



# UNICORE

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## How it all began

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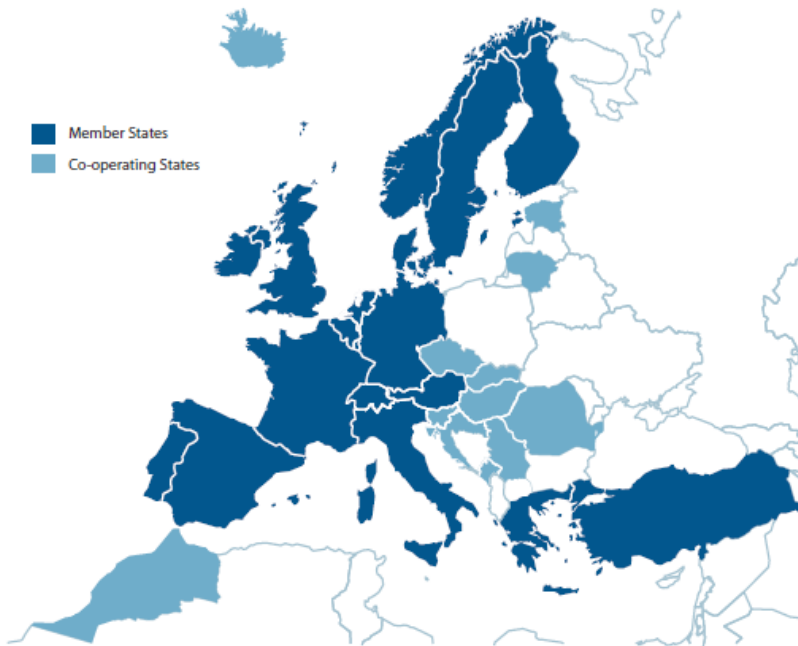
## Original motivation

The first idea about some kind of access software for HPC systems was developed at the European Centre for Medium-Range Weather Forecasts (ECMWF) in 1996, because its 17 Member States were automatically provided with allocations on its computer system for their own use. Since the computing environments of the different services varied considerably, a standard interface had to be considered. In the absence of any suitable system, a new design was undertaken by ECMWF staff, Dr. Jim Almond and Dave Snelling should be mentioned here.

In the autumn of 1996, it became clear that the main „pusher“ was going to move to Germany to join the Deutscher Wetterdienst (DWD) on 1 July 1997. Therefore, it was investigated whether the development of such a system could not be moved as well.



## European Centre for Medium-Range Weather Forecasts



The European Centre for Medium-Range Weather Forecasts (ECMWF), Reading, UK

## History

- 2.-6. September 1996: Summer school in Jülich  
,Partielle Differentialgleichungen in Numerik und Anwendungen'
- 3. September: Round table with  
Users, supercomputer centres, competency centres, vendors  
What prevents efficient use of distributed supercomputers?  
Result: Propose solutions
- December 1996: Project ideas for UNICORE submitted
- Spring 1997: Project proposal for UNICORE developed and submitted
- August 1, 1997: Start of Project

## UNiform Interface to COmputing Resources

- August 1997 – December 1999  
UNICORE project funded by BMBF  
Participants:  
Genias Software GmbH, Pallas GmbH  
DWD, Offenbach; ECMWF, Reading; FECIT, London; debis, Stuttgart  
ZAM, Jülich; RUS, Stuttgart; ZIB, Berlin; LRZ, München; PC<sup>2</sup>, Paderborn;  
RUKA, Karlsruhe  
Hitachi, HP, IBM, NEC, SGI, Siemens/Fujitsu, SUN
- October 1997  
VESUZ – feasibility study on the possible integrated network of  
the German Supercomputer installations



## Goals of UNICORE

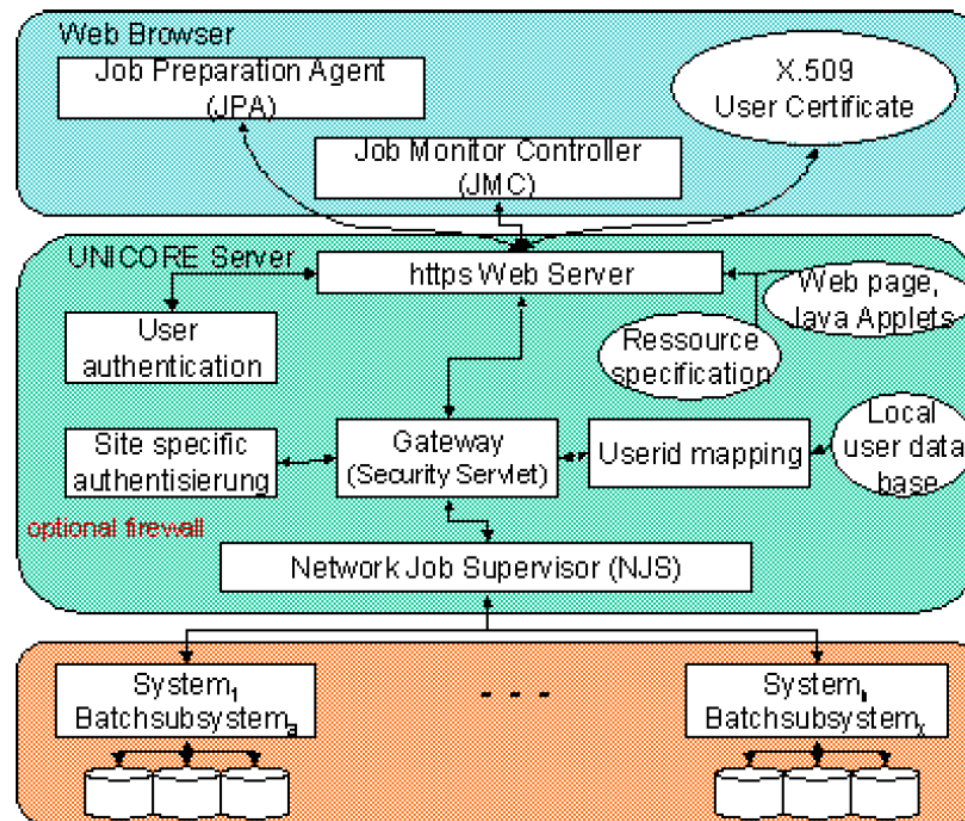
The goal of UNICORE is to deliver software that allows users to submit jobs to remote high performance computing resources without having to learn details of the target operating system, data storage conventions and techniques, or administrative policies and procedures at the target site. Existing Web-based technologies will be exploited wherever possible.

The user interface will be based on Java and modern browser technology to allow access to UNICORE resources from anywhere in the Internet for properly authorized users and eliminate software distribution.

A Network Job Supervisor (NJS) at each UNICORE site will interpret the Abstract Job Object (AJO) generated by the user interface, manage the jobs and the necessary data. NJS will interoperate with vendor specific batch systems, e.g. Cray NQE, IBM Load Leveler, Codine, etc.



## UNICORE architecture



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## UNICORE Forum e.V.

- The UNICORE Forum e.V. was founded in December 1999 by developers, leading European HPC centres, and supporting hardware vendors as a non-profit association to foster the distribution and use of UNICORE, to publish and maintain the specifications, to coordinate further development, certify implementations and extensions, and to support workshops.
- It currently comprises 30 members  
(see <http://www.unicore.eu/forum/members/>)



## UNICORE Plus

funded by BMBF

- January 2000 – December 2002

UNICORE Plus project funded by BMBF

Participants:

Intel GmbH

DWD, Offenbach ; ZAM, Jülich; RUS, Stuttgart; ZIB, Berlin; LRZ, München; PC<sup>2</sup>, Paderborn; RUKA Karlsruhe; ZHR, Dresden

UNICORE Forum e.V. through Technical Advisory Board

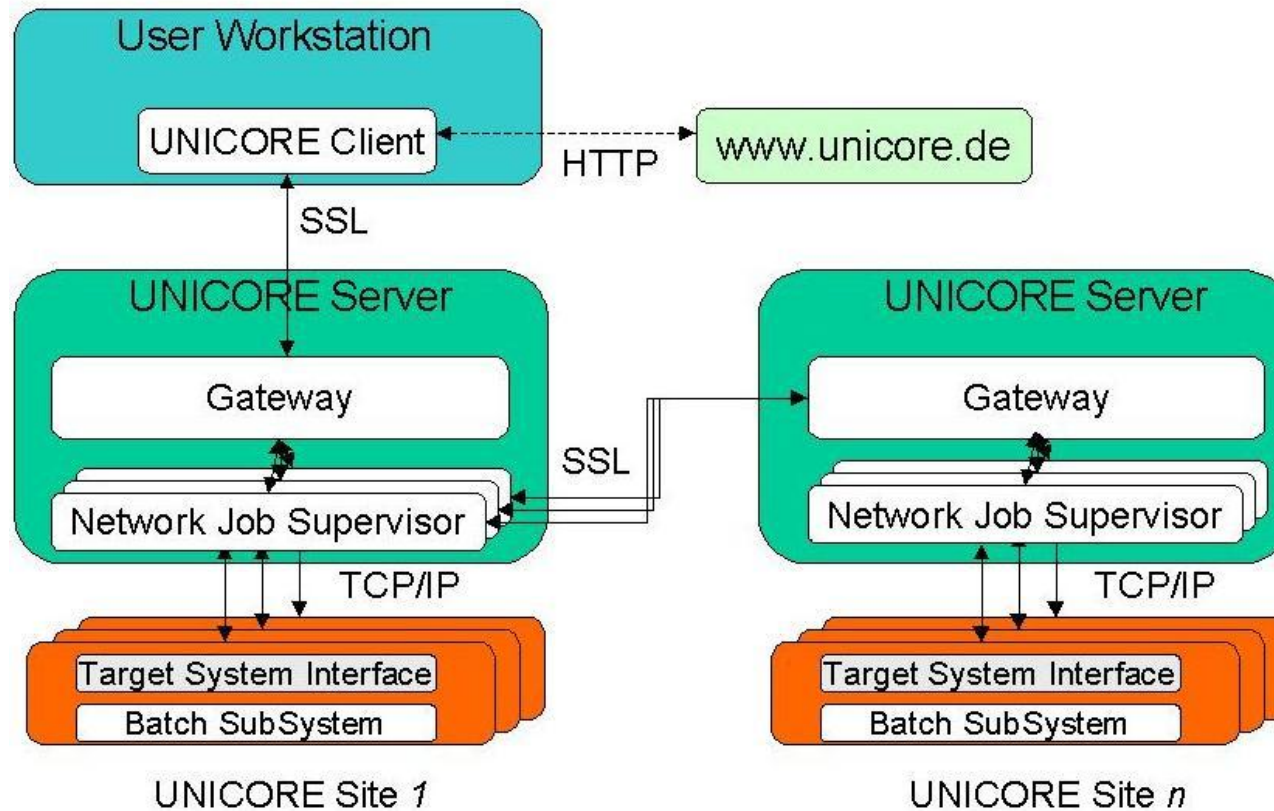
- Since 2004, UNICORE available as *Open source* under BSD license

## UNICORE Plus: Goals

The goal of UNICORE Plus is to develop a **grid infrastructure** together with a **computing portal** for engineers and scientists to access supercomputer centers from anywhere on the Internet. This has to be done with strong authentication in a uniform and easy to use way. The differences between platforms will be hidden from the user thus creating a **seamless interface** for accessing supercomputers, compiling and running applications, and transferring input/output data.

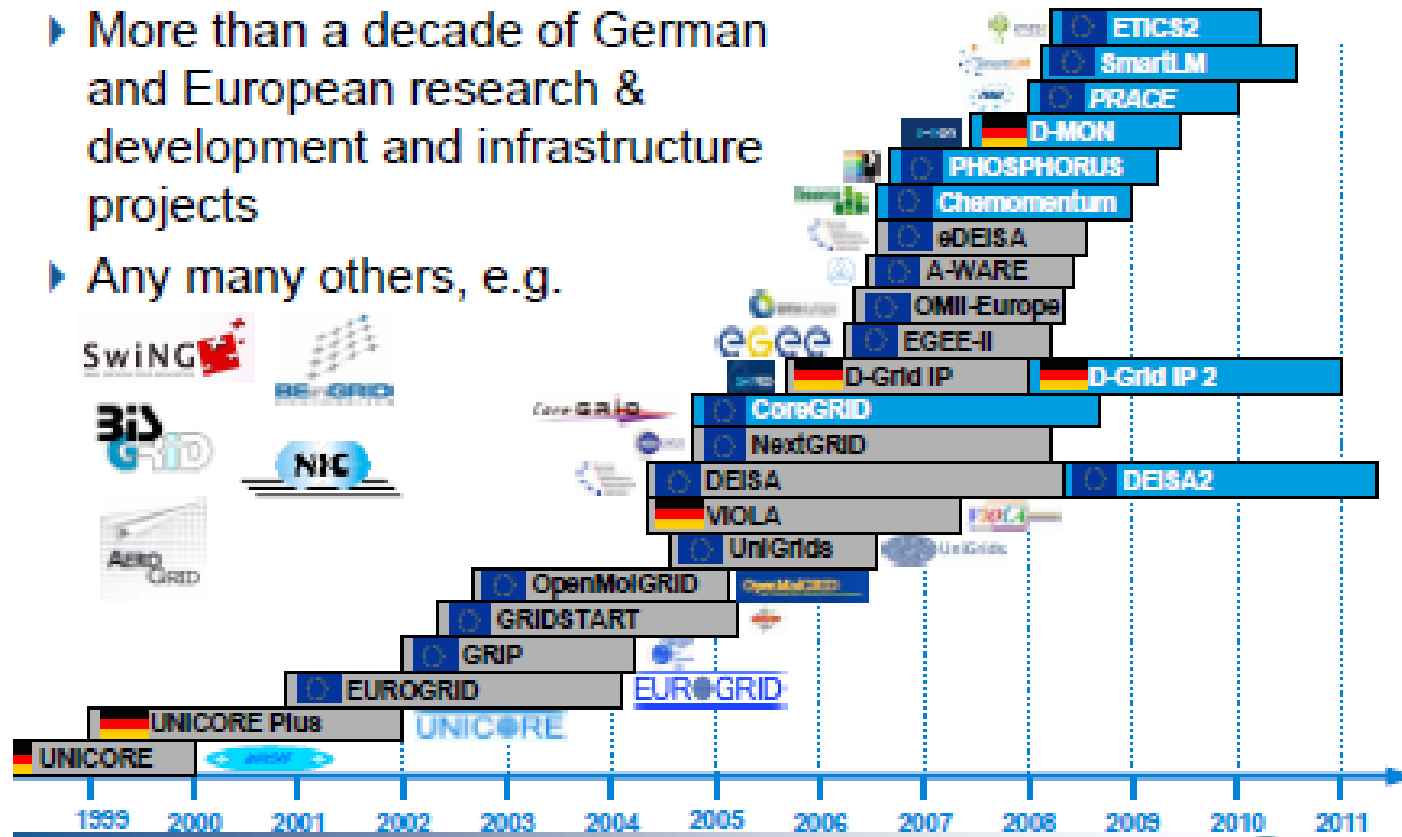
Research areas in UNICORE Plus are resource modeling, application specific interfaces, data management, job control flow, and metacomputing.

## UNICORE Plus architecture



## Some Projects with UNICORE

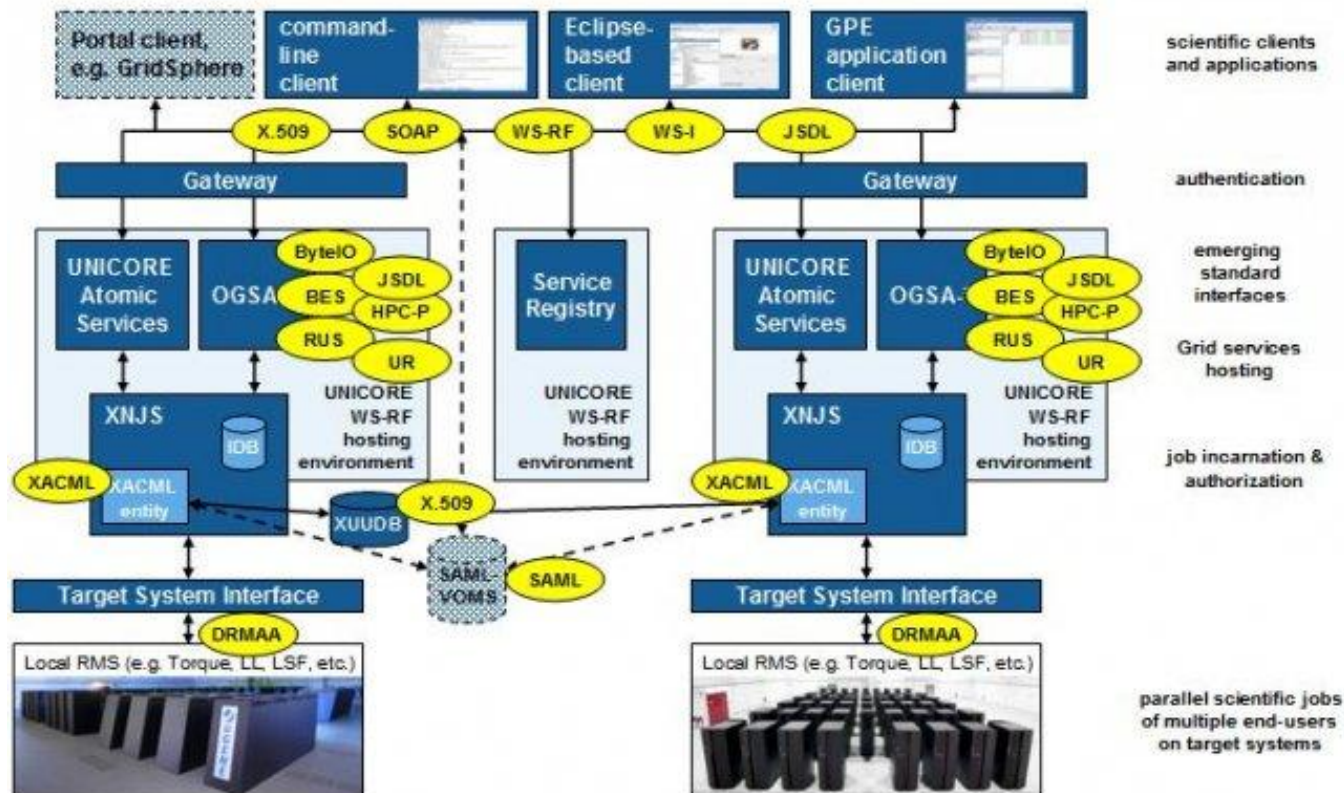
- ▶ More than a decade of German and European research & development and infrastructure projects
- ▶ Any many others, e.g.



Balatonfüred, Hungary, 6th-18th July 2008

## Current Version

# UNICORE 6 Architecture



## Comparison UNICORE 5 / 6

UNICORE 5	UNICORE 6	UNICORE 5	UNICORE 6
Graphical Client	Rich Client		JSDL (Job Services Description Language)
-	Commandline Client	AJO (Abstract Job Object)	UAS (UNICORE Atomic Services)
-	High Level API		WSRF-Lite, XML-Beans
	Global Registry		SOAP (Cxf/XFire)
Gateway	Gateway	UPL (UNICORE Protocol Layer)	HTTPS (Jetty)
	unicorex	End-to-end Security by signed AJOs	End-to-end Security by explicit trust delegation
NJS	workflow		
	servorch	USPACE (defined in IDB)	USPACE (defined in IDB)
IDB	IDB	Storage (located on target system, def. in IDB)	UNICORE Storage (located on target system, def. in uas.config)
UUDB	XUUDB	-	Workflow Files
TSI	TSI	OUTCOME (located on the target system)	XNJS.filespace (located on system running the unicorex, def. in xnjs.xml)



## Outlook

UNICORE is a modern, WS-RF based, OGSA-compliant, standards-conform, ready-to-run Grid technology implemented in Java. UNICORE makes distributed computing, data, network, and software resources available in a seamless and secure way.







## Questions ?

