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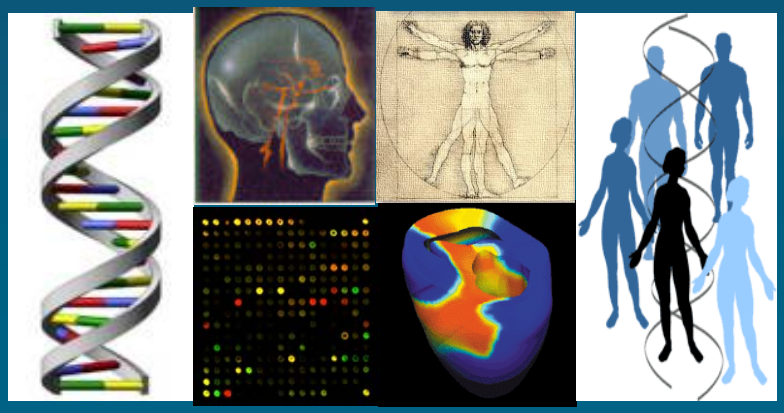
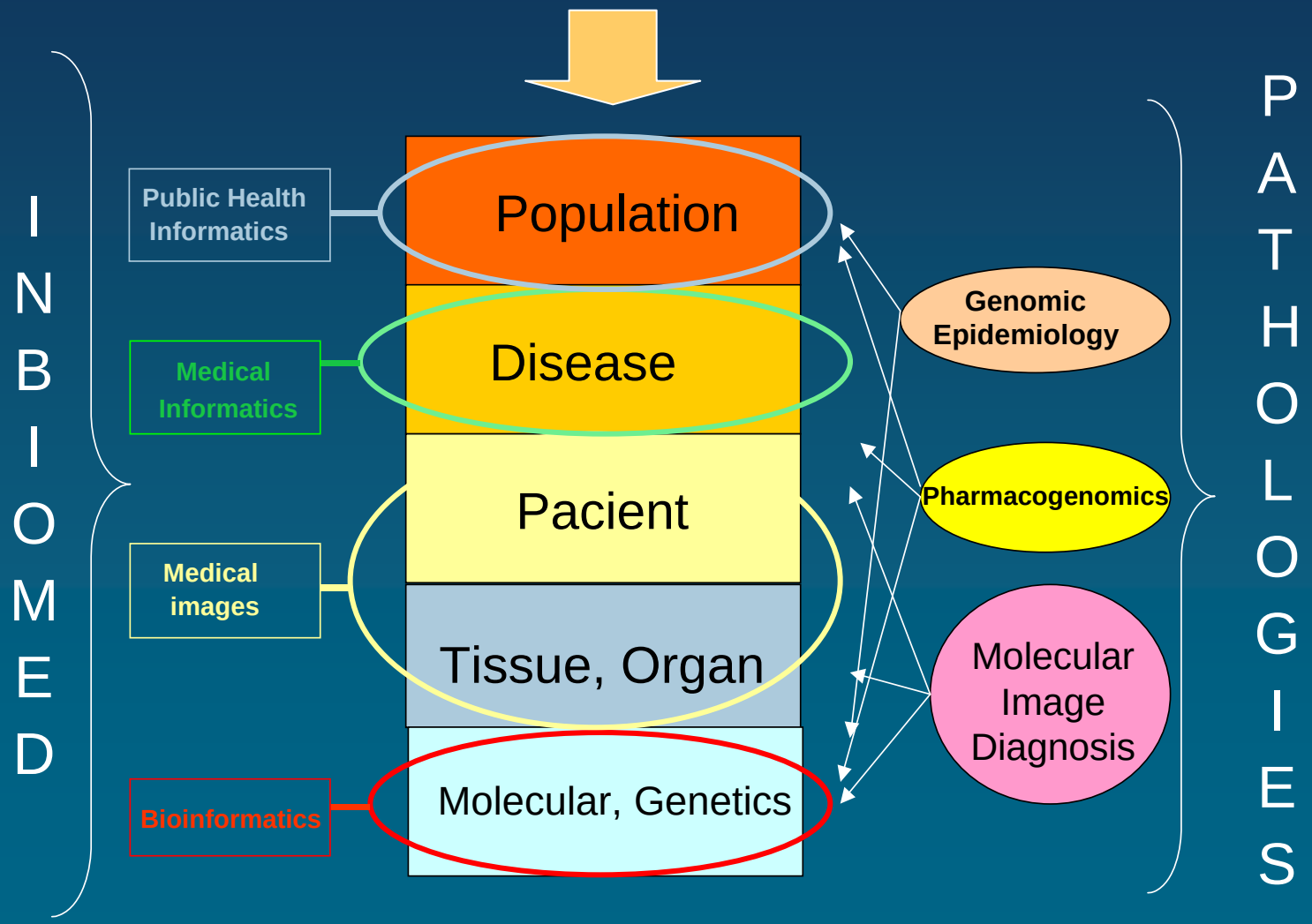
INBIOMED
The Spanish Cooperative Research Thematic Network on Biomedical Informatics



MEDINFO 2007, Brisbane, Australia

Integration of Health Information Levels



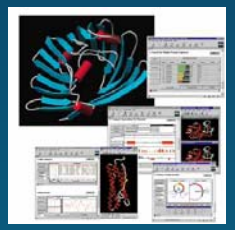
Genomic Medicine

Human Genetic Variation

Technologies | Data | Applications

Information

Clinical



Genomics

Genotypes

Haplotypes

Individual Genomics (SNPs and mutations)

Diagnosis

Pharmaco-genetics

BIOMEDICAL INFORMATICS

Genic Expression DNA arrays MS, 2D ef

Functional Genomics Proteomics

Pharmaco-Genomics Disease Reclassification

Molecular Causes of Diseases

Genomic Medicine

Individualized Medicine

Molecular Medicine

Preventive Medicine

ICT in Biomedical Research

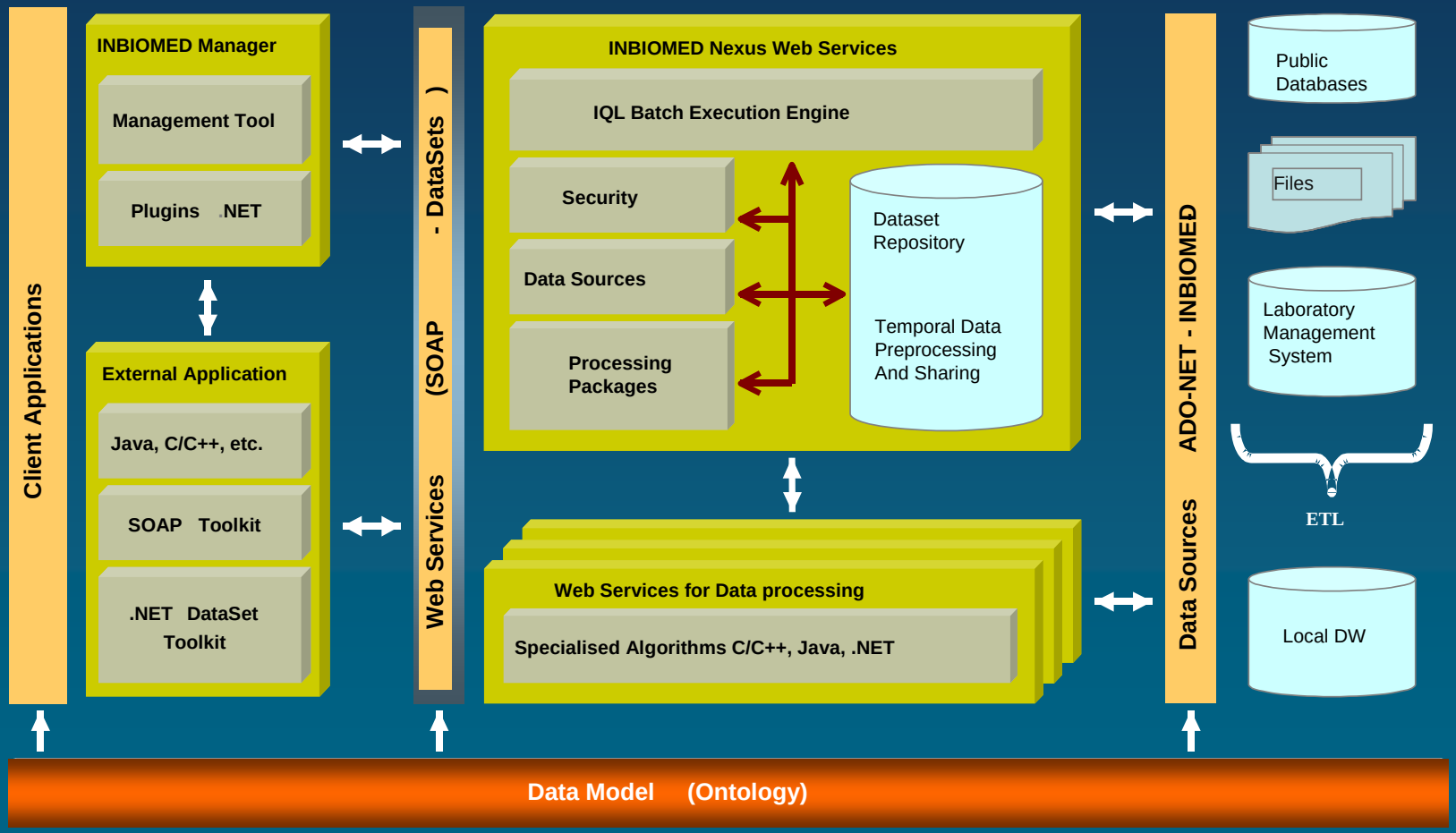
- ICT in Biomedical Research
  - tackles the acquisition, storage, integration and analysis of the biomedical data,
  - tries to provide models, methods and informatics tools
  - enables the integration of genetic, clinical and environmental factors
  - contributes to improve prevention, diagnosis and treatment of diseases in the future

INBIOMED: The Spanish Cooperative Research Thematic Network on Biomedical Informatics

http://www.inbiomed.retics.net

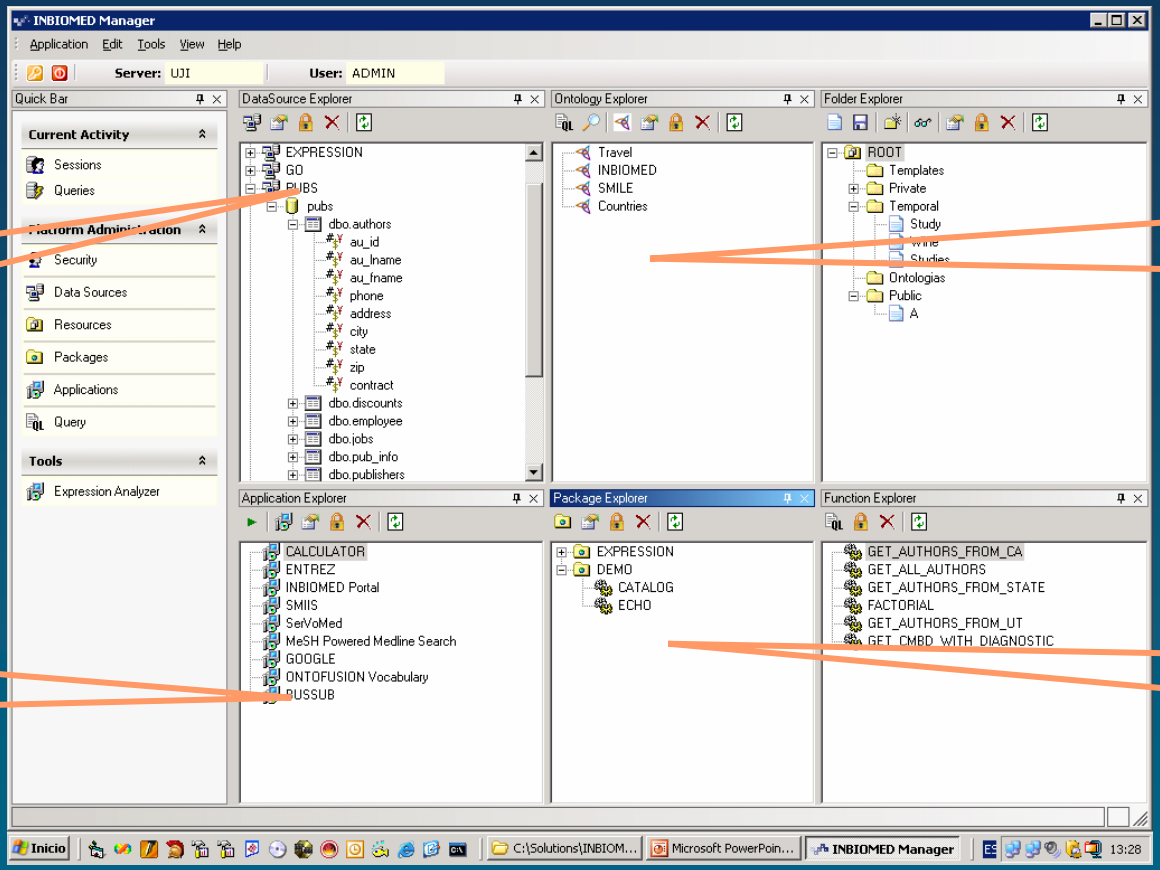
- 6 Autonomous Comunities
- 11 Centres
- 13 research groups
- +100 researchers
- Hospitals, Universities and Research Centres

Architecture of the INBIOMED Platform



INBIOMED Manager

Client Application that facilitates the management of the system, where several different relevant public databases have been integrated



Data Sources

Semantic Layer (Ontology)

Applications

Web Services

Tools

- OSIRIS: a tool for retrieving of articles from MEDLINE related to the sequence variants reported for a human gene.
- Blast2Go: a tool for annotating, visualizing and analysing data in functional genomics research.
- SOC: a distributed system for clinical decision making support.
- Tools for processing and filtering of images (DNA bands in gels, cell counting.)
- SIREN: a computerized system to make inquests in Genomic Epidemiology
- Seqpacker: tools for the analysis of nucleotide sequences.
- ZEHUTI: an algorithm to calculate the conceptual similarity between two texts by mean of the projection of concepts into an ontology.
- Bussub: a virtual amplicon retrieval software.
- DNASqueezer: a tool to compress DNA and RNA sequences.

Results

Cancer Epidemiology

INBIOMED Contribution:

- Data analysis: development of data mining techniques and comparison of different data mining strategies in data analysis.
- Image visualization and analysis: processing and storage of biomedical images.
- Information retrieval: automation and integration of heterogeneous clinical and pathologic information from hospital databases.
- SNP searching: automated search and selection of genetic polymorphisms and the use of OSIRIS to identify articles related to polymorphisms identified in genes of interest

Results

Pharmacogenetics in Neurology

INBIOMED Contribution:

- Image visualization and analysis: A Web format database to process, store and interchange images
- SNP searching area: automated identification of articles related to polymorphisms in genes of interest
- ZEHUTI algorithm: to classify basic and clinical scientific publications according to their conceptual similarities.
- Development of ontology based methods that could solve the problems associated with syntactic and semantics gaps across data sources.
- Development of algorithms to set genetic expression profiles applied on microarrays assays.
- Management of the Galician Computerized Biobank was improved to use its data and samples.

Results
Cardiovascular Epidemiology

INBIOMED Contribution:

- CITAGEST: an Informatics system to facilitate the efficient automatic recruitment and follow up of patients
- ALIGERA: a Tool for the management of biological samples
- Design of computerized questionnaires for the collection of epidemiologic data
- SIREN and VALFRECO: an informatics system for the automation and validation of information about food consumption and its conversion to nutrients.

- This area of interest also shared similar needs with the other “bio-users” groups like SNPs search, information retrieval and visualization and analysis of images.

Acknowledgments

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- Estruch A. and Heredia J. A. . Technological platform to aid the exchange of information and applications using web services. International Symposium Biological and Medical Data Analysis 2004, ISBN 3-540-23964-2, ISSN 0302-9743, Springer
[4] NET Framework Class Library. DataSet Class.

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