New Spanish research centre gains colossal computing power with HP Superdomes

"With 2TB of shared memory between two HP Superdomes and a peak of 1.6T floating point operations per second (flops), the HP Supercomputing solution offers superb technical characteristics for solving highly complex scientific problems." Jose Luis González-Sánchez, general manager and director, CénitS, Spain

HP customer case study:
CénitS deploys an HP Supercomputing solution to revitalise economic activity, increase employment prospects and establish a worldwide reputation for supercomputing

Industry:
Supercomputing

Objective

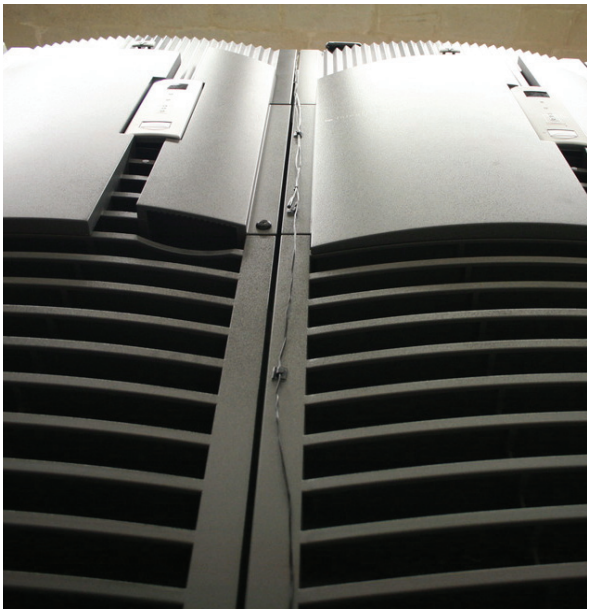
Deliver a supercomputing centre to strengthen business innovation, boost economic development in the Extremadura region of Spain and gain worldwide recognition in the field of supercomputing.

Approach

Evaluated numerous supercomputing solutions and visited several reference sites.

Business outcomes

- Generates vital revenue by attracting new business from approximately 20 commercial organisations.
- The new facility aids cooperative relationships between the private and public research sectors, creating new business opportunities.
- New business projects are revitalising the local economy by creating new jobs, enhancing economic recovery.
- The HP Supercomputing solution allows the research centre to conduct award-winning projects, enhancing the organisation's reputation for supercomputing.



The governing council of the Extremadura region of Spain authorised the establishment of a not-for-profit foundation called the Computer and Advanced Technology in Extremadura (COMPUTAEX). Bordering Portugal, Extremadura is an autonomous community that includes two of the country's most economically depressed provinces, Cáceres and Badajoz.

Funded by the European Union, the foundation's main objective is to manage the Extremadura Supercomputing, Technological Innovation and Research Centre (CénitS). CénitS provides supercomputing services to a wide range of business and research organisations that promote the use of intensive computing and communications to sustain socioeconomic development.

A supercomputer called Lusitania

CénitS wanted the supercomputer to have a name that clearly associated it to the region. Today's Extremadura region was, in Roman times, called Lusitania and CéntiS felt this delivered the link they wanted.

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Jose Luis González-Sánchez, general manager and director, CénitS, Spain

In its endeavours to improve the economic performance of the region and develop cooperative relationships between the public and private research sectors, the foundation needed to build and equip CénitS with the new supercomputer quickly.

"Our main challenge was to get CénitS operational in six months so that we could rapidly offer high performance computing services to research establishments and start to build a worldwide reputation for supercomputing within the scientific community," explains Jose Luis González-Sánchez, general manager and director, CénitS. "The supercomputer will also strengthen business innovation and technological improvements within the region."

CénitS and the foundation worked together with the Extremadura regional government and evaluated various supercomputing solutions from several vendors. To demonstrate its expertise in the field of supercomputing, HP took a number of CénitS staff to several HP reference sites in Spain - the Galicia Supercomputing Centre (CESGA) and the University of Málaga Supercomputing Centre (SCBI) explaining how its technology has improved the research and development capabilities at these centres.

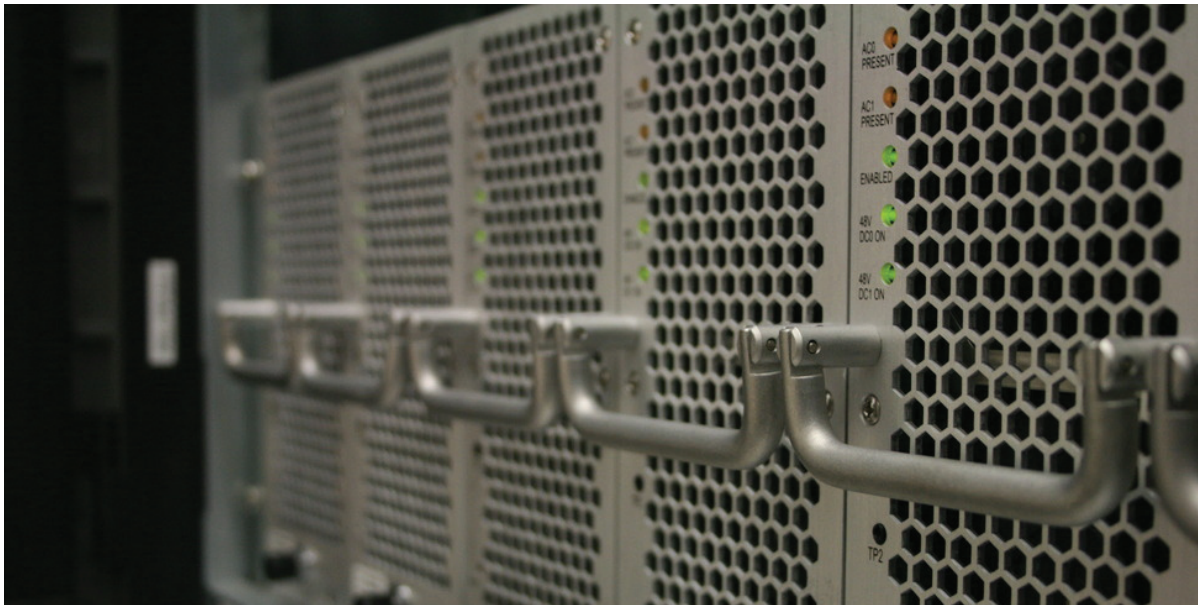
Prior to obtaining their new supercomputer, the national and regional government officials relied heavily on the HP team's supercomputing knowledge and professional advice as they collated information about different supercomputing systems. This guidance helped the project's decision makers to specify the hardware required to deliver the supercomputing services demanded by scientists and companies.

"We selected HP as our supercomputer provider because it offered a very powerful technical solution balanced by valuable technical and human support," continues González-Sánchez. "Our decision was especially influenced by HP's Superdome model which behaves well when faced with complex problems. With 256 processors and 2TB of main memory, we can tackle projects with massive computing requirements. Other important factors were HP's rigorous, large capacity backup and storage system and knowing that we could rely on the technical team to help us setup and use our supercomputer."

Massive computing power and storage capacity

The HP Supercomputing solution comprises two shared-memory HP Integrity SX2000 Superdomes with 10 GB connectivity supported by four HP Integrity rx2660 servers and four HP ProLiant DL380 rack-mounted servers, all operating in a powerful SUSE Linux Enterprise Server (SLES) environment. Two HP ProLiant DL380 servers support any Windows-based applications. The HP Superdomes offer CénitS high virtualisation and availability levels as well as scalability for future business growth.

Two HP StorageWorks 8100 Enterprise Virtual Arrays 8100 (EVA), eight HP StorageWorks Modular Smart Array (MSA) 50 devices and an HP StorageWorks Enterprise Modular Library (EML) E-series 245e Tape Library provide CénitS reliable, high-performance



storage and backup facilities, safeguarding mission-critical data. To cope with the massive volumes of data generated by the type of research CénitS conducts each of the EVAs have a storage capacity of 132TB whilst the MSA devices and tape library offer capacities of 1.46TB and 392TB respectively.

To help CénitS maintain Lusitania, HP provides two dedicated project staff, a Linux technical specialist and a support engineer. The HP High Performance Computing centre will offer additional support including technical consultancy.

New research projects boost esteem

CénitS operates a modern high-performance computing facility for a variety of mission-critical projects that support several customers' scientific research requirements. The Lusitania supercomputer allows CénitS to perform highly intensive mathematical tasks for customers who need to resolve complex problems. Research and commercial organisations requiring climate research, molecular modelling, physical simulations and weather forecasting are typical prospects.

"Organisations using our new facility include the University of Extremadura, the Energy, Environmental and Technological Research Centre (CIEMAT), the University of Seville and the University of Madrid," says González-Sánchez.

Customer solution at a glance:

Primary applications

- Supercomputing

Primary hardware

- 2 x HP Integrity Superdome SX2000
- 4 x HP Integrity rx2660 servers
- 6 x HP ProLiant DL380 G5 servers
- 2 x HP StorageWorks 8100 Enterprise Virtual Arrays (EVA)
- 1 x HP StorageWorks Enterprise Modular Library (EML) E-series 245e Tape Library
- 8 x HP StorageWorks Modular Smart Array (MSA) 50
- 2 x HP StorageWorks 8/40 SAN Switches

Primary software

- Linux SLES 10 operating system
- Linux SLES 9 operating system
- Windows Server 2003 operating system

The University of Extremadura has used Lusitania for three-dimensional modelling to assess human memory and rejuvenation processes whilst CIEMAT has commissioned work to design a particle accelerator to support Spain's Fusion Technology Programme. Other important research conducted at CénitS includes whole atmosphere climate modelling for the University of Madrid and neutron dose calculations for radiotherapy patients for the University of Seville. Organisations interested in industrial design and biological and earth sciences have also used the facility.

CénitS's esteem for supercomputing continues to grow and it is undoubtedly starting to make a valuable contribution to the region's economy. The establishment has created eight new research positions and its activities have generated several indirect jobs.

"We will continue to rely on the HP Supercomputing solution to support a wide variety of complex social, environmental and scientific improvement projects for the Extremadura region. This solution helped the foundation win the Itanium Solutions Humanitarian Impact Innovation Award," states González-Sánchez. "Moreover, we have also been nominated as a finalist in the Computationally Intensive Applications category and we will hear the results at the Itanium Innovation Awards Celebration in San Francisco later this year."

For the Itanium Solutions Humanitarian Impact Innovation Award, the foundation submitted a distinct solution to tackle a massive electromagnetic computational problem for the automotive industry. Lusitania solved the leading-edge problem, which involved over 620 unknown parameters, in less than 20 hours.

"We are very pleased receive the Itanium Innovation Award for Humanitarian Impact. Our Itanium-based supercomputing centre has helped researchers obtain results quicker than they could have imagined, making it possible to effectively develop innovative solutions to Spain's current social, environmental, and scientific challenges," concludes Gonzalez-Sanchez.

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