Part V

Overview of Scientific Workflow Systems
TAVERNA
http://taverna.sourceforge.net
TAVERNA [Goble et al 07; Hull et al 06; Oinn et al 00]

- Workflows of services
  - Web services, REST services, etc.

- Bioinformatics applications in myGrid
  - 3,000+ 3rd party services: EMBL-EBI, NCBI, BioMOBY, KEGG, …

- Workflows described in Scufl language
  - Workflows composed of “processors”
  - DAG + control links
  - Map item to list, item to list element, flatten lists of lists, cross product iteration, dot product

- Components:
  - Service discovery: UDDI registry, GRIMOIRES, etc.
  - Feta service discovery and selection uses semantics
  - FreeFluo workflow execution
Architecture of Taverna and Associated myGrid Components [Oinn et al 07]
Taverna Workflow Editor
ASKLALON
http://www.askalon.org
ASKALON [Fahringer et al 07]

- Research focus is on resource management, scheduling, performance analysis and prediction
- Abstract Grid Workflow Language (AGWL)
- Complex control constructs evaluated at run-time:
  - if-then, switch, while loop, parallel-for
- Assumptions made about control constructs at scheduling time
  - If assumptions not met, workflow is rescheduled
- HEFT scheduling algorithm [Zhao and Sakellariou 03]
ASKALON Architecture [Fahringer et al 07]
ASKALON: UML-Based Workflow Editor
TRIANA

http://www.trianacode.org
TRIANA [Taylor et al 07]

- Seamless integration of local Java tools and remote web services on same user workspace
- Workflow components represent algorithm, process, or service (the smallest granularity of work)
- Special components provided for loops and branching
TRIANA [Taylor et al 07]
KEPLER
http://www.kepler-project.org
Kepler [Ludaescher et al 06]

- Builds on the Ptolemy-II system for component oriented concurrent programming (http://ptolemy.berkeley.edu)
- Workflow steps implemented as “actors” with I/O ports and parameters
  - Actors may be data sources, sinks, data transformers, analytical steps, or arbitrary computational steps.
- Includes WebService actors, grid actors, database actors, data transformation actors, ingestion actors
  - Ptolemy-II provides Matlab and Python actors
Kepler User Interface
Other Workflow Systems
