MAPS: A flexible Laboratory Management System (LIMS) for R&D Labs

Dieter Kopecky[1], Otto Weichselbaum[2], Silvia Fluch[1]
[1]Austrian Research Centers GmbH - ARC, Department of Biogenetics/Natural Resources – PICME
[2] SEW Weichselbaum

Introduction

Finding and establishing a LIMS, which can be adapted to various and widely differing requirements at reasonable costs, is a major issue within many small-to-medium-size laboratories, especially those working in research. The need for a permanent adaptation to changing requirements in research contradicts the usually non-recurring tailoring of an off-the-shelf LIMS to lab requirements during product launch. *Maps™* (Material Administration and Preparation System) is a flexible and adaptable LIMS addressing various issues being related to this environment.

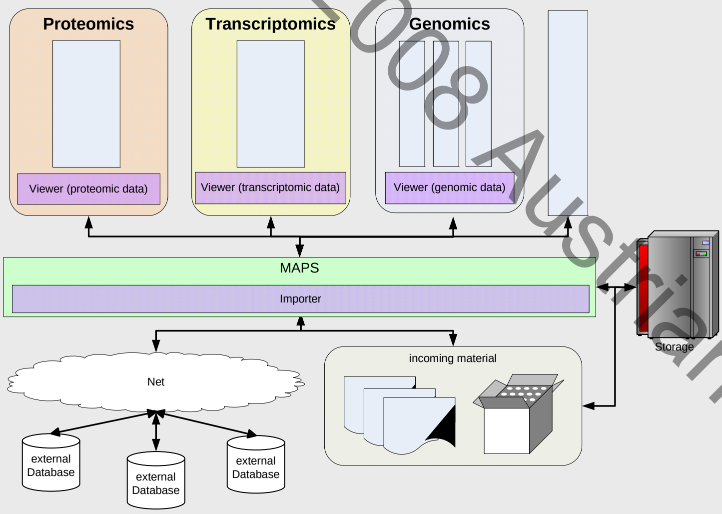

Figure 1 depicts the system architecture of *Maps™*

Key Benefits of *Maps™*

- Containers and material are the two concepts which *Maps™* is based on; both of them can be adapted to lab needs
- Containers and material can be described by any kind of information, which is grouped into documents and attributes *(concepts of attachable documents and declarative attributes)*
- Documents and attributes are fully configurable for the lab staff by administration user interfaces
- Stand-alone usage or SOP support by a workflow system
- Virtual databases support allowing multiple working group databases, test databases and data sharing between virtual databases
- Fully web-based and compatible with most current browsers

Technologies

- Database Layer – PostgreSQL
- Application Layer – EJB, SEAM, IceFaces, JSF, JSP
- Presentation Layer – HTML, CSS
- jBPM Workflow Engine

Key Issues

- No restrictions on material storage and organization
- SOP support and adaptability of SOPs by lab staff after initial setup
- Openness and adaptability to changing scientific requirements by lab staff
- Web technology for installation-free usage
- Interfacing to software being commonly used within the scientific community
- Single installation for multiple lab environments

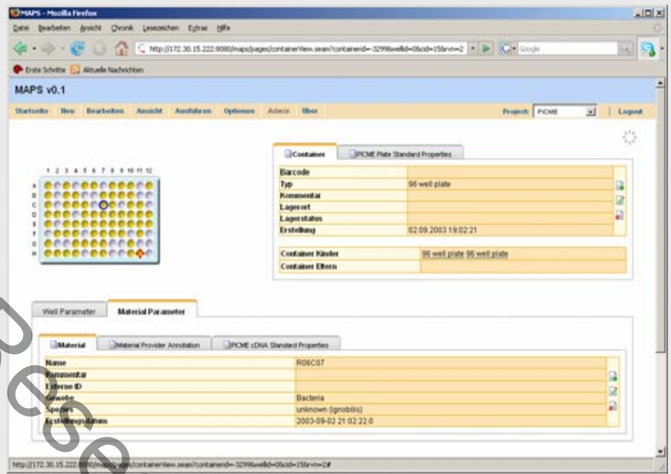

Figure 2 shows a screenshot of the *Maps™* plate administration

Domain Applications

Special purpose software can be linked to *Maps™* using low-level database interfaces or high-level application interfaces.

Currently Available

- BASE-II (BioArray Software Environment): The most widely used open-source microarray analysis platform released by Lund University.
- ARMS (Array Management System): A microarray production support software released by ARC.

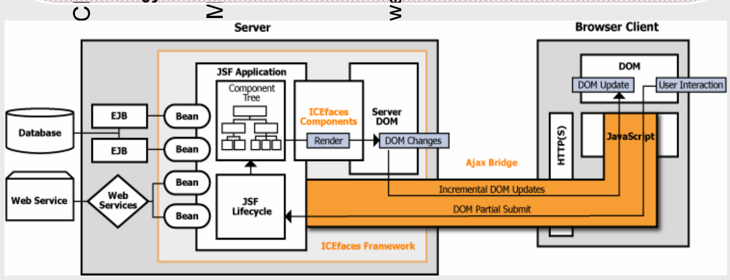

Figure 3 shows the the collaboration of technologies within *Maps™*

AUSTRIAN RESEARCH CENTERS

Dieter Kopecky
http://www.arcs.ac.at
dieter.kopecky@arcs.ac.at