Enhancing Traditional ATP Functionality in Open Source ERP Systems: A Case Study from the Food & Beverages Industry

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ABSTRACT

Available-to-promise (ATP) procedures in today’s enterprise information systems usually involve a simple search for available or planned inventory of a particular product in a particular depot at a particular time. In this article, ATP is viewed as a dynamic and more complex problem of deciding whether to accept a customer order request given the available inventory and planned production plus the remaining production capacity and business rules for covering demand from certain customer classes, for given products and time window. Whenever this is not possible, the production schedule is modified, by utilizing “reserved” capacity and resources, to cover extra demand. A prototype tool has been designed and implemented based on this approach, that can be easily integrated into existing ERP systems enhancing their functionality and increasing the level of customer service. The elaborated prototype is pilot tested in a case company in the food industry and is loosely integrated within the Open Source Compiere 2, ERP system extended to handle manufacturing. The prototype produces almost real time results on modern commodity-off-the-shelf computers, thus enhancing sales personnel performance and efficiency and increasing the level of customer service and satisfaction.

Keywords: supply chain management, production scheduling, available-to-promise, open source, ERP systems

INTRODUCTION

One of the major challenges enterprises faced during the past decade was the uncontrolled proliferation of ad-hoc, stand-alone computer system applications that supported various functions within different business units. Despite the initial advantages each application offered, managers eventually realized the many dangers this proliferation entailed. In particular, more often than not, the separate—island—applications...
tions were producing results of very dubious quality, not only because of possible flaws inside the application itself, but because the application was processing input data that were not coming from original sources. Data produced from one business function were transformed in many uncontrollable ways before being input to an application which required them. In other words, many systems were built around different functions, business units, and even business processes that could not “talk” to each other and thus could not automatically and reliably exchange information. This fragmentation of data among many different isolated systems often translated into reduced business performance or organizational inefficiency, or both, not to mention increased costs of maintenance for each separate application (Laudon & Laudon, 2006).

Enterprise resource planning systems (ERP) (Harreld, 2001) were invented as the response to this growing phenomenon, to provide a single information system for organization-wide coordination and integration of key business functions and processes. They became popular in the mid 90’s by vanquishing the old standalone computer systems in manufacturing, finance, human resources, and warehousing and replacing them with a single unified system divided into discrete software blocks (modules) that roughly approximated the old standalone systems. The maturity stage of ERP was reached in the late 90’s. By that time ERP systems were extended to include back office functions such as order management, financial management, warehousing, production, and quality control and front office functions such as sales force and marketing automation (Shehab, Sharp, Supramaniam, & Spedding, 2004).

Currently, ERP systems following the technological wave produced by the advent of new information technologies and mostly the Internet, have been expanded to include the new globalized view of their operations (De Burca, Fynes, & Marshall, 2005). Extended ERP refers to the inclusion of additional modules such as CRM (customer relationship management), SCM (supply chain management), advanced planning and scheduling, integrated e-commerce (including B2B e-marketplaces and B2C portals and Web-stores), sales force automation, content management (including intranets and corporate portals), and decision support (including knowledge management and business intelligence systems) to the core foundation modules of internally focused established ERP systems (McKie, 2001).

In this article, it is argued that despite the acceptance and applicability ERP systems have gained in the last 15 years, the problem of the uncommitted portion of a company’s inventory or planned production (available-to-promise) is still confronted, by both commercial off-the-shelf and open source ERP products, in a rather short-sighted manner. The remainder of this article is organized as follows: In the next section, a short but detailed literature review of the ATP problem is elaborated, presenting traditional approaches and explaining their shortcomings in comparison to the dynamic and more complex perspective. Next, a critical review of the ATP functionality in existing commercial and open source ERP packages is presented. In the following section, the proposed ATP model and its solution are presented followed by an evaluation of its performance regarding the necessary processing power and the required solution time. Finally, this myopic view of the ATP problem and the relative performance gap of existing ERP solutions are addressed by designing and implementing a prototype tool that utilises the aforementioned approach and can be loosely integrated into existing ERP systems, thus enhancing their functionality and increasing the level of customer service. In the last section, the results of the prototype implementation in a case company from the food industry are presented followed by a critical discussion on performance measurements, rising issues, and lessons learned from the implementation of the approach.

**Description of the ATP Problem**

Rapid response to customer needs, high level of customer service, and flexibility to handle uncertainties and fluctuations in both demand
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