Network 3.6

Future Astronomical Software Environments for data analysis and processing

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OPTICON Board meeting
Porto, 2008-11-11/P2D

Outline

- Objectives and management
- Progress and Achievements
- Deliveries and Plans

Issues and Objectives

- Network on Future Astronomical Software Environments
- Main issues
  - Many legacy systems available but
    - Not compatible, system specific control languages
    - Offer specific set of packages, often domain specific
    - Not scalable, aimed at single CPU systems
    - Limited support and maintenance
- General objectives
  - Establish high-level requirements
  - Outline software architectural concept
  - Sketch minimum software interface specifications required
  - Emphasis on processing and analysis of data
- Build broad consensus on concept and interfaces

Management

- Management of Network
  - Participants:
    - Regular members: major organizations and systems in Europe
    - Associated members: links to USA, Australia, Japan
  - Monthly phone meetings with minutes
  - Typically 2 face-to-face meetings per year
  - Twiki based Web site at ESO
    - http://archive.eso.org/opticon/twiki/bin/view/Main/WebHome
    - Minutes of meetings
    - Documents and publications
    - Discussions
  - E-mail lists for discussions
  - Presentations and posters at meeting
    - ADASS: posters and BoF sessions
    - IAU meeting in Prague: poster
- Man-power support from Euro-VO
  - Prototype developments in Milan and Marseilles

Deliverables

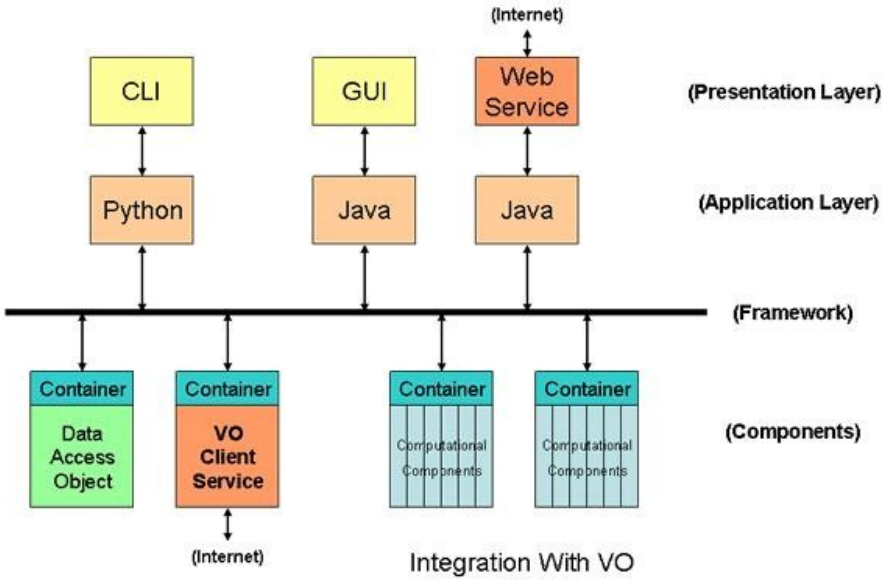
- High-level requirements
  - General needs for analysis of astronomical data
    - Instrument specific pipelines were not considered
  - Global properties of environment
  - Template requirements for specific environment
- Architectural concept
  - Overall structure of environment
  - Support for all main requirements
  - Generic concept which can evolve in time
- Detailed design with outline of interfaces
  - List major components of environments
  - Outline their interactions
  - Sketch all interfaces required

Results (I)

- High-level requirements
  - Draft document with 200+ ranked requirements (2006Q2)
  - Widely discussed and approved (both in USA and Europe)
  - Final version to be released (2008Q1)
- High lights of main requirements
  - Easy to use on desktops (i.e. for individual astronomers)
  - Based on open standards, open source, license free
  - Powerful scripting language (e.g. Python)
  - Simple but extensible to provide scalability (e.g. on clusters)
  - Provide easy interface for development of new tasks
  - Access to important legacy applications

Results (2)

- Architectural concept
  - Draft of concept document available on Twiki
    - Final review 2008Q4
  - General consensus on concept, emphasizing
    - Three level architecture
    - Scalability and modularity using distributed object software bus
    - Flexible access to VO services and legacy applications
    - Separation of astronomical tasks and IT



Results (3)

- Detailed design with outline of interfaces
  - Draft document available on Twiki
    - Review ongoing – final version 2008Q4
  - Major components of environment
    - Script level applications
    - Package manager
    - Distributed virtual machine
    - Tools and tasks
  - Major interfaces
    - Parameter parsing
    - Messaging
    - Data access
    - Package meta-data
    - Task life-cycle

Final FP6 activities

- Presentation at ADASS 2008
  - Poster on detailed design
  - BoF session - ~70 participants
- Face-to-face meeting Marseilles Dec. 11-12
  - Final review of documents to be delivered
  - Planning for FP7 activities
  - Collaboration with VAO (US)
- Final deliveries
  - High-level requirements
  - White paper with architectural concept
  - Detailed design document

Developments in North America

- AURA initiative
  - First meeting June 2008
    - Participation: NOAO, NRAO, NVO, STScI, Gemini, LSST, ...
    - Basic agreement with OPTICON N3.6 concept
      - D. Tody in both groups
    - LSST pipeline interface
    - Integration of IRAF
    - White paper to be made
  - Second meeting Nov. 2008 (ADASS)
    - Short term plans
      - Better IRAF – Python interface (STScI)
    - Emphasize long term objectives
      - Close interaction with OPTICON Network

FP7 Objectives

- Develop detailed interface specification
  - Minimum set required for desktop usage
  - Compatible with Linux
  - Assume Python as scripting language
  - Java interface for VO access
  - C interface for tasks
- Verify interfaces
  - Reference implementation
    - Null implementation for software bus
    - Use XML for parameter parsing
    - Access to VO through Java
- Revision of interface specifications
  - Based on experience from reference implementation
  - EU – US agreement
  - Compatibility with legacy systems

FP7 plans and time-line

- Interface specifications v1.0
  - Close coordination with US
  - Draft available 2009Q3
- Reference implementation
  - Shared 50-50% with US
  - EU work by Milan and Marseilles
    - Start 2009Q1 – adaption of VO standards (e.g. SAMP)
    - Finish 2010Q2
- Revision of specifications
  - Draft by 2010Q2
  - Review end by 2010Q3
  - Delivery 2010Q4

Long term considerations

- Integration of legacy packages
  - Approach major legacy systems
    - IRAF, MIDAS, Gipsy, CPL, AIPS, CASA, ...
    - Special adaption to interfaces
- Approach major organizations
  - Ensure compatibility between their software products and standard environment
- Maintenance of standards
  - IVOA or IAU
- Support for reference implementation
  - Astrophysics Software Laboratory (EU)
  - VAO (US)