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The application was designed to provide specific solutions across several departments within the company. Although the functionality requirements for each of the departments was quite different many of the core data elements were the same. The challenge was to create a system that leveraged these common data elements to provide a system that made accessing information from other departments intuitive and simple to use. An example of this was the document management module that provided a mechanism for tagging documents with metadata common to the rest of the system. Documents could then be indexed as part a normal business process without the need to understand the document management system.

The user interface was built on a small set of user controls which allowed users to become familiar with different parts of the application much quicker.

Solution Technology

Datasouth's software solution, the Seeds Research System uses Microsoft SQL Server 2005 as the data management engine. The application was developed as a browser based system using ASP.NET 2.0 developed in Visual Studio 2005. SQL Server 2005 was used to provide the database platform and reporting capabilities. Third party software, GenStat, was used to provide the statistical engine for reporting and analysis of data. Windows Mobile 6.0 and the .NET compact framework were used to provide PDA access to the system.

Benefits

“The system will allow us to provide better marketing information to our Sales and Marketing Brands so that they will be able to provide customers with better supporting data for new products that we commercialise”, says Andrew Dumbleton.

The system will provide a faster time-to-market in part due to the high reliability and security enabled by the solution. In the past, Kimihia researchers had to go through a lengthy phase to determine if their data was reliable or if manual data entry had introduced errors. With Datasouth's Seeds Research System, the solution automates data entry and locks down the data so it can be accessed only by authorised users.

Another large performance gain will be the reduction of time between researchers entering the data and being able to use it.

Better data quality will also mean that research can be performed faster and the Centre's customers will receive their required information faster therefore improving customer satisfaction.

“Working with Datasouth on the Seed Research System has been a success. Datasouth understood our needs and saw our limitations and provided us with a solution that integrated all our disparate systems into one consolidated business intelligence tool that can be accessed anywhere. By using Microsoft technology we knew the risk of non performance was greatly reduced and this was important due to the complexity of integrating data and third party applications” – Andrew Dumbleton.

The Seed Research System designed and implemented by Datasouth has increased business productivity through improved Data Management, Business Intelligence and Information Delivery. The outcome is the provision of a consolidated data collection and business intelligence tool delivered to users' both internal and external to the Kimihia Research Centre via a web service interface designed to the exacting requirements of the users'.

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SEEDS RESEARCH CENTRE INCREASES PRODUCTIVITY THROUGH IMPROVED BUSINESS INTELLIGENCE SYSTEMS



PGG Wrightson Seeds

PGG Wrightson Seeds is one of the largest proprietary seed companies in the Southern Hemisphere. The company makes a considerable investment into research and development. With millions invested annually, PGG Wrightson Seed's research programme ensures that any cultivars introduced to the market will perform under temperate farming systems with the goal of increasing on-farm productivity and profitability. PGG Wrightson Seed's 90-hectare research farm is the Kimihia Research Centre, located near Lincoln, Canterbury, within the main seed production and arable cropping region. Kimihia Research Centre's activities and services are directed to meet the needs of the company. From here, all of the New Zealand and global research activities are coordinated. PGG Wrightson currently employs more than 30 people in technical, operational and administrative roles on-site at Kimihia.

Research and development is the lifeblood of the Kimihia Research Centre. Kimihia tests and evaluates an enormous array of cultivars in its laboratory, in production operations, and in field tests, including those conducted in partnership with AgResearch and Crop and Food Research here in New Zealand as well as a number of international partners.

The amount of data generated by these tests is immense. At Kimihia alone the Research Centre collects tens of thousands of transactions per year from hundreds of extensive trials. In addition, the centre collects a large amount of data each year from field trials across New Zealand and abroad.

As part of Kimihia's commitment to the continued improvement of its research and development activities, Kimihia Research Centre partnered with Datasouth to review its current technology systems, with the goal of identifying and applying appropriate technology remedies that would allow increased business productivity, increased volume of seed research trials, and improve business processes.

Datasouth is an Information Technology Partner to innovative and leading businesses throughout New Zealand and Australia.

We understand Business Intelligence, Software Development, Network Infrastructure and total System Design and Support.

Through working with Datasouth, you are employing an Information Technology partner substantial enough to undertake any technology engagement.

We appreciate that the partnership with our clients is what matters, and realising the potential of this relationship enables us to understand your requirements to deliver effective business outcomes.



“Before the Seeds Research System, data management for our many different programmes revolved around the particular individual who managed the programme. This meant that research had different ways in which data was captured, analysed and reported.”

Business Pain Points

Kimihia’s management had a good understanding of the issues due to research information located in disparate silos across the organisation. Each area of the business had different data collection systems; Kimihia had a problem common to many organisations. There was no simple way to connect the systems for comprehensive data analysis, no way to give users’ access to selected data they were authorised to view, and no way to share information with partners.

This lack of data integration and independent and manual data collation methods created a number of inefficiencies:

- Data collection was extremely cumbersome, manual and paper based
- Data had to be entered into the various systems by the users in a format that only they understood
- The risk of IP residing with a single user
- Disparate data collection and analysis methods were compounded by the merger of PGG and Wrightson within the last few years
- Manual processes led to data entry errors
- Absence of adequate disaster recovery
- Data sources were not as reliable as available technology

“Before the Seeds Research System, data management for our many different programmes revolved around the particular individual who managed the programme. This meant that research had different ways in which data was captured, analysed and reported” – Andrew Dumbleton - Product Development Manager (PGG Wrightson Seeds).

Business Needs

Kimihia required the integration of disparate systems into one all encompassing system in order to provide cross company data on a variety of topics. For example there was a need to bridge its seed production and seed tracking databases, so that users could pull end-to-end information for any part—identifying when and where it was made and how it performed in field trials.

The business had specific requirements for the different areas of data capture, with a consolidated view of research being the essential requirement.

The different areas were:

IP Database – used to track IP agreements, trademarks, information releases and stored in Microsoft Access. Kimihia required this information to be linked to specific cultivars.

PI Books - used to keep track of all lines of seed entering Kimihia and stored in Microsoft Excel. This information needed to be linked with trials data.

Product Testing Records - a critical process used for capturing trial data and records management and captured in Microsoft Excel and Word. This was a labour intensive process requiring better use of resource and easier access to information.

Seed Supplies Records – used to keep track of seed stocks and records management using Microsoft Excel and Word. This had to be integrated with cultivar information.

Sample Records – used to detail records of all seed samples supplied to third parties and stored in Microsoft Access. Here there was a need to identify a cultivar that had gone elsewhere for trialing in order to ensure information is received back to compare with Kimihia’s Research trials.

Laboratory Records - contained records of endophyte and germination testing, rhizobia testing and biofumigation testing. Data stored in Microsoft Access. This data had to be integrated with cultivar information.

Labels - during the seed trial season a large number of labels are created for bags, and of these not all are generated electronically. There was a requirement to electronically produce labels to save time and reduce the likelihood of errors.

The integration of these data sources would be developed using a modular approach. In this way Datasouth could concentrate its efforts on one module at a time during the development phase.

Apart from integrating these various silos of data, Kimihia had other requirements involving the creation of a new Seed Multiplication module, a Statistics module and a PDA module.

Seed Multiplication Module – was required to keep track of information relating to research of seed multiplication.

Statistics Module - Kimihia required a statistical package that could give the required analysis capabilities, provide a visual representation of data and could be integrated into the solution.

PDA Development - was required to eradicate the dependence on paper driven data collection in the field, which had resulted in large inefficiencies.

In short a solution had to provide:

- Information consolidation
- A uniform data management system
- Quick and easy access to information
- The ability to trace cultivars from breeding to commercialisation.
- Access to information to/from third parties (trials, IP)
- For the discontinuation of repetitive manual handling of information
- Eradication of primary user dependence
- Replace Statistix7 (incumbent Statistics package)

“Before the seed research system we had to rely on staff who had a strong university statistical background to conduct our field research. With the development of this system it has enabled us to develop products more accurately and have more confidence in their field performance.”

The Solution

Kimihia considered a number of “out of the box solutions”. The solutions would have required either lengthy customisation of code, proving too expensive to develop and maintain, or duplicate copies of various data sources, which raised issues of database maintenance and integrity. Neither type of solution would have resulted in a consolidated view of the research which Kimihia regarded as essential.

It was Datasouth’s goal to optimise Kimihia Research Centre’s IT infrastructure in order to help the centre build a people-ready business. Datasouth did this by using the integrated Microsoft platform of Windows Server Operating System, SQL 2005, Windows Mobile 6.0, the .Net framework and web services.

GenStat was used as the primary statistical analysis engine for the application. Typically this type of tool is used directly by qualified statistical experts. The Seeds Research System was designed to remove the need for users to be experts in the use of a statistics package. This was done by placing the business rules for using GenStat within the database itself. Statistical analysis techniques could be designed and setup once for all users across the organisation using both industry and internal best practices. PGG Wrightson benefited from advanced statistical techniques that were previously either not practical to use or not available with their level of statistical knowledge.

“Before the seed research system we had to rely on staff who had a strong university statistical background to conduct our field research. With the development of this system it has removed the need to manually analyse and report data, allowing our staff to spend more time in the field and not doing data entry, analyzing and reporting. This has enabled us to develop products more accurately and have more confidence in their field performance”, says Andrew Dumbleton.

SQL Server 2005 was used as the engine behind the application providing both the database engine and reporting platform via Reporting Services. Using .NET we were able to integrate SQL Server and GenStat directly by developing .NET stored procedures. The integration between SQL Server and GenStat meant that any system using the database could gain access to real time statistical data analysis. Typical entry points were reporting services, the web application pages and batch programs.

SQL Reporting services was used as the primary reporting platform for the application. The tight integration between Reporting Services, SQL Server and GenStat meant that users could be provided with real time statistical analysis of data. Users who historically preferred to manipulate data in spreadsheets benefited from Reporting Services capability to render in different formats including Excel.

The application took advantage of reporting services graphing capability as well as being able to integrate reports with images produced directly from the GenStat engine in real time.

The statistical analysis techniques required were quite complex. A set of stored procedures in SQL Server were developed to remove most of the complexity from the report developers.

“Prior to this system each set of trial results were only analysed by individuals and not grouped together with results from other trials from the same species. The Seed Research System allows us to conduct multi site x multi year, unbalanced comparisons which greatly increased our ability to analyse results and select successful lines for commercialisation”, says Andrew Dumbleton.

The application was designed to provide the users with an interface that was intuitive and simple to use. Other systems currently on the market required users to fit within a certain model for viewing and entering information. Datasouth developed a user interface that rendered information in a format based on how the actual information was used in the business environment. Users could relate to the interface because it was how they were already physically working, this increased user acceptance of the product as well as reducing ongoing training costs.

Several techniques were used to speed up data entry including changing the user interface to suit how the data was physically recorded at that time. Type ahead and fast lookups were used to allow the users to have as limited an amount of knowledge as possible during data entry.

Several external devices were used to improve the speed and accuracy of data entry. These included an external probe which automatically calculated the dry matter weight of plants and then provided a mechanism to update the information back into the database, and PDA devices for uploading field trial data entry and downloading relevant historic data for use in the field.

A PDA application was developed to allow data entry to be performed at field trials therefore eradicating the need for a paper based system which had required double entry of research data (in the field and then into spreadsheets). This was developed using Microsoft Visual Studio 2005 together with the ASP.NET 2.0 compact framework for smart devices. The main aim here was to provide core functionality for recording data on location and easily updating the database with the details when required. A cradle based solution was implemented rather than producing a real time data exchange system as trials were often performed in remote locations where data connections would be unreliable or unavailable.