

RAD From Opposite Ends of the Earth: A Case Study

Despite geographic separation, a company and its client collaborated to successfully develop an efficient, customer-friendly system, using development frameworks, distributed components and rapid application development techniques.

Core Topics

Application Development: Constructing Applications; Managing Application Development

Key Issues

Which development processes are appropriate for ensuring on-time delivery of both opportunistic and systematic applications?

What tools, techniques and processes are appropriate for determining the total cost of ownership of an application during its entire life cycle?

English, Welsh & Scottish Railways (EWS), the United Kingdom's largest rail freight company, moves more than 100 million tons of freight each year on approximately 400,000 trains.

Problem: EWS contracted with the United Kingdom's eight electricity generators to supply coal to the country's 16 coal-fired power stations. The coal is sourced from 96 locations run by 33 companies. EWS coordinated the pick-up, transport and delivery of the coal from its supply points to the power stations, but it did not have a system to efficiently manage this complex operation.

Objective: Automate the placement of orders, schedule and plan the trains, and then book rail space by submitting the plans to Railtrack, the company that controls the rail network. The goal was to improve planning efficiency and enhance EWS's ability to negotiate deliveries. The system would also make it easier for customers to track their orders, including monitoring train progress, enabling EWS to improve its level of customer service and to better manage customer relationships.

Approach: Although Jade Software is located in New Zealand, on the other side of the world from EWS, it was engaged because of its ability to meet the tight project deadlines: The system had to be available to deal with the coming peak winter coal consumption period. By providing references that demonstrated its ability to deliver demanding projects in short time frames, Jade was able to convince EWS that it could bring the project in on time. Jade's capacity to complete the project within several months was particularly significant, as it was perceived by EWS as helping to limit risk. Also, project costs were contained, because labor costs in New Zealand are lower than in the United Kingdom.

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Jade — which traded until recently as Aoraki — has been in business for more than 20 years. It is well-known as the developer of LINC, a successful fourth-generation language that runs on Unisys mainframes. More recently, the company has built JADE, a consistent, object-oriented development environment for building all aspects of an application — from database, through business logic, to user interface and from design, through coding, to implementation. Jade has also written enterprise applications (built in JADE) for healthcare, education and ports. Based in Christchurch, the largest city in the south island of New Zealand, Jade has been able to build and retain a group of skilled developers.

Because of tight project deadlines, the two groups adopted rapid application development (RAD) techniques. JADE's ability to 1) use proven frameworks, 2) customize and build new components, put them together, pull them apart and make changes; and 3) detect integrity problems and conflicts, was important to the success of the project. Effective use of RAD requires intense interaction between business users and developers. The location of these two groups on opposite sides of the globe presented a management challenge for the project. Apart from the physical separation of the groups, time zone differences ranged between 11 to 13 hours over the course of the project.

The success of the project depended on a significant amount of travel by key business users and developers. Initially, a team from Jade traveled to the United Kingdom to gather high-level functional specifications. On that team's return, the initial ordering, planning and Railtrack-connectivity modules were developed. During that period, two business users spent five weeks in New Zealand, clarifying detailed business requirements.

When these modules were finished in New Zealand, three senior developers traveled to the United Kingdom to complete a number of tasks that required proximity to the client and to the target technical environment. These tasks included the resolution of some data quality and connectivity issues (particularly, connectivity to Railtrack), clarification of management reporting specifications and working through a number of platform/technical environment issues.

Because the development team was split, design work done during the U.K. business day flowed through to New Zealand overnight, taking advantage of the time differences and resulting in an around-the-clock development effort. For this approach to be successful, developers needed to avoid picking up an incorrect version of an artifact, and so considerable attention was

paid to software configuration management. JADE's in-built capabilities were important in maintaining control.

Extensive use was made of video conferencing, with at least one daily call during the period the development team was split. Not only was this business user participation valuable in communicating requirements and designs, it also helped to build relationships between the two companies.

In New Zealand, all members of the development team moved out of individual offices to work in the same room. This enhanced communication and was a valuable arrangement for a RAD project.

Results: The completed system was of moderate complexity, utilizing 1,300 classes, 7,000 attributes and 10,000 methods. The project was completed in five months, before the peak winter period. Coal generators and suppliers now have online access to train schedules and are able to track the progress of trains carrying their orders. EWS's planners are now better able to cope with peak periods, and their plans have fewer errors.

Critical Success Factors/Lessons Learned:

- With the client and development team in different locations, three critical development roles must be located at the client site:
 - An account manager to establish a liaison with the client and to manage the relationship.
 - A person to gather diagnostic information and analyze problems. This can be a very time-consuming task and may distract the core development team. Efficiencies are achieved through a single person doing this work. The person's physical presence at the testing site helps to speed up the collection-and-analysis cycle.
 - A person who understands the business domain and can communicate with the users, who understands technical issues and can communicate with the developers; and who can also communicate with executives and salespeople. This speeds up communication and is essential to retaining momentum. This person discusses requirements with users and knows enough about implementation to resolve immediately some potential issues. He or she would then discuss these requirements with the technical team, and through good business knowledge, would be able to clarify some points on the spot. The alternative is a much more formal and lengthy interchange.

- There must be a counterpart to the person with business, development and executive communication skills; this counterpart must be located with the developers.
- High face-to-face involvement with users, rather than reliance on detailed written requirements. This approach enabled the two groups to build a high level of trust.
- Some senior, highly skilled people should be assigned tasks that are not on the critical path so they are able to mentor more-junior people.
- With the team split on opposite sides of the world, configuration management of all development artifacts is mandatory. A tool that integrates into the development environment is particularly helpful.
- The use of the JADE development environment, which encourages reuse of existing frameworks, made a real difference in the ability to complete the project in the short time available.

Bottom Line: Although RAD-style development with business users and the development team located on opposite sides of the globe is challenging, it can work. Considerable attention must be paid to communication, and key developers and business people must be prepared to travel. Willingness to work flexible hours is essential, as well as using the time-zone differences as an advantage, facilitating around-the-clock development. Working in a development environment that enables flexibility and reuse and that enables configuration management is essential.