ASSESSGRID

Scope

Every day, we have to make a choice between providers offering identical or similar services and products. The selection of an appropriate flight carrier by a potential passenger is based on various parameters. Price and availability are major criteria, but the airline's reputation and thus the assumed quality of service also plays a major role.

Grid computing actors have not recognised the importance of providers' reputation so far. On one hand, customers need some information about the reputation and the quality of the provider as well as a legal agreement before assigning a mission. On the other hand, providers are still cautious on adoption as agreeing on services including penalty fees is a business risk. While the Grid community undertook significant efforts by developing Service Level Agreements (SLA), it ignored the need for reputation as corner stone for gaining trustworthiness in Grid technology.

Assessgrid addresses those issues slowing down commercial Grid adoption. For providers, the project brings risk assessment methods as decision support for accepting/rejecting SLAs, negotiation, and resource management. Assessgrid software also delivers to customers the estimation and confidence information to support provider selection and penalty negotiations. This is realised through Grid brokering services aggregating providers' offers and computing confidence levels according to success or failure of tasks delegated to each service provider.

Advances

The Assessgrid project is addressing the risk awareness and consideration in SLA negotiation, self-organising fault-tolerant actions, and capacity planning. The corner stones are risk management scenarios reflecting the perspective of Grid end-users, brokers, and providers. The results support all Grid actors by increasing the transparency and reliability of Grid services. By measuring and analysing risk in the provider's infrastructure, the project is also providing an objective foundation for planning and management of Grid activities.

Assessgrid will deliver an Open Source software platform for risk assessment, risk management, and decision support in each layer of the Grid software stack. Outcomes of the Assessgrid project will unlock market for Grid service providers by enabling agreements on quality of service with their customers. Furthermore the outcomes will form the basis for Grid brokering services similar to those existing in the telecommunications and energy sectors.

Methods and algorithms developed in Assessgrid on risk assessment and management will not only be beneficial for traditional Information Technology (IT) infrastructures by overhauling failures detection, but also will be applicable to emerging paradigms such as Cloud computing or Service Oriented Architectures (SOA) by increasing the level of confidence or trustworthiness their users can have.

Positioning in global context

AssesGrid is a precursor in studying risk assessment and applying risk management to Grid computing. Work executed in the project open the way for an exciting research field open to other aspects of Information Technology. At the same time there is currently no implementation of automatic negotiation of Grid services between two software programs and Assessgrid is about to deliver a prototype of such a mechanism. Automatic negotiation will help to develop software service composition while fostering research in SOA. Finally, both risk management and Grid service negotiation open interesting perspectives with economic analysis.

Contribution to standardization and interoperability issues

Assessgrid participates in the elaboration of the Web Service "WS-Agreement" specification dealing with automatic agreement between software applications, elaborated by the Open Grid Forum (OGF). The project developed a prototype used to perform protocol validation and interoperability. As no implementation of automatic negotiation exists nowadays, the Assessgrid project is defining requirements to implement negotiation between parties.

Assessgrid contributes to the standardization process by organizing workshops and being active in the OGF GRAAP (Grid Resource Allocation Agreement Protocol) working group.

Target users / sectors in business and society

Potential users of the Assessgrid outcomes are listed below:

- **System integrators:** Information Technology service companies acting as integrators and deploying Grid infrastructure with built-in risk assessment for providers.
- **Service providers:** Grid service providers either external or internal (large companies/organisations with IT department providing Grid services for other departments of the company). Service providers would use the risk assessor and the negotiation manager of the Assessgrid platform.
- **Application providers, offering Software as a Service (SaaS):** Application providers use Assessgrid software primarily to assess risk on their application hosting infrastructure (risk assessor). Once they use external resources, application providers can deploy brokering services of Assessgrid to select and benchmark them.
- **End-users:** They are users of either external Grid services (movie industry, bio-informatics) and/or internal Grid services in banking, insurance, telecommunication and pharmaceutical sectors.

Overall benefits for business and society

The Assessgrid outcome is a strong enabler of commercial Grid services as it delivers missing methods, software, and technologies in order to offer customers improved SLAs. Each actor of Grid service can see benefits in Assessgrid results:

- **Service providers** have a better view of their infrastructure and the possible failures; they improve their internal efficiency and therefore their external services. They are also able to engage on SLA, meeting the requirements of new customers.
- **End-users/customers** save time, money and receive an improved and reliable service. Assessgrid software providing them with confidence indicators to guide their choice of providers.
- A **Grid brokering** sector can thrive for external services. Large companies can also deploy Assessgrid brokering component to evaluate reliability and assess risk of various internal service providers.

Globally, Assessgrid outcomes allow better handling of computing resource outages, such as computer downtimes due to failures, and avoid wasteful re-execution of failed computing tasks while increasing intensity of use of IT infrastructure. Those two ways to increase efficiency, provided by Assessgrid, enhance use of energy and will contribute to "Green IT" efforts in addressing environmental concerns.

Examples of use

The scenarios listed below represent possible examples or real use-cases that are planned to be deployed once all the outcomes of the project will be delivered.

- **A service provider enhancing the Quality of Service of its own offer :** a provider, not necessarily restricted to the Grid services sector, wants to assess risk failures in its own infrastructure, so it deploys the provider layer software of the Assessgrid platform on its infrastructure to evaluate risk and anticipate problems caused by failures.
- **A bank managing its infrastructure:** The IT department of a bank manages several internal Grid providers. While providers use risk assessor component to manage risk, the IT department deploys brokering software for use by its internal customers in order for them to find the better offer from internal service providers that match their requirements.
- **SMEs:** due to their lower economic capacity, SMEs strongly need to outsource their computing resources. Assessgrid outcome will allow them using reliable computing services to meet their needs. It corresponds to the long-term target. Large companies will also have to rent their computing resources instead of buying more and more resources due to growing legal and economical green policies in environment prevention.

Achievements

The main achievement of the project will be the **"Assessgrid Risk Management System"**, the software platform, which users can integrate to their existing Grid infrastructures. In addition to many publications related to the topic, the project will also release a **final report on Advanced Risk Assessment** at the end of the project (first quarter of year 2009).

The project is also delivering three prototypes during its lifespan. Currently the first prototype in beta release can be downloaded. A second prototype will be available in July 2008 while release of the final is planned for beginning of year 2009. All prototypes and their source code can be downloaded from Assessgrid web site.

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