

ABSTRACT

A FLEXIBLE ARCHITECTURE FOR MANUFACTURING PLANNING SOFTWARE MAINTENANCE

by

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Computer software systems took on a new role in manufacturing planning with the introduction of Material Requirement Planning (MRP) system in 1965. The MRP system generates material requirement lists in response to given production requirements. In this way, inventory management, purchasing, and shipping activities are linked to manufacturing. In 1979, Manufacturing Resource Planning (MRP II) systems were introduced [VerDuin 1995]. MRP II typically includes planning applications, customer order entry, finished goods inventory, forecasting, sales analysis, production control, purchasing, inventory control, product data management, cost accounting, general ledger processing, payables, receivables, and payroll [Turbide 1995]. An emerging market is developing for software systems that expand the scope of MRP II farther to encompass activities for the entire organization. Among these systems are Enterprise Resource Planning (ERP), Customer-Oriented Manufacturing Management System (COMMS), and Manufacturing Execution Systems (MES). These systems integrate marketing, manufacturing, sales, finance, and distribution to move beyond optimizing production alone, to optimizing the organization's multiple objectives of low cost, rapid delivery, high quality, and customer satisfaction [VerDuin 1995]. MRP II is still the dominant solution for manufacturing in tens of thousands of companies. These companies range in size from less than a million dollars in sales right up to the top of Fortune 500 companies. However, this is a market penetration of only 11% which clearly shows the size and potential of the opportunity for MRP II development. Yet, despite the commonality of needs across the scope of manufacturing, there are distinct differences when comparing plant to plant, company to company, and industry to industry. Often MRP II has to be modified to adapt to a particular industry [Turbide 1993]. This modification often pushes the cost even higher and makes MRP II more out-of-reach for many companies.

This research presents a flexible architecture for development and maintenance of manufacturing planning software, especially MRP II. The architecture uses the concept of software reuse and is built on top of run-time object-oriented framework.