

Chapter 11

Conceptual Design and Usability Evaluation of a Grid Utility SECOnd Portal for Under-Resourced Business Enterprises in Sub-Saharan Africa

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ABSTRACT

Conventional grid-enabled portal designs have been primarily based on the usual traditional requirements specifications such as security requirements, grid resource requirements, job management requirements and the likes. However, the pay-as-you-use service provisioning model of utility computing platforms need to consider and satisfy certain salient requirements considered relevant in a bid to achieve better conceptual designs of Service-based Electronic Commerce On-Demand (SECOnd) that are well-usable for grid utility platforms such as the Grid-based Utility Infrastructure for Small, Micro, and Medium Enterprises (SMME) Enabling Technology (GUISET). The work aspect profiled in paper entails the conceptual design and usability evaluation of a SECOnd portal which serves as the uniform channel through which targeted under-resourced SMMEs can inexpensively access and use e-Commerce technologies and tools without owning them. The outcome of the evaluation experiment revealed that the service portal designed largely achieve the usability expectations of its users.

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INTRODUCTION

A grid amongst many ways can be defined as a collection of heterogeneous distributed interconnected computing and data resources that provides large scale virtual resources with an appropriate single user interface (Foster & Kesselman, 1999). The utility grid computing paradigm is a variation of the conventional grid computing model that involves the provisioning & utilization of resources and services solely on per user request basis (Rappa, 2004). It is essentially based on the *pay-as-you-use service* provisioning business model.

In a typical grid environment, grid portals are designed and developed to provide uniform access or single point of entry to various underlying grid resources and services within a virtual community (Russell, Novotny & Oliver, 2006). They act as gateways between various grid users and a range of different grid resources and services (Russell, Novotny & Oliver, 2006).

Grid-enabled portals (GeP) - portals based on grid technology, build upon the familiar Web portal model to offer virtual organizations (VO) or communities of users a single point of access to computational resources such as clusters, data servers, applications, scientific tools, and computing services (Russell et al., 2006; Yanli, Jian, Minglu, Lei, 2006). They are key technologies that have received great attention among developers and programmers due to their ease in development, richness in functionality, pluggable architecture and customization of interfaces (Russell et al., 2006; Yanli et al., 2006).

Grid-enabled portals are developed using *portlets* (Yanli et al., 2006). Portlets can be thought of as a miniature web application that is running inside a portal page alongside a number of similar entities. They are user-facing, multi-step, interactive modules that can be plugged into a portal application (Yanli et al., 2006). Portlets rely on the overall portal framework to access user profile information, participate in a presentation interface, communicate with other portlets to access remote contents, lookup credentials, and store persistent data (Yanli et al., 2006; Akram, 2005). Figure 1 shows portals composed of various portlets.

Portal frameworks are development platform for portal development. They are design structures that contain various modules, methods and software features used for developing specific portal (Russell, Novotny & Oliver, 2006; Akram, 2005). With the popularity of portals today, there are many portal frameworks that are available as open source and the list of these open source frameworks is all the time increasing. A typical grid-enabled portal has the following capabilities Russell, Novotny & Oliver (2006): secured registration of users; accessibility of various users to a range of underlying grid services and resources; provision of personalization, single sign-

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