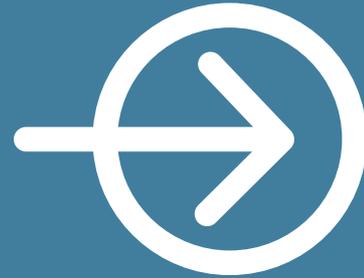# Case study | London Stock Exchange

RSP Gateway messaging architecture

London Stock Exchange

improved its market infrastructure, cut costs for retail trading and built on its advanced technology vision.

Company profile

The London Stock Exchange (the Exchange) is Europe's leading stock exchange and the third largest in the world. Established in 1800, it plays a vital role in positioning London as a major financial centre and lists more than 2,800 securities, both UK and international. Its market regulation activities are fundamental to the UK's international reputation for fair dealing and high standards.

The Exchange generates income from listing and membership fees, as well as from the sale of trading and information services. Its vision is to shape the global markets through technology links and partnerships, creating a global network of clients who access its markets for primary, secondary and stock exchange services. To create value for its shareholders, the Exchange consistently looks to increase the reach and scale of its business and to further extend its service offerings. Investment in innovative technologies is central to that goal.

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London Stock Exchange | RSP Gateway messaging architecture

Business scenario

Early in 2001, the Exchange undertook a review of the infrastructure in place to support retail trading. Its objective: to encourage a more competitive and efficient market.

Over time, the UK private client brokers, who represent an important group of the Exchange's shareholders, had developed complex, multiple host links to the individual Retail Service Providers (RSPs) from whom they obtain the prices to execute customer orders. Every time a broker wanted to obtain competitive prices for a customer, he or she potentially had to make 10-12 different phone calls.

The system not only represented a high industry cost, it also created high barriers to entry for new Retail Service Providers. "We wanted to offer an alternative," explains David Birch, Head of Trading Services at the Exchange. "We wanted to be able to deliver, at a utility level, a more efficient and cost-effective infrastructure for the retail brokers."

The Exchange's requirements in terms of time to market, cost, performance and functionality were challenging. There could be no point of failure and the new system could not afford to lose a single message. Nor could it tolerate additional latency.

The Exchange, indeed, wanted a solution that could process 500 messages per second, each with an average size of four kilobytes at an average latency of less than 250 milliseconds – a tall order. Moreover, as well as fully guaranteed and recoverable delivery, the solution had to be flexible enough to grow and develop in tandem with the retail market.

Building the solution

The Exchange decided to team with Accenture, a business partner of 10 years' standing and Avanade® the deep technology experts, to create the solution. The result of that creative partnership is RSP Gateway, a highly innovative, custom-built messaging architecture that gives retail brokers and RSPs a single, consolidated connection for routing quote and execution messages.

The strength of the Exchange's existing relationship with Accenture was key to the realisation of the RSP Gateway solution. The Exchange had worked with Accenture already on several large infrastructure-related projects. The two had originally teamed to work on the replacement of the Exchange's legacy trading systems with SEQUENCE, a top-performing platform for institutional securities trading.

"Accenture knows our business very well," says the Exchange's Birch. Birch also knew that Accenture had the global resources, including a strong network of partnerships and alliances, technological know how and experience in Web Services to create the solution the Exchange sought. Furthermore, Accenture's ability to swiftly assemble an integrated project team of professionals skilled in the relevant applications and technologies, including technology experts from Avanade, an Accenture affiliate company, jointly owned with Microsoft®, would help accelerate delivery.

The Exchange first asked the Accenture team to scour the market for existing systems that might be able to fulfil its requirements. But although about half a dozen software houses sold applications that could handle one-to-many messaging, the many-to-many service that the Exchange needed would necessitate significant modifications to existing software. "Whatever we put in the middle had to be extremely fast," explains John Erik Ellingsen, Accenture Partner on the project. "Either we found a very rapid middleware product – or we built something from scratch."

Standard market middleware was quickly rejected as too expensive in terms of both hardware and licensing fees. BizTalk® (Version 1), however, looked more promising, and the alliance with Microsoft helped facilitate a joint proposal, in conjunction with Microsoft Consulting Services. The Exchange liked what it heard and asked for a proof of concept.

Deep technical
expertise

Accelerated solutions
delivery

Powerful partners

Global reach

The development of RSP Gateway took place in two main phases. The first, prototype phase, which completed in June 2001, was key to the final outcome.

The prototype was built on HP hardware, so a development team flew to the HP Datacenter laboratory at Redmond in the United States, where Microsoft is located. Microsoft Consulting Services and personnel from the BizTalk and Microsoft® SQL Server product groups joined them for an intensive, two week testing period. It soon became clear, however, that BizTalk alone would not provide an economically viable, high performance solution. The special nature of the Exchange's requirements implied something completely new – in effect, a custom-built solution based on Microsoft technology.

"There was quite a high degree of risk involved on both sides," says Trading Services Head Birch. "But Accenture, Microsoft and Avanade were very keen to make sure this would work. They pulled out all the stops."

In the early summer of 2001, Accenture and Avanade set about designing and creating a custom-built, C++ application, using XML Web Services in which it is experienced. Because XML and SOAP, the two technologies that comprise Web Services, together provide a way of presenting an interface over the Internet that is platform-independent, they lower barriers to entry.

The Accenture team comprised 30 people at its peak. They were complemented by three technology experts from Avanade, one of whom was part of Microsoft's Most Valued Professionals (MVP) programme. They also worked closely with a design team from Microsoft Consulting Services, which included a SQL Server consultant whose input was crucial for the SQL Server 2000 database on which RSP Gateway

runs. "We made sure our premier support people were involved throughout the project," confirms Microsoft's Muir. Development with Visual Studio® 6 using C++ accelerated the process and led to cost and schedule savings over the considered alternatives (including Himalya and Solaris).

The system was exhaustively tested for almost four months before going live in May 2002. "There were a lot of weekends in there," recalls Licence. But it was all worth it. This testing phase, indeed, was critically important in proving to the Exchange that the custom-built solution would deliver the innovation it required.

Delivering value
And it did. Brokers and Retail Service Providers can now communicate via a single connection, a central hub, which performs message translation, routing, enquiry and recovery services, and barriers to entry for new Retail Service Providers have been significantly lowered.

RSP Gateway runs on Windows® 2000 Advanced Server and Datacenter Server, utilising MSMQ for inter-process messaging, as well as the SQL Server 2000 database. Because all the drivers in Windows® Datacenter Server are part of a pre-configured package, the architecture is exceptionally stable – a key requirement. Moreover, simply by adding more servers, throughput can be increased, giving the application the scale-out functionality that the Exchange also needed. The system relies on a combination of two and six CPU HP Proliant Servers with a high-speed SAN for shared storage, so there is no single point of failure. It also offers two customer interfaces – FIXML 4.3 over SOAP / HTTPS and FIX 4.2.

Customer reception has been 'very positive', according to Birch. Several brokers and Retail Service Providers are already online and trading and other customers are undergoing integration testing prior to going live. The solution has also had an impact on the wider market. Five of the major retail software houses have upgraded their applications to support the Gateway.

The future

RSP Gateway was built with the flexibility to support non-equity products and, in time, non-retail applications. It is already providing access to companies offering prices in covered warrants and will soon provide access to bonds as well.

Because it uses Web Services so efficiently, RSP Gateway provides a business to business solution that will significantly lower the cost base for the industry. The XML, SOAP-based, platform-independent capability lowers barriers to entry for new RSPs. The solution is expected to increase competition for broker business and over the two year timeframe envisaged by the Exchange will allow the industry to benefit from cost savings through infrastructure and efficiency gains.

Perhaps most importantly, RSP Gateway has delivered innovation. "The Gateway is the largest single build since SEQUENCE," confirms Birch. It delivers the first FIXML and FIX-compatible interface into the Exchange. It represents the first real application of Internet technologies for the Exchange. And it is the first service to be launched by the Exchange on a Microsoft platform.

To find out more about Avanade visit our web site:
www.avanade.com

Summary

Company
London Stock Exchange

Customer challenge
The Exchange wanted to develop a central solution for routing messages between brokers and Retail Service Providers (RSPs) to replace the current decentralised and fragmented system. Our envisaged solution entailed the building of a Gateway to provide a single simplified interface to multiple RSPs for brokers. The challenge was finding deeply-skilled resources with technical capability to bring this business vision to reality.

The solution
Avanade assisted in the development of the RSP Gateway which was built using Microsoft technologies, with most of the code written in C++. Avanade staff:
• Participated in the technical design, code and test of the RSP Gateway.
• Provided assistance and guidance to other team members.

The solution provided the facility for brokers to obtain price quotes from RSPs, to execute deals with RSPs and other supplementary messages. Brokers connect to the Gateway using the Exchange's new IP network. A FIXML based interface is provided over the network infrastructure. RSPs also connect to the Gateway using the FIXML interface.

The new FIXML interface has been designed to deliver openness and simplicity for the brokers and their supporting ISVs. Current and emerging web standards HTTP and SOAP along with FIXML have been adopted.

Results
The Gateway resulted in an improved level of service to brokers and will deliver efficiency benefits to RSPs. It also lowered the costs to the Exchange of providing this service.

What our customer says
"On the London Stock Exchange engagement, Avanade have shown just what a real strategic asset they are to Accenture. When we needed really deep .NET development skills and experience with Windows Server 2003, Avanade have been able to answer the call. Not only that, but their integration with the core Accenture team has been seamless. For all future Microsoft-related projects, I will definitely think Avanade."
John Erik Ellingsen, Accenture Client Partner,
London Stock Exchange

About Avanade

Avanade is the leading technology integrator specialising in the Microsoft enterprise platform. Our people help customers around the world maximise their IT investment and create comprehensive solutions that drive business results. Additional information can be found at www.avanade.com

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