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Towards a Secure and Efficient model for Grid Computing using Mobile Code

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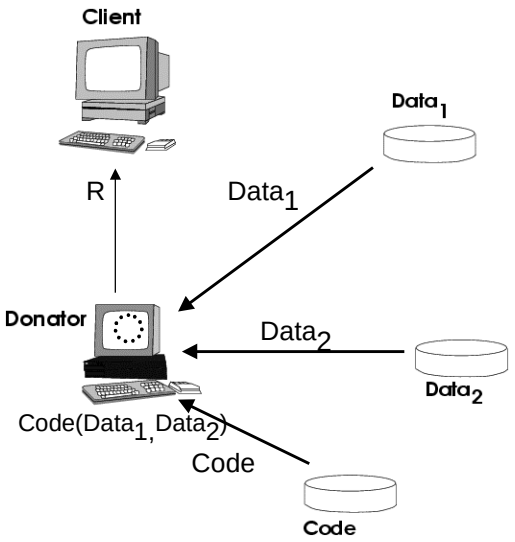
Introduction

- Grid Computing
  - "Controlled and coordinated resource sharing and problem solving in virtual organisations" -- The Globus Project
- Resources
  - Computational, Storage, Network
  - Tools, Software, Data, CPU, Disk Storage
- Grid Projects
  - DataGrid: CERN
    - High-Energy Physics, Biology, Earth Observation
  - Globus Toolkit

Grid



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Agent-Based Model

- Single Operator
  - Downloading of the application
    - security and accounting preparation
  - Distribution scheme of application
- Mobile Agent
  - Distribution of application and input data
  - Monitoring of computation (resource report)
  - Integration of computed results
- Business Model
  - Micro-payments

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Addressed Issues

- Distribution of Computation
  - Deployment descriptor
    - code, data, result location / composition of computation
  - Mobile Agent
    - agent platform at client and donators sites
- Security
  - Operator downloads and signs the code (filter)
  - Secure Java environment for computations
- Billing and Accounting
  - Operator reifies (rewrites) the code
  - Execution tickets

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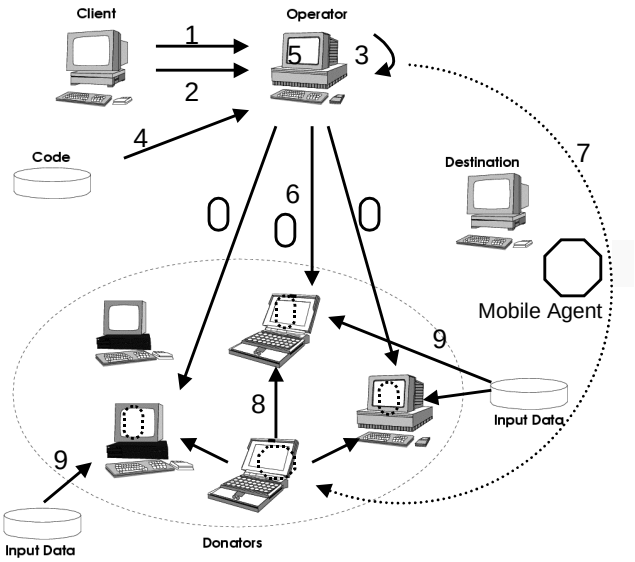
Deployment



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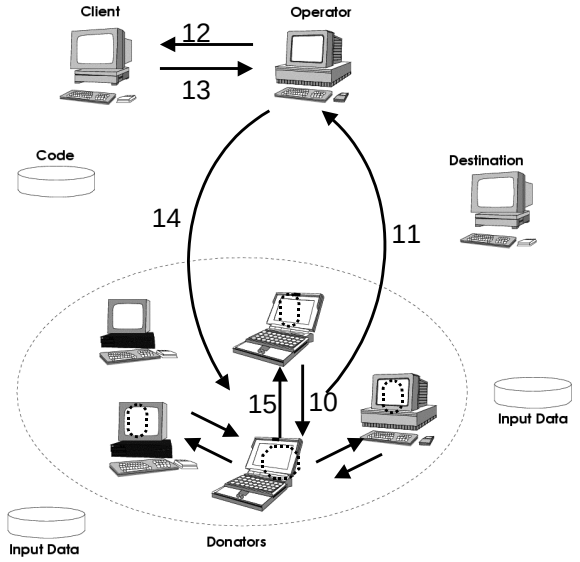
Monitoring



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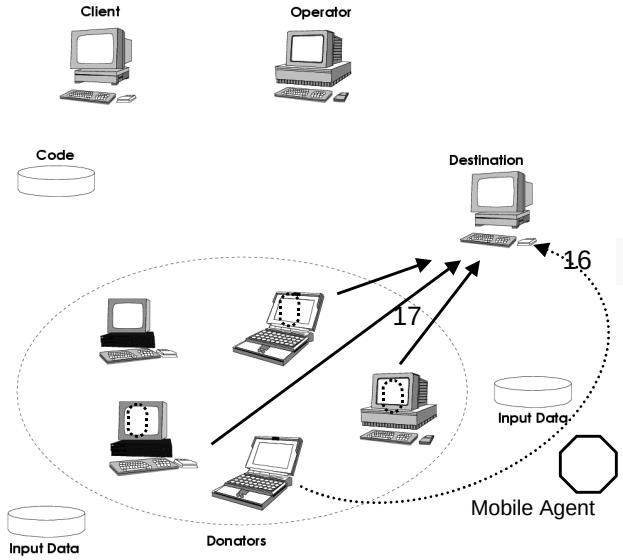
Results



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Platform

- Platform Requirements
  - Portability, performance, security
- J-Seal2
  - Java-based, Seal computations
  - Extended bytecote verification
  - Secure environment for Grid computing
  - Resource control
- Extensions Components
  - Control execution of applications: installation, access to resources
  - Monitoring: overloading detection

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Conclusion

- Open Questions
  - Efficiency of model
  - Precise description of the business model
  - Donators discovery
  - Integration into a complete Grid solution (Globus-like)
- Future Work
  - JSeal2 extension
  - Mobile Agent implementation

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