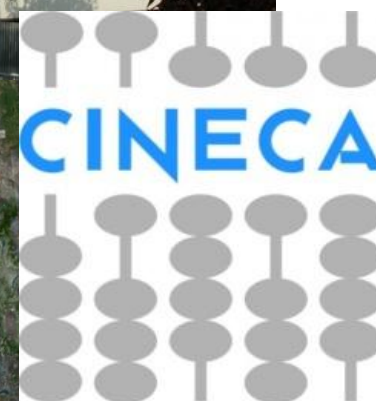


CINECA 2.0



CINECA

è un Consorzio non profit costituito da 69 università italiane, l'Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), il Consiglio Nazionale delle Ricerche (CNR) e il Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR).



CINECA è il maggior centro di calcolo in Italia, uno dei più importanti nel mondo.

Il Dipartimento SuperCalcolo, Applicazioni e Innovazione (SCAI):

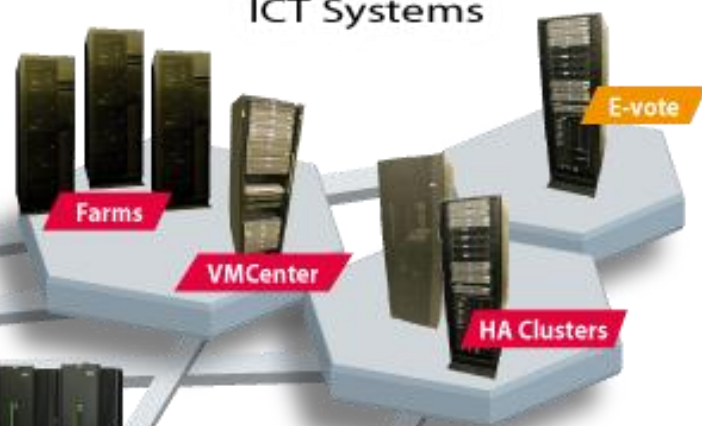
- gestisce l'infrastruttura HPC,
- fornisce supporto e risorse alla ricerca italiana e europea,
- promuove iniziative di trasferimento tecnologico per l'industria.



Data Storage



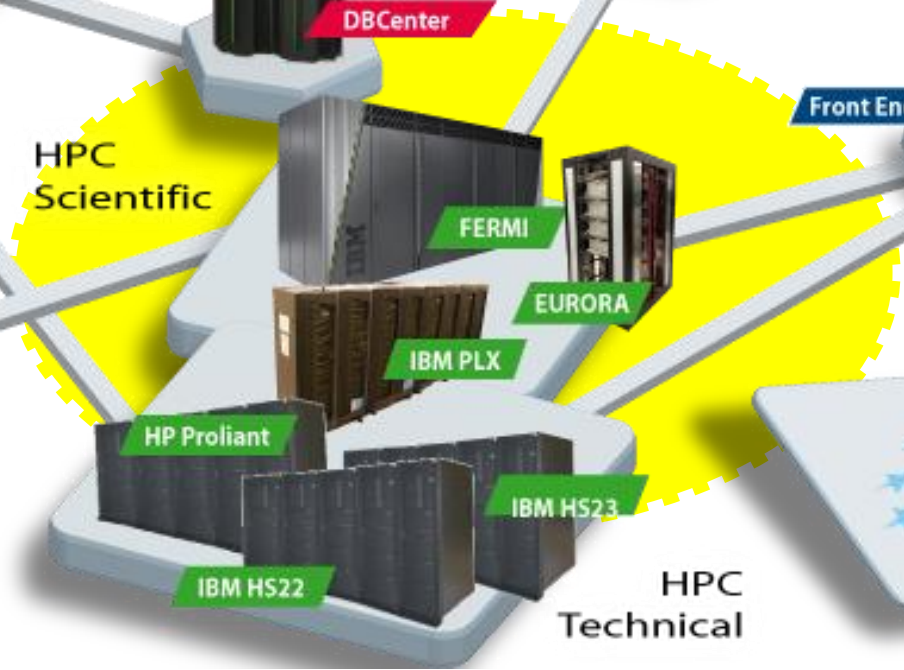
ICT Systems



Graphics



HPC Scientific



Front End Cluster



HPC Technical



Name: Fermi

Architecture: BlueGene/Q (10 racks)

Processor type: IBM PowerA2 @1.6 GHz

Computing Nodes: 10.240

Each node: 16 cores and 16GB of RAM

Computing Cores: 163.840

RAM: 1GByte / core (163 TByte total)

Internal Network: 5D Torus

Disk Space: 2PByte of scratch space

Peak Performance: 2PFlop/s

N. 12 in Top 500 rank (June 2013)

National and PRACE Tier-0 calls



EURORA

Architecture: Hybrid cluster by EUROTECH

Processor type: Intel Xeon E5-2687W Sandy Bridge-EP 3.1GHz

Computing Nodes: 64

Each node: 16 cores, 16GB/32 of RAM + 2 acceler

Computing Cores: 1.024

RAM:

Accelerators: 64 NVIDIA Tesla K20 +
64 Intel Xeon-Phi 5120D (MIC)

Internal Network: Infiniband & Custom

Peak performance: 110 TFlops

N. 1 in Green 500 rank (June 2013)

National and PRACE PrepAccess calls



Name: PLX

Architecture: IBM Hybrid Cluster

Processor type: Intel Xeon (Exa-Core Westmere) X 5645 @ 2.4 GHz

Computing Nodes: 274

Each node: 12 cores, 48GB of RAM, 2 GPUs

Computing Cores: 3.288

RAM: 14TByte

Internal Network: Infiniband 4xQDR switches (40 Gb/s)

Accelerators: 548 GPUs:

Peak Performance: 32 TFlops

565 TFlops SP GPUs

283 TFlops DP GPUs

PLX



National and PRACE Tier-1 calls

Accessi HPC

- Piattaforme con selezione:
 - Regionali
 - Nazionali
 - Europee
- Piattaforme senza selezione:
 - Convenzione d'Ateneo 2013

Piattaforme con Selezione



- **LISA:** <http://www.hpc.cineca.it/services/lisa>
- **ISCRA:** <http://www.hpc.cineca.it/services/iscra>
- **PRACE:** <http://www.prace-ri.eu/Call-Announcements?lang=en>

Piattaforma senza selezione

Convenzione d'Ateneo 2013:

- Monte ore: 600 k ore su Eurora/PLX + 6.000 k ore su Fermi
- Scadenza: giugno 2014
- Servizi inclusi: user support

Per accedere POLIMI ha stabilito di identificare dei referenti Dipartimentali a cui vengono accreditati dei monte-ore associati a macro-progetti. *I referenti inseriscono le persone all'interno del loro monte-ore come collaboratori.*

Referenti di Ateneo

Dipartimento	Referente	FERMI (Kh)	EURORA (Kh)	Attivato
ENERGIA	D'ANGELO GIOVANNI	500	50	SI
TECNOLOGIE AEROSPAZIALI	MANTEGAZZA PAOLO	500	50	SI
INGEGNERIA CIVILE	GHISI ALDO FRANCESCO	500	50	SI
MECCANICA	MICCOLI STEFANO	500	50	SI
MATEMATICA	PAGLIERI LUCA	500	50	SI
INGEGNERIA GESTIONALE	MOSCONI ROCCO ROBERTO	500	50	NO
ELETTRONICA	BREVEGLIERI LUCA	500	50	SI
CHIMICA	CAVALLOTTI CARLO ALESSANDRO	500	50	SI

Tot assegnate:

4.0 mln -- 400 k

Da assegnare:

2.0 mln -- 200 k

Accesso alla convenzione

1. Iscrizione User DB CINECA (<https://userdb.hpc.cineca.it/>)
 - <https://userdb.hpc.cineca.it/hpc-access> (elenco azioni da completare)
2. Contattare referente di Dipartimento POLIMI chiedendo di essere inserito come collaboratore nel progetto di interesse
 - Referente si connette allo userDB sotto myprojects ed edita il nuovo collaboratore (edit/save)
3. Accesso alla piattaforma
4. Job submission

Iscrizione userDB CINECA

<https://userdb.hpc.cineca.it/>

The screenshot shows a web browser window with the URL <https://userdb.hpc.cineca.it/>. The page features the CINECA logo and the text "UserDB SuperComputing Applications and Innovation". On the left, there is a "User login" section with input fields for "E-mail" and "Password", and links for "Create new user" and "Request new password". A "Log in" button is at the bottom of this section. The main content area is titled "Welcome to HPC@CINECA User Portal" and contains a message stating that users need to be registered. It lists several actions a user can perform, such as asking for an HPC username, checking active projects, and accessing the ISCRA and LISA sites. A "Please note:" section at the bottom mentions a recent update in June 2013. The footer contains copyright information for 2012 SCAI and CINECA, along with contact information.

Libero Welcome to HPC@CINECA Zimbra: In arrivo

<https://userdb.hpc.cineca.it/>

CINECA UserDB
SuperComputing Applications and Innovation

User login

E-mail

Password

[Create new user](#)

[Request new password](#)

[Log in](#)

Welcome to HPC@CINECA User Portal

You need to be a registered member to access the UserDB portal.

Using this portal a user can:

- ask for an HPC username;
- check the active projects;
- access the ISCRA site for submitting HPC project proposals;
- access the LISA site for submitting HPC project proposals (reserved to researchers in Regione Lombardia);
- view statistics on the use of HPC systems (not available yet);
- and MUCH MORE.....

Please note:

this portal has been recently updated (June 2013) to a new framework technology and a new service "LISA access" has been addressed for the submission of HPC projects (ONLY FROM regione lombardia)

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Informazioni generali

<http://www.hpc.cineca.it>

<http://www.hpc.cineca.it/content/hpc-user-guide-2012>

The screenshot shows a web browser window with multiple tabs. The active tab is 'HPC User Guide 2012'. The address bar shows the URL 'www.hpc.cineca.it/content/hpc-user-guide-2012'. The website header includes the CINECA logo, the SCAI logo (SuperComputing Applications and Innovation), and navigation links: Home, Contacts, CINECA. A search bar is also present. The main navigation menu has tabs: ABOUT US, RESOURCES, SERVICES, FOR USERS (selected), TRAINING, and PROJECTS. The 'For users' section is expanded, showing a list of links: My portal, Getting started, Get in touch, Help desk, and Documentation (selected). Under 'Documentation', there is a link to 'HPC User Guide 2012'. The main content area displays the 'HPC User Guide 2012' page, which includes a 'Content:' section with links to Introduction, General Info, HPC Portal, and System Specific. At the bottom, it states 'A User Guide for HPC systems in CINECA (last release: August 2012)'. There are also status indicators for FERMI and PLX systems, each with three colored circles (green, yellow, red).

Helpdesk

<http://www.hpc.cineca.it/content/help-desk>

Libero x Help desk | SCAI x RemoteGraph - R x Zimbra: In arrivo x RUN YOUR JOB - x

www.hpc.cineca.it/content/help-desk

CINECA **SCAI** SuperComputing Applications and Innovation

Home | Contacts | CINECA

Search

ABOUT US | RESOURCES | SERVICES | **FOR USERS** | TRAINING | PROJECTS

For users

- My portal
- Getting started
- Get in touch
- Help desk**
- Documentation

Help desk

Support

Silvia Giuliani

Center news

28/10/2013
Fermi Scratch nearly full

FERMI status **PLX status**

Home > For users

Help desk



The **Help Desk** is provided during working days.

Please send requests by e-mail to superc@cineca.it and we will answer as soon as possible.

The consultant "**on-duty**" in a given period is represented by the image visible under the top-left menu. Our team is presently composed by:

- Isabella Baccarelli
- Mirko Cestari
- Fabrizio Cinquini
- Francesco Falciano
- Silvia Giuliani
- Alessandro Grottesi
- Giusy Muscianisi
- Nicola Spallanzani
- Elda Rossi







Get in touch

SuperComputing Applications and Innovation

SuperComputing Applications and Innovation


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ABOUT US	RESOURCES	SERVICES	FOR USERS	TRAINING	PROJECTS
			FERMI status	PLX status	
			  	  	

For users

- My portal
- Getting started
- Get in touch**
- Help desk
- Documentation

Help desk



Alessandro Grottesi

Center news

30/10/2013

Crush of some running jobs on FERMI

28/10/2013

Fermi Scratch nearly full

23/10/2013

Fermi back to production

23/10/2013

Fermi temporarily unavailable

[» more Center News](#)

[Home](#) > [For users](#)

Get in touch

How to get Center's announcements (HPC-news)

We manage a mailing list (HPC-news) for posting announcements, scheduled downs, software updates, any problems and so on, about our HPC computing resources. It is advisable for HPC users to be included in that list!

You can subscribe (or unsubscribe) to HPC-news by sending an email from the address you want to subscribe. You can consult the archive browsing the archive web site.

To subscribe to HPC-new:

send a mail to listserv@list.cineca.it
in the body --> "subscribe hpc-news"
in the subject --> any string...

To unsubscribe to HPC-new:

send a mail to listserv@list.cineca.it
in the body --> "unsubscribe hpc-news"
in the subject --> any string...

To consult the archive:

for the recent archive go to → [Center News](#)
for the full archive go to → <http://list.cineca.it/archives/hpc-news.html>

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Premessa workflow CAE

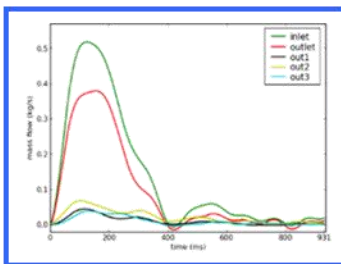
PRE-PROCESSING

COMPUTATION

POST PROCESSING

COMPUTATIONAL

PHYSICS



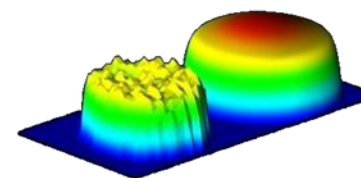
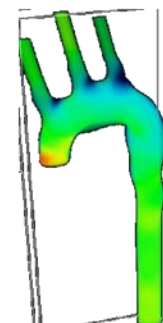
MODEL

SOLVING



HPC
ENVIRONMENT

VISUALIZATION



RESULTS

Pre/computing/post

Computing:

Non richiede interazione, BATCH processing.

Pre/Post possono richiedere interazione (GUI):

- RCM (Remote Connection Manager)
- Webcompute (su framework engineframe)

Applicativi disponibili

- Solutori
- Pre-processing (meshatori)
- Post-processing (visualizzazione)

Solutori

PLX/
EURORA

FERMI

- OpenFoam
 - Partial Diff Eq
 - OpenSource (per tutti)
- Ansys (CFD/mechanical/ ...)
 - General sw for mech and CFD
 - 1 Licenza accademica contemporanea fino a 64 cores
 - Priorità utenti LISA (fare richiesta a superc)
- Abaqus
 - Finite Element Analyzer
 - licenza accademica
 - Priorità utenti LISA (fare richiesta a superc)
- StarCCM+
 - CFD (anche pre e post-processing)
 - 16 licenze accademiche fino a 128 cores
 - Priorità utenti LISA (fare richiesta a superc)
- Elmer
 - Finite element Sw for multiPhys
 - Open Source (per tutti)

Pre-processing

PLX/
EURORA

- Pointwise
 - Mesh Generation Software for CFD
 - Due licenze (una con priorità calcolo industriale)
 - Priorità utenti LISA (fare richiesta a superc)
 - Utilizzabile via webcompute e RCM (interfaccia grafica) o tramite script

Post-processing

PLX/
EURORA

- Paraview
 - Open Source Scientific Visualisation
 - Utilizzabile via webcompute e RCM
 - OpenSource (per tutti)
- Tecplot 360
 - CFD Visualization software
 - Due licenze accademiche (fare richiesta a superc)
 - Utilizzabile via RCM

Computing: Accesso alle macchine

Modalità di accesso previste:

1. ssh client
2. sftp client
3. Web-based via Engineframe (Nice Tech.)
4. Grafica (GUI):
 - RCM
 - webcompute

Ssh (Secure Clients)

Shell per utenti Linux (scp, ssh)

per utenti windows:

- Putty (ssh)
- TECTIA client (ssh)
- Winscp per utenti windows (sftp)

Esempio utilizzo

- Moduli e loro caricamento
- Utilizzo openfoam batch
- Utilizzo Ansys/Fluent batch
- Utilizzo paraview con GUI

PLX login: *ssh login.plx.cineca.it*

Last login: Wed Oct 30 08:35:17 2013 from 131.175.80.185

```
*****
*
* Welcome to PLX DataPlex Cluster @ CINECA - RedHat EL 5.6!
*
* Qlogic QDR (40Gb/s) Infiniband high-performance network
*
* 274 Compute node
* - 2 esa-core Intel(R) Xeon(R) CPU E5645 @2.40GHz per Compute node
* - 48 GB RAM per Compute node
* - 2 Nvidia Tesla M2070 GPU per Compute node
* 8 Fat node
* - 2 quad-core Intel(R) Xeon(R) CPU X5570 @2.93GHz per Fat node
* - 128 GB RAM per Fat node
* 3352 Total cores
*
* 6 Remote Visualization Login
* 2 Nvidia QuadroPlex 2200 S4
*
* PBSpro 10.4 batch scheduler
*
* http://www.hpc.cineca.it/content/ibm-plx-gpu-user-guide-0
* for a guide on PLX
*
* mailto: superc@cinca.it for support
*
*****
[rponzini@node342 ~]$
```

Moduli disponibili: *module avail*

```
[rponzini@node342 ~]$ module avail  
----- /cineca/prod/modulefiles/profiles -----  
profile/advanced          profile/base(default) profile/engineering
```

module load profile/engineering

```
$ module load profile/engineering
```

```
$ module available
```

```
----- /cineca/prod/modulefiles/profiles -----  
profile/advanced      profile/engineering  profile/base(default)
```

```
.....
```

```
----- /cineca/prod/modulefiles/engineering/tools -----  
paraview/4.0.1--gnu--4.5.2  tecplot/2012R1  python/2.7.3--gnu--4.5.2
```

```
----- /cineca/prod/modulefiles/engineering/applications -----  
abaqus/6.12-1      elmer/2011      pointwise/17.0_R1  
ansys/145          openfoam/2.2.1-gnu-4.7.2  starccm+/8.04.010/Acd
```

\$ module help abaqus

abaqus-6.12-1

The Abaqus Unified FEA product suite offers powerful and complete solutions for both routine and sophisticated engineering problems covering a vast spectrum of industrial applications.

Example of a batch job for running on 4 nodes 8 procs for node (cpus=32) using the input my_data

```
#!/bin/bash
#PBS -N abq_parallel
#PBS -j oe
#PBS -l walltime=0:10:00
#PBS -l select=4:ncpus=8:mpiprocs=8
#PBS -A <Account_number>
#PBS -q parallel
cd $PBS_O_WORKDIR
module load autoload abaqus
cp $ABQUS_HOME/Documentation/example_cineca/my_data.inp .
cp $ABQUS_HOME/Documentation/example_cineca/my_data.f .
echo "Running on " `hostname`
echo "Working dir is $PBS_O_WORKDIR"
echo "Job started at " `date`
abaqus job=my_data user=my_data cpus=32 interactive
echo "Job finished at " `date`
```

This application is restricted access. To be enabled please contact superc@cineca.it.
To check license server status:
`abaqus licensing lmstat -a -c 7400@license02-a.cineca.it`

```
$ module load abaqus
```

```
WARNING: abaqus/6.12-1 cannot be loaded due to missing prereq.
```

```
HINT: the following modules must be loaded first: intel/11.1-binary
```

```
$ module load autoload abaqus
```

```
### auto-loading modules intel/11.1--binary
```

```
### auto-loading modules openmpi/1.4.5--intel--11.1--binary
```

```
$
```

```
$ module show abaqus
```

```
-----  
/cineca/prod/modulefiles/engineering/applications/abaqus/6.12-1:
```

```
module-whatis    The Abaqus Unified FEA product suite offers ...
```

```
conflict         abaqus
```

```
setenv           ABAQUS_HOME /cineca/prod/applications/abaqus/6.12-1/binary
```

```
prepend-path     PATH      /cineca/prod/applications/abaqus/6.12-1/binary/Commands :
```

```
prepend-path     LIBPATH  /cineca/prod/.../6.12-1/code/lib :
```

```
prepend-path     LD_LIBRARY_PATH /cineca/prod/.../6.12-1/code/lib :
```

```
prepend-path     MANPATH  /cineca/prod/.../6.12-1/binary/Documentation/docs/v6.12/pdf_boo  
-----
```



```
[rponzini@node342 rponzini]$ more carica220
```

```
module purge
```

```
module load profile/engineering
```

```
module load autoload openfoam
```

```
[rponzini@node342 rponzini]$ more carica-ansys145
```

```
module purge
```

```
module load profile/engineering
```

```
module load autoload ansys/145
```

Caricamento ambiente CFD

Fluent (Ansys)

```
[rponzini@node342 rponzini]$ source carica-ansys145  
[rponzini@node342 rponzini]$ which fluent  
/cineca/prod/applications/ansys/145/intel--12.1--binary/v145/fluent/bin/fluent
```

OpenFoam

```
[rponzini@node342 rponzini]$ source carica220  
[rponzini@node342 rponzini]$ which pisoFoam  
/cineca/prod/applications/openfoam/2.2.0-gnu-4.7.2/openmpi--1.6.3-gnu--4.7.2/OpenFOAM-2.2.0/platforms/linux64GccDPOpt/bin/pisoFoam
```

Job interattivi

```
[rponzini@node342 rponzini]$ qsub -I  
qsub: ERROR: Account number None is not valid for user rponzini
```

```
[rponzini@node342 rponzini]$ qsub -I -A cin_staff  
qsub: waiting for job 1344006.node351.plx.cineca.it to start  
qsub: job 1344006.node351.plx.cineca.it ready
```

Job list

```
[rponzini@node004 ~]$ qstat -n -u $USER
```

```
node351.plx.cineca.it:
```

Job ID	Username	Queue	Jobname	SessID	NDS	TSK	Req'd Memory	Req'd Time	Elap S	Time
1343893.node351 node097ib0/1	rponzini	visual	rponzini-p	7087	1	1	--	12:00	R	01:09
1344001.node351 node098ib0/1	rponzini	dcv_visu	XTerm	14722	1	1	--	06:00	R	00:08
1344003.node351 node098ib0/2	rponzini	dcv_visu	ParaView	16633	1	1	--	06:00	R	00:06
1344004.node351 node098ib0/3	rponzini	dcv_visu	ParaView	22661	1	1	--	06:00	R	00:02
1344006.node351 node004ib0/3	rponzini	debug	STDIN	27624	1	1	4gb	00:30	R	00:00
1344007.node351 node196ib0/0*12+node197ib0/0*12+node198ib0/0*12+node199ib0/0*12 +node201ib0/0*12+node202ib0/0*12+node205ib0/0*12+node206ib0/0*12 +node207ib0/0*12+node208ib0/0*12	rponzini	privatel	HL_18kt	30341	10	120	470gb	48:00	R	00:00

Fluent Job submission

```
#!/bin/sh
#PBS -N test32
#PBS -j oe
#PBS -q parallel
#PBS -l select=4:ncpus=12:mpiprocs=8
#PBS -l walltime=24:0:0
#PBS -A cin_staff
#PBS -V

cd $PBS_O_WORKDIR
module load profile/engineering
module load autoload ansys
NPROCS=`wc -l < $PBS_NODEFILE`
echo "Job started at `date` on nodes: `cat $PBS_NODEFILE` "

EXEC=`which fluent`

time $EXEC 3ddp -i journal.jou -t$NPROCS -g -ssh -pinfiniband.ofed -mpi=intel >& myout4x8.out -
    cnf=${PBS_NODEFILE}
wait
echo "Job finished at `date` "
```

OpenFoam Job submission

```
#!/bin/sh
#PBS -j oe
#PBS -m abe
#PBS -M r.ponzini@cineca.it
#PBS -l select=6:ncpus=12:mpiprocs=6:mem=10gb
#PBS -A cin_staff
#PBS -V

cd $PBS_O_WORKDIR
module load profile/advanced
module load autoload openfoam

NPROCS=`wc -l < $PBS_NODEFILE`

echo "Job started at `date` on nodes: `cat $PBS_NODEFILE` "
decomposePar
EXEC=`which multiphaseEulerFoam`

time mpirun -machinefile $PBS_NODEFILE -np $NPROCS $EXEC -parallel >& out-36-
    simple_spare_lowU.log

echo "Job finished at `date` "
```


Pre/computing/post

Computing:

Non richiede interazione, BATCH processing.

Pre/Post possono richiedere interazione (GUI):

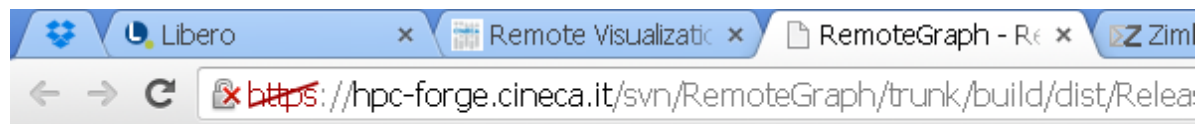
- RCM (Remote Connection Manager)**
- Webcompute (su framework engineframe)**

Applicativi con GUI e visualizzazione remota

- Due differenti strumenti, entrambi utilizzano gli acceleratori grafici su PLX/EURORA, entrambi si basano su grafica “remota”
 - **RCM: Remote Connection Manager**
 - **Webcompute**
- *Utili per pre e post-processing*

Remote Connection Manager

<http://www.hpc.cineca.it/content/remote-visualization>




RemoteGraph - Revision 382: /trunk/build/dist/Releases

- Sito di dipartimento
www.hpc.cineca.it
- Seguire il link
services → RemoteVisualiz →
download
- Scaricare il client corretto per la
propria workstation
- eseguirlo

- ..
- [RCM_darwin_64bit](#)
- [RCM_linux2_32bit_Ubuntu_10.04](#)
- [RCM_linux2_32bit_Ubuntu_12.04](#)
- [RCM_linux2_32bit_openSUSE_11.2](#)
- [RCM_linux2_64bit_RHEL_5.6](#)
- [RCM_linux2_64bit_Ubuntu_12.04](#)
- [RCM_linux2_64bit_openSUSE_11.4](#)
- [RCM_linux2_64bit_openSUSE_12.2](#)
- [RCM_win32_32bit.exe](#)
- [RCM_win32_64bit.exe](#)

Remote Connection Manager

RCM Login:



REMOTE CONNECTION MANAGER
version: 1.1.365

Sessions:

Host:

User:

Password:

LOGIN

Remote Connection Manager 1.1.365 - CINECA

CONNECT **KILL**

CREATED	DISPLAY	NODE	STATE	TIMELEFT	USERNAME	WALLTIME
20131030-10:06:32	5	node097	valid	11:00:57	rponzini	12:00:00

NEW DISPLAY **REFRESH**

Idle

TurboVNC: node097:6 (erossi00) [Tight + JPEG 1X Q95]

common_tools - Konqueror

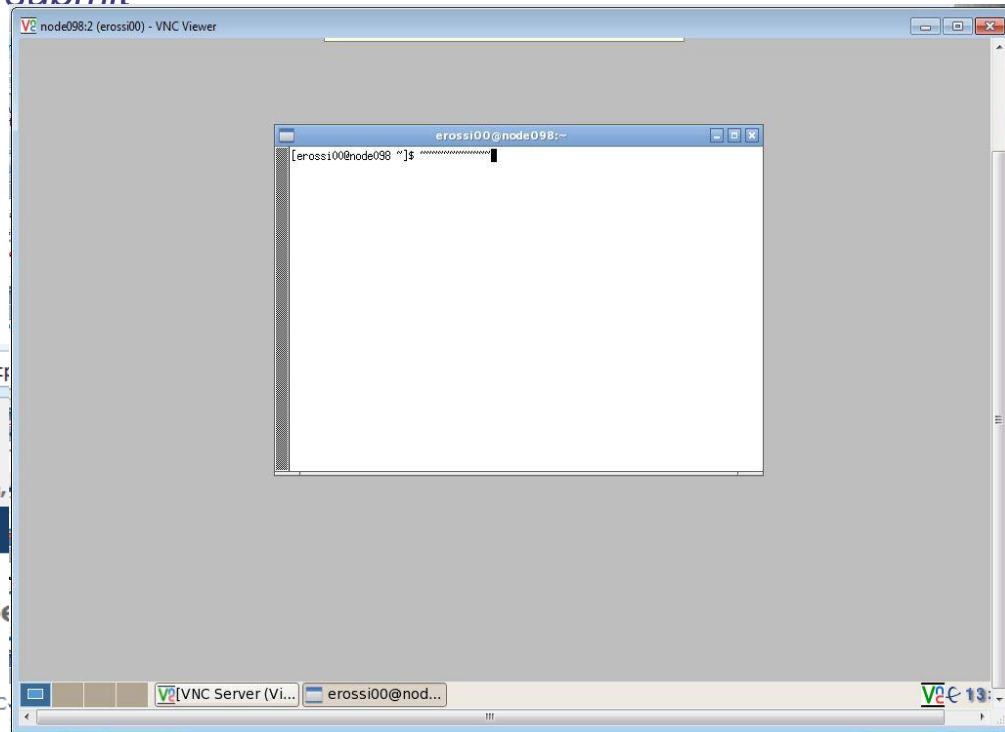
Location:

- paraview3.14.desktop
- paraview3.98.desktop
- paraview4.0.1.desktop
- paraview_demo1.desktop
- tecplot.desktop
- UnigineGraph icTest.desktop
- Vaa3D.desktop

7 Items - 7 Files (2.9 KB Total) - No Folders



- Sito webcompute.cineca.it
- Scaricare il client corretto per la propria workstation (solo al prima volta)
- *Selezionare il servizio di interesse (Xterm o applicativo)*
- *Selezionare il progetto per accounting + submit*

The screenshot shows the webcompute portal for CINECA. The browser address bar displays <https://webcompute.cineca.it/engineframe/runyourjob/it.cineca.runyourjob>. The page header includes the CINECA logo and the SCAI (SuperComputing Applications and Innovation) logo. A navigation bar contains links for Home, My Sessions, My Data, and My Jobs. On the left, under 'HPC Services', there is a list of available services: XTerm, Pointwise, Pointwise 16, and ParaView. The main content area features a 'Welcome to CINECA's Computing Services' message, followed by instructions to pick an application from the menu. Below this, there is a section for visualization services with instructions to download and install VNC, and a list of links for Windows, Linux, and Mac OS X users.




Domande aperte

<http://www.hpc.cineca.it/content/application-software-science>

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Application Software for Science

Content:

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- Data Libraries
- All Software


Application Software for Science & Technology

Cineca offers a variety of third-party applications and community codes that are installed on its HPC systems. Most of the third-party software are installed using the software modules mechanism. The packages available and detailed descriptions of them can be **viewed for discipline** by selecting the menu on the left. If you want to see the full catalog, please get [all Software in alphabetical order](#).

The information in this list may not reflect all software products available at Cineca. If you do not see an application you are interested in, or if you have questions about software that is currently available, please contact the [Help Desk](#)

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Sw engineering


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Resources software - Engineering

Name	Version	Description	Topic	Availability	Target user
Abaqus	6.12-1	Finite Element Analyzer	Engineering	EURORA, IBM PLX	academic
ANSYS	12.0, 12.1, 13.0, 13.4, 14.0, 14.5	General purpose software for mechanical engineering	Engineering	IBM PLX	restricted
ELMER	2011	Open Source Finite Element Software for Multiphysical Problems	Engineering, Physics	IBM PLX	all
OpenFOAM	2.1.1	The OpenFOAM® (Open Field Operation and Manipulation) CFD Toolbox can simulate anything from complex fluid flows involving chemical reactions, turbulence and heat transfer, to solid dynamics, electromagnetics and the pricing of financial options.	Engineering, Physics	IBM BG/Q, FERMI, IBM PLX	all
parFE - parallel mu-FE	0.2	A fully-parallel mu-FE code	Engineering, Maths Libraries	IBM PLX	all
R - statistical computing and graphics	3.0.2, 2.15.1	Statistical computing and graphics	Engineering, Life Science	EURORA, IBM PLX	all
stata - statistics	10.0.0	Fast, powerful statistical package designed for researchers of all disciplines.	Engineering, Life Science, Physics	IBM PLX	all

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