PROCEEDINGS OF SCIENCE

Internal Grid Computing Experiences in Financial Companies

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A recent studio from Gartner Group shows how computing utilization of Intel platform is typically very low (from 15 to 30%).
The usage of an internal Grid computing infrastructure could provide a way to maximize the computing utilization of resources, lowering cost and speeding up some kind of processes.
Monte dei Paschi has begun to study this kind of architecture since 2004 and has a production environment since the Januarys 2005 for many different computing intensive applications.

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1. Introduction

CONSORZIO OPERATIVO GRUPPO MPS (COperGMPS) is a company within the Monte dei Paschi di Siena Group; it manages information technology systems and administrative services for companies within the group.

COPERGMPS has adopted a SOA architecture since 1999 to provide connectivity between different information systems inside and outside the Group. Gartner Group says that MPS Group is one of the first institutions in the word to have implemented a SOA architecture and to provide web services to their customers.

The final goal of this strategy is to permit the financial institution inside the Group to dive in the evolution of the internet environment: a large ecosystem of services interconnecting Government, companies and final users.

COPERGMPS has been an early adopter of many brand new technologies in financial services. The central infrastructure is built on mainframe and server systems. We have MS Windows 2003 as central servers and Linux servers for both some very specialized parts of our infrastructure and some business applications.

As a consequence of the introduction of new regulation as IAS and Basel II, CRM and reporting applications actually need large amount of computing power.

As competition increases, financial institutions have to lower costs and increase their agility in application development and execution.

Since 2004 we have begun investigating an Internal Grid solution with the goal of discovering and leveraging idle resources for CPU intensive applications: we started with Condor infrastructure by Wisconsin University.

In late 2004 we decided to implement AGA*: a new GRID architecture with Avanade Inc.

This new architecture is in production since the beginning of 2005 and we have implemented many different applications on top of it.

AGA provides an applicative architecture which is able to distribute many different jobs on a server farm made of dedicated and non dedicated machines. AGA is able to work both in MS Windows .Net platform and a multiplatform JAVA environment.

1.1 Application using internal Grid Computing

Today we have implemented 4 applications that are currently in production (Clickstream analisys, IAS 32 and 39, Basel II Market Risk Management, Client reporting services) and we have plans for several new applications. Today we have about 50 servers and clients in the Grid server farm. Only few of these are dedicated machines.

Today, the Consorzio provides information system services for many banks and companies inside the Group; so it has to manage a lot of web sites and to mine information from their web logs. Currently we manage about 50 web sites with 476 instances of web server, for scalability reasons. We are using both an open source

*) Avanade Grid Based Architecture.

application (Webalizer) and a proprietary application build on reporting services by Microsoft to mine and analyze all these logs

In a traditional computing environment we had supposed the usage of two 4-processor Intel server working for about 8 hours each: the same jobs take about 3 hours running on the described Grid architecture.

The reporting effort for IAS standard requires many batch jobs. Since the beginning of this project we had decided to use our Grid architecture instead of traditional Mainframe development.

This IAS application is capable to run on different platforms: Mainframe, Windows and Linux. The provider usually strongly advises the mainframe-based application for large banks and the department one for small financial institutions.

Using the Grid architecture we have demonstrated that we are able to run the department solution even for large banks, by using idle resources.

The application was in production since August. We met a lot of problems caused by the lack of instruments which are normally provided by the mainframe infrastructure so we had to implement this kind of instruments from scratch on Windows platform too.

Now everything works fine and very fast (all the jobs are running during the day and tasks finish in about 8 hours).

For market risk analysis compliance within Basel II regulation we have chosen the "Algorithmics" suite.

This suite typically runs on Unix environment but is also suitable for Grid scheduling. We decided to use AGA also for this environment and so we have implemented a Java client where to submit tasks from and a Java computing node where to run Linux grid tasks.
We are in production since the end of 2005.

During 2005 we also decided to acquire a solution for designing and producing official customer communication documents such as account statements, reporting statements, etc.

As for the IAS experience, our provider had both a mainframe-based and a Windows-based application in its application portfolio, recommending, as usual, the first for large companies and the second for small e medium size ones.

The mainframe solution was already in production but the computing effort and the elapsed execution time were not compatible with our business requirements (some batches took more then 4 elaboration days).

Today we have implemented the solution using the Intel application on AGA and we succeeded in obtaining more speed and cost cutting in this activity.

We are now testing the porting of many different batch processing from the IBM mainframe to our AGA Grid solution with the goal to lower the computing effort on the central machine using idle resources.

1.2 Evolution

We are now planning several evolutions:

1) porting new application to the AGA Grid infrastructure,
2) evolving the AGA Grid with Avanade to make the solution stronger and to obtain new functionalities,
3) implementing a new WSRF gateway to make the interaction possible with other Grid solutions and with remote sites
4) invoking Grid services from a remote client

We believe that Grid services (or "stateful web services") can represent important evolutions for some kind of business services usually provided by financial institutions for those customers who have to face very complex computing scenarios (corporate entities, government, etc.).

In this kind of interaction clients need not only to invoke stateless web services, but they also really need to transfer large file containing many dispositions (like providers payment, employee payment, etc), invoke execution, wait for notification of errors or "end of job" signals.

We believe WSRF can be a way to provide all these services in a standard way, in the very near future: this is a crucial requirement for the services ecosystem in the SOA paradigm.

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