HPC Portal Development Platform for CFD

Chien-Heng Wu (Gary)

National Center For High-Performance Computing, Hsin-Chu, 300, Taiwan
(e-mail: garywu@nchc.org.tw)

Keywords: HPC Portal Development Platform, Job Submit Portlet, Job Status Portlet.

---

1. INTRODUCTION

HPC Portal Development Platform (Figure 1) is for web portals that design to support access to in the field of CFD, high performance computing and business fields. It draws upon best practices derived from the collective experience of many projects such as personal portals, small business portals, enterprise portals, educational portal, infrastructure portal and other kinds of portals. Within the robust IT architecture, this platform can also allow Java developers to speed up the development and deployment process.

1.1 HPC Portal Development Platform

HPC Portal Development Platform (Figure 1) provides the best development platform for Java developers in the field of CFD, high performance computing and business to design, implement, configure and deploy. Its architecture (Figure 2) is robust, stable and advances because it utilizes the Tomcat (Web Server) and JBoss (Java EE Application Server) to separate the presentation tier, the business tier and the database tier. It also allows developers to create context-rich applications that satisfy these requirements. In addition, this development platform provides the natural user interaction environment for your specific applications, and allows you to leverage all types of services in creating a better, more effective user experience.
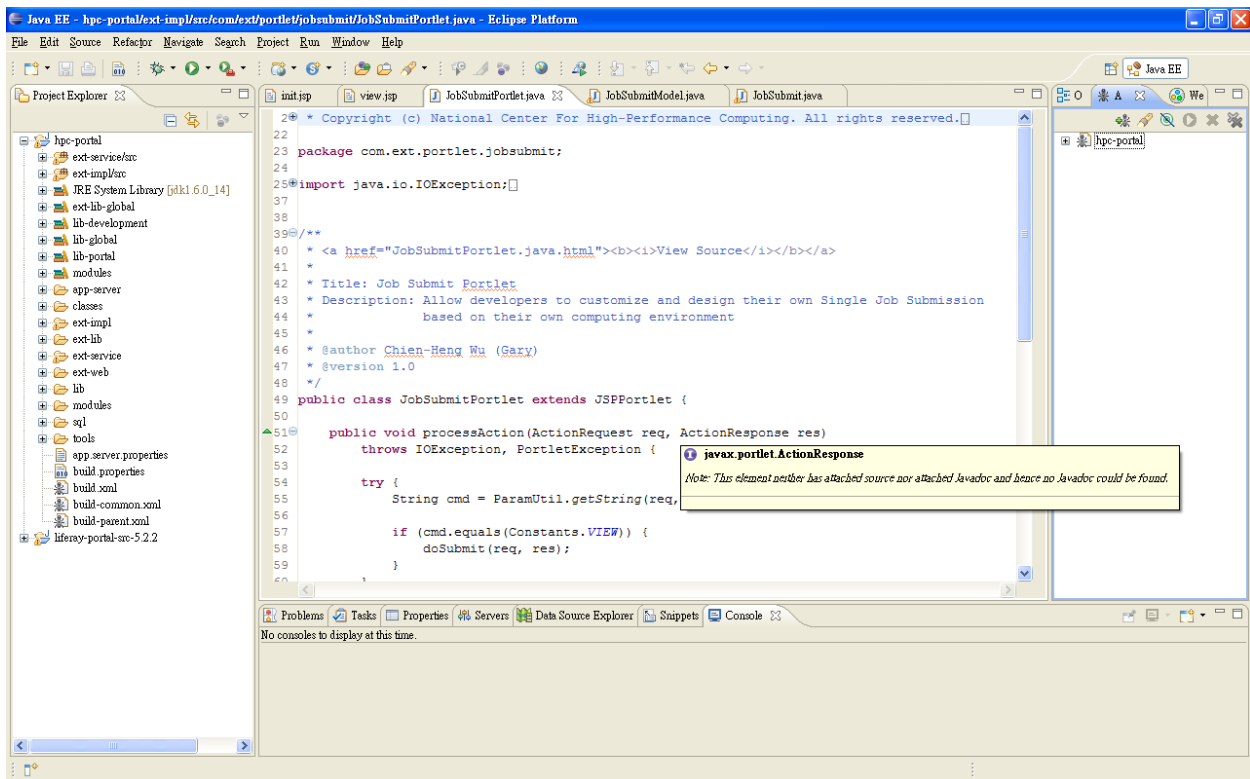

Fig. 1: HPC Portal Development Platform

1.2 Platform Architecture

HPC Portal Development Platform provides the well functionalities to break down the boundaries between Web-based portals and the applications of CFD, high performance computing and business. It enables them to create flexible and content-sensitive working environments that are based on rich content, portlets, and components in an open and standards-based architecture. By specifically design and implementation, the knowledge workers of CFD, high performance computing and business will use a single Web interface to access a wide range of CFD, HPC and business services, including communication and collaboration services, applications, content and search. It also provides the support of any combination of multiple tiers - presentation, service, business logic, and database - to meet your specific load requirements.

This platform architecture (Figure 2) allows the developer to separate the Web tier, EJB tier, and database tier to achieve clustering at three levels. This is true n-tier deploying because no one is forced to cluster at any single layer and allows the most flexibility. This architecture provides the great ability to scale with your organizations with clustering and the unlimited capacity for the contents and applications in the field of CFD, high performance computing and E-Business.

This development platform wraps the POJO implementations with Session EJBs to provide heavy scaling and transaction support required by large sites. To ease for HPC applications to communicate with each other, the Web Services is required. It uses XML standards to make Java, .NET, and other applications working together easily because of Web Services.

In addition, this platform architecture provides Java developers or programmers to enable the function of mobility during the implementation. HPC users can access the portal via traditional and wireless devices.
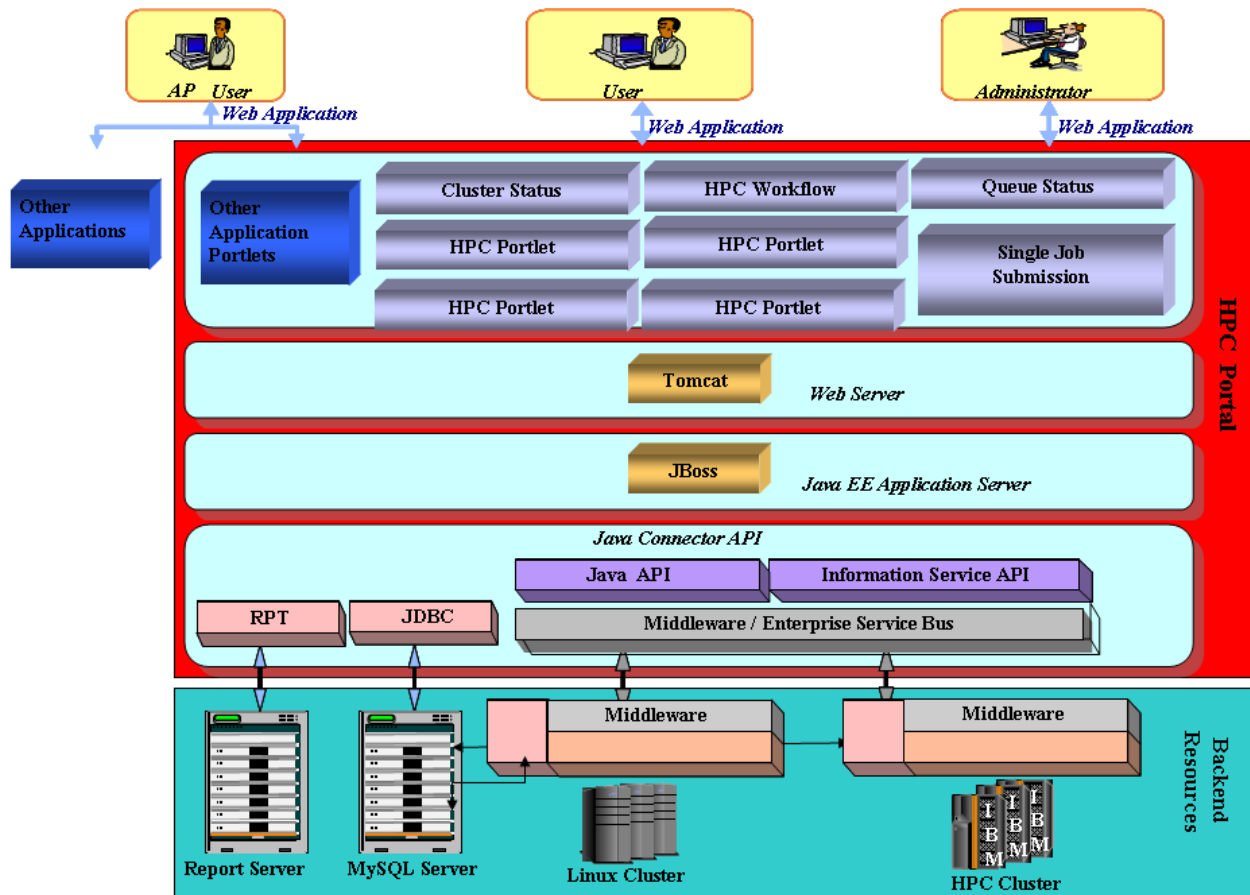

Fig. 2: Platform Architecture

2. Job Submit Portlet

1. This Job Submit Portlet (Figure 3) is used as the standard portlet for High Performance Computing. It allows HPC or CFD Portal Developer to customize, implement and integrate with their specific Job Submission function with the backend resources in their particular CFD or HPC environments.

2. "Job Submit": Use this service to submit a generic job into one of the HPC clusters for complex and high speed computation.

3. Upload Function: Use this function to upload the selected job into the desire path.
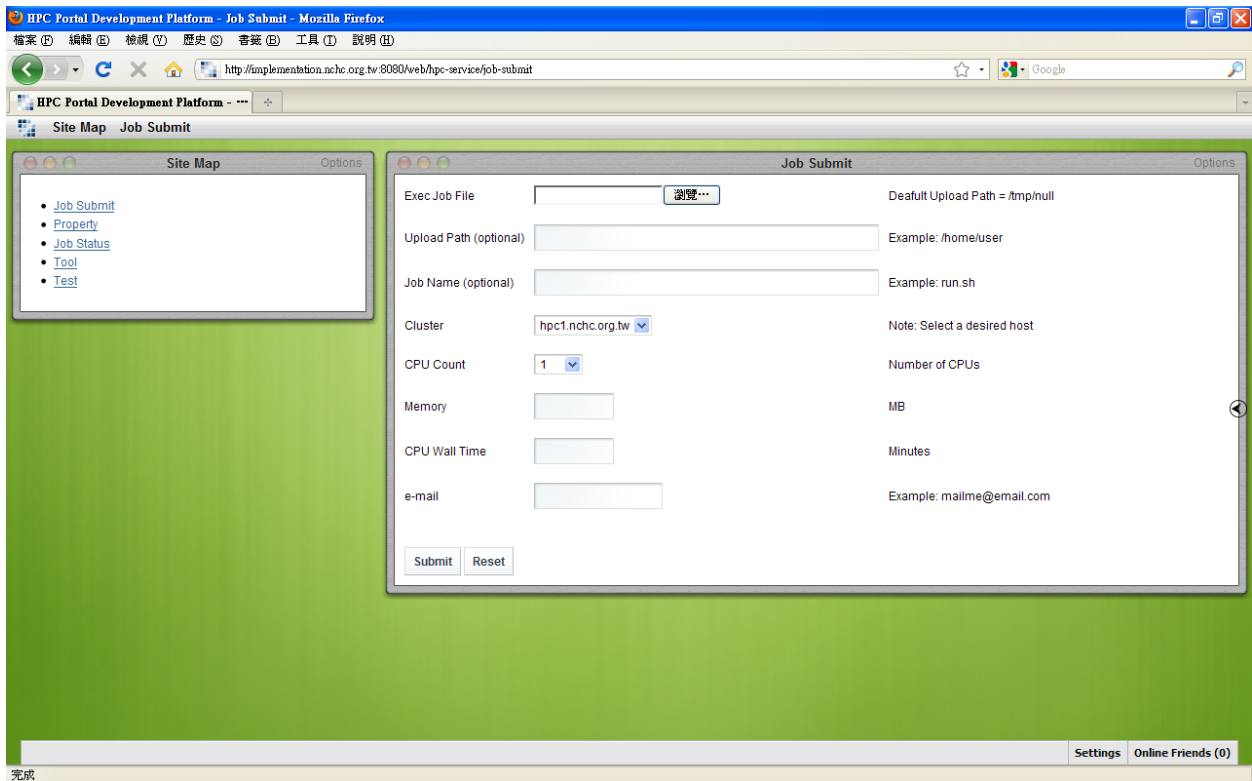

Fig. 3: Job Submit Portlet

3. Job Status Portlet

This Job Status Portlet (Figure 4) allows users to check the status of their jobs. It's also for Java developers to continually design, implement and integrate their specific backend resources for checking their job status after they submit their jobs.
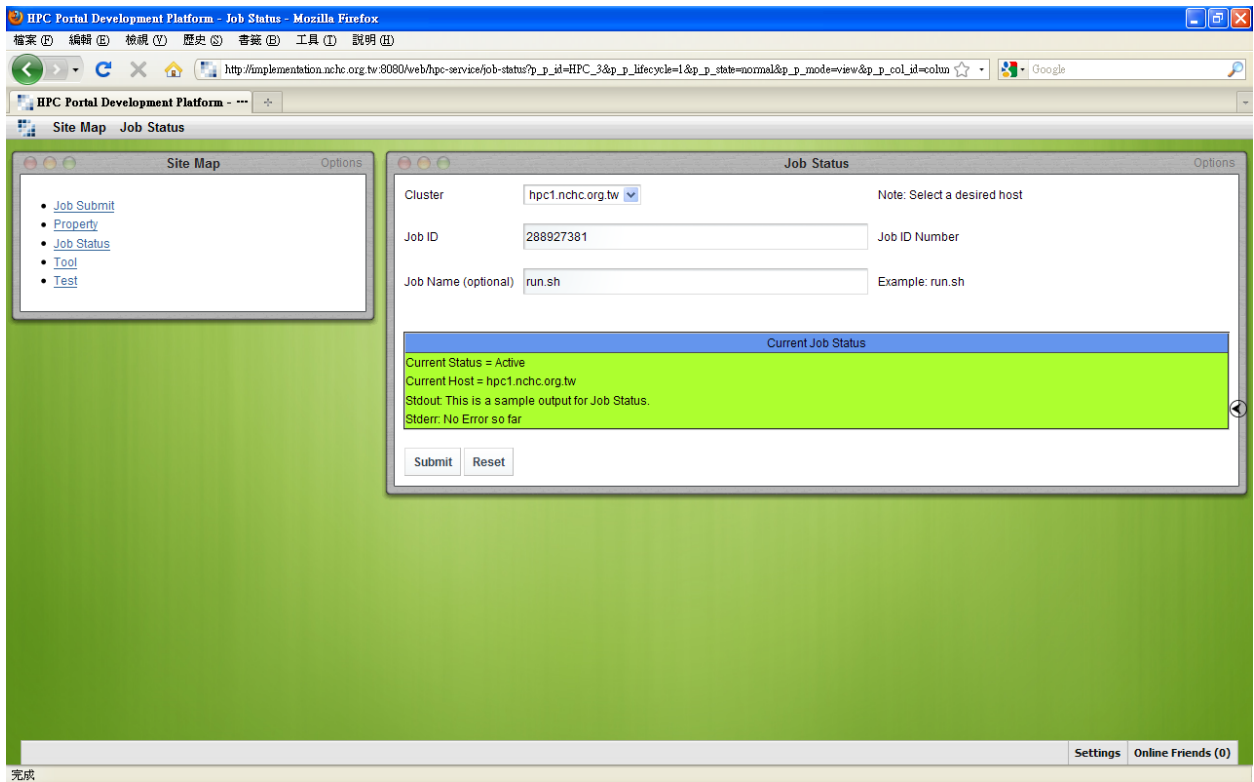
Fig. 4: Job Status Portlet

REFERENCES

1. Chien-Heng Wu, "HPC Portal Development Platform with E-Business and HPC Portlets", 2009 Conference on Information Technology and Applications in Outlying Islands, Kinmen, Taiwan, 2009, 05, 22－2009, 05, 24, pp. pp14-19.
2. Chien-Heng Wu, " High Performance Computing: HPC Portal Development Platform with SOA", Workshop on Compiler Techniques for High-Performance Computing (CTHPC 2008), Taipei, Taiwan, 2008, 05, 26－2008, 05, 27, pp. ppIV13-IV18.
3. Chien-Heng Wu, "HPC-Portal-Development-Platform_Developer-Guide.pdf"
4. Liferay , http://www.liferay.com