

vl·e



virtual laboratory for e-science

Problem Solving Environment (PSE) for Medical Image Analysis

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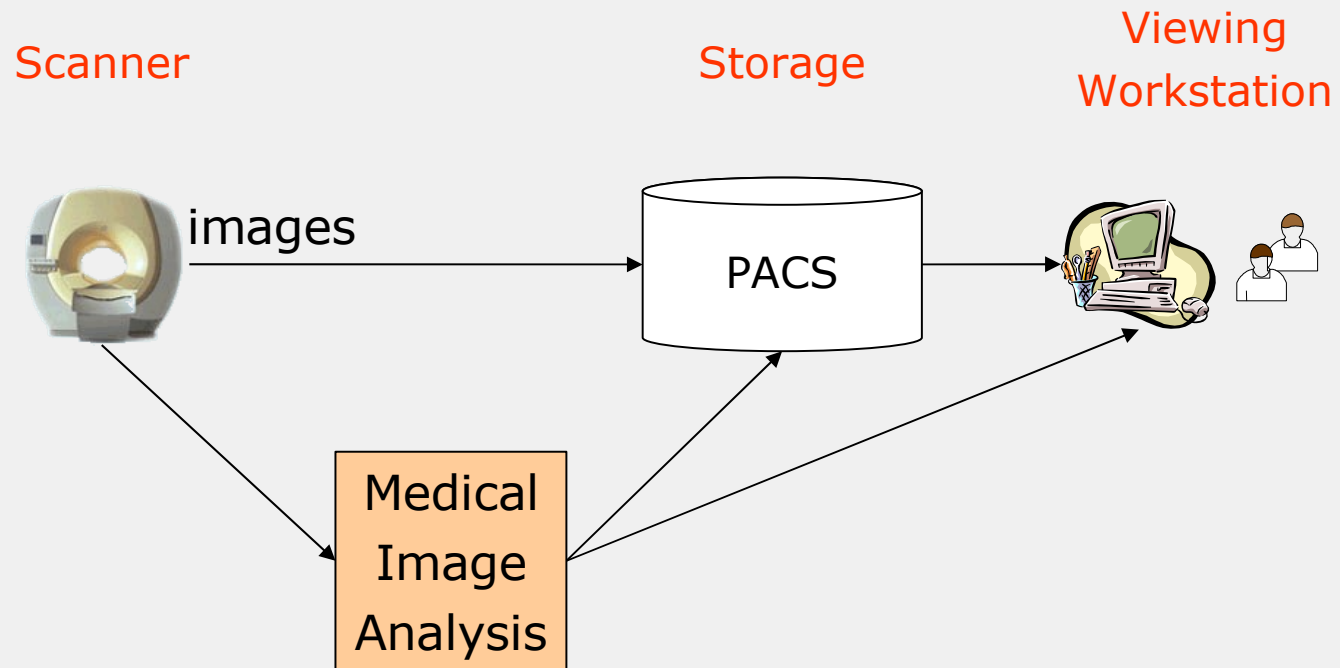


Overview

- Medical Image Analysis (MIA)
- MIA Support System (MIASS)
- Problem Definition
- Requirements
- Approach
- Current Activity



Medical Image Analysis(MIA)



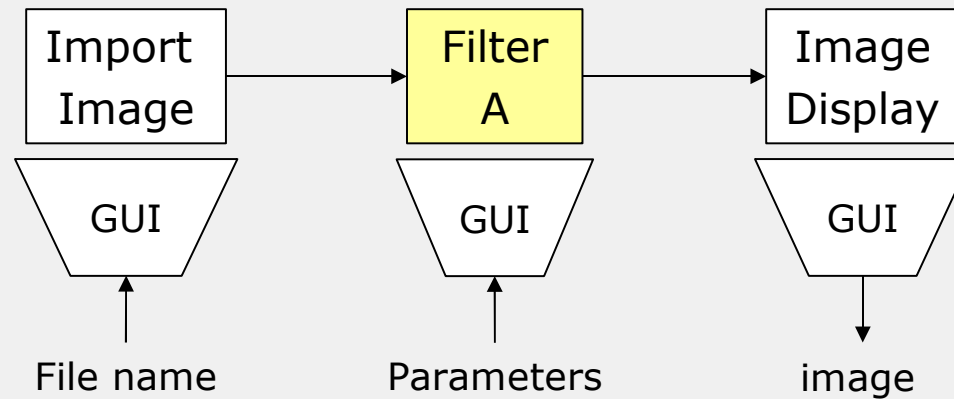
Source: S. Olabbarriaga, J.G. Snel, C.P. Botha, and R.G. Belleman. Integrated support for medical image analysis methods: from development to clinical application. To appear, Jan 2007, IEEE Trans. Information Technology in Biomedicine.

MIA Support System (MIASS)

- Phases
 - Development
 - Parameter Optimization & Evaluation
 - Clinical routine
- Users
 - Diverse, Different Goals
- Ideal

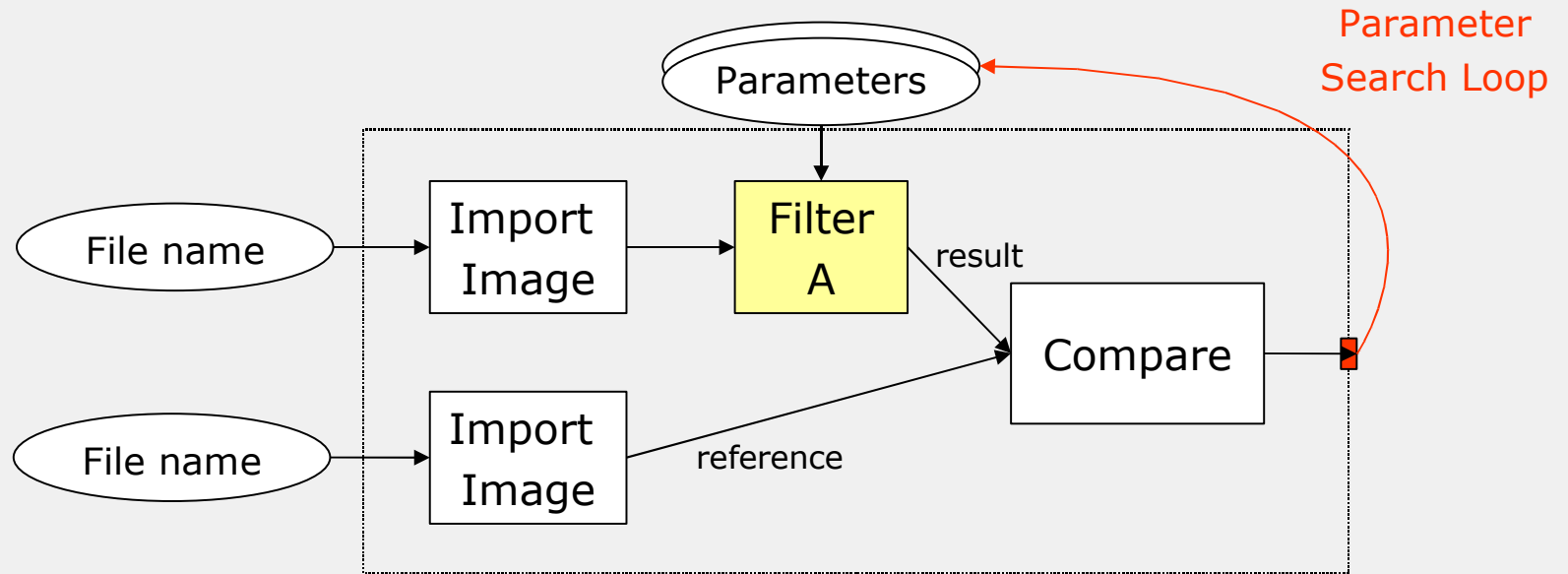


Development Phase



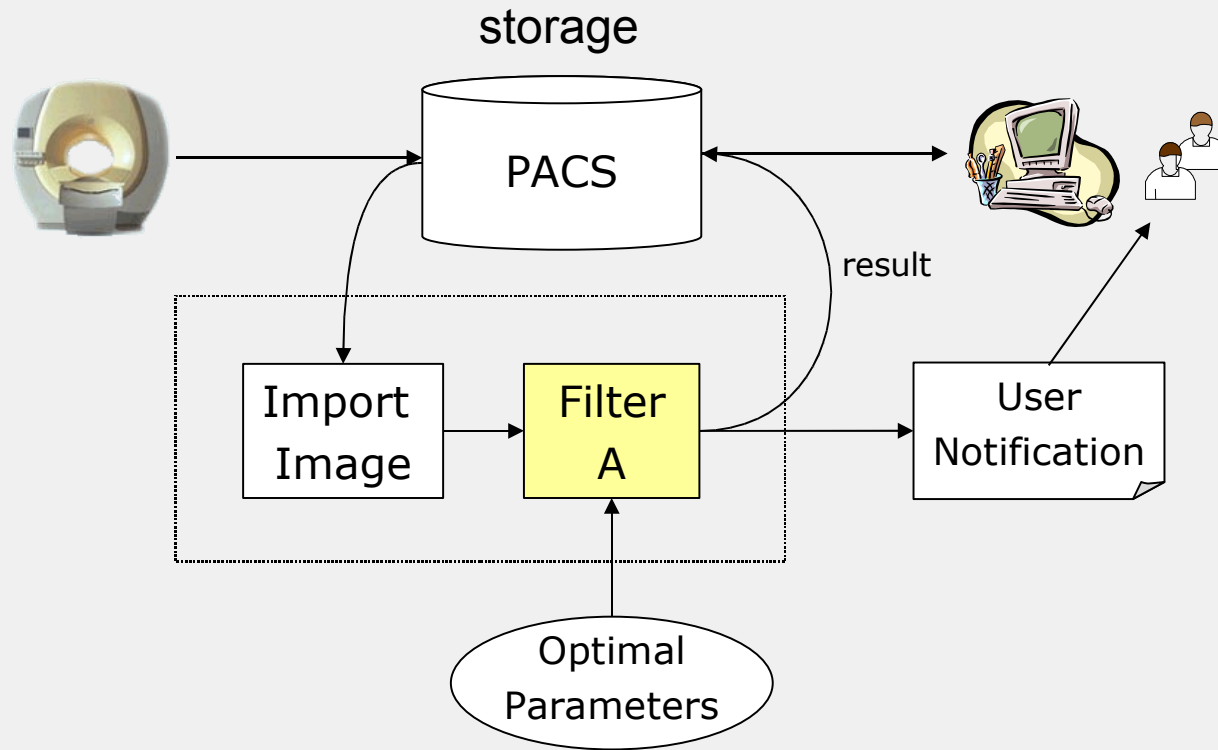
Source: S. Olabbarriaga, J.G. Snel, C.P. Botha, and R.G. Belleman. Integrated support for medical image analysis methods: from development to clinical application. To appear, Jan 2007, IEEE Trans. Information Technology in Biomedicine.

Parameter Evaluation



Source: S. Olabbarriaga, J.G. Snel, C.P. Botha, and R.G. Belleman. Integrated support for medical image analysis methods: from development to clinical application. To appear, Jan 2007, IEEE Trans. Information Technology in Biomedicine.

Integration into clinical Routine



Source: S. Olabbariaga, J.G. Snel, C.P. Botha, and R.G. Belleman. Integrated support for medical image analysis methods: from development to clinical application. To appear, Jan 2007, IEEE Trans. Information Technology in Biomedicine.

Problem Definition

“To propose, implement and evaluate an **architecture** for the realisation of the MIASS through the **integration** of **Workflow Management Systems (WfMS)** and **problem solving environments (PSE)**”



Requirements

User's Point of View

- User Interface
- User Notification
- Component Development
- Component Networking
- Collaborative
- Seamless & Platform Independent Execution



Requirements

System Engineering Point of View

- WfMS & PSE Standards and Interfaces
- Sustainable Architecture
- Fault Tolerance
- Cross Platform
- HPC



Approach

- Systems Available in VL-e
 - Nimrod, DeVIDE, DDWE, DWMS
- Workflow Bus
- Pilot Implementation and Evaluation



Systems

- **DeVIDE**
 - rapid prototyping, testing and deployment of visualisation and image processing algorithms
- **Nimrod**
 - Distributed parametric computing environment
- **AMC DWMS**
 - Workflow and logistics management system for clinical application
- **WS-VLAM**
 - SOA based workflow management system

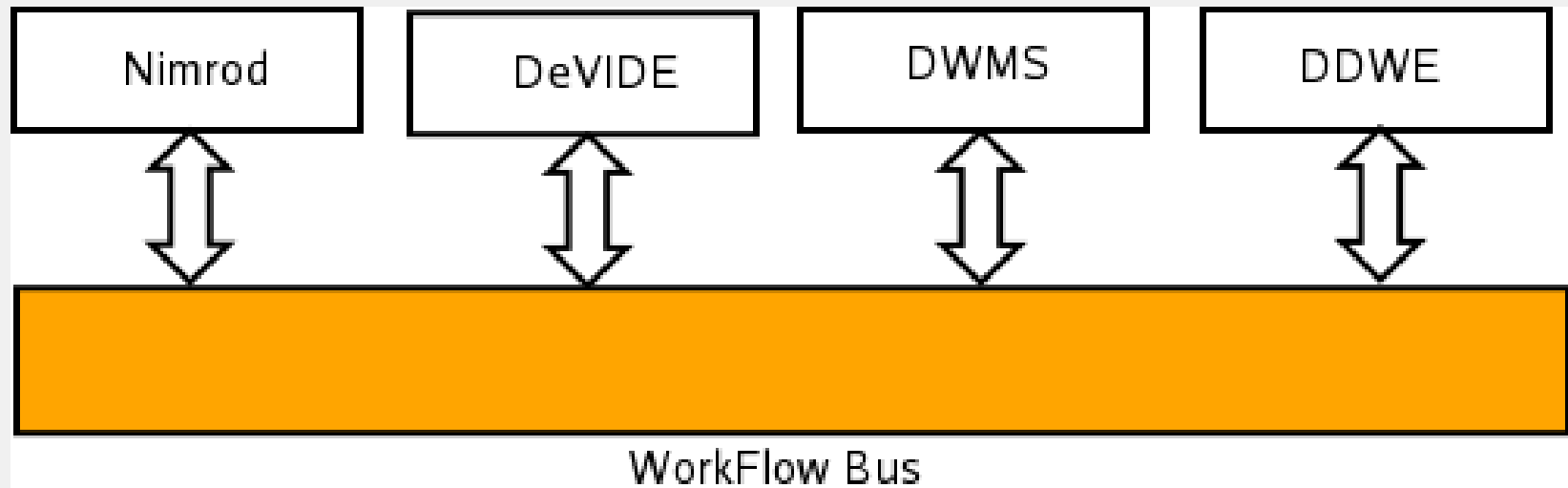


A Small Survey

<i>Requirement</i>	DeVIDE	Nimrod	AMC-DWMS	WS-VLAM
Graphical User Interface	+	+		
Component Networking	App	Param sweep	Clinical	Grid
HPC	-	+	+	+
User Notification	-	-	+	-
Provenance	-	-	+	
Fault Tolerance	+	+	+	
Platform	Linux,win	Linux,win	Linux,win	Linux,win



Workflow Bus



*A workflow bus is a **special workflow system** for executing meta workflows, in which sub workflows will be executed by different engines.*

Source: Z. Zhao et al., "Workflow bus for e-Science", submitted to IEEE e-Science 2006, Amsterdam

Current Activity

- Studying WfMS/PSE Standards and Interfaces
- Focusing on Nimrod and DeVIDE
 - Achieving Minimal Interoperability
 - Python Scripts?
- Service Oriented Architecture?



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Key References

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