

DEISA The European HPC Infrastructure (www.deisa.eu)

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Partners











BSC CINECA CSC

EPCC

ECMWF

FZJ

HLRS

IDRIS

LRZ **RZG** SARA Barcelona Supercomputing Centre

Consortio Interuniversitario per il Calcolo Automatico

Finhish Information Technology Centre for Science

University of Edinburgh and CCLRC

European Centre for Medium-Range Weather Forecast

Research Centre Juelich

High Performance Computing Centre Stuffgart

Institut du Développement et des Ressources

en Informatique Scientifique - CNRS

Leibniz Rechenzentrum Munich

Rechenzentrum Garching of the Max Planck Society

Dutch National High Performance Computing

Kungliga Tekniska Högskolan

DEISA: May 1st, 2004 – April 30th, 2008 Consorzio Interuniversitorio
Swiss National Supercomputing Centre

Three interpretations are provided in the control of the control o

Academy of Sciences

DEISA2: May 1st, 2008 - April 30th, 2011

Spain Italy

Finland

UK

UK (int

Germany







Switzerland

Russia







Integrated TeraFlops-Systems in DEISA2



	DEISA Partner	Architecture	TF/s
	MPG-RZG	IBM BlueGene P	27.0
		IBM Power6	120.0
	BAdW-LRZ	SGI-Altix Itanium	62.3
	BSC	IBM PowerPC	94.2
	CINECA	IBM Blade Center	26.6
		IBM Power5	3.9
	CSC	Cray XT4 dc	10.1
		Cray XT4 qc	70.0
	FZJ	IBM BlueGene P	223.0
		IBM Power4+	8.9
		IBM Power4+ successor	> 50
	IDRIS-CNRS	IBM Power4+	6.7
		IBM Power+ successor	> 40
	SARA	IBM Power5+	14.6
		IBM Power6	60.2
Status: March 2008	UEdin-EPCC	Cray XT4	65.0
	UStutt-HLRS	NEC SX-8	13.0

DEISA Partner	Architecture	TF/s	#Cores	Memory in TB
MPG-RZG	IBM BlueGene P	27.0	8,192	4.0
	IBM Power6	120.0	6,400	20.0
BAdW-LRZ	SGI-Altix Itanium	62.3	9,728	39.0
BSC	IBM PowerPC	94.2	10240	20.0
CINECA	IBM Blade Center	26.6	5120	10.0
	IBM Power5	3.9	512	1.0
CSC	Cray XT4 dc	10.1	2,024	2.0
	Cray XT4 qc	70.0	6,736	7.8
FZJ	IBM BlueGene P	223.0	65,536	32.0
	IBM Power4+	8.9	1,312	5.0
	IBM Power4+ successor	> 50	n/a	n/a
IDRIS-CNRS	IBM Power4+	6.7	1800	10
	IBM Power+ successor	> 40	n/a	n/a
SARA	IBM Power5+	14.6	1920	7.7
	IBM Power6	60.2	3328	15.6
UEdin-EPCC	Cray XT4	65.0	11,520	35.0
UStutt-HLRS	NEC SX-8	13.0	576	9.0



DEISA Data Services - Global File System

(based on IBM's GPFS)



AIX IBM domain



CSC (F









various architectures / operating systems
High bandwidth (up to10 Gbit/s)







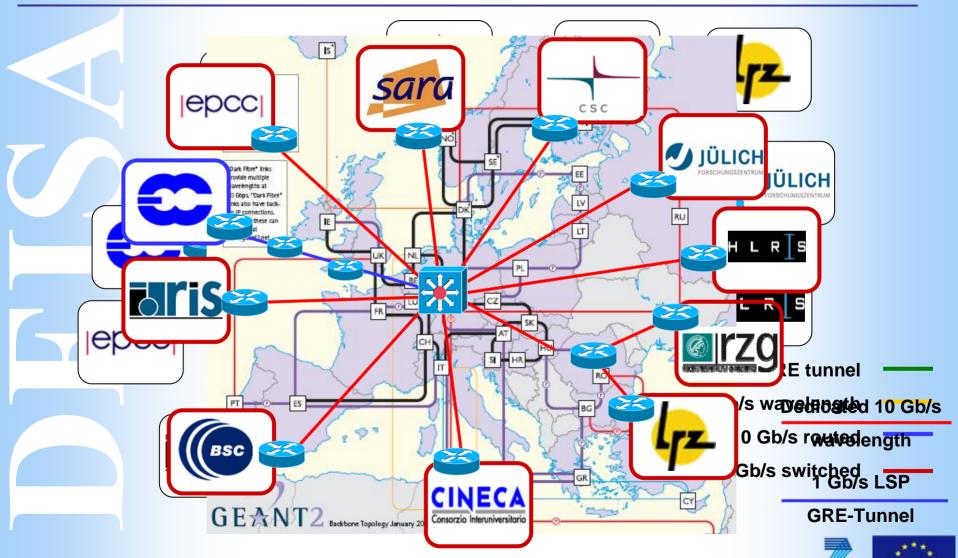
LINUX Power-PC



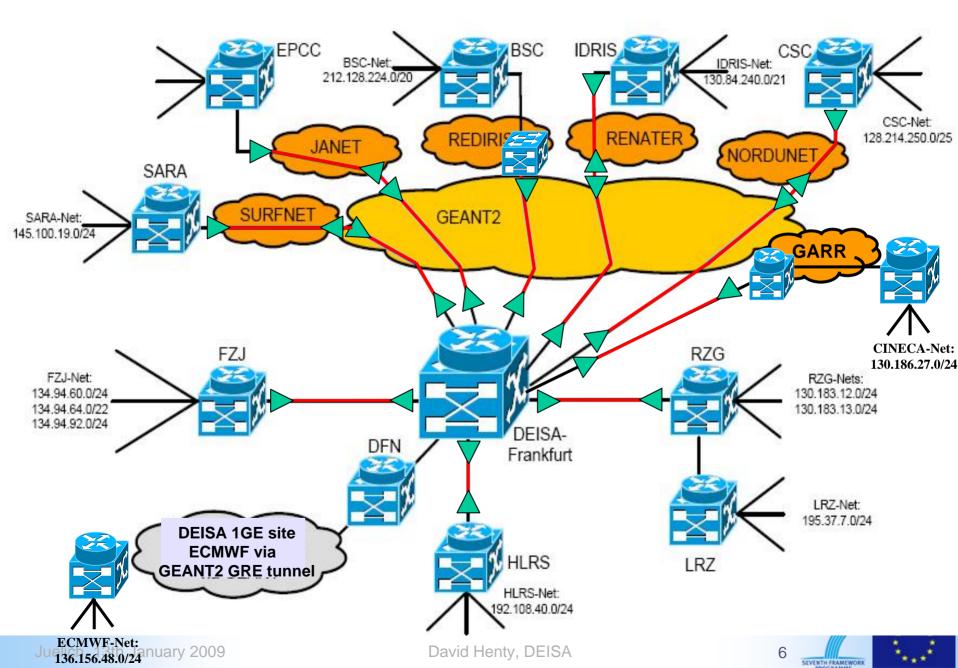


DEISA Network Infrastructure



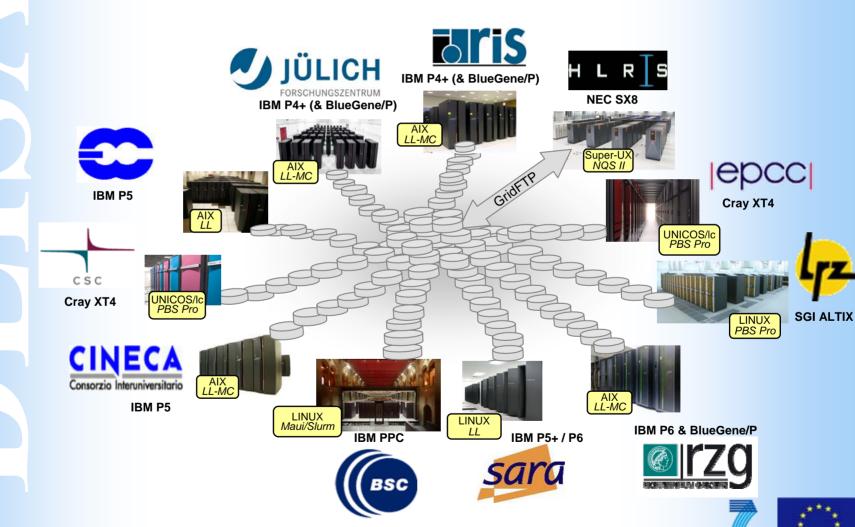






DEISA Global File System (based on MC-GPFS)

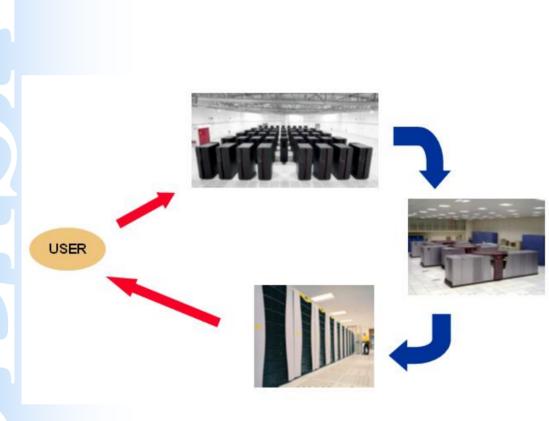






Workflow execution via UNICORE





UNICORE supports complex simulations that are pipelined over several heterogeneous platforms (workflows).

UNICORE handles workflows as a unique job and transparently moves the output – input data along the pipeline.

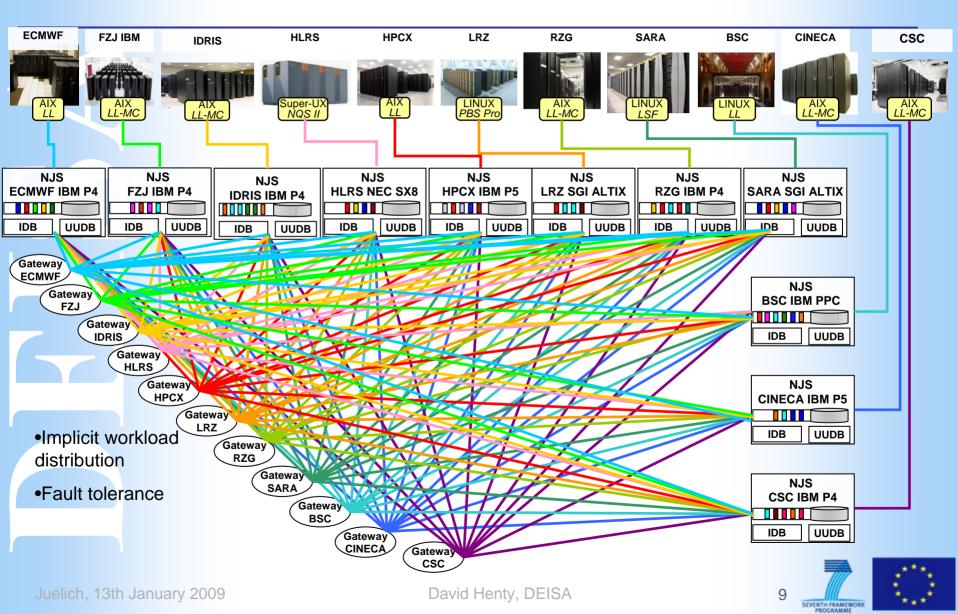
The **UNICORE** client that keeps control and monitors applications can run simply on the user's notebook.

UNICORE has a user friendly graphical interface. DEISA has developed a command line interface for UNICORE (DESHL).



DEISA Unicore infrastructure

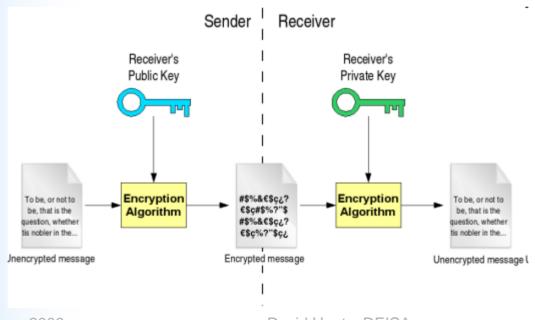




Security Infrastructure



- Standard public/private key setup
 - private key: only owner knows
 - public key: known to everyone
 - one encrypts, the other decrypts: gurantees authentication and privacy
 - figure by Borja Sotomayor, http://gdp.globus.org/gt4-tutorial/multiplehtml/ch09s03.html
 - from J. Schopf, Globus Alliance

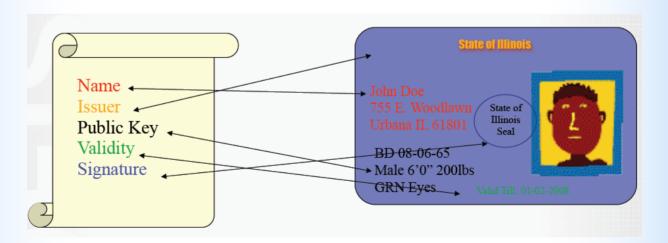




Certificates



- Similar to passport or driver's licence
- All DEISA users have an X509 Certificate
 - certified by their national certificate authority
 - have special temporary certificates for training sessions
- Guarantees authentication
 - figure by Rachana Ananthakrishnan (from J. Schopf, Globus Alliance)





Other Access Mechanisms



UNICORE is a GUI interface

- command-line interface to same infrastructure developed by DEISA
- DESHL: DEISA Services for Heteregoneous management Layer

Bulk Data Transfer

- can transfer files explicitly as an alternative to Global File System
- use GridFTP

Direct Login

simplest mechanism uses GSI-SSH

All these are covered today



DEISA Extreme Computing Initiative (DECI)



The basic service providing model for scientific users is currently the Extreme Computing Initiative

- DECI launched in early 2005 to enhance DEISA's impact on science and research
- European Call for proposals in May-June every year. Multi-national proposals strongly encouraged.
- Identification, enabling, deploying and operation of "flagship" applications in selected areas of science and technology
- Complex, demanding, innovative simulations that require the capabilities of DEISA compute resources
- Proposals reviewed by national evaluation committees
- Applications are selected on the basis of scientific excellence, innovation potential and relevance criteria – and national priorities
- Once approved, the most powerful HPC architectures in Europe assigned to the most challenging projects, and the most appropriate supercomputer architecture selected for each project

Supported by the Applications Task Force (ATASKF)

- Hyperscaling of huge parallel applications, data oriented applications
- Workflows and coupled applications
- Production of an European Benchmark Suite for HPC systems





DEISA Extreme Computing Initiative (2)



DECI call 2005

51 proposals, 12 European countries involved

30 mio cpu-h requested

29 proposals accepted, 12 mio cpu-h awarded (normalized to IBM P4+)

DECI call 2006

41 proposals, 12 European countries involved

28 mio cpu-h requested

23 proposals accepted, 12 mio cpu-h awarded

DECI call 2007

63 proposals, 14 European countries involved

70 mio cpu-h requested

45 proposals accepted, ~30 mio cpu-h awarded

DECI call 2008

66 proposals, 15 European countries involved

134 mio cpu-h requested

42 proposals accepted, ~49 mio cpu-h awarded



DEISA Extreme Computing Initiative (3)



Involvements in projects from DECI calls 2005, 2006 and 2007:

157 institutes, universities and industry partners

from

15 European countries

Austria Finland France Germany Hungary
Italy Netherlands Poland Portugal Romania Russia
Spain Sweden Switzerland UK

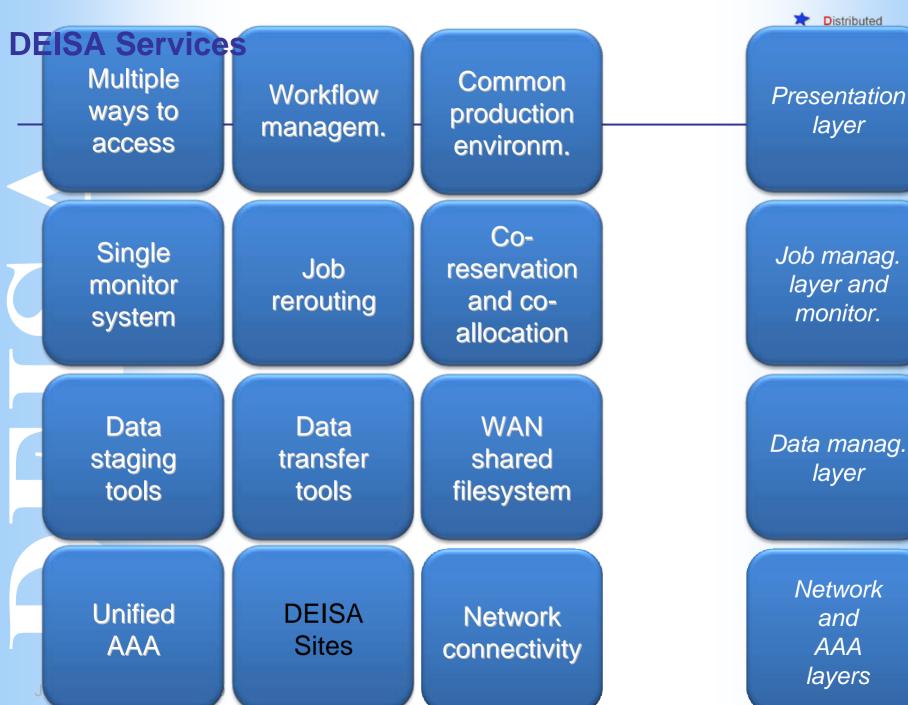
with collaborators from

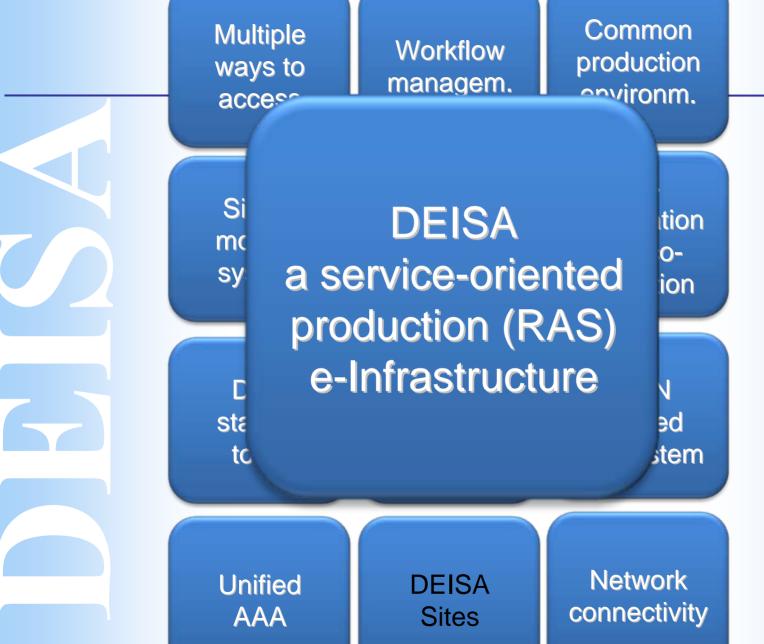
4 other continents

Asia, Australia, North America, South America









Juelich, 13th January







