Real Time Shop Floor Management

Embedded Internet System Implemented in Print Industry

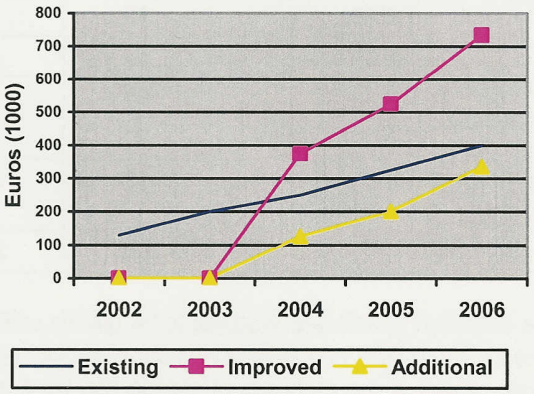
Mytron has developed an Embedded system that allows shop floor scheduling, management and reporting facilities across the Internet. This technology allows company personnel to remotely access the latest production information and to take effective management decisions based on real time data. Additionally, clients can also be allowed access to production status information to facilitate improved planning along the supply chain.

Mytron Limited specialises in the design, manufacture and installation of microprocessor based control and instrumentation equipment. Historically their specialisation has been in the printing industry, with the main products being high speed video based inspection equipment, and shop floor data collection systems. The existing product line is being marketed under the name of Dynamic Process Analysis (DPA) system, and this has now been updated to provide a full Intranet/Internet based system.

Mytron Ltd	
Employees	5
Turnover	200k Euro
Industrial Sector	Process control equipment (NACE code 3320)
Technology Introduced	Embedded Internet

ECONOMIC BENEFITS

Sales Projections



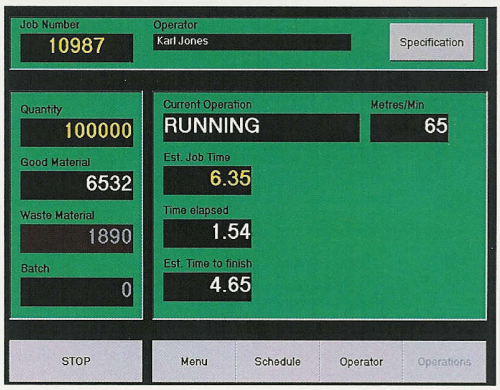
The improved DPA system's enhanced technical performance will provide a significant growth opportunity for the company. This will come about from the enhanced functionality of the system appealing to a wider range of companies. The company sales projections are considered cautious and limit its sales growth to levels that are manageable, in terms of both manufacturing and technical support. The introduction of remote diagnostic and upgrade functionality will significantly help the company with issues of support, thus removing this current barrier to company growth.

Based on projected profit growth, the company expects a payback period of less than 20 months with this project and a return on investment of over 250% over a 3 year period.

PRODUCT IMPROVEMENTS

The product was improved by introducing:

- A touch screen Graphical User Interface.
- Increased data bandwidth to allow video frames and colour information to be collected and archived with other process data.
- The ability to view real time productivity data from any software equipped machine on a company LAN.
- Remote access to productivity data from any suitably equipped computer via an Internet Service Provider.
- The ability to run diagnostic functions on the DPA system remotely and to upgrade software over the Internet.



How to go about it

The company had made a strategic decision to utilise Open Source Software (OSS) in future product development. The new DPA specification and the initial design process indicated that a range of OSS solutions could be used in the development of the product. In order to fulfil company aspirations an in-house training programme was developed and this led to Linux becoming the choice of operating system and the Red Hat 7 version was obtained.

In order for the target platform to provide the functionality required, an on-board web server was needed. The initial consideration was that of Apache, but as the full functionality was not required and the specification and design process highlighted the use of Java Servlets and Java Server pages, the Tomcat webserver from the Apache Jakarta project was chosen (http://jakarta.apache.org/). This servlet container is much smaller than the full Apache implementation.

The Java Servlet technology provided a simple, platform independent mechanism for extending the functionality of a Web server and for accessing existing business systems. Servlets also have access to the entire family of Java APIs, including the JDBC API to access enterprise databases, which was also a requirement of the specification. The database used was MySql for Linux and this worked well with the JDBC driver to provide full database connectivity. The Java Server Pages technology, an extension of the Java Servlet technology, enabled rapid development of platform independent web-based applications. The Java used in the development process was the Sun version 1.4.1 and the serial communications software used was the Java Serial Comms module, which is based on the Open Source Java Comms module.

TECHNICAL IMPLEMENTATION

Implementation of TCP/IP required a complete Hardware and Software redesign of the DPA Clients. The improved system is now based on an EBX format Pentium Class Single Board Computer with integrated Ethernet controller.

Adoption of the TCP/IP communications protocol and Linux operating system permits the improved DPA system to be easily tailored to individual requirements and operate as a company, group, or multi-national level, management decision support tool. It facilitates full Internet connectivity and allows upgrades and software maintenance "on-line" rather than the necessity for engineers to visit a site.

Task	Planned Days	Actual Days
Training	10	10
Specification	55	55
Design	90	93
Test & Evaluation	40	46
Technical Management	10	13
Total	**205**	**217**

The availability of vast amounts of re-useable code will now enable a collection of software modules to be quickly written and compiled together to provide a near custom solution for future customers. The project presented a number of distinct problems and barriers that needed to be overcome to ensure it was a success. Many of the problems related to the small memory footprint initially used and consequently the limited functionality of the embedded Linux. Increasing the memory and up rating the Linux helped resolve many of the issues. Running this project and overcoming the technical difficulties provided the company with an array of skills and knowledge that can now be transferred into many new projects.

BENEFITING FROM BEST PRACTICE

EC IST Programmes aim to improve the competitiveness of European enterprises by promoting the adoption of under deployed or emerging technologies. This will enable these enterprises to increase their competitiveness and enhance their economic growth. The demonstrator described here is one example of the many Best Practice projects undertaken.

Further details of projects covering a wide span of applications, industry sectors and technologies can be found on **www. eujoin.org**

Mytron Ltd
C1 Caerphilly Business Park
Van Road
Caerphilly
CF83 3ED
UK

Centre for Electronic Product Engineering
UGCS Ltd, University of Glamorgan
Pontypridd, Mid Glamorgan
CF37 1DL, UK
Tel: +44 1443 482542
Fax: +44 1443 483651
Email: ejcthoma@glam.ac.uk

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