Enterprise Automatons with useR2006

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Agenda

- Background
- Business Process Modeling Meets R
- Next Steps & More Information
- Demonstration

Background
Need: Repository for Analytical Automatons

- Database = Repository for Data
- Business Process Management (BPM) = Repository for Processes
  - Automaton / Task Agent
    - **1:** a machine or control mechanism designed to follow a predetermined sequence of operations
- Analytical Automaton = Business Process Management + Statistical Engine
  - YAWL (Yet Another Workflow Language)
  - R

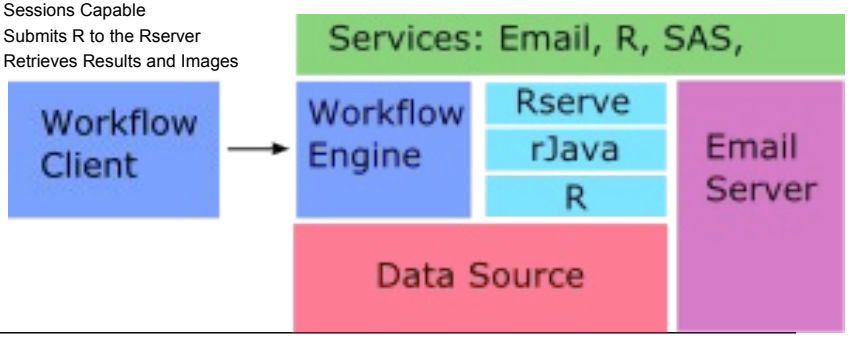
Background
Need: Repository for Analytical Workflows and Automation

- YAWL (Yet Another Workflow Language)
  - Open Source Business Process Modeling (workflow) – Best of Breed workflow engine from Queensland University leveraging Petri Nets.
  - Open Source Reference Site:
    - http://www.nexusworkflow.com/
- R Statistical Engine
  - R is a Free language and environment for statistical computing and graphics – Best of Breed, highly supported.
  - R provides a wide variety of statistical (linear and nonlinear modeling, classical statistical tests, time-series analysis, classification, clustering, ...) and graphical techniques, and is highly extensible. The S language is often the vehicle of choice for research in statistical methodology, and R provides an Open Source route to participation in that activity

Business Process Modeling Meets R

- Open Source (LGPL) Project to create an Enterprise Analytical Workflow System
  - Combining YAWL and R
  - J2EE

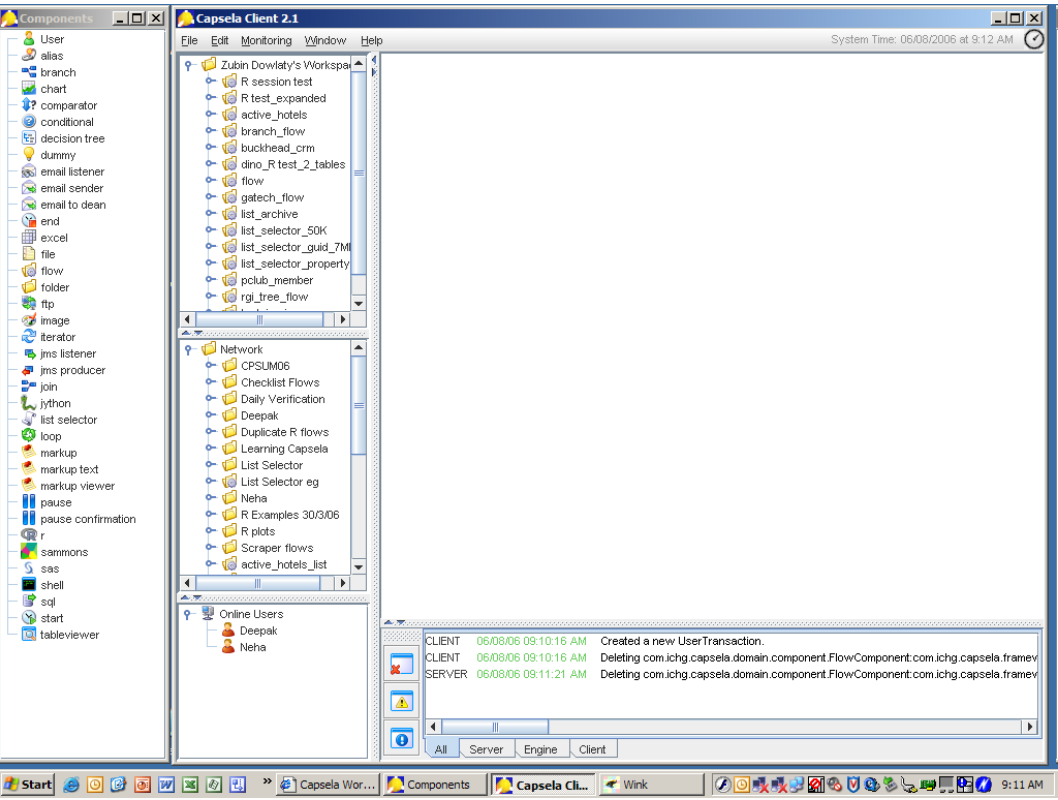
- R integration completed v1.0 by Simon Urbanek
  - R Component
    - Leverages JDBC for transparent data frame creation
    - Sessions Capable
    - Submits R to the Rserver
    - Retrieves Results and Images



Next Steps & More Information

- R Component
  - Richer GUI
    - Interactive vs Batch
  - Enable L (Load) more efficiently – write data frames leveraging JDBC

- Release of Nexus 1.0 – expected October 2006
  - Rich Java based Client
  - R Integration
  - Enterprise Quality Workflow Engine
    - J2EE
  - XForms capable (web tier)
  - LGPL
  - Check our web page for status, if you like to contribute click – contacts and send us an email
    - www.nexusworkflow.com



Live Demo
Nexus Workflow

Technical Appendix

START - SQL - R - END

1. Start runs
2. Sql runs
3. Sql attribute is transferred from sql to R
4. R begins to run:
5. R converts sql attribute to data frame using simon's method, execCapselaSqlQuery() <-- simon's method
6. execCapselaSqlQuery() makes an rJava call using the jdbc driver name specified in the sql attribute.
7. rJava result is converted into a data frame result
8. R executes the user code in the component
9. After executing user code, it scans R component to see if there are any outgoing attributes defined.
10. If there are outgoing attributes, for each attribute, it will convert it into java types.
    - 10a. if the outgoing attribute is an image, it will pipe the binary data in.
    - 10b. if the outgoing attribute is a data frame, it will execute createCapselaSqlQuery() <-- simon's method
      - 10b i: create a table with a random table name from the data frame
      - 10b ii: return a sql attribute that contains the select statement pointed to the database & table that contains the data
11. Any data transfer edges coming out of R will be transferred to outgoing components.
12. End runs