



From BIOPATTERN to Bioprofiling over Grid for eHealthcare

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BIOPATTERN – Grand Vision

- “To integrate co-operative research aimed at a pan-European approach to coherent and intelligent analysis of a citizen's *bioprofile*; to make the analysis of this *bioprofile* remotely accessible to patients and clinicians; and to exploit the *bioprofile* information to combat major disease classes”.
- Vision is long term, but it inspires short-term objectives.

Biopattern and Bioprofile – what are they?



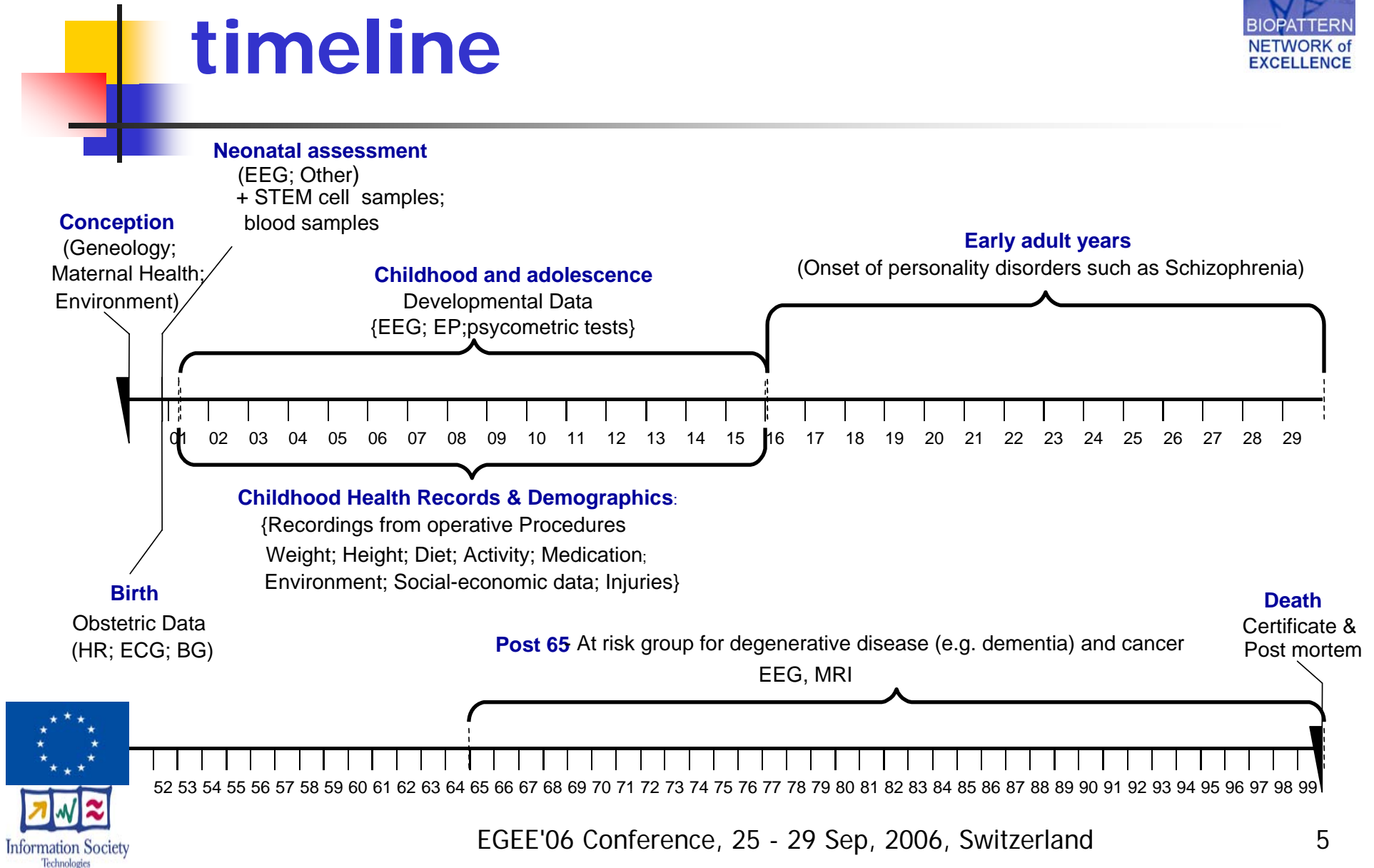
- *Biopattern* – basic information which provides clues about underlying clinical evidence for diagnosis and treatment.
 - A snapshot which includes features derived from data (e.g. genomics, EEG, ECG, imaging etc);
 - Often used for diagnosis and short-term patient monitoring.
- *Bioprofile* – personal “fingerprint” that combines a person’s bio-history and future prognosis.
 - Combines data, biopatterns, analysis and predictions of future or likely susceptibility to diseases;
 - Should drive personalised and better healthcare.



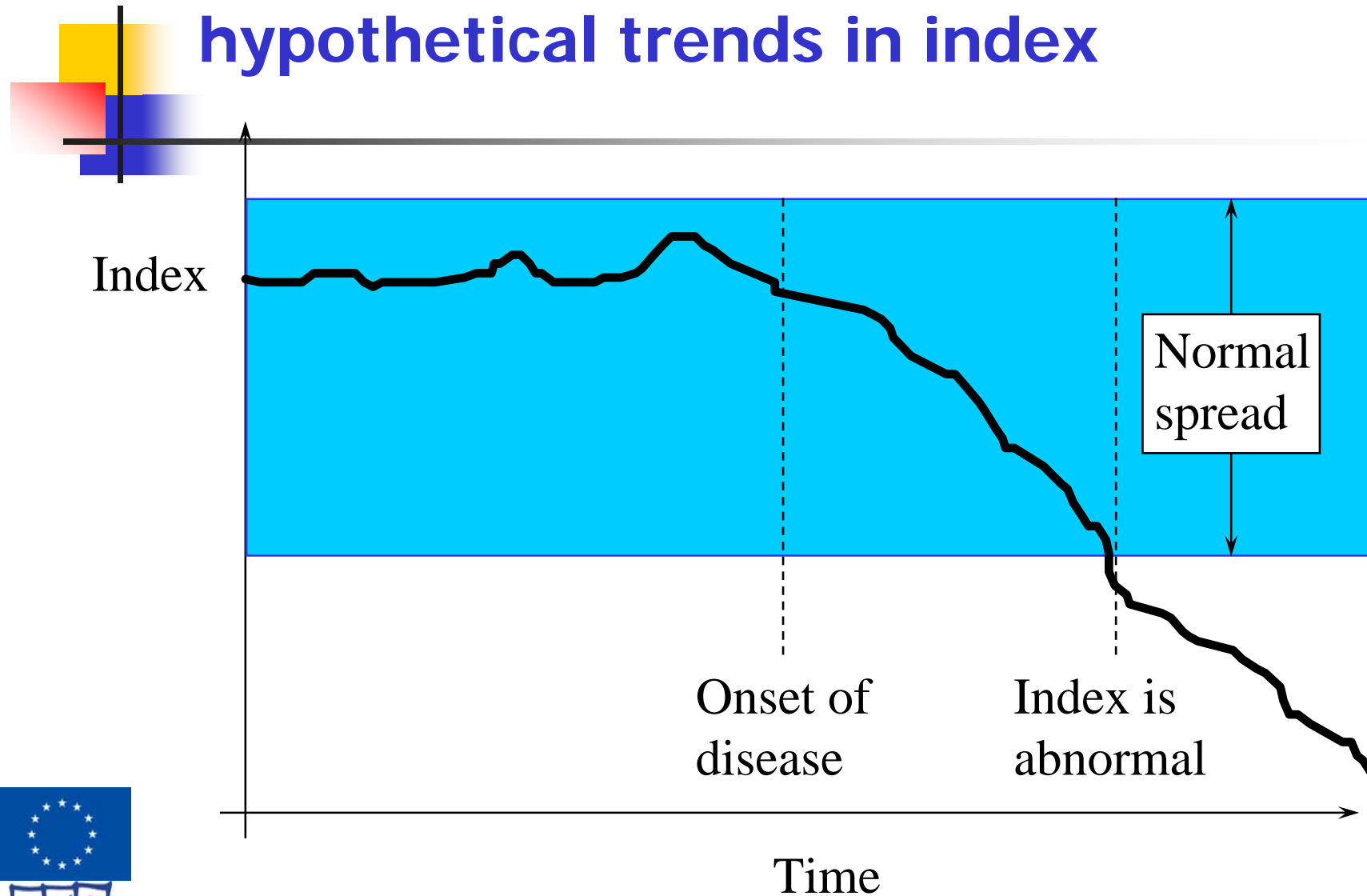
Some of the key areas in BIOPATTERN

- Bioprofiling for early detection and care for Alzheimer's disease.
- Early Life – fetal and neonatal bioprofiling assessing adverse events and their impact.
- Personalised care for breast cancer
- Personalised care for Leukaemia (in collaboration with GEMIMA Project)
- Personalised care for brain tumour (in collaboration with eTumour project).

Concepts of bioprofiling – timeline

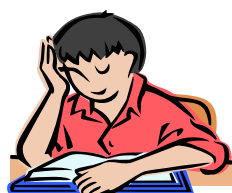


Subject-specific bioprofile analysis – hypothetical trends in index

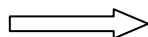


Why over Grid?

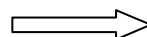
- Conceptually, our interest is in “bioprofiling from birth to death”
- Bioprofiling databases are geographically distributed.
 - Mobility of a citizen (e.g. Mike’s life journey)
 - Databases may be located at different countries/centres.
 - Collaboration and cooperation with partners across the EU, need sharing of resources (e.g. expertise, data and software/ algorithms).



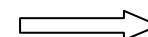
France
(0-20 yrs)



U.K.
(20-40 yrs)



Italy
(40-60 yrs)



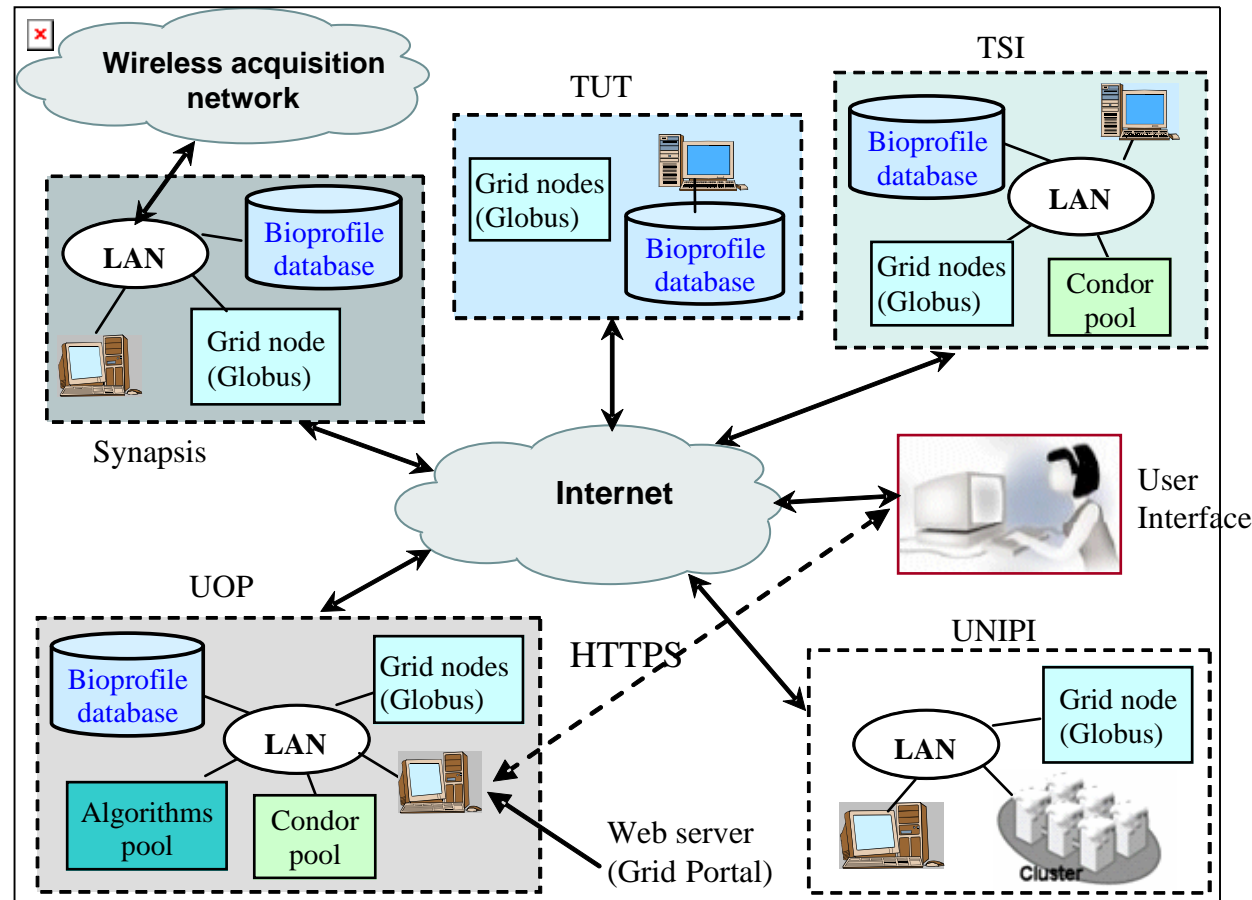
Germany
(60- yrs)

Mike’s life journey

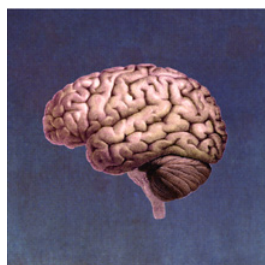
Why over Grid? (cont.)

- Bioprofiling databases are huge and dynamic.
 - E.g. serial MRI, EEG, genomics, etc.
 - Regular update of data
- Online access to computational intelligent methods are needed to process and analyse data at anytime and from anywhere
- Intelligent analysis is computational intensive
 - Processing, analysis and interpretation of multi-model biomedical data
 - Visualisation of large biomedical data sets
 - Integration and fusion of data

BIOPATTERN Grid prototype



An illustrative example - bioprofiling over Grid for dementia



Dementia is a progressive, age-related neurodegenerative disorder associated with cognitive decline and aging.

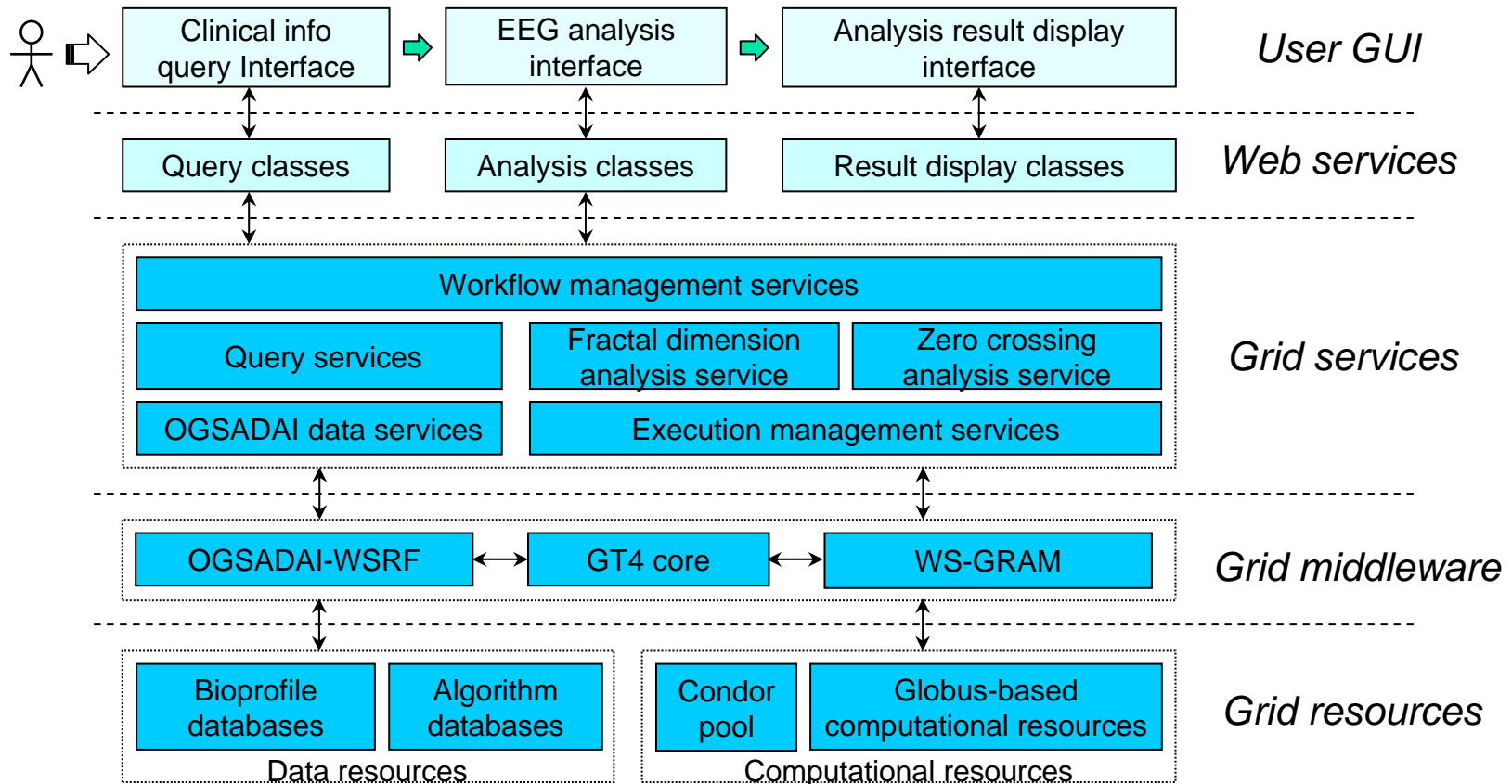
It is common in the elderly.
10% of persons over age 65
and up to 50% over age 85
have dementia.



BIOPATTERN Grid services for dementia



EEG analysis for early detection of dementia



Data integration issues in BIOPATTERN



- Bioprofile databases are huge, dynamic and geographically distributed.
- Data models - to describe and handle different data structures
- Knowledge models and infrastructure - to support data analysis, interpretation and integration of information from multimodal data and knowledge.
- Privacy, security and QoS issues