# Motivation and Objectives

## Motivation
- Provisioning of multi-cloud resources for scientific workflows
- Loosely coupled integration with cloud management platforms
- Leverage cloud elasticity for autoscaling of scientific workflows driven by workflow execution stage

## Objectives
- Integrate the HyperFlow workflow runtime environment with the PaaSage cloud platform
- Application-agnostic interplay of application-specific workflow scheduler with generic provisioning and autoscaling components of PaaSage

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# PaaSage platform

Open and integrated platform to support model-driven development, deployment and adaptive execution of multi-cloud applications.

Define your application once — deploy it at the full spectrum of the Clouds

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# Solution Architecture

## Main components
- **HyperFlow workflow engine**: workflow enactment
- **Job queue**: submission of task requests, fetching results, and execution monitoring
- **hflowc**: prepares the execution plan taking into account constraints such as cost and deadline and generates the CAMEL model
- **Executors**: deployed on VMs alongside workflow components, controlling their execution and data transfer

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## Integration with PaaSage
- **CAMEL application model** automatically generated based on the HyperFlow workflow description. Includes initial deployment plan and scalability rules which control autoscaling behavior
- **Monitoring information** sent from the Task scheduler and VM workers to the PaaSage Executionware; Triggers the scalability rules and automatic scaling of the workflow application

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## Rapid deployment model and its benefits
- **Improved isolation**: each workflow runs in its own sandbox (separate instance of the workflow runtime system)
- **Improved performance**: workflow engine orchestrates the workflow from inside the cloud leveraging instance-to-instance communication.
- **Easier integration**: no tight coupling integration with a specific cloud platform is required; the same deployment model can be applied to various clouds through deployment plugins

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## Conclusion
- **A solution** for deployment, execution and autoscaling of scientific workflows
- **Workflow runtime environment** deployed in the cloud on-demand as part of the workflow application
- **Loosely-coupled integration** with the PaaSage cloud platform

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# References


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PaaSage: Model-Based Cloud Platform Upperware –

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