KEO: a component based programming environment for earth observation image archives

ESA-EUSC 2006: Image Information Mining for Security and Intelligence

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The vision

“The information extraction process must be replaced by more automated, direct and human centred methods”
Key Concepts

• Modularity/Scalability
  – Service Based
• Human Centred
• Reduced time to market
• Interoperability
  – Open Standards

Component Based Programming Environment
The data flow
Components

**Inlets**
- Internal (Reference Dataset)
- External (adapters)

**Dataflow designer and processor**
- PIM components
- Feature Extraction

**Outlets**
- OGC Servers (WMS, WFS, WCS)
- FTP
Reference Dataset Handler
Processing Components

• From the external interface point of view:
  - CLI (Command Line Interface)
  - Web Services (adhering the ICD)
  - Internal Components

• From the methodology point of view
  - Probabilistic (kim like)
  - Specific Feature Extraction Modules

• From the interaction point of view
  - Unattended
  - Interactive
Role of the knowledgebase

• Browse and Search the Knowledgebase to find products and services. We will provide two interfaces:
  – Browser based
  – Java component to be embedded in applications

• The user shall be able to add tags/labels/categories to items found on these catalogues

• Automated applications shall also be able to add tags/labels/categories to items on these catalogues
Service Output

• Different “outlets” will be provided:
  – OGC servers
    • WMS (maps)
    • WFS (geometrical features)
    • WCS (coverage offering)
  – FTP (for the on-demand services)
WFS output in SSE
WFS & WMS output in SSE
PIM Batch output in SSE
Semantic Catalogues

• Using KIM and the new KAOS interface, it’s easy to add semantic capabilities to the catalogues

• Following video shows an example on MERIS
SSE Search: Land
SSE Present: Land
SSE Search: Sea
SSE Present: Sea
SSE Present: Clouds
Feature Label Designer
KEO Phase 1 - Lessons learnt

• Component Based Programming Environment
  - New capabilities adding new Web Services
  - Independence from services implementation
    • Java, .Net, BPEL, …
  - Independence from services location
    • KB Service running at GTD premises (Barcellona)
  - One-size-fits-all: from small service providers up to ESA
KEO Phase 1 - Lesson Learnt

• Carefully designed network infrastructure for services dealing with huge data I/O
• Automatic image registration necessary to Data Fusion
The running KES:

• KES installation at ESA:
  – http://kes.esa.int/kes