

# Grids to aid breast cancer diagnosis and research

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The MammoGrid project is studying the commercial possibilities for its distributed computing environment that employs existing Grid technologies for the creation of a European database of mammogram data. By using Grid computing, the system allows hospitals, healthcare workers and researchers to share data and resources. It supports effective co-working, such as obtaining second opinions that reduce the risk of misdiagnosis, and opens the door to powerful statistical analysis of the incidence and forms of breast cancer to assist future research.

"Breast cancer is one of many diseases that is complicated to diagnose and for which Grid computing will prove to be a very valuable tool," says Jean-Marie Le Goff, head of the Technology Transfer Service at CERN.

Breast cancer screening procedures suffer from several complications including the physical differences between the breasts of different women, the different procedures and equipment used to obtain mammography images, and the large amount of image data produced that makes computer-aided diagnosis (CAD) processing intensive.

These problems have contributed to the relatively high error rate of breast cancer screening procedures. It is estimated that around 30 per cent of mammograms result in either false positive diagnoses, whereby women are falsely diagnosed with breast cancer leading to unnecessary and painful biopsy, or, more seriously, in false negative diagnoses that lead to tumours going undetected.

With one in eight women developing breast cancer at some point in their lives and one in 28 dying from it, the importance of improving screening procedures and ensuring accurate diagnosis is evident.

By giving healthcare professionals the ability to use Grid computing to efficiently share data and resources their ability to accurately diagnose breast cancer is greatly enhanced. "A doctor in a small village, for example, probably doesn't have access to powerful tools but with Grid computing he can provide the patient with an analysis from a hospital online. Also if cancer is detected the doctor would be able to monitor data from mammography exams taken over the course of months to determine the patient's response to treatment," notes Le Goff.

The interconnectivity the system provides between different hospitals and medical centres makes obtaining a second opinion simpler and faster, opening the door to tele-diagnosis and the creation of communities of medical 'virtual organisations' able to co-work using the shared resources of the Grid. Analysis of mammograms can be carried out in different locations using CAD tools, for example.

The resource-boosting properties of Grid computing are particularly important for creating a European distributed mammography database that would give healthcare professionals access to millions of mammography images to assist diagnosis and research.

Such a database would not only improve diagnosis through enhancing comparative analysis with other breast cancer cases, but would provide important statistical information about the epidemiology of the disease.

The project developed a proof-of-concept demonstrator to test their Grid architecture that so far allows access to 30,000 mammogram images. Grid boxes were set up and used by clinicians at hospitals in Cambridge in the United Kingdom and at Udine in Italy as well as by

researchers at Oxford University with CERN acting as the central node.

The project's success has led to interest from outside companies, with one Spanish firm, Helide, looking to deploy a commercial variant of the system in the region of Extremadura within a year.

"Helide is aiming to have a number of Grid boxes throughout the region that will enhance the ability of doctors to verify test results and obtain a second opinion and use of the clinical experience acquired by the Hospitals involved in the project. They then aim to scale it up in terms of what the system can do and the geographical area where it is used, expanding it to other areas of Spain and then Europe," Le Goff says.

Source: [IST Results](#)

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