

Grid Computing moves beyond derivatives to wider Financial Services sector



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The Financial Services sector has been taken the lead in adopting grid computing commercially over the last 5 years, using it to power complex, time-constrained financial calculations. But grid computing has proved so successful that IT departments are struggling to meet

demand from across their banking organisations. Terry Quigley, head of Financial Services at COLT and grid computing expert Frank Falcon, also of COLT, argue that banks need to look to managed services to open up grid's true potential.

The background to grid computing

In the late 1980s and early 1990s the concept of grid computing began to be discussed in technical circles. The idea was to create a pool of processing resources that could be made accessible to many users over a closed network to execute a wide variety of computing tasks. It was enthusiastically taken up by scientific and academic communities as a very cost-effective way to undertake research that their limited IT budgets would not have been able to sustain in any other way. This typically comprised massive, parallel computing tasks such as those found in astronomy or seismology.

The basic premise was that these massive computing tasks could be split into a large number of smaller jobs and simultaneously farmed out to computers in the community pool via the network connectivity. The idea was to use the redundant processing cycles that typically exists on the vast majority of servers and personal computers. Statistics show that on average desktop PCs normally use less than five per cent of their capacity, small Unix boxes less than 10 – 15 per cent and large Unix boxes less than 15 – 20 per cent. Normally, these under-utilised capacities are not accessible to software applications other than the one they have been provisioned with.

Importantly it has been established that one of the main reasons that the Grid was seen as eminently suitable for these types of applications was that these communities typically had a secure Virtual Private Network (VPN) over which these computers could be securely allocated tasks.

In its simplest form, grid computing has enabled organizations to unite disparate IT capabilities to create powerful, unified platforms in an extremely cost-effective way.

Grid computing in the Financial Services sector

The financial sector has eagerly adopted grid engines in the last few years, mainly for derivatives calculations that require the huge amounts of processing power which only grid engines can deliver quickly and cost-effectively. Investment houses run complex financial models with a wide range of variables being calculated to support complex derivative simulations. It is paramount that these 'Monte Carlo' simulations - massive calculations covering a wide spread for each variable – are processed as quickly as possible.

The requirement for a derivatives calculation can be simplified into two categories:

1. The massive simulation calculations needed for strategic planning to manage risk e.g. answering 'what if' questions, such as what if interest rates moved 50bp.
2. The real time calculations needed where they have to deliver a price as a result of a trade or blocks of trades. The response has to be in 100s of milliseconds. This is time critical as whoever gets the result first, at the right price, places and wins the trade.

Using grid computing for derivatives calculations has proved very successful. However, this success has come at a price. Trading requirements needed higher and higher levels of accuracy but faster and faster execution. Paradoxically, the banks found that to improve accuracy they needed the applications to run for longer periods, therefore impacting time to trade!

To address this challenge IT departments started to introduce different kinds of efficiency measures, such as scheduling engines, buying clusters with very sophisticated load balancing machines and all kinds of techniques to make the process as efficient as possible. These worked for a while, but ultimately the escalating spiral of capex involved has begun to impact financial matrices like TCO and ROI.

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These problems are reaching a critical point, because banks' data centres are creaking at the seams - they are running out of power, space and cooling facilities needed to support grid engines. The challenges are typically the same for every data centre:

- > Lack of agility due to statically-bound resources – applications are over-provisioned to peak loads and will not scale dynamically or adapt in any way, making it difficult to align resources with business imperatives
- > Rising complexity and Total Cost of Ownership – as systems are geographically dispersed and heterogeneous, they are expensive to manage. Simply provisioning and managing them accounts for 80% of the total cost of ownership
- > Increasing space, power, and cooling costs – data centre floor space is growing at compound annual growth rate of 5% - 7%, accounting for escalating costs
- > Increasing regulatory compliance requirements – today's regulations such as Sarbanes-Oxley and MiFID, require companies not only to deliver information, but to provide controls and store the data for specific periods of time
- > The need to keep legacy applications operating at the required performance levels – at the same time IT departments need to contain costs and ensuring we can future-proof the environment with web-centric applications

In summary, banks have reached the point where they have bought all the right kit, they have capitalised on all the available efficiencies, and then the CEOs have started to ask whether this new model could be successfully deployed in other areas of the business and for general business applications such as ERP and CRM systems.

Limitations of grid computing in today's IT environment

The grid engine fulfilled its promise to open up the under utilised resources and simultaneously provide the level of agility required to meet the changing business needs. But not surprisingly, IT departments have recognised the limitations that their current IT environment imposes on their operations.

We see three major limitations facing IT departments with Financial organisations:

1. They are experiencing an unprecedented downwards pressure on costs, whilst simultaneously being required to improve performance and hence the market differentiator. Even though the costs of technology overall is falling, the

heterogeneous nature of the IT environment is causing operational costs to escalate;

2. The need to produce a step-change improvement in the existing costs and performance limitations of running legacy business applications;
3. No clear, intuitive, evolutionary path to embrace the emerging shift to a web-based software-as-a-service (SaaS) delivery model for business applications, eliminating the current constraints of licence purchases and IT hardware capabilities.

What do these challenges have in common? The common relationship between them is the need to exploit the benefits that virtualisation of the entire IT stack can bring. They require access to an intelligent engine to provide the control necessary to run application software as and where required within the pool of resources available – in reality a complete separation between the software and the hardware it runs upon.

Those CIOs that have recognised the need for this separation of applications and infrastructure have turned to the suppliers of Grid Computing Engines for the necessary intelligence. They have successfully incorporated these engines into their infrastructure within their firewalls. This has enabled them to implement an IT organisation and infrastructure transformation which has allowed them to begin to act as an Internal Service Provider to their internal Line of Business customers.

They have employed a basic SLA structure as the service assurance mechanism, typically for one or two applications. However the limitations of this approach have already become apparent as the IT departments have attempted to expand their service offerings in response to demands from different departments.

The IT infrastructure available is restricted to those assets contained within the firewall, and the staffing operational costs and expertise required to run the grid engine have proved to be a significant limitation to expansion of the service. Both of these issues have restricted the IT organisation in its ability to capture the full business benefits of its role as an Internal Service provider.

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The Future – Managed Grid Services

The grid computing marketplace is starting to evolve. Early-adopter CIOs have recognised that third party service providers can help address the major challenges they face with expanding their grid capabilities, if they were able to provide access to other IT assets and also provide the expertise to manage the grid engines.

Telecoms providers such as COLT, which operates an extensive fibre network with geographically dispersed data centres, are well placed to create and manage a grid platform within their own network. They can create a massive grid platform by adding in connectivity controls that provide customers with access to other IT assets contained in these dispersed centres across the network. This resulting platform can be used to offer managed grid services that have no restriction on the size, type and diversity of IT assets available to it and can be supported by an expert team managing the Grid Engine(s) centrally.

Financial sector organisations will be able to choose from a range of managed services depending on their specific IT set-up. As a small step, banks will be able to run their existing legacy applications themselves at substantially reduced costs, by tapping into the extra computing power provided by the service provider's grid, as and when they need it. Over time, they will also be able to outsource the provision of entire applications to a third party, backed by SLA guarantees. Typically known as 'software as a service', this model will give financial sector customers very high performance and reliability together with substantially reduced and more predictable costs.

Conclusion

The Financial Services sector has been an early adopter of grid computing with spectacular success in the area of derivative calculations typified by 'Monte-Carlo' type simulations. However, there is now increasing demand for using grid services for more general transactional business applications. If the sector is going to reap the full benefits of grid computing within the limitations of the current IT environment, things are going to have to evolve.

At COLT, we believe that network-centric grid engines, where the grid engine is built within a service provider's network, are going to be key to the future of finance sector IT. Organisations will be able to take small steps on the 'grid journey' depending on their IT requirements and set-up. Whether managed grid services are used simply to provide additional computing power for legacy applications, or they are used to provide entirely outsourced business applications, they will introduce a much more flexible and lower cost way to meet the IT needs of the tomorrow's finance sector.



About the Authors

Terry Quigley heads COLT's Financial Services team, which serves more than 1,000 organisations across Europe. Frank Falcon is a senior product manager within COLT's managed services team and is responsible for driving forward COLT's grid programme. United Devices granted Frank its 2006 Grid Visionary of the Year award in recognition of his work at the forefront of grid technology as an enterprise platform.