

Grid, Scientific and Business Workflow Management Systems

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Overall Picture



- A grid workflow management system
 - A type of workflow management system aiming at supporting large-scale sophisticated scientific and business processes in complex e-science and e-business applications, by facilitating the resource sharing and computing power of underlying grid infrastructure.
- A scientific workflow management system
 - A type of workflow management system aiming at supporting complex scientific processes in many e-science applications such as climate modelling, astronomy data processing. It may or may not be built upon grid infrastructure. Can be cluster or P2P.
- A business workflow management system
 - A type of workflow management system aiming at supporting business processes in many business applications such as student registration or insurance claims. It may typically be built on Internet, Intranet or other internal enterprise information infrastructure.



Similarities (typically than exactly)



- Motivation
 - Some applications often require the creation of a collaborative workflow.
 - Many e-scientists and e-business people lack the necessary low-level expertise to utilise the underlying information infrastructure (Grid, Internet protocol suites and etc.).
 - Documented workflow specifications are beneficial for modelling and managing processes; and can be reused, modified and shared.



Similarities (typically than exactly)



- Common requirements/functions
 - Build-time, run-time
 - Control flow modelling
 - Even-based analysis
 - Collaboration support
 - Exception handling
 - Overall management
 - QoS issue
 - Security issue
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Differences (typically than exactly)



- Grid/Scientific Workflows
 - Computation or data intensive
 - Less human interaction and transient service management
 - A large number of activities
 - High dynamic execution environments
 - Dynamic resource allocation, scheduling and mapping to underlying distributed infrastructure
 - Scientific workflows may or may not be supported by grid infrastructure



Differences (typically than exactly)



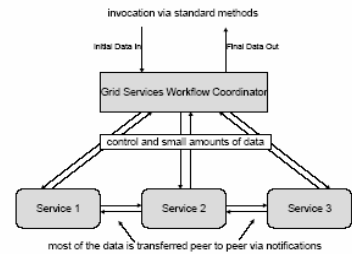
- Business Workflows
 - More Logic rather than computation or data intensive
 - Much more human interaction (an office workflow)
 - A reasonable number of activities
 - Execution environments is often much more certain.
 - Not much resource allocation, scheduling and mapping
 - Internet (Web Services), Intranet or other internal enterprise information infrastructure



Cases



- Differences (examples from [1])
 - Dealing with large amount of data (for grid workflows)



Cases



- Differences (examples from [1])
 - Lifecycle management (for grid workflows)
 - Grid service instances are created by the Factories,
 - And destroyed explicitly or via soft-state
 - Certain grid services in the workflow will not be executing while others are



Grid Workflow in Grid Architecture



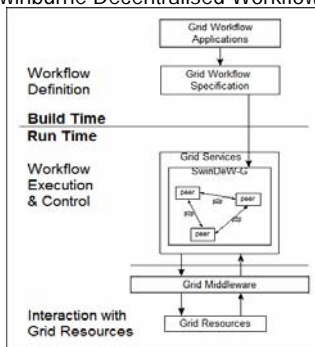
- General architecture (from [2])



A Grid Workflow Management System



- A sample grid workflow management system – SwinDeW-G: Swinburne Decentralised Workflow for Grid [3].



Questions



- Thanks for your patience and attention!

- Questions?



References



- [1] Cybok, D. 2006. A Grid Workflow Infrastructure. Concurrency and Computation: Practice and Experience, Special Issue on Workflow in Grid Systems 2006; 18(10): 1243-1254.
- [2] The Gridbus Middleware (The Gridbus Project): <http://www.gridbus.org/middleware/>.
- [3] SWINDEW-G Team. 2007. System Architecture of SwinDeW-G. http://www.ict.swin.edu.au/personal/jchen/SwinDeW-G/System_Architecture.pdf, accessed on June 9, 2007.

