

Custom Development of Integrated Forest Information and Planning Systems

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Introduction

During 1998/99 PF Olsen and Company Limited developed and implemented a custom application FIPS (Forest Information and Planning System), which integrates financial accounting, cost accounting, job (forest) budgeting, forest information and spatial data analysis.

The system was developed using a dynamic systems development methodology and rapid application development tools.

The system was developed by Integral Limited of Rotorua, using Magic and Btrieve. Simon Hornby was the designer from Integral. Integral have been developing systems since 1991. Simon is a former consultant from Anderson Consulting, London with 10 years' system design and development experience.

The scope of the project

FIPS was developed as a system to replace the loosely integrated spatial data (Terrasoft), Forest Records (The ForestMaster) and Accounting Information (CBA). FIPS also provided us with the opportunity to replace some Olsen user developed programmes for budgeting, cost recording and reporting and integrate these to provide a company-wide standard of reporting, monitoring and financial control.

Previous attempts to improve data integration from spatial through to financial, using the existing software, were thwarted by the limited flexibility of the commercial applications being used and the lack of a common database system. This required data to be re-keyed or exported inefficiently into each software application and meant Forest Managers spent a lot of time acquiring and collating data rather than interpreting information.

One of Olsen's aims was to eliminate this re-keying, and also to put responsibility for data entry as close to the source as possible.

Development or purchase commercial Software

Prior to embarking on in-house development Olsens evaluated commercially available packages and engaged external consultants to assist in this search. This led them to conclude that they are generally written from the financial accounting perspective and require significant customisation to meet the needs of forest companies. This limits their applicability to the forest industry.

Olsens therefore concluded that to achieve their aims within their financial resources the only option was to develop their own system. A number of other medium

sized forestry companies have reached the same conclusions.

Critical success factors in development of FIPS

The critical factors that have made FIPS a successful system in the Olsen organisation are:

- Development methodology;
- Development tool;
- Development team; and,
- Deployment mode.

Each of these is explained below.

Development methodology

Traditional software development requires a large up-front effort in specifying the system and trying to anticipate user needs. The time taken in development using traditional tools can lead to the system being delivered and not meeting the needs of an organisation, because changes to the organisation had not been taken account of during the development process or the organisation's needs were not adequately defined in the first place.

Olsens and Integral adopted a dynamic approach to development. The broad parameters of the design were set out, and the system was designed, built and delivered in incremental units. Undertaking a development in this way was facilitated by having:

- a small team;
- a rapid development tool (Magic); and,
- a rapid deployment environment (Citrix).

By breaking the project down into sub-projects, Olsens were able to prioritise, developing the most important deliverables first. Integral could focus their efforts without much concern for the subsequent impact on other systems. If a new sub-system highlighted a deficiency in the design of an existing component amendments were quickly made and the process moved on.

Development tool

The selection of a development tool can have a huge impact on the speed of progress.

Integral used Magic for the development of FIPS. In the hands of a skilled developer Magic is able to deliver usable components very rapidly. In FIPS Integral took the Forest Records component from concept to first production release in six weeks.

Development team

The development team was kept small throughout the project. Olsens and Integral have also had a very stable workforce throughout the project, so the same core personnel have been involved. As the project has progressed Olsens' staff have assisted in defining the requirements for the components that support their part of the business.

Olsens learned from past forays into software development, that database design is the most essential aspect of this type of development. A good database design not only ensures that the system operates efficiently but

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also ensures that useful information, that supports business decisions, can be extracted from the system. While the development tool speeded the building of the application, Simon's data modelling expertise was an essential part of efficiently designing the database components that would model the forest industry processes.

Deployment mode

One of the obstacles Olsens faced was the geographic distribution of staff requiring access to the information system. Olsens wanted to make FIPS an on-line system, enabling field staff to enter relevant data and extract information in a timely manner.

Olsens opted for a server-centric model of computing, based on Windows NT Terminal Server Edition, and Citrix Metaframe. Users can dial into the system from throughout the country and interact with the system. The data and the processing takes place on the application servers, not on the user workstation. This means that programme updates, and data are all centralised. There are no data synchronisation issues, and minor updates to the application can be made as necessary without any chance of users running the wrong version.

Server-centric deployment also paid dividends in Y2K readiness. It meant that only the date handling of the servers had to be up to standard, rather than the individual workstations. Indeed, many of the workstations are old 386 or 486 machines that are not Y2K compliant, but do not need to be. Hardware enhancements are concentrated on the central server, rather than the workstation.

Key data elements

FIPS has been designed around a number of key concepts. These concepts have data representations in the FIPS data model with specific attributes. One example is shown below.

To achieve integration from the spatial description of the forest through to accounting, a key concept "The GeoUnit" was designed. While the GeoUnit may not seem all that new to some readers, its use throughout the system, and the hierarchy of GeoUnits in FIPS is pivotal. Full use of the GeoUnit concept is possible by integrating with a spatial data-modelling tool such as ARCView.

Every transaction within FIPS that has any spatial element can be assigned to a relevant GeoUnit. Ultimately the data entry start-point for many of these transactions will be the map via an Intranet Map Server.

Implementation and Results to Date

The core modules of FIPS have been in operation in excess of twelve months and are now very much part of the way Olsens do business and interact with clients. FIPS stores and maintains all static data relating to clients and their forest land and tree crops as well as information relating to suppliers and contractors.

The staff module allows individuals to update their own training records and has a specific section relating to continuing professional development for staff who are Registered Forestry Consultants.

All clerical, cost accounting and financial accounting functions are now undertaken in FIPS including payroll,

contractor payments, accounts payable, accounts receivable, client invoicing and reporting, without the need to re-key or export data.

Olsens have achieved or exceeded their key objectives including:

- Entering data at source with a minimum of re-keying.
- All staff have access and have been trained in the use of FIPS whether they are based in Kaitia or Dunedin
- An integrated cost accounting and financial accounting system achieving a company wide standard for reporting, monitoring and financial control.
- The Forest Records system (ForestMaster) which was not Y2K compliant has been replaced, enhanced and integrated with financial and spatial data systems.
- The mapping package (Terrasoft) which was no longer supported by its developers has been replaced by ARCView and integrated with financial and forest record data systems.

The payback has come in the reduction in time and effort to undertake clerical and accountancy functions as well as standard forest reporting functions and process control by forest and harvesting managers.

Examples of this include:

- Completion of invoicing up to five days earlier each month has reduced costs at the same time as improving cash flow.
- Automated preparation of standard company and client financial reports.
- The preparation of Olsen's annual NEFD return was an onerous task; Olsens have taken all of the fun out of it by reducing it to the click of a button.

More timely information

By going "on-line" Olsens have put information in Manager's hands more quickly. Users are not tied to a monthly cycle of data entry and the associated panic. Prior to FIPS there were cut-off dates and tight timetables to meet, with a small team of data entry operators deciphering data supplied by busy field staff. Now, field staff are entering data themselves and the workload is starting to be spread more evenly through the month.

It is now possible to have all costs entered to a job and available on-line for the manager to review within three days. In the past the "current position" was only verifiable once a month. Timely information presented in standard reports allows Forest Managers to concentrate on effectively managing client forest operations rather than collating and manipulating data in spreadsheets. Financial Reports by Business Centre or Activity give Senior Managers information to manage their Business effectively.

FIPS is adaptable

FIPS has also proven itself adaptable to other businesses. A companion system used by another forest owner that uses FIPS's core concepts, plus modules developed by Integral specifically for the client, has been implemented for over 12 months. The data model that underlies FIPS is applicable to a wide variety of businesses, and the Magic rapid development environment, provides the means to adapt the processing to the individual requirements of other users.