DEISA Development Environment - D2E

Giuseppe Fiameni* – g.fiameni@cineca.it | Shahbaz Memon⁺ - shahbaz.memon@gmail.com
Judit Jimenez† - judit@bsc.es | Siew Hoon Leong⁺ - siew-hoon.leong@lrz.de

Abstract

In order to fully exploit the DEISA[1] [3] supercomputing infrastructure, effective software development tools, customized over resource specifics, must be provided to the user communities in order to facilitate the process of developing applications. The goal of our work is to provide an effective environment for scientific applications development, based on a software platform where different tools coexist and work together. And with the further aim to provide a common user interface to operate across different computing platforms, while remaining agnostic to the actual tools deployed on the back-ends. The mentioned environment is based on Eclipse [1] and on the Parallel Tools Platform (PTP) [2]. Eclipse is a well-known Java-based integrated development environment (IDE) that provides numerous tools, all accessible from a common graphical interface, which are essential for developing enterprise level applications. Employing the functionalities provided by the Parallel Tools Platform, Eclipse can be extended to support a set of tools which are specific for the development of scientific parallel applications. The integration of Eclipse and PTP, with the support of other components, will bring to researchers and software developers a standardized and uniform interface to effectively and efficiently perform all the steps necessary to develop and execute parallel applications across heterogeneous resources. The resulting environment is referred as the DEISA Development Environment (D2E).

The functionalities that the environment provides have been exploited and tailored according to DEISA infrastructure requirements and specifics. Missing DEISA key-functionalities have been implemented; these include the support of the DEISA compliant authentication method based on the GSI-SSH protocol, the support of the module system to automatically set up environment configuration, the support of profiling tool (i.e. PARAVER [5]) and the integration of UNICORE [4] Grid system to carry out all the steps concerning the job submission.

By means of the D2E, application developers will see immediate productivity benefits using such integrated environment. These benefits include:

- an integrated interface for developing, launching, debugging and executing scientific applications;
- a simplified approach for porting applications across heterogeneous execution environments;
- a dynamic platform that can be easily extended to accommodate new tools with the consequence to provide new functionalities;
- a customizable environment that permits user personalize the environment interfaces and perspectives as they wish.

The aim of this paper, other than showing the advantages in using the D2E platform to develop scientific applications, is also to present the work done in developing the UNICORE plug-in and to show its technical fundamentals. The UNICORE-PTP realization represents an important advantage for the Eclipse PTP model in terms of simplicity in managing different resource managers. Within the existing model if a user desires to port and execute applications on different machine, each adopting a different resource manager, he/she is required to mount and provide a configuration for

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∗ **CINECA** – Consorzio Interuniversitario – Bologna, Italy – www.cineca.it

✢ **FZJ** - Forschungszentrum – Jülich, Germany - http://www.fz-juelich.de

† **BSC** – Barcelona Supercomputing Centre – Barcelona, Spain - http://www.bsc.es/

✢ **LRZ** – Leibniz-Rechenzentrum – Munich, Germany - http://www.lrz-muenchen.de/

1 **DEISA** (Distributed European Infrastructure for Supercomputing Applications) is a consortium of leading national Supercomputing centres that aims at fostering the pan-European world-leading computational science research. Deploying and operating a persistent, production quality, distributed supercomputing environment, it aims at delivering an operational solution for a future European HPC ecosystem.

each of them. Conversely, thanks to the UNICORE-PTP feature, this can be easily avoided being it possible to set up a unified web services based interface - the UNICORE registry - to access multiple and heterogeneous computing resources and distributed storages at the same time.

The picture below shows a logical view of the D2E architecture.

Figure 1: D2E architecture logical view
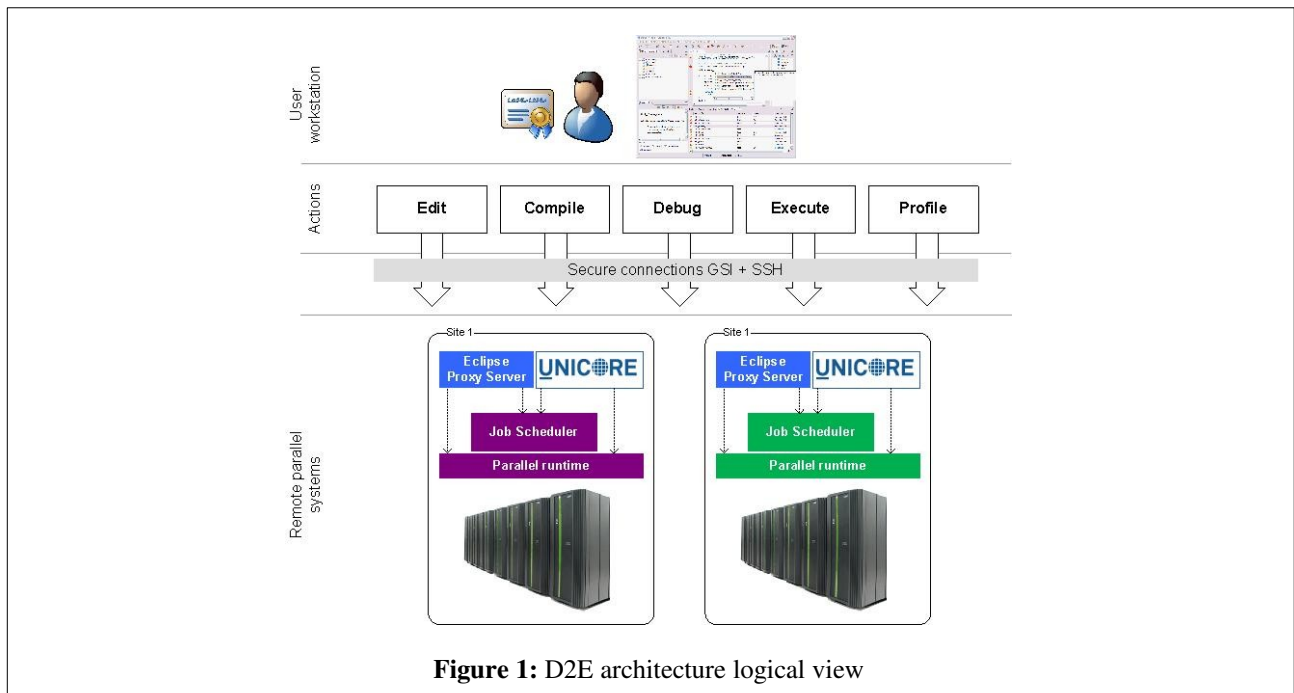
The demonstration will show how to perform all the steps which are required to develop a scientific application moving from the editing of the code to its final execution on a UNICORE enabled site. The implementation of the UNICORE-PTP feature will be presented with more details and the benefits of its adoption illustrated to the participants.

References

[1] Eclipse: http://www.eclipse.org
[2] PTP: http://www.eclipse.org/ptp/
[3] DEISA: http://www.deisa.eu
[4] UNICORE: http://www.unicore.eu
[5] PARAVER: http://www.bsc.es/plantillaA.php?cat_id=485