A Web-based portal to access and manage WNoDeS Virtualized Cloud resources

The Worker Nodes on Demand Service (WNoDeS), developed by INFN, is a framework designed to offer local, grid or cloud-based access to computing and storage resources, preserving maximum compatibility with existing computing center policies and workflows. WNoDeS has been running in production at the INFN Tier-1 located at CNAF since November 2009, where it currently manages several thousands of dynamically created Virtual Machines; WNoDeS is also being deployed at several other Italian sites. This presentation shows the current state of the WNoDeS Web portal, aimed at end users for the instantiation of WNoDeS cloud resources and at site administrators for the management of the WNoDeS infrastructure. Description of the work: The current WNoDeS Web portal has three main components: 1) an authentication and authorization module. This module currently lets existing Grid users connect to the portal using a valid X.509 digital certificate installed in a user's browser. Before issuing any requests to the portal, the user must specify the existing Grid VO he or she intends to charge the requests to. The authentication part of the module then contacts the appropriate VOMS server(s) for the specified VO and validates whether the user is actually part of that VO. If this check is successful, the authorization part of the module contacts an Argus server to verify the authorization policies that have been either implicitly or explicitly defined for the user. These policies may include whitelists or blacklists, DN- or role-based access, or other types of Argus-supported policies. 2) a module to request access to WNoDeS cloud resources. This module lets users select, instantiate and manage computing and storage resources. These resources are categorized for ease of management and for billing purposes. For example, a user may wish to instantiate a so-called "Small server": this results in the request for a virtualized system with one core, 1.7 GB RAM, 50 GB of local hard disk space. This server is dynamically created by the WNoDeS system using the WNoDeS common pool of resources and handed over to the user, who can connect to it using a passwordless ssh connection. Wallclock time usage of the resources is billed to the user or VO requesting it. The user can eventually destroy the resource once he or she is done with it. 3) a module to manage WNoDeS resources. A WNoDeS administrator may log on to the portal and see all the components of the WNoDeS system. In particular, the state of the WNoDeS Name Server and of all the WNoDeS Virtual Machines may be examined. Through an interface with the KVM libvirt virtualization API, statistics on the use of the WNoDeS VMs like CPU, RAM, or I/O usage can be shown. This module also provides the possibility to start and stop WNoDeS services. Impact: The WNoDeS Web portal for cloud access and for resource management is a key component of the WNoDeS framework. Through this Web application, we exploit the flexibility of WNoDeS to let users instantiate their own resources out of a common resource pool, used to seamlessly support local, Grid or Cloud requests. Although WNoDeS also provides an OCCI-compliant API to programmatically instantiate cloud resources, the Web portal offers a much simpler user experience for the self-provisioning of resources. Since it can be easily integrated with existing authentication, authorization and accounting solutions, the WNoDeS Web portal may be used by a site to offer novel added-value services to existing and new customers alike. In its current state, the WNoDeS Web portal supports users already belonging to Grid VOs. This eliminates the need for Grid users to get additional credentials to access cloud resources and - through the integration of the Argus middleware - allows sites and VOs to define fine-grained authorization policies. Future developments of the portal will include the possibility to authenticate users based on other methods, such as local accounts or federated identities (e.g. Kerberos- or Shibboleth-based authentication frameworks). For site administrators, the WNoDeS Web portal provides a graphical view of the state of the local WNoDeS installation, allowing monitoring and management of the WNoDeS resources. Conclusions: WNoDeS is a flexible and scalable system, allowing access to resources provided by a computing center via local, Grid or Cloud interfaces. The WNoDeS Web portal provides on the one hand management capabilities to local site administrators; on the other hand, it gives users the

possibility to rapidly self-provision their own systems. Sites using WNoDeS may use the portal to offer new services to their customers, billing them according to flexible policies. From an implementation point of view, WNoDeS and specifically its Web-based portal re-uses several proven technologies, like Linux KVM, Apache Tomcat, Java Spring, VOMS and Argus. Future developments will include support for additional authentication methods and possibly the integration of a Grid submission portal, thus expanding usability further and exploiting the use of existing e-Infrastructures and resources.

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