8th Advanced School on SCIENTIFIC VISUALIZATION

School presentation

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CINECA

About CINECA

CINECA is a non profit Consortium, made up of 68 Italian universities, and 3 Institutions (MIUR, OGS, CNR).

Today it is the largest Italian computing centre, one of the most important worldwide.

Mission: to develop advanced Information Technology applications and services, acting like a trait-d'union between the academic world, the sphere of pure research and the world of industry and Public Administration.

SCAI: Data management, data processing, data visualization

Cineca is one of Italy's main representatives in European Union projects, participating in numerous activities related to the promotion, development and diffusion of the most advanced information technologies.

The hardware infrastructure

- **FERMI**:
- IBM BG/Q supercomputer composed of 10.240 PowerA2 sockets running at 1.6GHz, with 16 cores each, totaling **163.840 compute cores** and a system peak performance of **2.1 Pflops**. Is now number 12 in the **Top500**.

- **PLX**:
- IBM PLX composed of 274 compute nodes with 2 Nvidia GPU and 48GB per Compute node + 8 Fat node with 2 Nvidia GPU and 128 GB RAM per node.

- **EURORA** (prototype):
- is the world's most green supercomputer (hot water cooling system): 1st in the Green500 List of June 2013. 64 computing nodes (1024 cores) equipped with GPU.

Arguments

- **VTK**: The Visualization Toolkit (VTK) is an open-source, freely available software system for 3D computer graphics, image processing and visualization
- **Paraview**: open-source, multi-platform data analysis and visualization application.
- **OpenFOAM**: free, open source CFD software package for the solution of continuum mechanics problems, including computational fluid dynamics.
- **SPLOCTH**: a ray-tracing algorithm for effective visualization of large/huge astrophysical datasets coming from particle based simulations.
- **VAA3D**: open source is a handy, fast, and versatile 3D/4D/5D Image Visualization & Analysis System for Bioimages & Surface Objects.
- **BLENDER**: an open source, cross platform suite of tools for 3D creation used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games.
- **Gui with Qt**: s a cross-platform application framework widely used for developing c++ application software with a graphical user interface

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School agenda

Day1	Time	Title	Argument	Lecturers
	9.45-10.00	Presentation of the school	General	Roberto Mucci - CINECA
	10.00-11.15	Introduction to VTK	VTK	Stefano Perticoni - SCS SuperComputingSolutions
	11.15-11.30	coffe-Break		
	11.30-13.00	Advenced Filtering in VTK	VTK	Stefano Perticoni - SCS SuperComputingSolutions
	13.00-14.30	launch-break		
	14.30-16.00	Applications based on VTK	VTK	Stefano Perticoni - SCS SuperComputingSolutions
	16.00-17.00	Tutorial	VTK	Stefano Perticoni - SCS SuperComputingSolutions

Day2	Time	Title		Lecturers
	9.30-11.15	Paraview and OpenFOAM	PARAVIEW	Prof. Federico Piscaglia - Politecnico di Milano
	11.15-11.30	coffe-Break		
	11.30-13.00	Tutorial	PARAVIEW	Prof. Federico Piscaglia - Politecnico di Milano
	13.00-14.30	launch-break		
	14.30-16.00	Splotch for high performance visualization of huge datasets	SPLOTCH	Claudio Gheller - CSCS
	16.00-17.00	Tutorial	SPLOTCH	Claudio Gheller - CSCS

Day3	Time	Title		Lecturers
	9.30-11.15	Visualization of 3D-3V simulations of plasma turbulence	Case history	Luigi Calori, Giuseppa Muscianisi - CINECA
	11.15-11.30	coffe-Break		
	11.30-13.00	A walk through the Full Scale Simulation of ventilation in the Mont Blanc Tunnel	Case History	Prof. Diego Angeli - UNIMORE, Ivan Spisso - CINECA
	13.00-14.30	launch-break		
	14.30-17.00	Vaa3D: an extendible and versatile open-source tool for 3D visualization-assisted analysis of big scientific data	VAA3D	Alessandro Bria - Projectome

Day4	Time	Title		Lecturers
	9.30-11.15	Introduction to Blender	BLENDER	Francesca Delli Ponti - CINECA
	11.15-11.30	coffe-Break		
	11.30-13.00	Tutorial	BLENDER	Francesca Delli Ponti - CINECA
	13.00-14.30	launch-break		
	14.30-16.00	Demo teatro virtuale	BLENDER	Silvano Imboden - CINCEA
	16.00-17.00	Blender scripting	BLENDER	Silvano Imboden - CINCEA

Day5	Time	Title		Lecturers
	9.30-11.15	Advanced GUI development using QT	Qt GUI	Paolo Quadrani, Andrea Negri - CINECA
	11.15-11.30	coffe-Break		
	11.30-13.00	Tutorial	Qt GUI	Paolo Quadrani, Andrea Negri - CINECA
	13.00-14.30	launch-break		
	14.30-16.00	Free		