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Gatlet –A Grid Portal Framework

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Overview

The aim of the Gatlet project (http://gatlet.scc.kit.edu) is to provide an easy access to major grid middlewares and storage resources via web browser. Currently the framework supports access to Globus 4, gLite 3.1, GridFtp and SRM resources.

With a portal built on this framework a grid user can submit and monitor jobs and manage files on storage resources.

Grid infrastructures are mapped in the portal to entities like sites, clusters, corresponding middlewares and VOs. Gatlet is shipped with several portlets (e.g. for Job Submission, Monitoring, Resource Management).

Developers can use the Gatlet API (Application Programming Interface) to access the grid for creating custom portlets. These portlets can be used to bring science applications from the grid to the browser.

The framework is currently developed in cooperation between the University of Ulm (for the bwGRiD project) and the Karlsruhe Institute of Technology (for the D-Grid project).

Impact

Portals built on top of the Gatlet framework address grid resource provider, grid users, portal providers and application developers.

Users, especially grid newcomcers, can use their well know web browsers to obtain access to grid resources. They need no deep knowledge of specific middleware clients, of grid security mechanism or of operating systems. Another important fact is that they do not need to install any software on their computers.

Resource providers get a software to provide easy access to their grid infrastructure over the internet. The process of importing data from a resources database to the Gatlet database can be automatised easily.

The portal administrators can assign installed software, hardware and VOs information to grid resources. This information is used by a Meta-Submitter that automatically chooses a matching resource. This eases the job submission for non grid experts.

With the Gatlet Service API it's easy to develop portlets with access to grid resources. A developer of custom portlets programs against this API, which will integrate his portlets seamless into the portal. This gives a solid foundation on which to base a web interface to higher level applications installed on clusters.

Middleware and storage resources are handled internally as abstract entities. The integration of new middleware and storage types does not require updating the existing job management or the file management. New technologies can therefore be seamlessly integrated into the portal.

Future developments will include support for Unicore 6, Globus 5 and ARC resources. Another important goal is the integration of the Gatlet framework into LifeRay, a modern enterprise open source portal and collaboration software utilised by a big community. It's planned to provide an application repository where portlet developers can share their custom portlets with the communities.

Description of the work

The Gatlet framework is Open Source and written completely in Java. The name Gatlet is a combination of GAT (Grid Application Toolkit) and Portlet. GAT provides access to several major grid middlewares (Globus Toolkit, Unicore and gLite) and storage resources (GridFtp, SRM) through an API. It's easy to extend GAT with middleware types or versions.

GridSphere is used as portlet container for the portlets shipped with Gatlet and respectively custom portlets for scientific applications (e.g. Gaussian portlet). GridSphere allows users to authenticate against the portal with X.509 certificates.

Grid security issues are handled by Gatlet via MyProxy. Before using the portal the user must upload a proxy certificate (which is derived from his grid certificate, e.g. in the web browser) to a MyProxy server that issues short lived certificates that are used for accessing the grid resources.

The framework uses a database to store data for submitted jobs, grid resources and application data. In case of using JPA (Java Persistence API) all common vendors of relational databases are supported.

The Gatlet service API enables access to this database and GAT. Gatlet is unitised in the following areas that are built of core portlets which use the service API.

The job management unit submits, monitors and destroys jobs. It also allows to monitor the runtime parameters and the sandbox files of a submitted job.

The file management unit gives access to storage resources. The user can copy files between two resources and can upload, download, delete, rename files on a single resource.

The resource management unit provides a portlet to handle the resource entities of the database, which are needed to submit jobs and access storage resources.

With the SSHTerm Portlet the user can directly access an interactive console on a grid resource that supports the gsissh protocol.

URL

http://gatlet.scc.kit.edu

Conclusions

The Gatlet framework is one of the few open portal frameworks currently available. It allows users to access a large variety of grid resources without having to deal with the complexities of the various grid middlewares. Gatlet acts as a foundation on which application specific portlets can be developed and easily used on the grid by scientists with their web browser.

With gLite and SRM the framework supports two of the major grid services that are provided by the EMI (European Middleware Initiative). With Globus another big middleware flavor is available which is supported by IGE (Initiative for Globus in Europe).

As a result of the open architecture of Gatlet, ARC and UNICORE, the other two middleware that are supported by the EMI, can be integrated in the Gatlet Framework, which would then cover most of of the technology used in EGI.

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