Provisioning and Orchestration in Distributed Wide Area Large Scale Infrastructures

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Problem Formulation

How to orchestrate multiple services in grid environments to provide adaptivity under resource and service availability uncertainty.

Grid System Model

Resources are connected via two-level hierarchical networks. The first level is a wide are network that connects local area networks or virtual organizations at the second level.

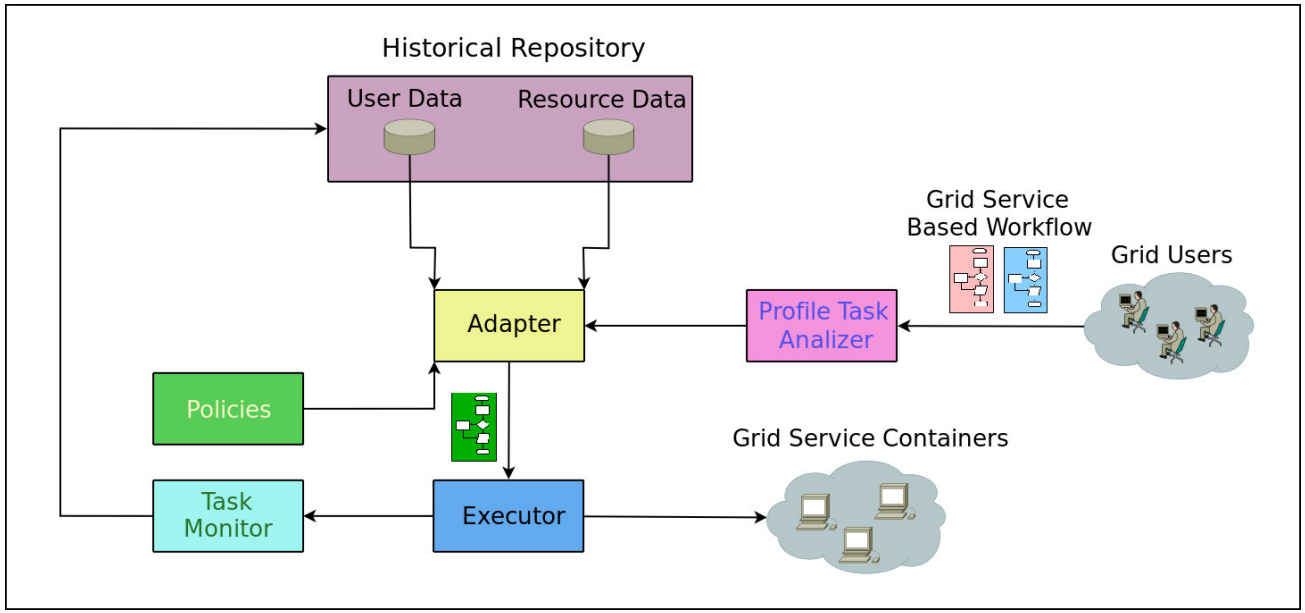
Uncertainty

max $E[f(x,y)]$

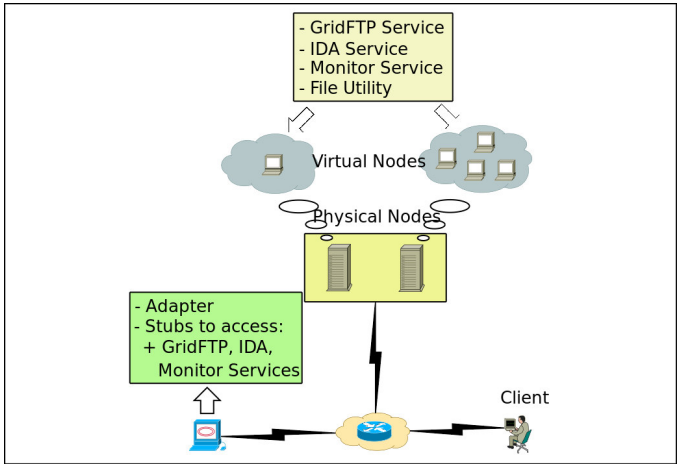
subject to:

$E[gj(x,y)]$ 0, $j = 1, 2, \ldots, p$

Methodology



Gateway Architecture

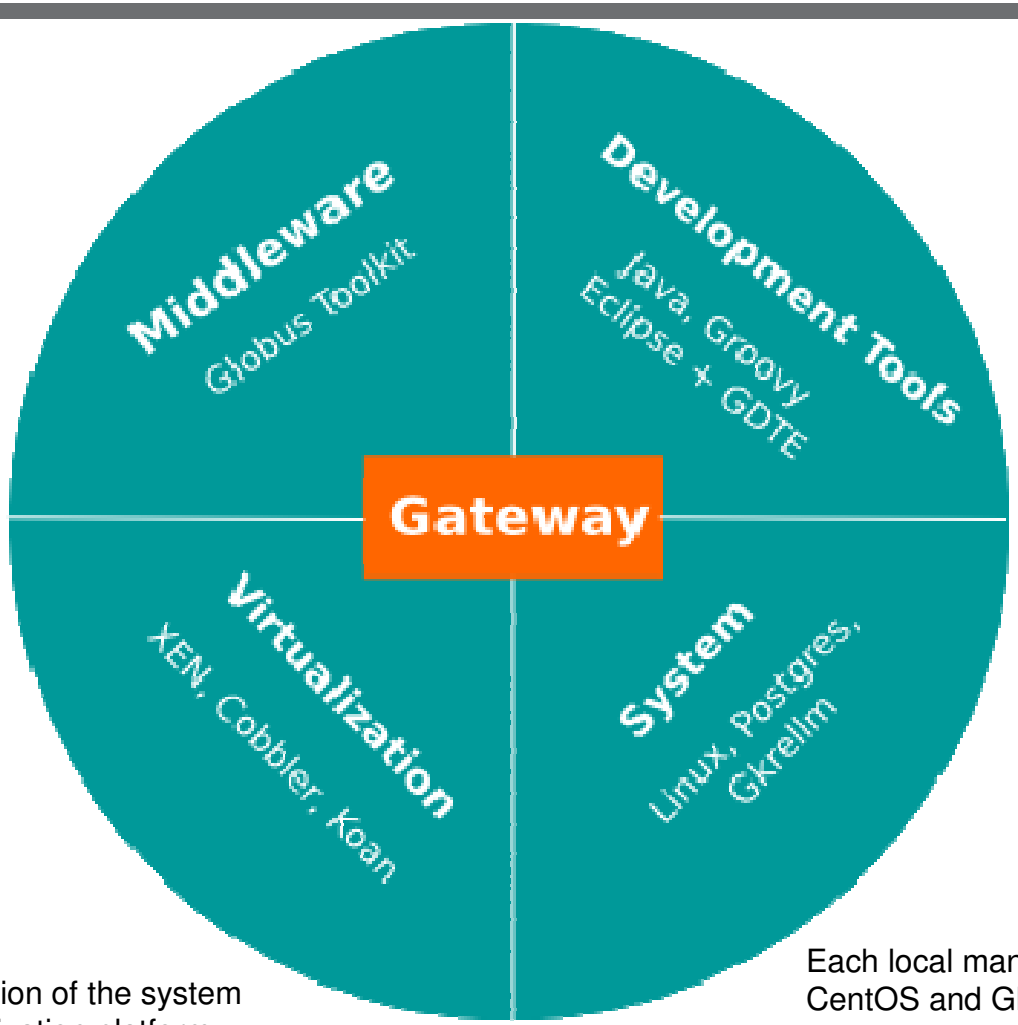


Local virtualized environment

Hierarchical Approach

- Global (distributed) gateways implement orchestration policies
- Local managers implement provisioning policies.

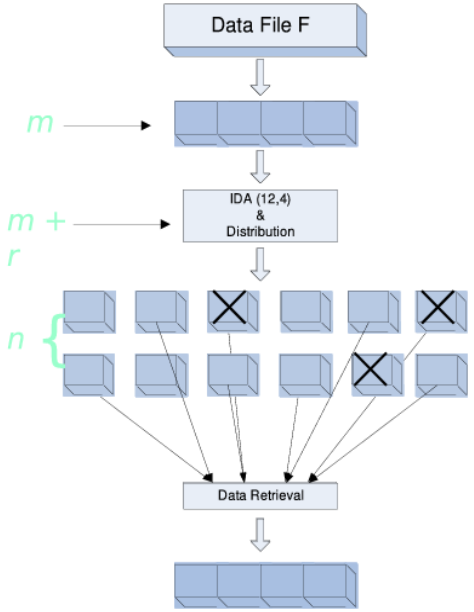
Application Tools

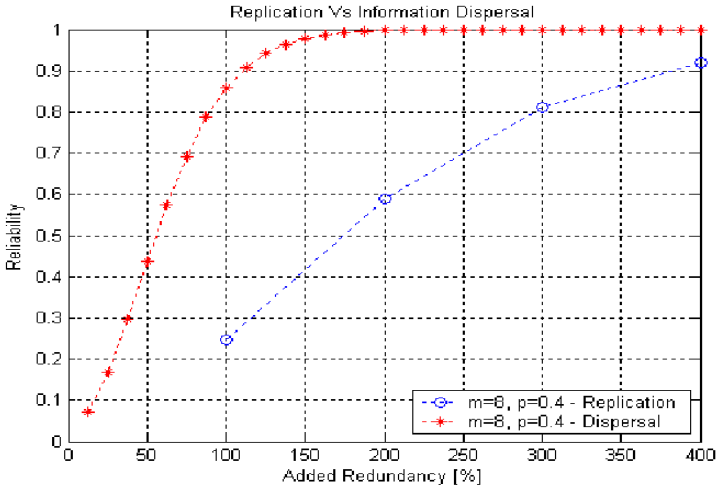


The current implementation of the system uses XEN as the virtualization platform and Cobble and Koan for automated deployment

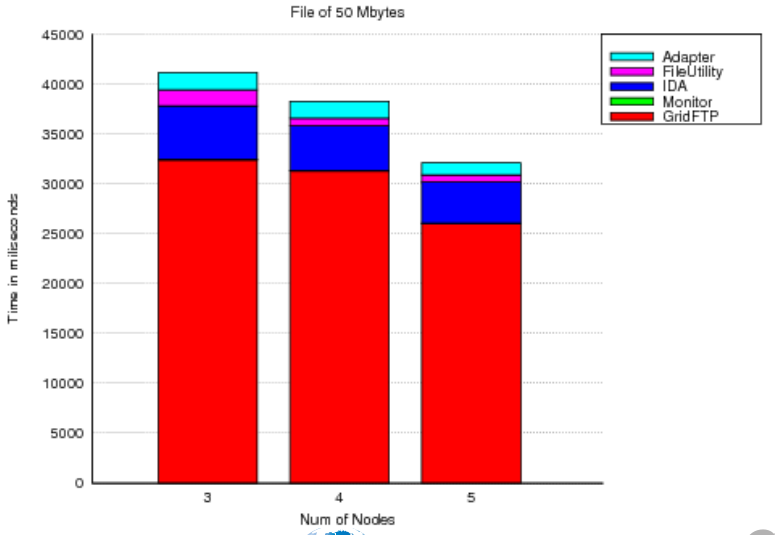
Each local manager has pre-installed CentOS and Globus Toolkit plus a set of management tools developed under the PDCLab

Research Results





- A hierarchical model for orchestration and provisioning has been defined.
- Experimental results obtained for dispersion/replication of data files demonstrate the viability of the proposed environment.



Publications: "Grid Based Pervasive Distributed Storage "
D. Arias, J. Sanabria and W. Rivera
IEEE International Symposium on Wireless Pervasive Computing (ISWPC), 2007

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