

# Monte Paschi Group

## From Milan to Dublin in Milliseconds on a New Application Platform

With more than 44 billion Euros of total managed assets, MontePaschi Asset Management (MPAM), a company of Monte Paschi Group (MPSG), is an established leader in the European fund management market. In 2006, the company banked on the GigaSpaces XAP scale-out application server to deliver the integration capabilities and improved performance required to support growing transaction volumes between its Italian and Irish IT systems.

### CHALLENGE

When Milan-based MPAM entered the quantitative management market by teaming with a Dublin-based investment company, the company initially employed a traditional application server approach to exchange pricing information between the two geographically distributed sites. As the business took off over the next couple of years, low bandwidth combined with "information spaghetti" led to unacceptable latency and limited scalability. Fixing the problem required centralizing the financial data providers and improving distribution performance.

### SOLUTION

MPAM implemented the GigaSpaces eXtreme Application Platform (XAP) scale-out application server as the underlying middleware for its "Piattaforma Unica" (Unique Platform), a new Enterprise backbone that integrates all existing data providers with data consumers. Working with FastConnect, a European IT consulting firm, MPAM used XAP to develop a new pricing information system that replaces the previous application server architecture with a dynamically scalable, low-latency platform.

### RESULTS

The new pricing system delivers extreme performance and includes a statistical "cockpit" that provides managers with the status of the company's performance, profitability, risk, and volumes, and allows them to run simulations of new business scenarios in near real time. ROI has been equally extreme—the simplicity of the development and testing phase allowed MontePaschi to achieve 100% return on its investment in GigaSpaces XAP before even going into production. The simplified architecture and improved reliability of the GigaSpaces solution has also significantly lowered the cost of ownership compared to the old application server.

#### Solution Overview

- Replaces traditional application server approach with GigaSpaces XAP scale-out application server.
- Easily elaborates 10,000 quotes realtime.
- Supports high-volume distributed data exchange in near real time.
- Provides dynamic scalability to meet fluctuating demand.

*"Dynamically deploying services throughout our network was one of our key requirements, and GigaSpaces platform was the perfect fit for our needs."*

—Alberto Santini,  
Head of Business  
Intelligence and Math  
Engine for Wealth  
Management

## THE CHALLENGE

### Creating a Unique Platform to Eliminate Information "Spaghetti"

Alberto Santini heads MPSTG's Business Intelligence and Math Engine for Wealth Management, a small development team with deep expertise in both business and technology domains. In 2005, he was tasked with finding a solution to the multitude of problems associated with the application server-based pricing workflow and technology.

"At the time, people were using local Excel spreadsheets to manage information, exchanging data via email or ftp, and struggling with low bandwidth between Italy and Ireland," explains Santini. "There was no data owner since everyone managed their own spreadsheets and integration between systems had to be done manually. With the spaghetti information we were dealing with, exchanging many prices with any time coherence or speed was basically impossible. Every transaction had high latency."

To transform the complex technology and cumbersome business process, Santini began investigating Space-based technology as a means to gain scalability and low latency. The new architecture needed to provide fast access in both Milan and Dublin to prices generated by the Price Module. It also needed to be able to get historic data generated from the Price Module.

### Key Requirements

The main goal of the Unique Platform (UP) was to hide all of the underlying heterogeneous data sources located on several systems. The development team identified several key requirements to accomplish the goal:

- **Service-Oriented Architecture (SOA) and Unique Interface (UI)**—The architecture needed to support loose coupling among interacting software agents, and include a UI that could create "contracts" between supplier (UP) and client (consumer) in a request-response mechanism.
- **Aggregation**—The UP needed to be able to collect information coming from different sources and provide a single response to the application request.
- **Parallel Processing**—To speed-up the statistical-engine calculations, the UP had to allow dividing the program into multiple fragments that could execute simultaneously, each on its own processor.
- **Scalability**—The system needed to scale up by adding resources to a single node in a system, such as adding memory or a faster hard drive to a computer. It also needed to scale out by adding more nodes to the system, such as adding a new computer to a clustered application.
- **Availability/Fault tolerance**—The UP had to be able to respond gracefully to an expected or unexpected hardware or software failure.

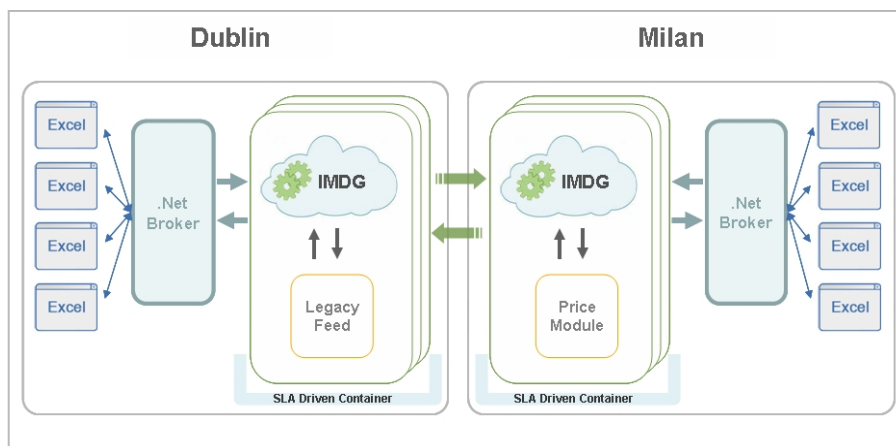
After a brief search, Santini decided to base the new architecture on GigaSpaces. "In 2005 there were many 'vaporware' Spaces products out there, but I don't remember what they were now," he recalls. "GigaSpaces was the only company focused on the technology we had been looking for: parallel processing using a workflow approach, a simple architecture with user-friendly administration, very low latency, and a wonderful API. (Thanks, Nati!)"

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## THE SOLUTION

### Multi-Site Data Sharing in Near Real Time

The Unique Platform is based on the GigaSpaces XAP scale-out application server. It is designed to access the database, perform parallel processing, aggregate data, and provide data in a service-oriented way. This combination of functionality enables MPAM's data consumers to write requests and read responses from data providers in milliseconds, and notifies data consumers of real-time changes to the data. It also allows the exchange of high volumes of data (i.e. best prices) between users in Dublin and Milan in near real time.



The GigaSpaces dynamic service deployment capability allows scaling out of the application services while ensuring low transaction-latency—even under extreme data volumes.

### One Unique Technology Solves Many Challenges

GigaSpaces XAP increases resiliency and eliminates scalability barriers by condensing the Price Module application into a self-sufficient Processing Unit (PU) that performs the entire business process. At the core of the Processing Unit is the space—a middleware infrastructure, collocated with the business process services—which provides in-memory messaging and data storage facilities for the Processing Unit.

MPSG's grid platform integrates data providers with data consumers and automates commercial and budget processes by means of the GigaSpaces Space:

- Business information is distributed from the databases to the Spaces using a workflow approach implemented in GigaSpaces Services.
- Information is replicated in the In-Memory Data Grid (IMDG), allowing real time data feeds to the Spaces.
- The Excel user interface uses the Space API to retrieve the data.
- User-friendly administration makes it easy to add resources and spawn new processes

The applications and the grid platform share the same interface, providing total control over the information exchanged. The grid platform knows the requests an application can perform, and the applications know how the responses will be provided by the grid platform. Changes applied to the data structure are transparent to the applications, which do not need to be updated because the “contract” (interface) remains the same.

### UNIQUE PRICING SYSTEM WORKFLOW

1. Excel clients register interest in a specific instrument by connecting to the Java broker through socket-based connection.
2. The Broker writes the corresponding request as an entry in the Space.
3. The Broker registers a notification associated with the expected price entry.
4. The Price Module listens for requests (reads corresponding tasks) and publishes prices associated with the instrument.
5. When an interesting new price is generated in the Price Module, it is written in the Space.
6. Each time a new price is written in the Space, a notification is triggered to the Broker.
7. The Broker sends the new price to all RTD servers via a multicast connection.

*"With GigaSpaces, we don't have to worry about fluctuating loads because we can add or remove resources when needed, while running our applications simultaneously."*

## THE RESULTS

### Fast ROI, Low Latency, and High Throughput: Everybody's Happy

It took only three months for the MPSG team to move from architecture configuration to physical implementation of the grid platform, and even less time to achieve a 100% return on the investment in GigaSpaces XAP. "We were lucky in that the project started from scratch, so we could build it exactly how we wanted it," says Santini. "This simplicity of development and testing allowed us to integrate our math engine quickly, smoothly, and without pain. The success of the technical side of the project can be largely attributed to the FastConnect consultants who injected GigaSpaces knowledge inside the team."

With the new grid platform in place, the network is now the application container and information spaghetti is a thing of the past. In just 8 hours each night, the system can elaborate 10,000 quotes realtime and extract performance, profitability, risk, and volume information from the in-memory data grid. Users can also exchange high volumes of data in near real time, dramatically improving collaboration between Italy and Ireland. "The bottom line is that the users and the boss are happy" says Santini.

The development team is happy, too, since the architecture has been greatly simplified compared to the multi-layered application server system. "We're not a software company, we're a financial company," Santini explains. "We didn't have weeks or months to study the technology. Our main goal was to use it to achieve our goals. GigaSpaces XAP allowed us to do that right out of the box."

The new system delivers the low latency, high throughput, and dynamic scalability MPSG required by using Spaces to distribute the processing load between nodes, currently made up of 24 CPUs and 8 application servers. "With GigaSpaces, we don't have to worry about fluctuating loads because we can add or remove resources when needed, while running our applications simultaneously," Santini explains. It also ensures high availability and lowers the cost of ownership. "We can count on one hand the number of calls we've had to make to GigaSpaces support. We only

had one show-stopper and the live system was delivered within one week."

Since launching the UP in 2006, MPSG has ported the software from GigaSpaces 5.x to 6.x. Santini recalls, "GigaSpaces made a promise to our company that its software would adhere to the Keep It Simple Stupid (KISS) approach. The new product release has not only fulfilled that promise, but also allows us to deploy the software throughout our infrastructure at the speed of light."

In addition, MPSG has leveraged the project's success and GigaSpaces XAP in a larger context: the group's Wealth Management Advisory Platform. This platform processes a huge number of portfolios to calculate the budget of the commercial network, new products, or an assessment of the customer portfolios.

#### KEY BENEFITS

##### Simplicity and fast ROI-

GigaSpaces XAP works right out-of-the-box and eliminates the multiple layers associated with the previous application server approach. The simplicity of development and testing delivered 100% ROI before the system went live.

##### Dynamic scalability-

Handles 10,000 quotes realtime and allows quick adaptation to changes in load.

##### High quality and easy maintenance-

Zero governance for facility management and minimal technical issues provide high availability.

##### Extremely low latency and high throughput-

Distributed load across 8 machines speeds access and improves collaborations between sites.

##### Rapid deployment-

Processing Units can be deployed or updated in minutes.

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### **About GigaSpaces**

GigaSpaces Technologies is a leading provider of scalability solutions for Java, .Net and C++. The company's flagship product, GigaSpaces eXtreme Application Platform (XAP), is a next-generation application server built for today's most demanding enterprise and web applications. Unlike traditional application servers, GigaSpaces XAP scales predictably and on-demand, and integrates with existing development frameworks.

GigaSpaces customers include leaders in financial services, telecommunications, government, manufacturing, oil & gas, on the Web and other industries.

### **About Monte Paschi Group**

Monte dei Paschi di Siena spa Banking Group was founded in 1472 and is considered to be the oldest bank in the world. It is among the top five Italian banking groups. It operates across the whole Italian market in all the relevant international sectors. Its activities span Retail Banking, Private Banking, Asset Management, Investment Banking and Corporate Finance (Project Financing, M&A, Advisory, etc.).

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