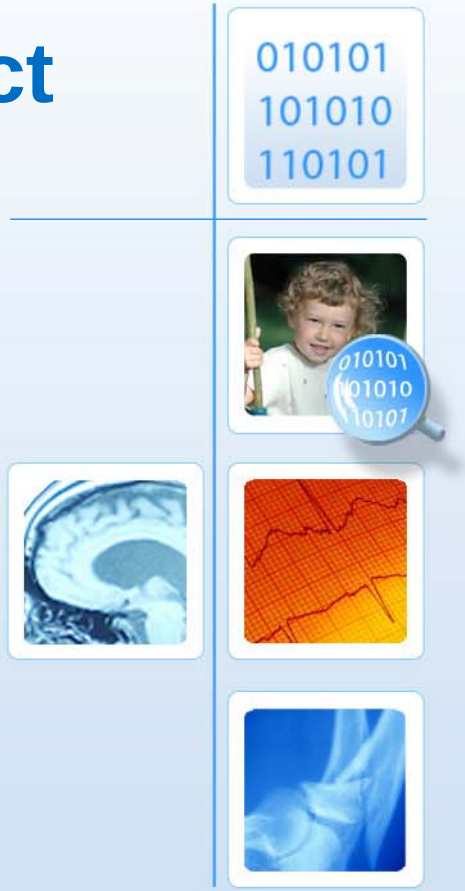
Health-e-Child

The Health-e-Child Project



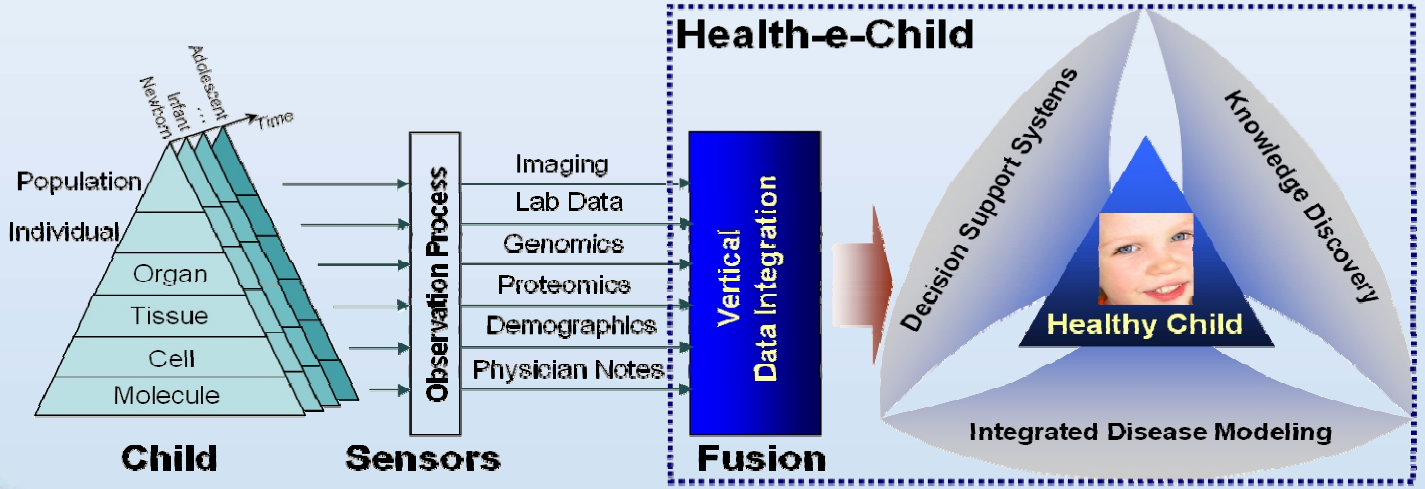
EGEE 2006 – Industry Task Force

David Manset

MAAT GKnowledge

Project Objectives

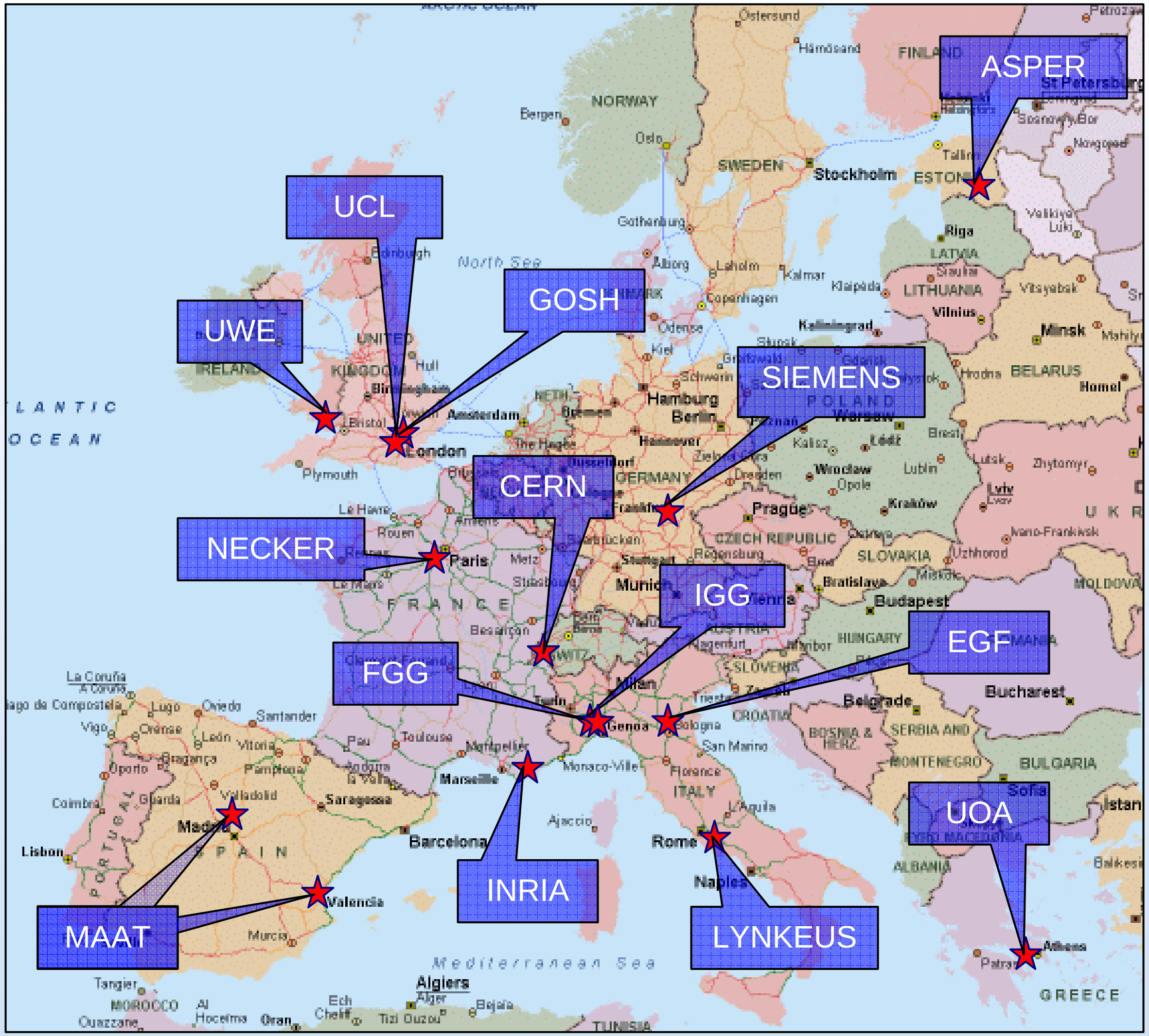
- Establish Horizontal and Vertical integration of data, information and knowledge for Paediatrics
- Develop a grid-based biomedical information platform, supported by sophisticated and robust search, optimisation, and matching techniques for heterogeneous information,
- Build enabling tools and services that improve the quality of care and reduce its cost by increasing efficiency
  - Integrated disease models exploiting all available information levels
  - Database-guided decision support systems
  - Large-scale, cross-modality information fusion and data mining for knowledge discovery
- A Knowledge Repository for Paediatrics?



Project General Info

- Instrument: Integrated Project (IP) of the Framework Program FP6
- Project Identifier: IST-2004-027749
- Coordinator: Siemens AG, Dr. Jörg Freund
- Partner: 14 European (companies, hospitals, institutions)
- Timetable: 01-Jan-06 to 31-Dec-09 (4 years)
- Total cost: 16.7 Mio. €
- EC funding: 12.2 Mio. €
- Web page: http://www.Health-e-Child.org

Project Map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Clinical Context

- **Diseases**
  - Heart diseases (Right Ventricle Overload, Cardiomyopathy),
  - Inflammatory diseases (Juvenile Idiopathic Arthritis), and
  - Brain tumours (Gliomas)

- **Clinical Institutions**
  - I.R.C.C.S. Giannina Gaslini (IGG), Genoa, Italy
  - University College London, Great Ormond Street Children's Hospital (GOSH), London, UK
  - Assistance Publique Hopitaux de Paris – NECKER, Paris, France

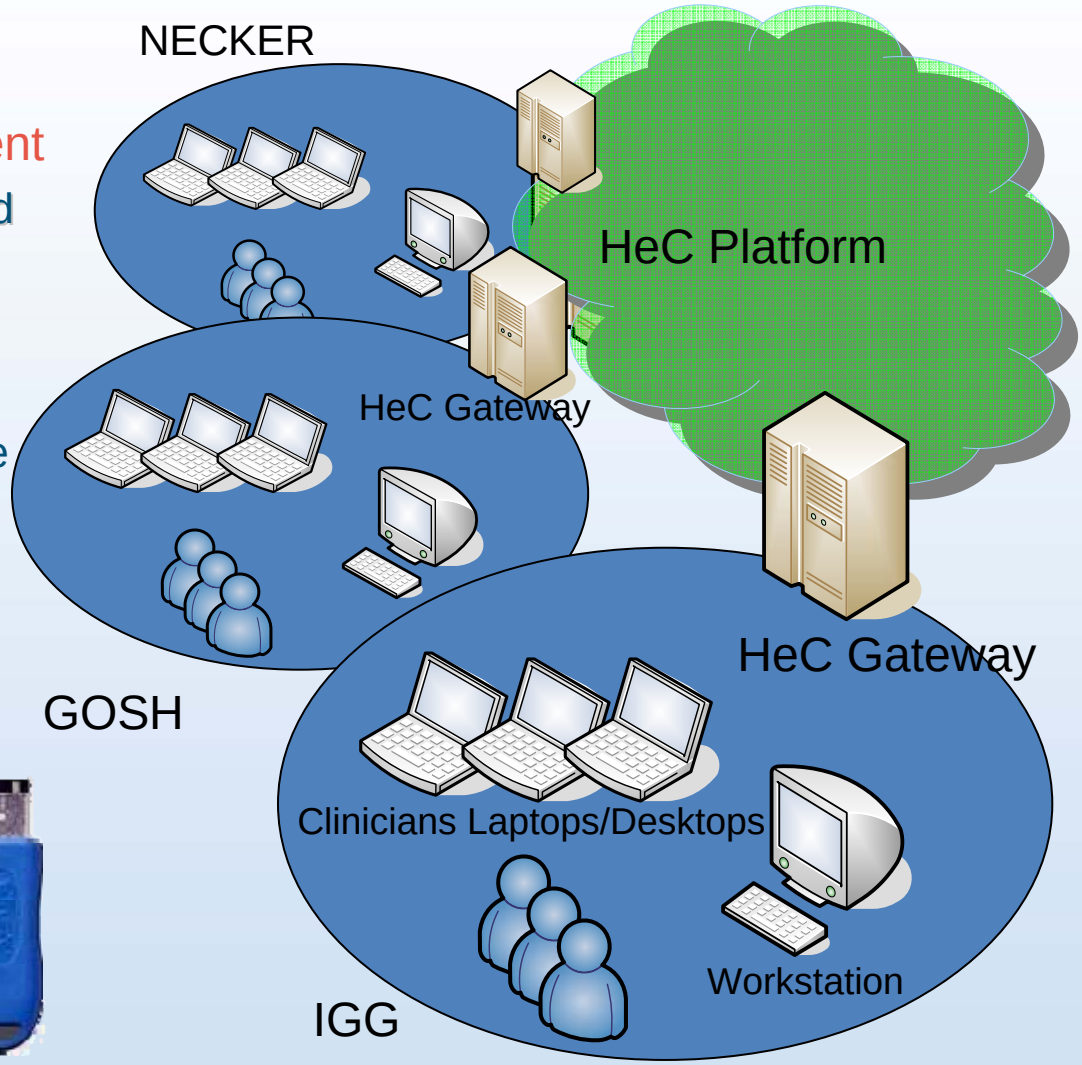
- **Clinical Departments**
  - Cardiology
  - Rheumatology
  - (Neuro-)Oncology
  - Radiology
  - Lab (Genetics, Proteomics, Lab)
  - Administration

Clinical Data Integration

- Heterogeneous Data/Imaging Sources
  - Database Backends: from simple MS ACCESS to complex Patient Information Systems like TOMCAT, RIS …
  - No or few linkage bw department's IS
  - Various imaging modalities
    - **i.e. MRI, CT, US, X-Ray…**
  - Various imaging devices
    - **i.e. Siemens Bi-Plan, GE Vivid7, Sequoia, HP128…**
- Heterogeneous Connectivity
  - PACS not yet present in all Hospitals/Departments
  - Hospitals have different Hardware/Network/Security constraints
- Acquisition of large samples of Imaging data
  - 3 diseases X 300 cases X 2 modalities X 300 images
    - **i.e. at most 540000 images**

Approach (1)

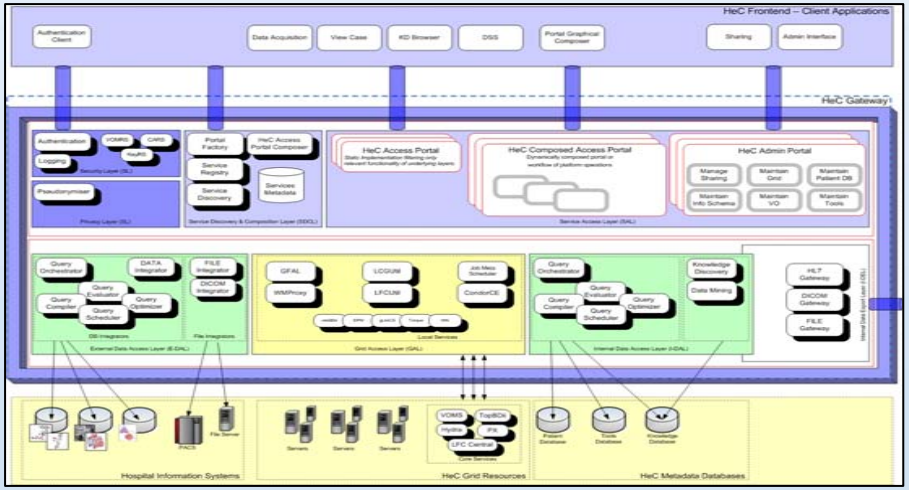
- One server per Hospital
  - Single entry point to HeC Platform
- One workstation per Department
  - For complex tasks a dedicated user interface is used
- Generic computers on Intranet
  - Most functionalities accessible from generic web browsers



Clinician's Identity + Portable Applications

Approach (2)

- An Domain Specific Stack of Services: the **HeC Gateway**
  - To decouple client applications from the complexity of the grid and other computing resources
  - Towards a platform independent implementation
  - To expose the medical functionality
- Grid primarily used as a “Distributed PACS”
  - Uses cases might evolve in the near future (especially with griddification of applications)
- A Dedicated Test-bed for Security & Privacy reasons



Early Faced Issues

Mainly Non-Functional since project has just started

- Selecting grid m/w services wrt project requirements
  - Lots of services/functionalities available
  - Different implementations with different levels of maturity

  => ***First cut based on URS + Grid Questionnaire***

- Clustering grid m/w services
  - To reduce the h/w requirements & maintenance (1 server / Hospital)
  - To facilitate deployment (3 clinical sites + at least 5 institutional sites)

  => ***"Xenification" of OSs + clustering services wrt functionality***

- Decentralisation of grid m/w services
  - Sites need to be as much as possible autonomous

  => ***Investigation of possible Master/Slave configurations***

- "Griddification" of Applications
  - Some of the HeC applications might be "griddified"

  => **Requires further investigations**

Conclusion (1)

Middleware Requirements

Non-functional Requirements (gLite)

- Hospital Sites should be autonomous
  - Sites should not depend on any central services
- Hardware requirements remain too high for Hospitals
  - Getting access to the grid through ***one box*** would be ideal
  - e.g. ***1 Server per Hospital***

Functional Requirements (gLite - HealthGrid)

- Pseudonymisation as a native middleware service?
- Native Streaming facilities for sharing large DICOM files
- [Native patient-centric data model(s)
  - (flexibility) Optionally data model could be selected from existing standards (e.g. HL7…) or even created from scratch
  - (interoperability) Optionally a native commodity for exporting/exposing data through different data models would be nice (model-driven)
  - (interoperability) Optionally a data model (schema) discovery mechanism could help
- Native connectors to external backends for batch data integration]

Conclusion (2)

1st Technical Accomplishments

- Establishment of a Common Development Environment
  - Indispensable to synchronise partners and leverage synergy
- Creation of the Health-e-Child Virtual Organisation (VO)
  - Establishment of the HeC Certificate Authority
  - HeC VO Structure in place, being tested
- 1st gLite Test-bed deployed in May 2006
  - ~20 computers involved
  - Being refined according to project requirements and extended to Hospitals
- 1st embryo HeC gateway
  - Authentication Client Application & Grid Service (VOMS enabled)
  - HeC Portal & Factory (exposing domain specific functionality)