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Usage of ALICE Grid middleware for medical applications

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Breast cancer screening programs require managing and accessing a huge amount of data, intrinsically distributed, as they are collected in different Hospitals. The development of an application based on Computer Assisted Detection algorithms for the analysis of digitised mammograms in a distributed environment is a typical GRID use case. In particular, AliEn (ALICE Environment) services, whose development was carried on by the ALICE Collaboration, were used to configure a dedicated Virtual Organisation; a PERL-based interface to AliEn commands allows the registration of new patients and mammograms in the AliEn Data Catalogue as well as queries to retrieve images associated to selected patients. The analysis of selected mammograms can be performed interactively, making use of PROOF services, or taking advantage of the AliEn capabilities to generate “sub-jobs”; each of them analyzes the fraction of the selected sample stored on a site, and the results are merged. All the required functionality is available: by the end of 2004 a working prototype is foreseen, with an AliEn Client installed in each of the Hospitals participating to the INFN-funded MAGIC-5 project.

The same approach will be applied in the near future in two other application areas:

- Lung cancer screening, equivalent to the mammographic screening from the middleware point of view, where Computer Assisted Detection algorithms are being developed;
- Diagnosis of the Alzheimer disease, where the application is intrinsically distributed: it should, in fact, compare the PET-generated image to a set of reference images which are scattered on many sites and merge the results.

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