



Integhy

Programming Models: Who needs Components? (a user's perspective)

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Components?

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(From C. Szyperski et al.: Component Software)

- Component:
 - A unit of independent deployment
 - A unit of third-party composition
 - Has no (externally) observable state
- My own translation:
 - Software "off the shelf"
 - Components are for composition
 - Components are neither objects nor (parallel) processes, but their code

Core GRID

Application Developers and Users Research Group (APPS-RG)

Chairs: S. Cox (Southampton),

- T. Hinke (NASA Ames),
- T. Kielmann (Vrije Universiteit)



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Goals:

- Facilitate the exploitation of grid technologies by application developers and users.
- Assess the nature of the applications that are using grid technology.
- Assess the nature of the support the grid is providing to these applications.



What Grid Developers/Users Want/Need

- Use grid resources (computers, data, instruments)
- Have grids that are stable, understandable, easy to use
- Grid middleware that is part of the solution rather than the problem...



What Grid Developers/Users get

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- Grid Application Programming Environments: Comparing ProActive, Ibis, and GAT
 - CoreGRID Technical Report 0003, 2005
 - Kielmann, Merzky, Bal, Baude, Huet, Caromel



A (simple) Grid Application Execution Scenario



European Research Network on Foundations, Software Infrastructures and Applications for large scale distributed, GRID and Peer-to-Peer Technologies

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Functional Properties

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What applications need to do:

- Access to compute resources, job spawning and scheduling
- Access to file and data resources
- Communication between parallel and distributed processes
- Application monitoring and steering



Non-functional Properties

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What else needs to be taken care of:

- Performance
- Fault tolerance
- Security and trust
- Platform independence



A Generic Architecture for Grid Programming Environments





Simple API for Grid Applications Research Group (SAGA-RG)

- API Scope
 - Files
 - Streams
 - Jobs, Tasks
 - Steering
- Strategy
 - Create strawman API (while doing the 'real thing')
 - Something to work with and discuss
 - Something for early implementation and experience











WP7: Environments, Tools, and Systems

(Taken from V. Getov, SAB Meeting, May 2005):

The *long-term main objective* is to develop the design methodology of a component-based Grid platform that integrates application components, tools/system components, PSE/portal components, and infrastructure components.



WP7 System Integration Block Diagram





WP3: Programming Model

From D.PM.01 (WP3 roadmap, version 1):

- T3.1 Basic Programming Models
 - Models and tools (WP7??) to support the programming of single components that will constitute component based Grid applications.
- T3.2 Components and Hierarchical Composition
 - Aimed at defining a component model suitable for Grid programming, and allowing components to be composed, either sequentially or in parallel, to construct new components
- T3.3 Advanced programming models
 - Aimed at defining higher level models that permit programmers to use components and component compositions in more efficient and user friendly ways



Progress of WP3

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("measured" by mailing list traffic and my own, leaky memory)

- T3.1: zero
- T3.2: some
- T3.3: zero

(We, partner VUA, are subscribed to contribute to T3.1 and T3.3, only.)



WP3 Progress: How comes?

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A personal view:

- WP3 is busy with T3.2, designing a component model
- Tasks 3.1 and 3.3 are stalled, waiting for the results of 3.2



Can we do better?

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A personal suggestion:

- Keep doing the good work (T3.2), but:
- Propose a "Strawman"

Grid Component Model NOW

- (just pick one: Fractal, CCM, CCA, ASSIST, ???)
- Something to work with and discuss
- Something for early implementation and experience
- Get tasks 3.1 and 3.3 going!
- Give WP7 something to ... get going!



So, who needs components, after all? (Conclusions)

- Grid systems, tools, end environments (a.k.a. WP7)
- Grid application developers, if there would be suitable components to build applications from – e.g., HOC's (Gorlatch et al.)

What is component-based programming?

- Addressing non-functional properties, only
- "Objects off the shelf" ? (COTS)
- How do position w.r.t. OOP, AOP, (Web) services?