

DeployWare: A Framework for Automatic Deployment of Software Systems on Grids

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Deployment, which can be defined as a set of tasks to orchestrate such as installation/uninstallation of software on remote nodes, configuration of nodes and software, starting/stopping of application servers or data collecting, is a nightmare for Grid Computing users. A first challenge is complexity of the orchestration of the several deployment tasks and software dependencies, and the administration of such large distributed software systems. A second challenge is heterogeneity of:

- the software systems to deploy, which use different paradigms (parallel or object-oriented programming, component-based or services-oriented approaches) but also a plethora of runtime platforms/middleware (e.g. MPI, Globus, GridCCM, ProActive, SOA-based systems, etc.)
- the targeted physical infrastructures in terms of hardware, operating systems, network, protocols.

A third challenge is scalability: a typical scenario is to automatically perform the deployment of a software system on thousands of nodes.

3. Impact

DeployWare addresses the complexity, heterogeneity and scalability challenges of deployment on grids. The framework can be used by Grid Computing scientists coming from various disciplines (Physics, Earth Sciences, etc.), i.e. by non-computer science experts, to easily deploy and execute their applications on grids. DeployWare provides a metamodel that captures abstract concepts of deployment, a concrete syntax to describe software system, a virtual machine (named FDF, Fractal Deployment Framework) that interprets this description and executes the deployment process, and a graphical console allowing to manage, at runtime, the deployed system. DeployWare, implemented using the component-based approach, can deploy itself in order to address very large scale deployment (thousands of nodes).

Currently, DeployWare can deploy CORBA-based systems, SOA-based systems, JEE-based systems, Database systems, or grid-based services such as the OAR tool used in the Grid'5000 platform to reserve nodes

URL for further information:

<http://fdf.gforge.inria.fr/>

4. Conclusions / Future plans

We have experimented DeployWare on Grid'5000, the french experimental grid infrastructure with the automatic deployment of OpenCCM application servers on 1000 nodes of Grid'5000, on several clusters. Performance results have shown that, firstly, the execution time of the deployment process grows linearly with the number of nodes, secondly, the execution time decreases with the number of used DeployWare nodes. We plan to deploy more grid-specific middleware such as GridCCM or the Globus Toolkit.

Provide a set of generic keywords that define your contribution (e.g. Data Management, Workflows, High Energy Physics)

Software Deployment, Middleware, Distributed Applications, Grid'5000

1. Short overview

DeployWare is a framework allowing to automatically deploy and manage heterogeneous and distributed software systems, including middleware, application servers and applications, on large scale infrastructures such

as grids. It is independant of the paradigm/technology of the software that compose the system to deploy, automatically orchestrates the deployment process, dealing with software dependencies, and the heterogeneity of the targeted physical infrastructure (hardware, network, protocols).

Primary author: FLISSI, Areski (LIFL - UMR 8022 CNRS)

Co-author: Dr MERLE, Philippe (INRIA)

Presenter: FLISSI, Areski (LIFL - UMR 8022 CNRS)

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