

Optimization of Application Execution on the ViroLab Virtual Laboratory

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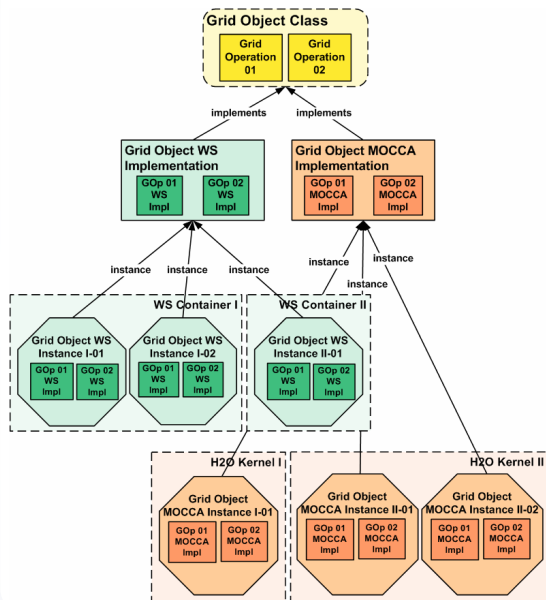
Objective

To provide a Virtual Laboratory with subsystem for optimization of specific Grid-based applications.

GridSpace Application Optimizer – GrAppO

Functionality

- During application execution, the **Runtime Library**
 - knows which **Grid Object Class** can perform a certain operation
 - needs to know which of the Grid Object Class' instances (**Grid Object Instance**) should be used
- GrAppO tells which Grid Object Instance (of a given Grid Object Class) is optimal for performing an operation

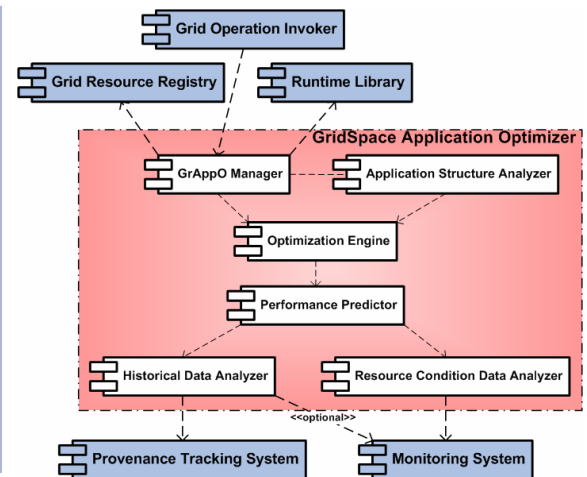


GrAppO optimization modes:

- short-sighted optimization** – provides solution only for one Grid Object Class at a time
- medium-sighted optimization** – provides solutions for a group of Grid Object Classes at a time; no reordering of operations
- far-sighted optimization mode** – analyzes the whole application, ordering the operation calls

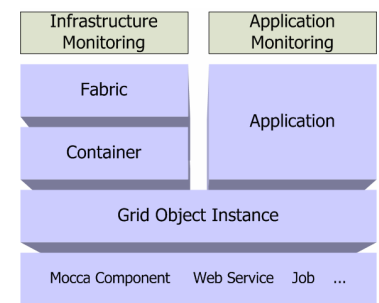
GrAppO Architecture

- GrAppO Manager** – coordinates GrAppO components
- Optimization Engine** – calculates optimization algorithms
- Performance Predictor** – estimates performance of possible solutions using:
 - Historical Data Analyzer** – analyzes historical performance data
 - Resource Condition Data Analyzer** – analyzes current state of resources
- Application Analyzer** - retrieves the application graph and analyzes it



Monitoring System

- Uses **Grid Object Instance** abstraction over **Grid Resources**
- Infrastructure monitoring – instrumentation of containers of multiple technologies involved within the Virtual Laboratory
- Application monitoring – Aspect-Oriented Programming techniques applied by **leMonAdE** monitoring system
- Integration with Provenance Tracking System



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References

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