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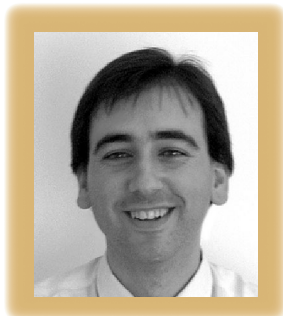
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Open Source Software ERPs: A New Alternative for an Old Need

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It's become conventional business wisdom to view information as a primary resource. To successfully manage the wide-ranging information available in a company—about customers, products, employees, and other assets—requires suitable information systems. Enterprise resource planning is the central element of any information systems architec-



ture. So, selecting and implementing an ERP system is a key factor in company performance—one that can offer a significant competitive advantage.

What are ERPs?

ERPs are information systems that manage the data for a company's main business processes, from customer orders to accountability. Their functions include data capture, processing, and customized distribution to any end user.

Usually, ERPs are expensive, which has restricted small and medium-sized enterprises' access to them. The availability of open source software ERPs has changed this situation. More

and more companies are studying the possibility of adopting OSS ERPs. Many articles have focused on how OSS ERPs are gaining users.¹⁻⁵

Why OSS ERPs?

Both OSS ERPs and proprietary ERPs involve complex system implementations that usually require modifications to a firm's business processes as well as some adaptation of the ERP's functionality. This mutual matching project usually involves consulting firms.

However, the benefits of applying OSS are greater for ERPs than for other kinds of applications, for three main reasons:

- *Increased adaptability.* ERPs aren't plug-and-play. They always need an implementation project to match the business processes and local regulations. Having full access to the ERP source code can facilitate this unavoidable customization.
- *Decreased reliance on a single supplier.* Businesses that acquire a proprietary ERP are highly dependent on the product builders and distributors—that is, the source code's owners. If one, or even both, of these agents disappears, upgrading and maintaining the ERP can pose significant problems.
- *Reduced costs.* Proprietary ERP licenses are expensive. A rule of thumb puts them at between one-sixth and one-third of the implementation project costs.^{2,6} OSS ERPs avoid this cost. Furthermore, they usually don't need expensive hardware to run.

There are other reasons to choose OSS ERPs. For example, you don't need to manage licenses, and fulfilling license terms is easier.

However, we must note that OSS skeptics argue that few reliable consulting firms have experience implementing OSS ERPs. In contrast, proprietary ERPs have a mature distribution network and a long history of successes and failures for implementers to draw on.

Compiere

The best-known OSS ERP is Compiere (www.compiere.org).¹⁻⁴ It has been on SourceForge.net (an open source software repository) since 2001 and has had more than one million downloads. This is especially relevant, considering that an ERP isn't simply a click-and-install application. The user must also install a relational database management system (RDBMS) and an application server. Compiere currently runs in many companies (knowing the exact number isn't possible, owing to the nature of open source).

Compiere is a Java Swing (a GUI development tool) application that works with a JBoss server. So, it's a desktop application with a rich interface. It also has a limited Web version, for when you can't access the Windows application.

One of Compiere's most valuable features is a data dictionary that stores all the information about the user interface. This lets you build windows and tabs that are similar to each other without incorporating the window and tab definitions in the code. Two key concepts of the data dictionary are Tables and Windows. Tables define the tables and their columns in the application; this is usually done by importing the structure from an RDBMS. Windows define a form's features and the tabs that constitute every window, including their hierarchical structure. Consequently, each tab is related to a table, which consists of fields related to the table columns. For example, the Sales Order window in figure 1 consists of three tabs: Order, Order Line, and Order Tax. The tab labels' size indicates the hierarchy: an Order comprises some Order Lines and some Order Taxes. In the figure, the Order tab is active, and its fields are showing.

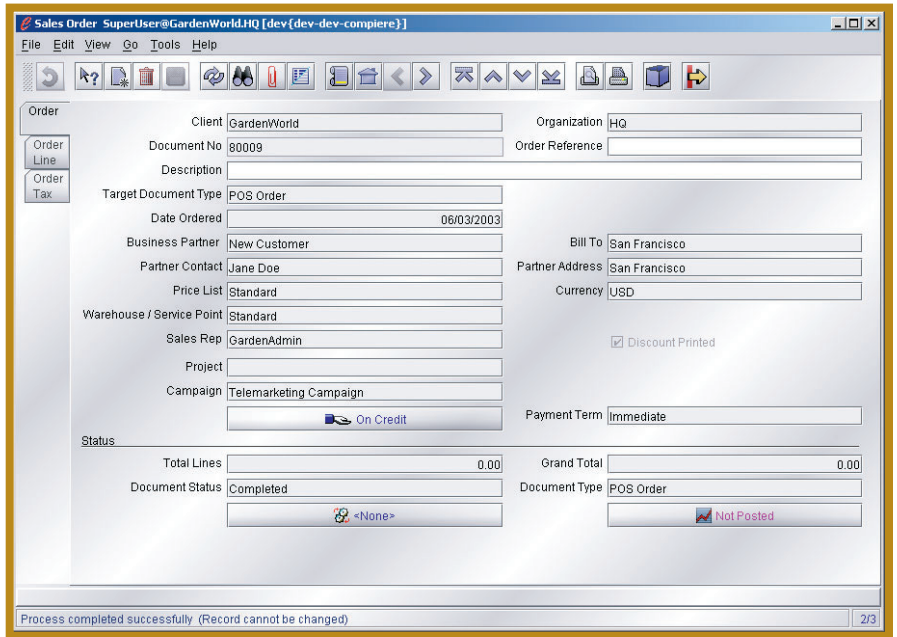


Figure 1. Compiere's Sales Order window. (image copyright Compiere)

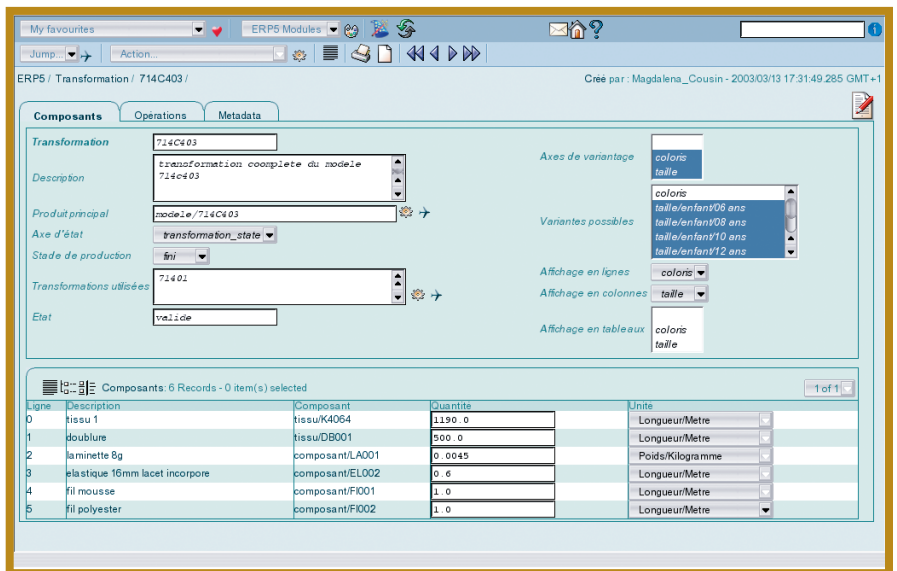


Figure 2. ERP5's bill-of-materials window. (image courtesy of Nexedi)

Compiere was developed using model-driven development. For an explanation of MDD's advantages, see the Sept./Oct. 2003 *IEEE Software* special issue on MDD and the Feb. 2006 *Computer* special issue on model-driven engineering.

Compiere works on Oracle and Sybase.

ERP5

In 2002, Coramy, a French apparel company, founded Nexedi (http://nexedi.com) to develop and customize an OSS

ERP. This project resulted in ERP5 (www.erp5.org). Because ERP5 employs Python and Zope technologies, it has a Web interface (see figure 2). Like Compiere, it uses a data dictionary, which is based on an abstract model to define business activities.

This model, in turn, is based on five classes (hence, the name ERP5):

- Resources are resources in a business process (for example, a product).
- Nodes are entities that receive and

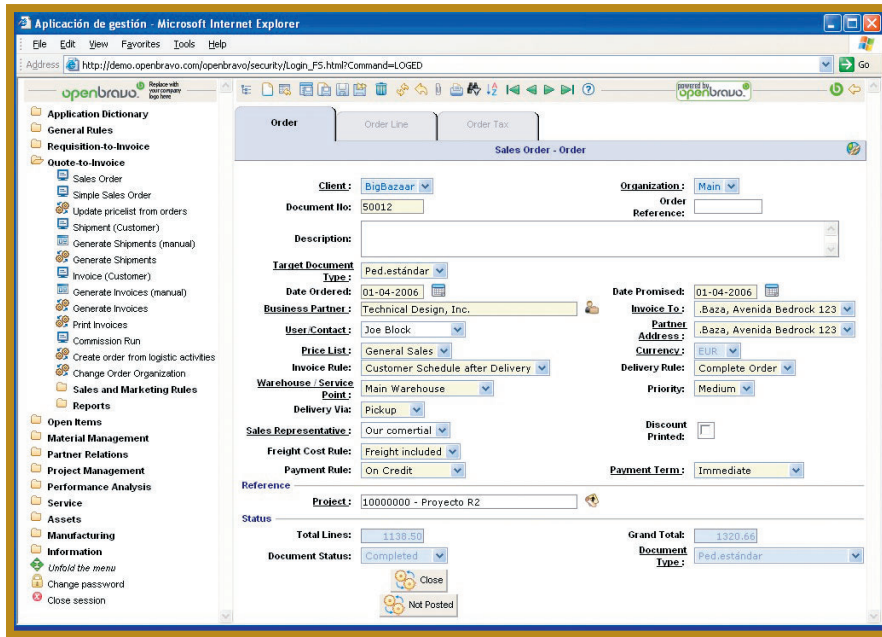


Figure 3. The Openbravo ERP Order window. (image courtesy of Openbravo)

- send resources (for example, stocks).
- *Movements* are the movements of resources between nodes (for example, a payment).
- *Paths* are the way that nodes access resources.
- *Items* are instances of a resource that allow traceable movements.

ERP5 is built on Zope with ERP5-Type, a rapid-application-development

framework that automatically generates source code, reducing the need for manual coding. ERP5Type separates the data from the processes, allowing independent reuse of both. It uses categories and relations, so Zope documents can be associated to categories or other related documents.

Besides the ERP functionalities, ERP5 includes a manufacturing module, a customer relationship management (CRM)

module, a content management system, an e-business platform, and groupware.

Openbravo ERP

We've collaborated with Openbravo (previously Tecnicia), a company that since 2001 has been implementing OSS ERPs for small and medium-sized enterprises. After evaluating the OSS ERPs available at that time, Openbravo chose to develop a Web-based application that employs Compiere's data dictionary. To build the Web engine, Openbravo used a Model-View-Controller framework (that had been tested in other environments) on top of Apache tools. To generate the framework, they created the WAD (Wizard for Applications Development) engine, which generates human-readable MVC code from the metadata in the dictionary. WAD is executed and recompiles the application with the required changes every time the system administrator updates the application's configuration to suit user requests.

The result was Openbravo ERP, an application that incorporates new functionalities such as a manufacturing module. (Figure 3 shows the Openbravo ERP Order window.) Since 2003, Openbravo ERP has been successfully installed in 12 small and medium-sized enterprises. In those cases, the customers weren't interested in Openbravo ERP's open source license, and they invariably evaluated it against commercial ERPs. But increasingly, customers—especially IT professionals and integrators—are attracted to the application because it's open source.

Table 1 compares Openbravo ERP with Compiere and ERP5.

And others

Many other OSS ERPs exist, with different maturity levels, installation bases, features, license types, technologies, and so on. Here are some examples:

- Fistera (<http://fistera.org>) is a generic OSS ERP that was born from a custom-made application for an automotive company.
- OFBiz (Open for Business, www.ofbiz.org) is an application based on the *Data Model Resource Book*, by Len Silverston, William Inmon, and Kent

A Business Model for OSS ERP Developers

Some years ago, open source software critics said that the success of the development of operating systems, programming tools, and server applications such as Apache, Tomcat, or JBoss couldn't be extrapolated to other fields, such as office applications or management information systems.

Nevertheless, companies are developing successful businesses based on this model. For example, Openbravo, the company with whom we collaborate, successfully provides services based on its OSS enterprise-resource-planning system to medium-sized companies in a variety of industries. Recently, venture capital has committed US\$6 million to internationalize the ERP.

Installing an OSS ERP is analogous to installing a commercial ERP. Although you can download and install the software by yourself in both cases, you usually need a consulting firm's help. The companies that produce OSS ERP software usually have a network of partners to do that. Compiere maintains a list of its partners at www.compiere.com/partner/index.html, ERP5 maintains a list at www.erp5.com/buy-erp5/erp5-howto-buy/erp5-consulting-partners, and Openbravo maintains a list at www.openbravo.com/index.php?option=com_content&task=view&id=91&Itemid=228&lang=en_US.

- Graziano (John Wiley & Sons, 1997).
- Value Enterprise is (www.valueerp.com) is a modular OSS enterprise accounting and resource planning application with a CRM module.
- GNU Enterprise (www.gnuenterprise.org), part of the GNU Project (www.gnu.org), aims to develop an enterprise application as free software.
- SQL Ledger (www.sql-ledger.org) adds ERP functionalities to a double-entry accounting system.
- WebERP (www.weberp.org) is Web-based accounting software with inventory management.
- Tiny ERP (tinyerp.com) is an application combining an OSS ERP with CRM, with some working installations in Europe.

Previous analyses^{1,4,5} and our experience demonstrate that users have already accepted the quality of some OSS ERPs, which let a business use low-cost technologies to help manage its unique needs.

Hints for an ERP installation

First, analyze your company's processes and compare them to the functionalities of the ERPs you're studying. Define the fits and the gaps. Concerning the gaps, decide whether to customize the ERP or adapt your processes to the ERP functionalities. This decision depends on how critical the processes are and on the customization costs. An OSS ERP is usually easier to customize.

ERP implementation, either OSS or proprietary, is complex. Usually, firms don't have enough resources and skills to do this by themselves. Collaborating with a trustworthy consulting firm could be the difference between success and failure.

Involve your company in the implementation. You will need both the managers' commitment for the necessary resource allocation and the end users' acceptance for the ERP's correct deployment and efficient use. Ideally, an internal implementation project leader is better than one from the consulting firm.

ERPs need frequent upgrades and maintenance. Using industry standards makes this easier. Also consider dependencies on software builders or distributors. Having

Table I

Comparing three open source software enterprise-resource-planning systems


Feature	ERP		
	Compiere	ERP5	Openbravo ERP
Technology	Java Swing, JBoss	Python, Zope	Java Servlets
License	Mozilla	GNU General Public License	Mozilla
Web interface	Limited	Yes	Yes
Data dictionary	Yes	Yes	Yes
Database	Oracle	Zope Object Database	Oracle
Content management system	No	Yes	No
Customer relationship management	Yes	Yes	Yes
Current distribution	International	International	Spain
Business types	Distribution, services	Apparel, banking, aerospace, health, government, and others	Distribution, services, and manufacturing
Customers	200	10	15

full access to the application code, whether it's OSS or proprietary, guarantees independence. A vendor's stability also affects independence.

An ERP implementation is an investment that should add value to your company. Improving a process is beneficial; changing a process so that it conforms to the ERP is a waste of money.

To install an OSS ERP yourself, follow these steps:

1. Select the OSS ERP, using the guidelines we gave at the beginning of this section.
2. Follow the OSS ERP's installation steps (for example, see www.compiere.org/support/install/index.html, www.erp5.org/sections/documentation/howto/install_erp5.stx/view, or www.openbravo.com/docs/Openbravo_quick-start_installation_guide.pdf).
3. Become familiar with the product. Tutorials and getting-started guides are available for most products.
4. Input information about products, customers, providers, and so on, to initialize the system.
5. Try using the OSS ERP to perform your core business processes. Be confident about it before thinking about customization.

After step 5, each implementation's development might vary considerably. 

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