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ERP Lockup

PLANNING SUCCESSFUL DATA JAILBREAKS

To prevent software from becoming a "data jail," you have to understand modules, screens, and relational databases as well as business processes and activities.

Imagine a room full of workshop participants gathered to learn how to retrieve data from an enterprise resource planning (ERP) system. The participants have various backgrounds—CPAs, management accountants, system consultants, information technology personnel, and office managers. Their experience as system users also varies, but they all share one thing—the need to liberate data from their ERP systems.

Every software vendor touts its product's ability to produce reports. This is a welcome feature because improving processes and maintaining a competitive advantage require timely and reliable information. To generate custom reports, users can't just mindlessly click, fill in required fields, and then save/send data. They need a clear understanding of how ERP systems have transformed accounting-cycle-based systems into integrated, processed-based systems. Moreover, users must understand how the software uses business processes and activities on screens and within modules and relational databases. These complex systems can easily become "data jails" for information.

STEP 1: UNDERSTAND BUSINESS PROCESSES AND ACTIVITIES

Many software vendors claim that their packages integrate business processes. A business process is a group of activities undertaken by a company to create goods and services that a customer values. Businesses generally engage in three processes: (1) acquire and pay for resources; (2) convert resources into goods and services; and (3) acquire customers, deliver goods and services, and collect cash. In his 1985 book *Competitive Advantage: Creating and Sustaining Superior Performance,* Michael E. Porter links these processes into one continuous value chain connecting the company's suppliers, operations, and customers. Business processes are, or should be, tailored to a firm's business strategy and competitive environment.

A business activity takes many forms. It may be an event, such as a sale or a purchase, or it may be a task, such as creating a sales invoice or printing a report. Systems capture data about the events/tasks with the goal of providing useful information to improve decision making and company performance.

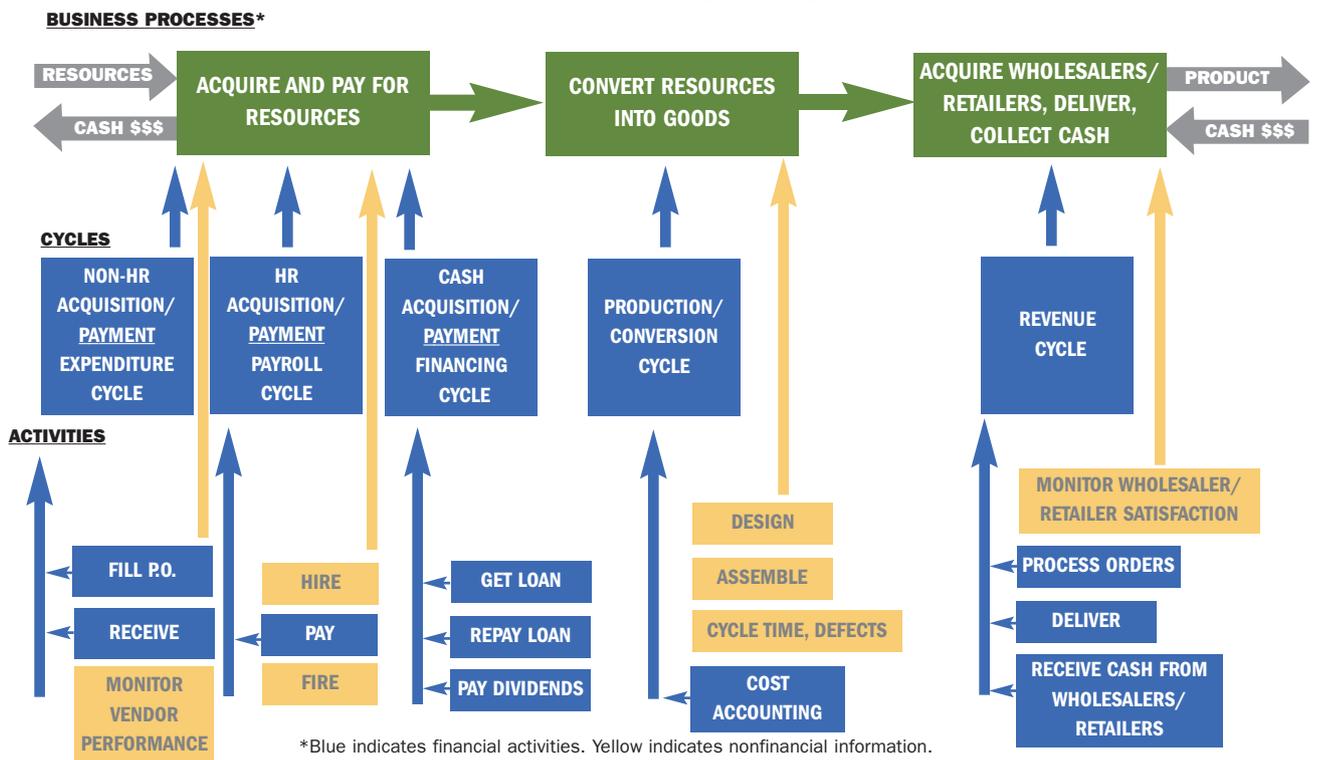## STEP 2: LINK TO TRANSACTION CYCLES

In the past, companies didn't have large ERP systems and couldn't handle the thousands of activities that occurred. To simplify the recording effort, companies used a transaction-based system to record financial accounting transaction entries. The cycles were classified as Expenditure, Finance, Human Resource/Payroll, Manufacturing/Conversion, and Revenue. These transaction-based systems ignored two important items—nonfinancial information and the relationships among the business activities.

Figure 1 was adapted from our article, "Linking Business Processes and Transaction Cycles," that appeared in the Fall 2004 issue of *Journal of Information Systems.* It illustrates the relationships among activities, cycles, and processes for a manufacturing company. Cycles capture financial information from the activities, represented in blue. To form business processes, the cycles are grouped as indicated in the diagram. For example, the process of acquiring and paying for resources includes the Expenditure, Human Resource/Payroll, and Finance cycles. Each business process captures a give-and-get event related to both a resource, such as cash, labor, raw materials, or finished goods, and an agent, such as customer, vendor, or employee. The Expenditure and Human Resource/Payroll cycles give up cash to get raw material and labor resources, which the Production cycle gives up to get finished goods, which are in turn given up by the Revenue cycle to get cash.

These give-and-get events incorporate activities that generate financial information, indicated in blue, and

Figure 1: Manufacturing Company

*Blue indicates financial activities. Yellow indicates nonfinancial information. Green indicates both financial and nonfinancial information.

Source: "Linking Business Processes & Transaction Cycles," *Journal of Information Systems,* Fall 2004.

nonfinancial information, indicated in yellow. A purely transaction-cycle-based system doesn't capture nonfinancial information, but a business-process-based system captures and integrates nonfinancial information with financial information, indicated by the color green (blue + yellow = green). An integrated system has the ability to generate reports that reflect both financial and nonfinancial information across business processes. For example, when reporting sales profitability by product line and by salesperson, a processed-based system would supplement financial information (of a cycle-based system) with forward-looking nonfinancial information, such as customer satisfaction. This nonfinancial information helps companies evaluate performance, address customer problems, and predict future demand.

STEP 3: LINK SCREENS TO MODULES AND TABLES

Figure 2 shows the relationships among window screens, business processes, activities, tables, and modules. Window screens provide an easy vehicle for recording business activities while giving users a simplified view of the underlying tables that systems use to store data. Software vendors will group window screens related to the same business process into modules, or system subcomponents, that handle specific functions. If modules are integrated applications, they can share data, eliminating the need to reenter the data. These modules incorporate predefined business activities and systematically coordinate the collection of data using relational database tables.

The underlying tables allow the integration of information across business processes (or software modules). The relational database tables link business activity components according to the firm's business process model. For example, tables store data for each event, related resource, and the agents or participants in the event (customer, employee, and vendor). Each table contains characteristics, or attributes, about the event, resource, or agent. This methodology can be applied regardless of the system used (Great Plains, SAP, Oracle, MAS90).

STEP 4: PLAN YOUR REPORT

Now you know that:
◆ There's a link between accounting transaction cycles and business processes.
◆ Business processes provide the structure for software modules.
◆ Modules consist of relational tables that store data about the company's resources, events, and agents.

Figure 2 : Screen Representations
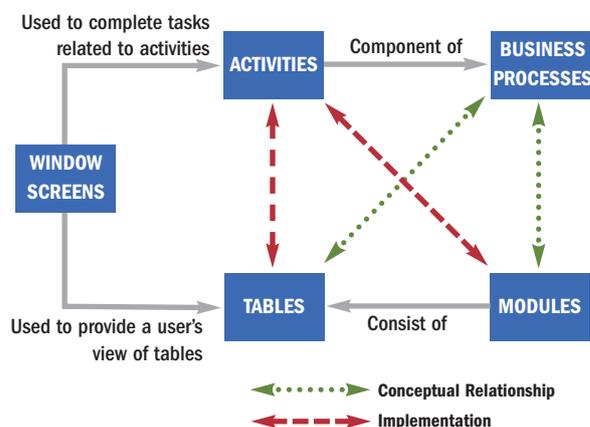
◆ Windows are an efficient means of updating the underlying tables.

So far, so good, but the question remains, how do you free information from its potential data jail? First and foremost, information should have a clear purpose and answer specific questions. If not, don't release it.

Next you need to:
◆ Determine an appropriate report format and layout of data fields.
◆ Identify the modules based on the business processes/activities related to the purpose and questions.
◆ Identify the tables within the modules that contain the desired data fields.

To demonstrate how to free your data, we could use a number of different systems. Because of our academic alliance relationship with Microsoft Business Solutions, we have experience with and access to Microsoft Great Plains version 7.5, which we will use in the following example. The question is: What is the profitability, by product type and by salesperson, for the second quarter of 2004?

The first step is to determine the report format and layout. (For ease of readability, we have selected the final report layout in Table 2.) The next step is to retrieve the information, and that requires identification of the modules and tables that contain the desired data. The financial data items are sales transaction date, salesperson name, product name, and profitability (calculated as sales price less cost of item). Management also has requested one nonfinancial measure, length of employment for each salesperson, as an indicator of skills and loyalty to the company.

Figure 3 has five window screens that are relevant to the sales transaction: the event (two screens document-

Figure 3: Screen Relationships

A. SALES TRANSACTION ENTRY AND SALES COMMISSION ENTRY

B. ITEM MAINTENANCE

C. SALESPERSON MAINTENANCE

D. EMPLOYEE MAINTENANCE

ing the sales by invoice), the resource (inventory), and an agent (the salesperson and employee maintenance screens). We use the letters A through D to identify the windows/modules. The numbers illustrate the shared data between windows and tables.

A. Sales Transaction Entry, accompanied by the Sales Commission Entry, the sales order processing module.

B. Item Maintenance, inventory control module.

C. Salesperson Maintenance, receivables management module.

D. Employee Maintenance, human resource module.

Data items are:

1. **Inventory item number.**
2. **Inventory item description.**
3. **Salesperson number.**
4. **Employee number.**

The sales transaction window (A) is used to record the sales invoice. Besides identifying the customer, the window also identifies the specific inventory items bought using their inventory item numbers and descriptions

entered in the Item Maintenance window (B). The Commissions button connects to the Sales Commission Entry window, where the salesperson is identified and sales commission is calculated for the invoice. The salesperson

Table 1: Example of Database Tables, Attributes, and Relationships

Module	Window	Selected Tables	Unique Attribute	Attribute 2	Attribute 3	Attribute 4	Attribute 5
Sales Order Processing	Sales Transaction Entry	Sales Transaction Header	Invoice ID	Salesperson ID*	Document Date	Customer ID	
		Sales Line Item Detail	Line Item Number	Invoice ID*	Item ID*	Extended Cost	Extended Price
Inventory Control	Item Maintenance	Inventory Master	Item ID	Item Description	Item Cost		
Receivable Management	Salesperson Maintenance	Salesperson Master	Salesperson ID	Employee ID*	First Name	Last Name	Address

Unique attribute is underlined, which indicates the table's primary or unique key.

* indicates the foreign key, which links the tables. The matching colors indicate table linkages.

Table 2: Final Report—Profitability by Salesperson and Product: April 1, 2004 – June 30, 2004

		Salesperson 1: Marty Muscle (Months Employed: 10)			Salesperson 2: Tony Twotime (Months Employed: 2)		
Number	Product Description:	Total Sales	Total Gross Profit	Avg GP %	Total Sales	Total Gross Profit	Avg GP %
300S	Compact Shovel	$5,000.00	$ 750.00	15%	$7,000.00	$ 770.00	11%
437L	Extra-Long File	$1,500.00	$ 105.00	7%	$1,000.00	$ 50.00	5%
6004R	8-Foot Inflatable Raft	$2,500.00	$ 675.00	27%	$1,750.00	$ 402.50	23%
	TOTAL:	$9,000.00	$1,530.00	17%	$9,750.00	$1,222.50	12.5%

ID and name are from the Salesperson Maintenance window (C), which in turn uses the employee ID number from the Employee Maintenance window (D).

Using these windows and module information, the user can identify the specific tables containing the desired information, as in Table 1. The goal of a relational database is to store each piece of data in only one place (table). This structure prevents conflicting data about business processes. A unique primary key that identifies a specific record is identified in a given table. For example, Invoice ID uniquely identifies an invoice in the sales transaction header table. The tables are linked using foreign keys or common attributes indicated by the matching colors. For example, the Salesperson ID is used to link the sales invoice and salesperson tables, allowing you to develop a report with Invoice ID, Salesperson ID, and salesperson name.

Now that all the tables and data fields have been identified, you can liberate the company's data. Extracting information using the ERP system's report writer requires an understanding of the underlying fields and table relationships. Table 2 shows the final report with the freed information and layout requested by management.

FREEDOM!

To liberate your information from a potential data lockup, you must have a thorough understanding of your company's business processes and how your system captures data about those processes (and activities) using system screens, modules, and relational databases. Given a clear view of the question and its purpose, you can leverage your ERP system investment by freeing the data and making information available for decision making. ■

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