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Cheryl A. Cave, Managing Editor

From the Managing Editor

Even a casual observer can't help noting SAP's moves toward securing a big slice of the mid-size market pie. Our old pal Jon Reed attended this year's ASUG/Saphire event and focused on learning about the mid-size companies' experiences with SAP. Jon shares the "lessons learned", particularly on the "human factor" side of these

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SAPtips ONLINE

Be sure to visit the SAPtips Document Library to download these new white papers.

On ABAP

RFC Programming Primer:

A Guide for SAP Consultants and Developers

By Rehan Zaidi, Siemens Pakistan

Remote Function Calls (RFC) offer a powerful functionality for exchanging data between SAP systems - which is why we're pleased to have Rehan Zaidi here to explain some of the key functions, advantages, and uses of this technology. Let Rehan get you started with an overview, some tips on Transactional RFCs, and finally, the steps for setup.

On CIO

Writing a Business Case for SAP Products and Upgrades

By Jocelyn Hayes, SAPtips Director of Consulting and Training

OK, you've identified the problem, found the perfect solution, and you and your team are ready to implement, right? Not so fast. Like all else, you need upper management buy-in. And to get that buy-in, you need a good business case. You need to be able to sell your recommendations to the key decision makers, the ones that will be forking over the dollars for your budget. There's both a science and art to creating and presenting a winning business case. Jocelyn Hayes has been on the delivery end of a few, and she's here to share her tips and practices for getting that final blessing to go forward and implement!

On HR

Mastering PNP and PCH Macros: A Guide For SAP HR Consultants and Users

By Rehan Zaidi, Siemens Pakistan

They're overlooked and under-utilized. And, according to Rehan Zaidi, they have the potential to be a consultant's best friend. They are the macros in the PNP and PCH logical databases, found in SAP's HR sub-module. Rehan addresses the structures, advantages, and uses of these macros. If you're a programmer or a consultant, this white paper provides you some valuable information that may make your next SAP HR implementation easier.

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implementations, in his article on page 55.

And whether you're part of a small, medium, or large enterprise implementing SAP, you'll find a great deal of wisdom in Satish Badgi's "how to" on payroll implementation and cutover. Read Satish's article on page 8.

On the other hand, if you're trying to coax the greatest ROI out of your SAP investment, you'll want to follow our dynamic duo (Axel Angeli and Lynton Grice) through their second installment on Building the SOA City (page 36). In this installment they explore ways to restructure the IT landscape to optimize inefficiently-used resources. They even demonstrate the potential savings by employing SOA.

Perhaps you need to identify the overall health of your company to identify your IT strategy. On page 61, CJ Rhoads begins a three-part series to guide you through the analysis.

Other money and time saving features in this issue include our very own Jocelyn Hayes' discussion on setting up SAP's Express Delivery function to interface with a third-party parcel service (page 12), and Roger Myers' simple and low cost approach to set up front-end faxing from SAP (page 46). Peter Scott demonstrates the agility of the BEx Report Designer tool for formatting executive level reports without an add-on reporting package on page 30.

Okay, so we've optimized your structure and staff, and saved you a wheelbarrow full of money with quick and easy solutions. Now what do you do? If you're as smart as we think you are, you'll want to invest those extra bucks in our mastery-level training. You may choose to attend the SAPtips University classes in Dallas this November. Classes are

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Contact Jocelyn Hayes at Jocelyn.Hayes@ERPtips.com, 1.877.832.2594, ext. 122.

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already half-full, so avoid missing out by reserving a seat now -- see page 4 to find out the what, when, and how! Or, remember, if you can't come to Dallas, we'll be glad to come to you. We can provide onsite training and/or consulting services to help you get the most out of your SAP investment. Contact Jocelyn Hayes at 877-832-2594 x 122.

We're here for you through all your ups and downs. In fact, you can learn how to minimize system downtime with iTera's High Availability product (page 5), or perhaps share stories of those ups and downs to be published as part of our upcoming Humorous Stories feature (page 64). Whether you're augmenting, opti-

mizing, or commiserating...SAPtips is here for you.

Sincerely,

Cheryl A. Cave,
Managing Editor, SAPtips
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SAPtips University November, 2007

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~ SEPTEMBER ~

Start Date	Event	Event Type
September 6, 2007	ASUG Quebec Chapter Planning Meeting	Chapters
September 7, 2007	ASUG Georgia - Northwest Chapter Meeting	Chapters
September 12, 2007	ASUG Presents: End-to-End Root Cause Analysis Webcast	Education/SIGs
September 12, 2007	ASUG SAP ERP Upgrades Webcast: Lessons Learned at Nebraska Public Power District	Education/SIGs
September 13, 2007	ASUG BITI Community TechEd '07 Sneak Preview Webcast	Education/SIGs
September 13, 2007	ASUG Pennsylvania - Philadelphia Chapter Meeting	Chapters
September 14, 2007	ASUG Up State New York - Up State Pennsylvania Chapter Meeting	Chapters
September 14, 2007	ASUG North Carolina/Virginia Chapter Meeting	Chapters
September 14, 2007	ASUG Pennsylvania - Pittsburgh Chapter Meeting	Chapters
September 18, 2007	ASUG ARIS and the Business Process Expert Webcast	Education/SIGs
September 19, 2007	ASUG Enterprise Asset Management	Education/SIGs
September 19, 2007	ASUG Supply Chain Management	Education/SIGs
September 19, 2007	ASUG Product Lifecycle Management	Education/SIGs
September 21, 2007	ASUG Ohio Chapter Meeting	Chapters
September 24, 2007	ASUG Ottawa Chapter Meeting	Chapters
September 28, 2007	ASUG Wisconsin Chapter Meeting	Chapters

~ OCTOBER ~

Start Date	Event	Event Type
October 1, 2007	SAP TechEd '07 Las Vegas	Education/SIGs
October 2, 2007	ASUG New York City Metro Area Chapter Meeting	Chapters
October 3, 2007	ASUG All Canadian Chapter Human Capital Management (HCM) Meeting	Chapters
October 11, 2007	ASUG New Jersey Chapter Meeting	Chapters
October 11, 2007	ASUG New England Chapter Meeting	Chapters
October 16, 2007	ASUG Real Estate SIG YRC Meeting	Education/SIGs
October 22, 2007	Global SAP Environments 2007	Education/SIGs
October 22, 2007	ASUG Data Governance SIG YRC Meeting	Education/SIGs
October 23, 2007	ASUG Atlantic Canadian Chapter Meeting	Chapters



Payroll Go-Live in SAP®: Planning and Managing the Cutover

By Satish Badgi, SAP Consultant

Editor's Note: *If there is one area of SAP that is handled with white gloves, it has to be Payroll. Employees will eventually adjust to pretty much any other system changes, but mess with their paychecks and, well—we wouldn't want to be you. There's no doubt, then, that Payroll go-lives and cutovers have vastly more challenges than other projects. However, according to Satish Badgi, it's easier if you plan, plan, plan. Satish provides us with the critical factors and entities that you'll need to consider before initiating your Payroll project.*

1.0 Introduction

In most cases, an SAP Payroll go-live is a very different and far more sensitive experience compared to other HR/Personnel Administration (PA) projects. The business process related reasons and issues are obvious:

- The employee population is directly affected and hence the transition and communication can be challenging.
- The accuracy of paychecks is, needless to say, very important to all of us; even a difference of a few cents can leave people upset.
- There are State and Federal regulations with which compliance is mandatory.
- There are contracts and agreements with unions, vendors, and other third parties that also require compliance within stipulated time.

And those are just some of the business considerations. Additionally, there are issues related to operations and technology that make the payroll go-live projects challenging, such as:

- Configuration issues – includes complexity of payroll rules and calculations in SAP's schema and rules
- Interfaces and Integration issues – includes interfaces with third-party vendors as well as transmitting files to banks
- Compliance and Regulatory issues – includes as garnishments and tax processing

In this article, we will review these and other challenges and list the critical success factors for payroll cutover and go-live milestones. The scope of this article is of a strategic nature; therefore, there is no reference to any particular SAP version.

2.0 Definition and Planning

I am sure, everyone has heard the term “cutover”, which is defined in MSN Encarta as “to transfer existing data, functions, or users of a computer system to

Impact Area	Payroll Specific Scenario
Data	<ul style="list-style-type: none"> - Employee data - Mid year payroll data, if go-live is in the middle of tax year - Flexible Spending Accounts or similar balances
Functions	<ul style="list-style-type: none"> - Managing employee data - Running payroll process - Running post payroll processes
Users / Departments	<ul style="list-style-type: none"> - Changes to system - Changes to processes
Third Parties	<ul style="list-style-type: none"> - Interfaces (Example – Benefit vendors)
Government Agencies	<ul style="list-style-type: none"> - Tax remittances - Processing payroll as per state regulations
IS/IT	<ul style="list-style-type: none"> - Impact of new technology environment
Unions	<ul style="list-style-type: none"> - Agreements
Employees	<ul style="list-style-type: none"> - New pay stub and check - Changed calculations - Differences in tax calculations
Banks	<ul style="list-style-type: none"> - Send the positive pay files - Bank transfers for direct deposits

Table 1: Potential Cutover Impacts for Payroll

new facilities or equipment in a synchronized manner”. Now, apply this definition to payroll and let’s look at the impact. Table 1 illustrates a payroll-specific scenario, and adds some payroll specific elements to this definition.

I’ll use Figure 1 to show the entities that need to be accounted for while planning the cutover.

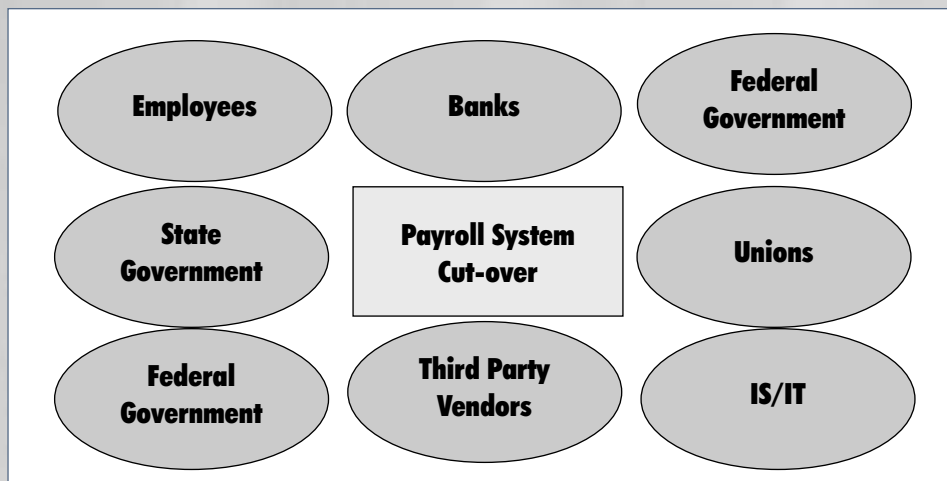


Figure 1: Cutover Entities and Impact

Both the table and figure should give you an idea of the critical areas/entities impacted and, thus, the need to plan. Now, let’s discuss the planning process for cutover.

The planning process starts with the Payroll go-live date. In real life, it may not be necessarily a “single” date. For a payroll with just one payroll area, you may have one single go-live date, but many times, you will have a combination of payroll areas – Weekly, Bi-weekly, and Monthly. In a situation like that, the go-live and cutover planning need to address individual payroll areas. Table 2 lists the planning factors around the cutover plan in relation to entities we discussed earlier.

When you start creating the cutover plan document (as MS-Word and/or MS-Project), you’ll need to keep these factors in focus, as they will allow you to create appropriate tasks in the project plan and ensure that they are completed prior to the go-live.

Entity	Planning Factors
Employee	<ul style="list-style-type: none"> - Are the pay stubs changing? - Is there an impact on time clocking systems? - Are employees using Self Service/Portals?
Banks	<ul style="list-style-type: none"> - To how many banks do we need to send positive pay files? - Has the file transfer been tested satisfactorily? - Is someone in the bank “on call” for any technical snags?
Unions	<ul style="list-style-type: none"> - Are the unions aware of cutover and go-live schedules? - Are there any functional limitations or technical issues with the new system? For example, inability to pay overtime in current period.
Third-Party Vendors	<ul style="list-style-type: none"> - Are any outbound interfaces going to the third parties? - Is someone from vendors “on call” for any technical snags?
IS/IT	<ul style="list-style-type: none"> - Has IS/IT planned for system upkeep, recovery, etc.? - Are BSI updates for taxes and Support packs in alignment?
Government	<ul style="list-style-type: none"> - Is tax remittance and filing tested and planned well? - Are the payroll calendars in compliance with individual state regulations?

Table 2: Payroll Cutover Planning Checklist

Scenario	Cut Over Salient Points
Payroll go-live is at the beginning of year with one single payroll area. The payroll processing is carried out centrally while the data entry and maintenance are performed in a distributed manner.	<ul style="list-style-type: none"> • Payroll period is likely to start in the last week of December and hence planning should start in December • If the data is maintained at different locations and if payroll is processed centrally, then your cutover plan needs to include user training, error handling, issue tracking, etc., to fit that business model
Payroll go-live at the beginning of year with multiple payroll areas. Both the data maintenance and payroll processing is carried out in distributed fashion.	<ul style="list-style-type: none"> • Same as above, except that the challenge is bigger. You will almost need "mini" cutover plans for each location
Payroll go-live with outsourced benefits processing and outsourced tax processing.	<ul style="list-style-type: none"> • This could reduce the complexity of the cutover since tax processing and benefits are handled by outsourced vendors. It will also bring down the coordination around benefit vendor interfaces and tax remittances.
Payroll go-live with gross processing in your SAP system and net processing in third-party system with responsibility for interfaces and tax filing with the outsourced vendor.	<ul style="list-style-type: none"> • This will be a simple scenario. Majority of responsibility is with an outsourced vendor since net processing is done by the outsourced vendor. Benefits interfaces, tax remittances, garnishments remittances, check printing, and bank transfer will all be handled by outsourced vendor.
Payroll go-live with middle of payroll year go-live date and both gross and net processing in-house with multiple locations and multiple payroll areas.	<ul style="list-style-type: none"> • This could be probably the most complex of the scenarios for cutover. Since there is net payroll, multiple locations as well as multiple payroll areas, the cutover planning needs to be very comprehensive.

Table 3: Payroll Cutover Scenarios

3.0 Cutover Scenarios

Let's take some examples to learn more about the cutover planning. In Table 3, I'll use scenarios to illustrate the salient points of cutovers.

Now let's discuss the critical success factors for a good, solid cutover plan.

4.0 Checklist

Is there a standard checklist for payroll cutover? As we have seen earlier (in Table 3), the scenarios will drive different situations and therefore will drive the checklist. Figure 2 shows a sample checklist to give you an idea. This is not a complete list in any manner and is only a small representation.

5.0 Success Factors

It is fairly easy to identify the critical success factors around the cutover plan, which will help you to achieve a successful go-live.

Innovation – This may sound very strange, but those of you who may have done some payroll cutovers will probably agree with me. As you run the first payroll and identify issues and problems, solving them in a timely manner requires innovation and deep knowledge of the product as well as the subject. You will

Final Data Conversion

- Final employee master data conversion
- Manual transaction entry in both legacy and SAP
- Maintain paper documents for transaction entry
- Maintain retroactive change requirements
- Final payroll results conversion
- Reset the control record after data conversion
- Ensure the RA date in control record
- Check for the new hires after data conversion
- Check for the terminations after data conversion
- Check for the garnishments after data conversion

Bank Transfer and Checks Printing

- Check that each location has tested check printer
- Verify the signature cards on printers
- Communicate with bank about the first file transfer
- Verify that check stationery is available
- Verify that manual checks are available
- Verify that a signatory authority is available
- Check the communication / FTP for bank file transfer

Payroll Process

- Test the BSI connection
- Identify the complex verification cases for employees
- Identify out of state employees for tax calculations
- Generate schemas and activate features

Figure 2: MMSC Enter Storage Locations Collectively

definitely need “innovative solutions” to address the issues. Some of the issues may have technical solutions, while others may not.

Accuracy – Most of the time, payroll is “binary” – either it’s right or wrong. Therefore, accuracy of calculations is of primary importance in payroll go-live. In case you have any situation where some of the paychecks are not right, you will need an alternate plan, such as whether to issue manual checks or simply talk to the employees and manage the fixes in the following payroll.

Issue Tracking and Resolution – Keep track of every issue, small or large, during the final hours of a Payroll go-live. It is a good idea to designate a resource to manage the issues. Some of the issues might need to be escalated to the project leadership. Keep in mind, some issue escalation might have to be done in the odd hours of the night shift as the first payroll is run! Your cutover plan therefore needs a plan to keep the leadership/stakeholders/decision makers updated and informed.

Prioritization and Focus – As the issues are logged and tracked, keeping priority and focus is very crucial. Let me explain that with some examples: You find a problem in payroll that will affect General Ledger postings. A problem like this will be low priority. In the second example, an employee’s local tax was not deducted. This problem requires higher priority. The focus needs to be on accuracy, especially at the employee level. Any downstream processes can always be tackled after we get accurate paychecks out on schedule.

Plan – We’ve talked about the cutover plan throughout this article. However, managing the plan document is a task by itself. While managing the cutover plan, teams will need to coordinate with all the entities and ensure that tasks are completed in time. The plan should be updated frequently. As the go-live comes closer, the teams may need to meet a few times a day to look at pending tasks.

Communication – In Figure 1, we noted that there are many internal and external entities with which we, as project teams, need to communicate in the project. In the cutover plan, you will need to schedule enough time and resources to deal with these entities.

6.0 Conclusion

Payroll go-live projects have their challenges and thus are always feared by project teams. However, if you take the impact-based or entity-based view as described

in this article, you should be able to get the right tasks in your project plan. We all agree that there is never a “simple” payroll go-live. However, by following the approach I presented, including identifying the critical success factors, you should be able to bring discipline to your cutover plan. And hopefully, make this project a tamer “monster”.

Satish Badgi, SAP HR Expert. Satish is a senior consultant with specialization in SAP HR and Payroll. He has over ten years of experience implementing and supporting SAP systems across multiple countries in a variety of industries. In his recent engagements, Satish has been involved with implementing SAP payroll systems in complex Public Sector environments and integrating them with Finance, Costing, and Funds Management. You may contact the author at SAPtips.Authors@ERPtips.com. Be sure to mention the author’s name and/or the article title.



Latte or Express-o: Interface SAP® Shipping with Express Delivery Services

By Jocelyn Hayes, SAPtips Director of Consulting and Training

Editor's Note: *If your company does a considerable amount of shipping via third-party parcel delivery services (like UPS or Fed Ex), then you'll appreciate this tip from Jocelyn Hayes. By working with your preferred shipper, you can interface SAP with their systems to automate and streamline many of the manual processes involved with this often tedious job. Let Jocelyn walk you through the steps of getting connected with your shipper—the effort spent will be more than balanced by the time and money your company will save!*

Introduction

The big buzz today in Enterprise Software (SAP is not alone here), is Business Process Management (BPM). To most, this is a novel concept; to others it is just another catchy term with little meaning. BPM refers to identification of business process details in order to make them more efficient. An excellent example of this in SAP is an interface to a third-party parcel delivery service (a.k.a. express delivery service) for shipping (distribution). An example of such a business would be DHL, UPS, or Fed Ex. Working with the vendor to integrate processes eliminates a lot of redundancies and makes the process much more efficient.

In this article, the third-party parcel delivery service will be referred to as express delivery service.

Let's put this in the context with the scope of this article. Here's the scenario: Your management team wants a process that simplifies the human interface between systems – in other words, they want more automation. To have automation, you must utilize technology. Here the business process is to ship a delivery (a package) from your SAP solution using an express delivery company as the carrier. To be stored to SAP, you'll need the parcel tracking number, the shipping charges, and the tracking status stored for future reporting, tracking,

or billing purposes. You also want the shipping label printed via this interface. You now have true business process integration.

While this article provides the basics on how to configure this interface, there is much programming and mapping that has to be done in the middleware tool. One parcel tracking company (to my knowledge) will provide this interface free of charge with a contract to use their services. They also provide support staff to assist your company with setting up the interface.

Technology Background

Three components of technology exist in this solution:

- 1) Parcel company shipping engine (provided by the express delivery company)
- 2) SAP R/3
- 3) Middleware

In this article, I utilize the SAP Business Connector, but you could use SAP Exchange Infrastructure – XI - or another middleware of your choice. The express delivery company illustrated in this article developed the solution using the Business Connector, and has plans to move forward with an XI solution.

Basic Process Flow

The steps are fairly simple once the solution is configured. Once you create a delivery, you pack it into a parcel box (set up as a material master), and you enter an Output Type at the header level of the delivery, which creates the IDOC output to the express delivery company via the middleware. A message then comes back to SAP and populates the tracking number, status, and shipping charge. See Figure 1 for the process flow.

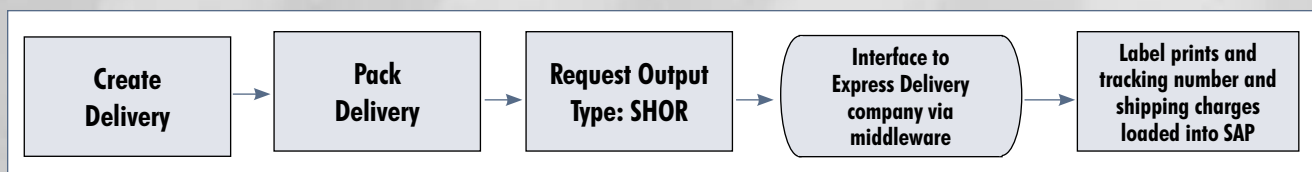


Figure 1: ESG and PSG in PA Module

Display View "Processing routines": Details

Dialog Structure

- Output Types
 - Mail title and texts
 - Processing routines
 - Partner functions

Output Type: SHOR Shipping Order

Application: V2 Shipping

Transm. Medium: 6 EDI

Layout module:

SmartForm:

Processing 1

Program: RSNASTED

FORM routine: EDI_PROCESSING

Form:

Figure 2: SHOR Processing Routines

Now let's get to the guts of how to set up SAP. There are some steps left out here because this solution does require some ABAP code (which was supplied to us by the express delivery company) and installation of the middleware (SAP Business Connector). Again, if you wish to pursue this solution with the express delivery company, you should contact your local account executives to see if they can provide this solution to you.

Step 1: Shipping Point

Set up address information in the Shipping Point(s) that you will use to "ship from". This is the Sender Address information printed on the shipping label.

In the IMG, go to: Enterprise Structure → Definition → Logistics Execution → Define, copy, delete, Shipping Point

Step 2: Master Data

A vendor (forwarding agent partner) must be created. The vendor is one of the business partners used in the delivery note in SAP. The vendor is also used for the service agent assignment (see Step 10) and when you set up the Partner Profile (see Step 8). To create a forwarding agent vendor, use transaction V-11. You only need to create the address-relevant screens.

Step 3: Delivery Output Type

Output Type SHOR is used to issue the DELVRY03 IDOC. This Output Type is already configured with the correct transmission medium, program, form, and partner functions, but you should check these settings to make sure it has not been modified.

Using transaction V/34, select the SHOR Output Type, double-click on Processing routines, and check the processing routine details, as shown in Figure 2.

Once you have checked the processing routines, double-click on the Partner functions option to check the data, as shown in Figure 3.

Step 4: Create Condition Record

Using transaction VV21, create a Condition Record and map the Output Type to the forwarding Agent Partner. Select Output Type SHOR, press the Enter key, and enter the information, as shown in Figure 4 (the Partner is the vendor you created in Step 2).

Display View "Partner functions": Overview

Dialog Structure

- Output Types
 - Mail title and texts
 - Processing routines
 - Partner functions

Application: V2 Shipping

Output Type: SHOR Shipping Order

Partner functions

Medium	Funct	Name
6 EDI	CR	Forwarding agent

Figure 3: SHOR Partner Functions

Shi...	Name	PartF	Partner	M...	Dat...	Lang...
<input checked="" type="checkbox"/>	DigitalGlobe Service	CR	FDX	6	4	
<input checked="" type="checkbox"/>						
<input checked="" type="checkbox"/>						

Figure 4: SHOR Condition Record

Step 5: Output Procedures

Add output type SHOR to your shipping output procedure. This is a header output type. To add it, use transaction NACZ and select your header output procedure, double-click on Control (see Figure 5).

Step 6: Set Up RFC Destination

In order for SAP R/3 to communicate to the Business Connector (or any other middleware), you must set up an RFC (Remote Function Call) connection. To set up the connection, use transaction SM59, select TCP/IP Connections, and click on Create.

Enter the RFC destination name, connection type = T, and a description of the connection. Click Save.

Tip #1: The Business Connection (middleware) should already be configured to listen on this RFC destination. The RFC destination name is pre-determined based on how your Basis team set up the Business Connector server.

Step 7: Port Definition

The Port Definition identifies how data is sent from SAP to the Business Connector. To set up the Port Definition, use transaction WE21, click on transaction RFC, then create. You can either choose to define the port name or allow SAP to define it – the best practice is to just let SAP define it. You should also enter a Port Description, the version, the RFC Destination (defined in Step 6), and a description. See Figure 6 for an example.

Step 8: Partner Profile

You must maintain the partners with whom you electronically communicate in the Partner Profiles. You must also link the Port defined in Step 7 in the Partner Profile. To create a Partner Profile, execute transaction WE20 and click on Create. Enter the partner number (this is the vendor master ID you created in Step 2), Partner Type LI, Partner Status A, Typ US, Agent (enter the name of the person responsible) and click Save. See Figure 7 for example.

Step	Cntr	CType	Description	Requiremnt	Manual only
10	1	ZLD0	DG Packing list		<input type="checkbox"/>
20	2	MAIL	Mail		<input checked="" type="checkbox"/>
30	3	SHOR	Shipping Order		<input type="checkbox"/>

Figure 5: Shipping Output Procedure

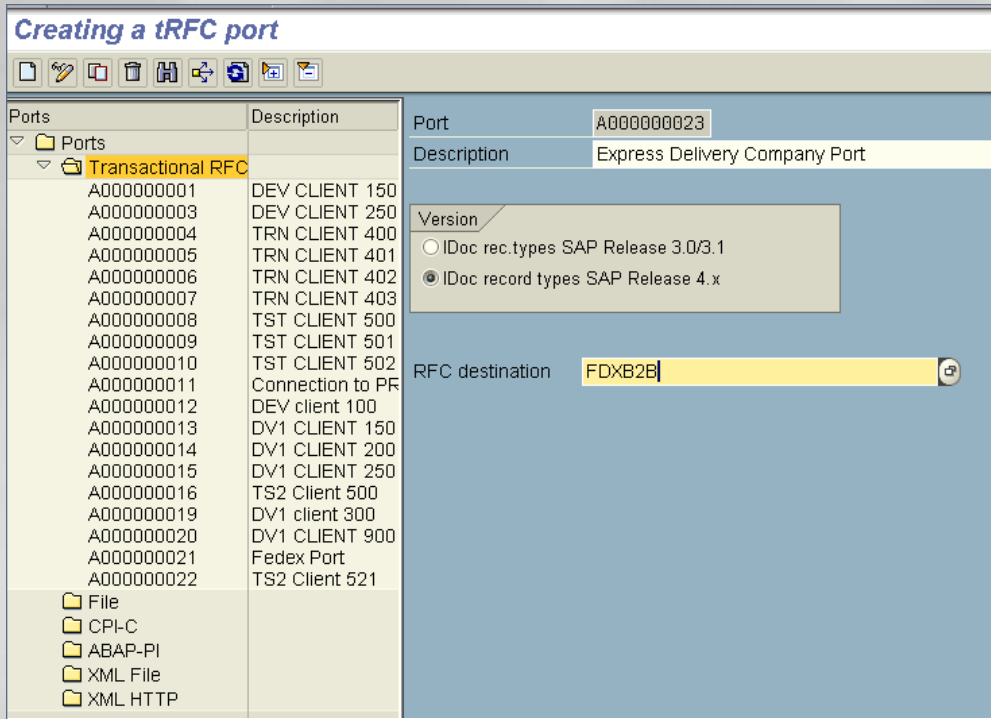


Figure 6: Port Definition

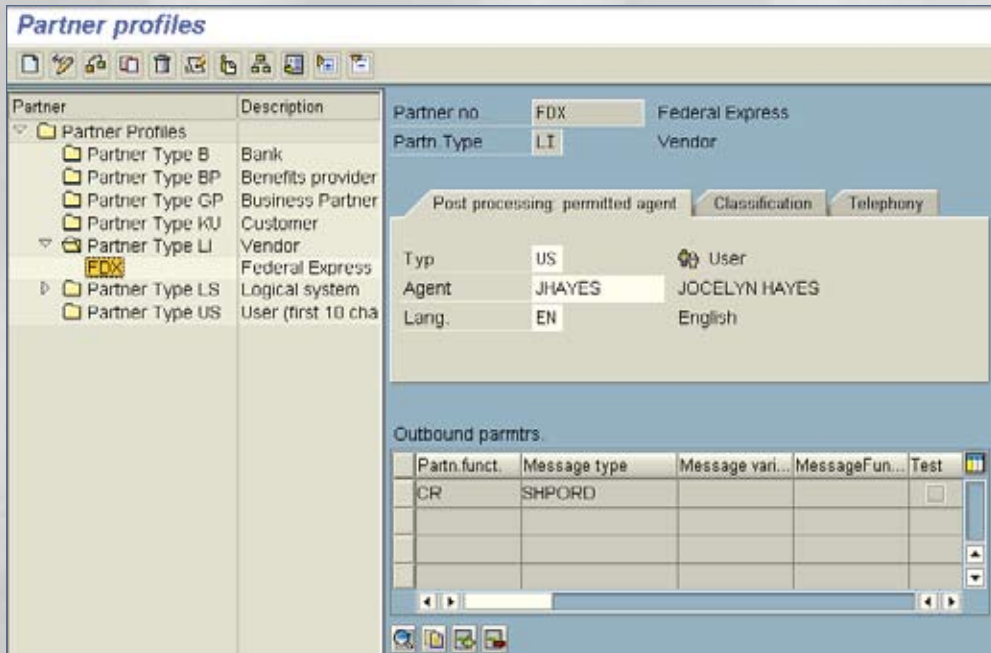


Figure 7: Partner Profile

Without leaving this screen, click on “Outbound parameters”, and enter the information detailed in Figure 8.

Click on the Message Control tab, and enter the information as shown in Figure 9.

Click Save.

Step 9: Service Code Setup

Note: The express delivery company that we used for this solution provided three options for determining the

Partner profiles: Outbound parameters

Partner no. Federal Express
 Partn.Type Vendor
 Partn.funct. Forwarding agent

Message Type Delivery: Dispatch order
 Message code
 Message function ☐ Test

Outbound Options | Message Control | Post Processing: Permitted Agent | Telephony

Receiver port Transactional RFC Fedex Port
 Pack. Size

Output Mode
☒ Transfer IDoc immed. Output Mode 2
☐ Collect IDocs

IDoc Type
 Basic type Delivery interface
 Extension
 View
☒ Syntax check
 Seg. release in IDoc type

Figure 8: Partner Profile: Outbound Parameters

Outbound Options | Message Control | Post Processing: Permitted Agent | Telephony

Application: V2 : Shipping
 Output type: SHOR : Shipping Order
 Process code: DELV : Delivery DELVRY01: DESADV/CARNOT/WHsORD/SHPORD

Application	Message type	Process code	Change ...
V2	SHOR	DELV	<input type="checkbox"/>

Figure 9: Partner Profile: Message Control

service code. The other options were Shipping Conditions (our selection), Delivery Priority, and Route. In our SAP environment, Shipping Conditions comes from the Customer master, is passed to the sales order, then to the delivery. SAP has prevented its customers from changing the Shipping Conditions value on the delivery note, but we found many cases in which our Shipping

Department needed to change the shipping condition to designate a different service level (like upgrading to overnight priority from standard overnight).

For this step, you will need to work with your express delivery company to determine the best field to use for your company.

Step 10: Express Delivery Company Cockpit Setup

This step creates links from many of the previous steps into one transaction.

Go to transaction VTRC. Click "Create Express delivery company" and enter the information shown in Figure 10.

Once you have entered all the information on the Express Delivery Company Control tab, move to the Data Provider tab, where you will enter the target URL for your Business Connector (or chosen middleware). To check the connection, click on the "Non-SAP system" button and click the "Load all master data" button. This action causes the Cockpit to receive metadata from the express delivery company. If you navigate to the Metadata tab, you will see the populated metadata table.

Click Save.

The next step in the VTRC transaction is to assign a service agent to the carrier; this links the vendor master created in Step 2 to the express delivery company. Click on the "Exp. Div Cmpny control" tab and click on "Assign service agent". A couple examples have been provided in Figure 11 to display how to complete the table.

Your express delivery company will provide you with additional metadata information that you may need to complete this configuration.

Figure 10: Express Delivery Company Control

SvcAgent	ExpID	Name 1	ExpDivCo.
DHL		DHL	DHL
DHL	X	DHL	DHL
FDX		Federal Express	FDX
FDX	X	Federal Express	FDX

Figure 11: Create Carrier

The final step is to Assign the Service Codes. In Step 9, I explained that you will have multiple options for which SAP Delivery note fields are used to designate the Service Codes. In this example, we use Shipping Condition. In the VTRC transaction, click on the Service Codes tab, click on "Srvc. Codes determination" and select the chosen folder under the Dialog Structure on the left.

Save when complete.

Figure 12 illustrates an example of “uses Shipping Conditions” as the Service Code.

Step 11: Create Packaging Materials

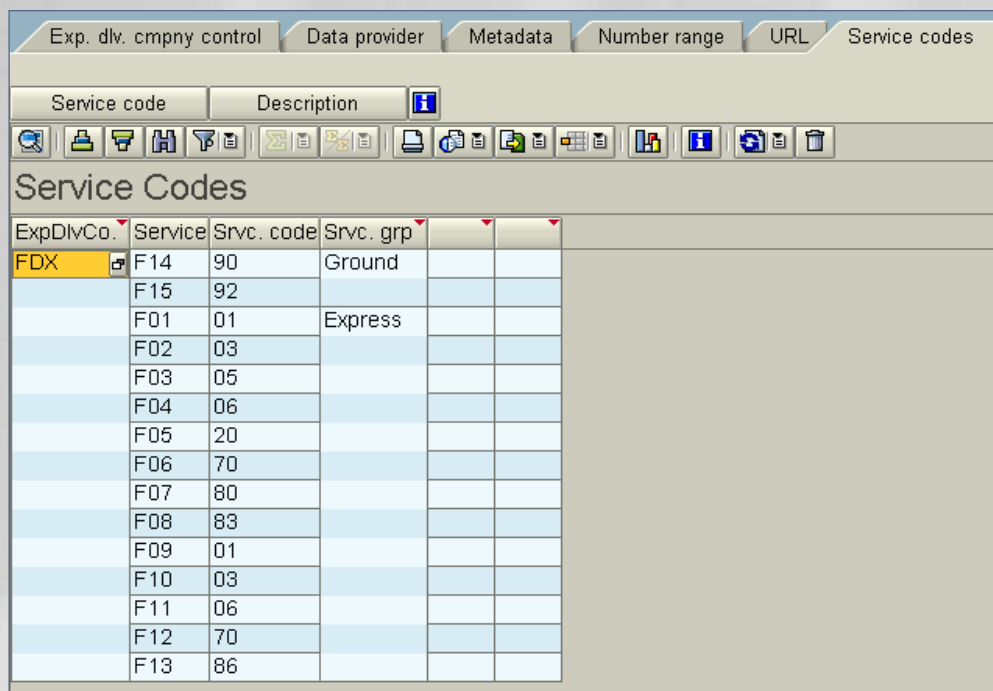
To create the packaging materials, you will use the MM01 transaction. Be sure to copy your materials to all the organizational units that will be used on your Delivery notes. Since creating a Material master can be an SAPtips article of its own, I will assume the user of this guide has some knowledge of creating materials in SAP, and will simply provide some key values that should be used when creating these materials:

- Material Type: Packaging (VERP)
- Material Grp Pack Materials – PACK
- Additional Data – enter box dimensions
- Item category group – VERP

Now, let’s see it work!

Starting with an existing Delivery note, we will pack the parcel:

Using transaction VL02N (Change Delivery), follow the menu path Edit→Pack to navigate to the packing screen. In the upper portion of the screen, enter the Material master name for the packaging material (box size) that you will use for the delivery. Select the items on the lower half of the screen that will be put in that package and click



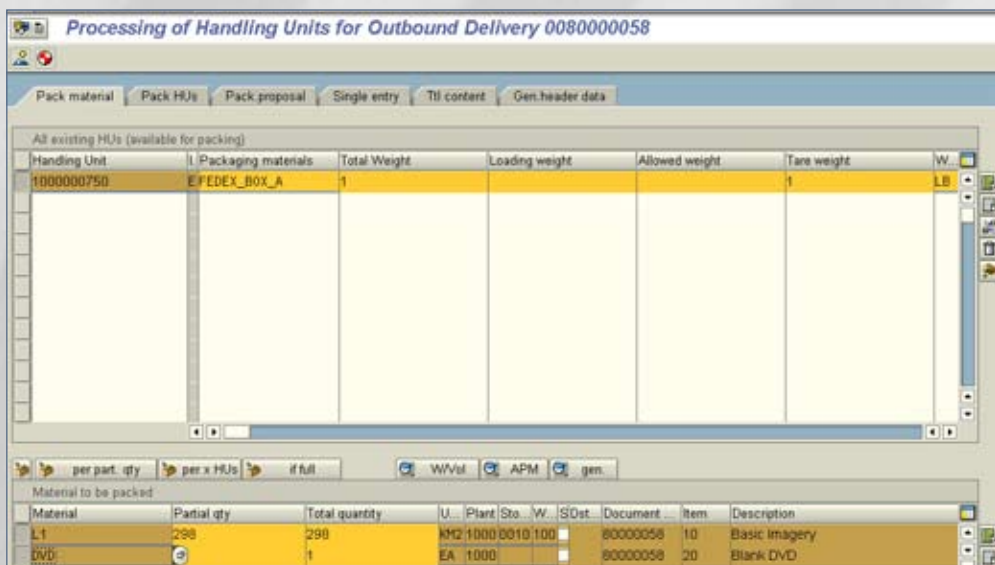
ExpDivCo.	Service	Srv. code	Srv. grp	
FDX	F14	90	Ground	
	F15	92		
	F01	01	Express	
	F02	03		
	F03	05		
	F04	06		
	F05	20		
	F06	70		
	F07	80		
	F08	83		
	F09	01		
	F10	03		
	F11	06		
	F12	70		
	F13	86		

Figure 12: Service Code Assignment

the Pack icon. Figure 13 illustrates the results of these steps.

Note: In the Pack transaction, you create a Handling Unit; a handling unit is simply a single package or parcel.

Once the parcel is packed, we need to issue the SHOR output. To do that, you go to the Header output screen (Extras→Delivery output→Header) and select the SHOR Output Type.



Handling Unit	U	Packaging materials	Total Weight	Loading weight	Allowed weight	Tare weight	W
1000000750	E	FEDEX_BOX_A	1			1	

Material	Partial qty	Total quantity	U	Plant	Sto	W	SOst	Document	Item	Description
L1	298	298	KM2	1000	0010	100		80000058	10	Basic Imagery
DVD	1	1	EA	1000				80000058	20	Blank DVD

Figure 13: Processing of Handling Units (Pack Screen)

	ExpDivFld	Quantity	HULT...	Status	Date	Time	Loc	Text
▼ Outbound Delivery	0080079049			Delivered	06/25/2007	11:02:00		
▼ Track. status				Delivered	06/25/2007	11:02:00		
▼ ExpDivCmpny's data field								
▼ YOUR PACKAGING	1000014556			Delivered	06/25/2007	11:02:00		
▼ Track. status				Delivered	06/25/2007	11:02:00		
BOULDER,CO US				Picked up	06/22/2007	15:47:00	BOULDER,CO US	Picked up by FedEx
BOULDER,CO US				In Transit	06/22/2007	18:23:00	BOULDER,CO US	Left FedEx Origin Loc
DENVER,CO US				In Transit	06/22/2007	19:23:00	DENVER,CO US	Arrived at FedEx Rar
BOULDER,CO US				In Transit	06/22/2007	19:34:00	BOULDER,CO US	Left FedEx Origin Loc
DENVER,CO US				In Transit	06/22/2007	20:07:00	DENVER,CO US	Arrived at FedEx Rar
DENVER,CO US				Exception	06/22/2007	22:41:00	DENVER,CO US	Package in FedEx loc
DENVER,CO US				In Transit	06/23/2007	07:28:00	DENVER,CO US	Left FedEx Ramp
INDIANAPOLIS,IN US				In Transit	06/23/2007	18:10:00	INDIANAPOLIS,IN US	Left FedEx Sort Facil
DULLES,VA US				In Transit	06/24/2007	04:54:00	DULLES,VA US	Arrived at FedEx Rar
DULLES,VA US				In Transit	06/25/2007	05:06:00	DULLES,VA US	Left FedEx Ramp
WASHINGTON,DC US				In Transit	06/25/2007	06:43:00	WASHINGTON,DC US	Arrived at FedEx Des
WASHINGTON,DC US				In Transit	06/25/2007	07:07:00	WASHINGTON,DC US	On FedEx vehicle for
WASHINGTON,DC US				Exception	06/25/2007	08:44:00	WASHINGTON,DC US	Customer not availab
WASHINGTON,DC US				Delivered	06/25/2007	11:02:00	WASHINGTON,DC US	Delivered
▼ ExpDivCmpny's data field								
Declared Value	1.00							
Net Charge	19.81							
Tracking Number	69924103291							
Standard Imagery	L2	129 KM2						
DVD disc with remotely sen	DVD	1 EA						
Invoice	0020041542							

Figure 14: Parcel Tracking Tab of Display Delivery Transaction

Save the delivery. What has happened behind the scenes is the SHOR output created an IDOC, which was sent to the Business Connector via the RFC. The Business Connector then converted it to XML, did some mapping, and sent a subsequent message to the express delivery company. The express delivery company server sent a message back containing the tracking number, shipping cost, and tracking status (initial).

Now, let's look at this delivery a few days later. We can navigate to the Parcel Tracking screen on the Delivery and see the tracking status of this delivery.

Using transaction VL03N (Display Delivery), we can see the tracking status as shown in Figure 14.

Another nice little program we created was using a Condition Type to pull the actual shipping charges into an invoice. When our finance department wants to charge the customer the exact shipping charges, they simply add the ZF00 Condition Type to the invoice (or use a Condition Record to do it automatically).

Conclusion

With the assistance provided by your express delivery company, you too can have Business Process Management automation integrated into your SAP delivery process. This project did take about 300 hours to imple-

ment in the company I was working with due to a large learning curve, but the express delivery company used provided most of the code and development. We save thousands of man-hours per year utilizing this solution because we have reduced the manual processes in both the Shipping and Finance departments.

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 Wikipedia - http://en.wikipedia.org/wiki/Business_Process_Management

SAP®'s New General Ledger in ECC 6.0: Document Splitting – Part III

By Anurag Barua, The Washington Post

Editor's Note: All good things must come to an end, though we hope for those of you using the new G/L in ECC 6.0, it's just the beginning of great things to come. This is the final installment of Anurag Barua's three-part series on Document Splitting. In this issue, Anurag provides the configuration activities you'll use if your business needs exceed what the standard SAP features can provide. He also delves into a few of the tips he's learned along the way (after all, we wouldn't be SAP-tips without TIPS!)

Introduction

In the April/May issue of SAPtips, I introduced you to the features of the New General Ledger (New G/L) in Enterprise Core Component (ECC) 6.0 in the mySAP® ERP 2005 application. In that article, we began our overview of document splitting. In Part II of this series (which appeared in the June/July 2007 issue), I continued to build on the concepts of document splitting (introduced in Part I) and took a look at those key configuration activities that need to be completed before you can be up and running with document splitting in your system. In this third and final installment, I will share with you the remaining configuration steps, as well as other tips you'll need to know to make the most of this feature.

Additional Configuration

While SAP provides you with a lot of standard functions, very often your specific business needs will transcend the capabilities provided in these standard features. This is equally true in the case of document splitting. Therefore, let's delve into the additional configuration steps required, should your business needs not be met by the configuration activities that were discussed in Part II.

"While SAP provides you with a lot of standard functions, very often your specific business needs will transcend these."

You will find these four configuration activities in the "Extended Document Splitting" area in the IMG. To get there, you need to navigate as follows: Financial Accounting (New) → General Ledger Accounting (New) → Business Transactions → Document Splitting → Extended Document Splitting. This navigation is shown in Figure 1.

- **Define Document Splitting Method** – SAP provides a few standard splitting methods (as shown in Figure 2). Each of these methods is a composite of various splitting rules. If your analysis reveals that you need to create custom splitting method(s) to suit your business needs, you can do that in this configuration step by clicking on "New Entries" and then assigning a method key and a meaningful text.

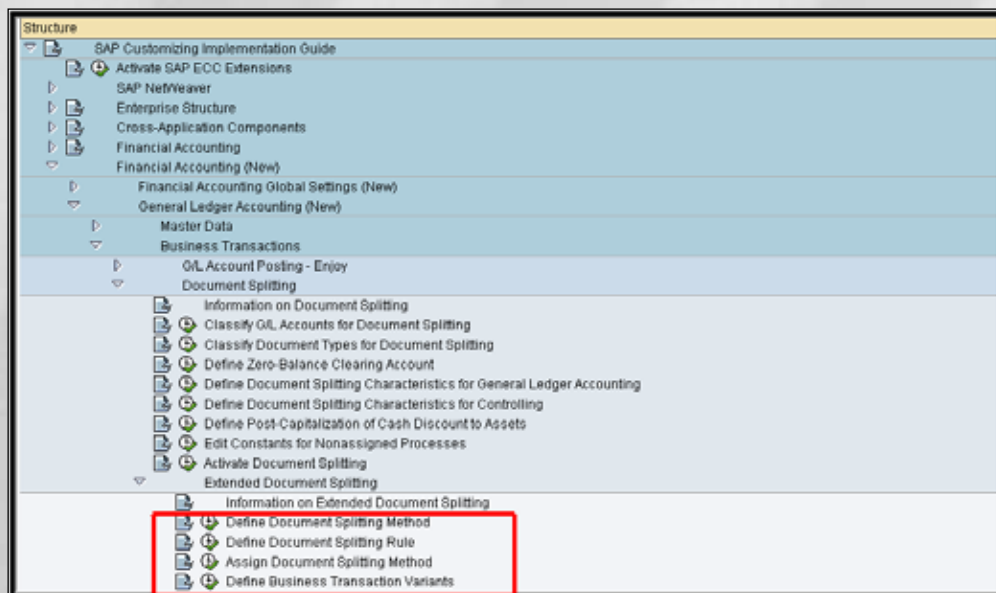


Figure 1: Configuration Steps for Extended Document Splitting

- **Define Document Splitting Rule** – This is where you define your own splitting rules and methods. In Figure 3, you see the screen displayed when you execute this configuration activity; here you'll find the entire list of available splitting methods along with their respective business transactions and variants.

Now, suppose you want to create a new splitting rule. Highlight the "Header data" node in the Dialog Structure column, click on the "New entries" button, and you will see a screen like the one shown in Figure 4. On the right-hand panel of the screen shown in Figure 4, you'll need to enter the splitting method, business transaction, and business transaction variant along with other information such as the level of detail (including inheritance of account assignments), the account key for items with zero balance, etc.

There are two other major configuration activities that you'll carry out on this screen:

- **Edit Item categories** - As the name suggests, you can make changes to item categories.
- **Base Item categories**
 - You'll need to maintain this if you have selected the processing category of "Splitting by base item categories specified" (choice "2" in the processing category field in the previous configuration step for a combination of item category, business transaction, and variant).

Figure 4: Creating a New Splitting Rule

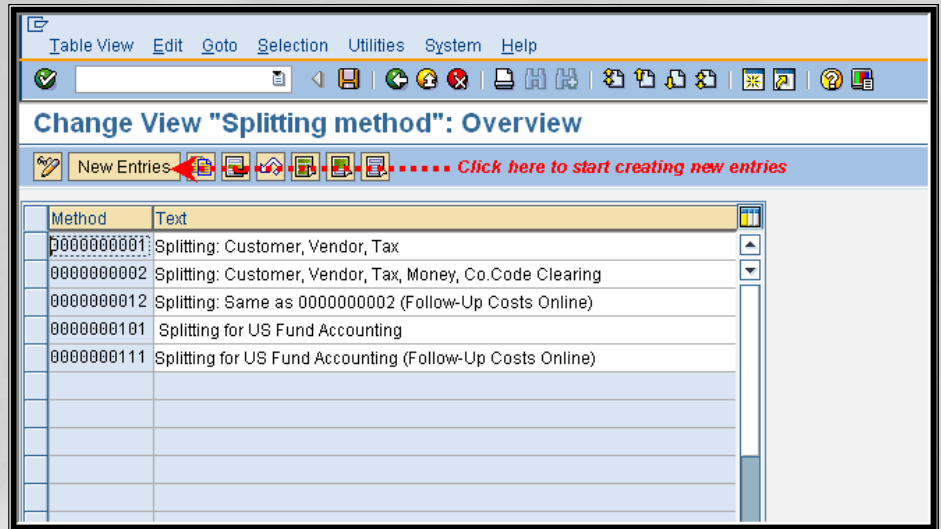


Figure 2: Creating New Splitting Methods

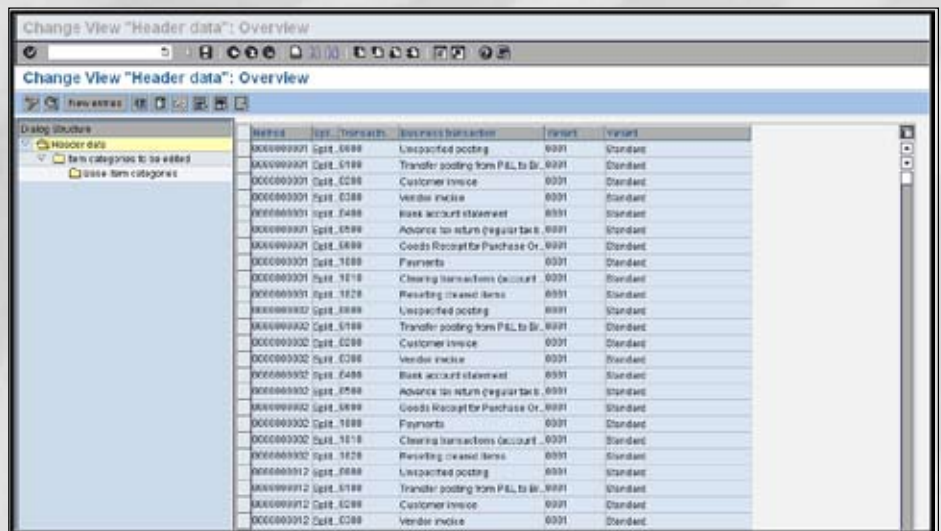
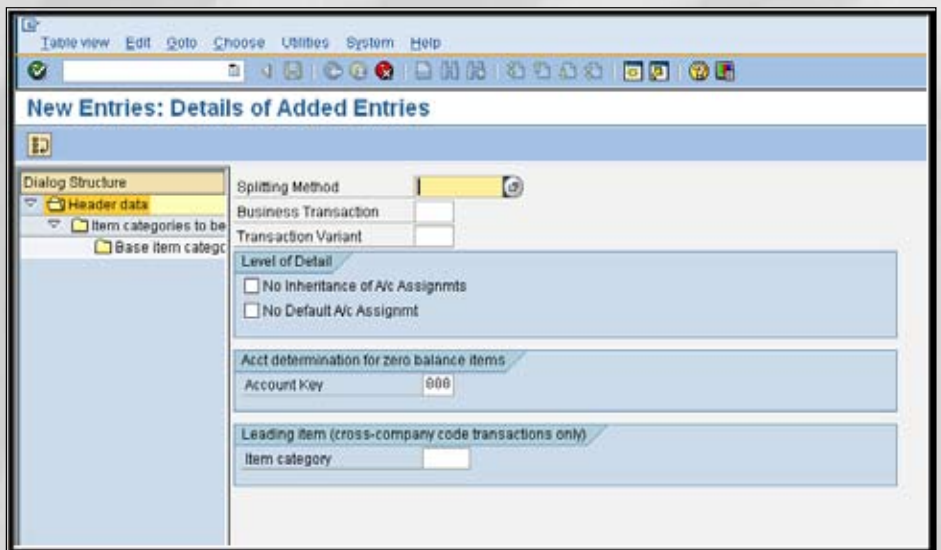


Figure 3: Maintenance of Document Splitting Rules



(Please note that a detailed discussion on these is beyond the scope of this article.)

- **Assign Document Splitting Method** – In this step, you'll assign a splitting method of your choice, assuming that you want to use something other than the SAP default one of "0000000012". If this is the case, you can assign your own splitting method provided that you created one in the "Define Document Splitting Method" configuration step. See Figure 5 for an illustration.

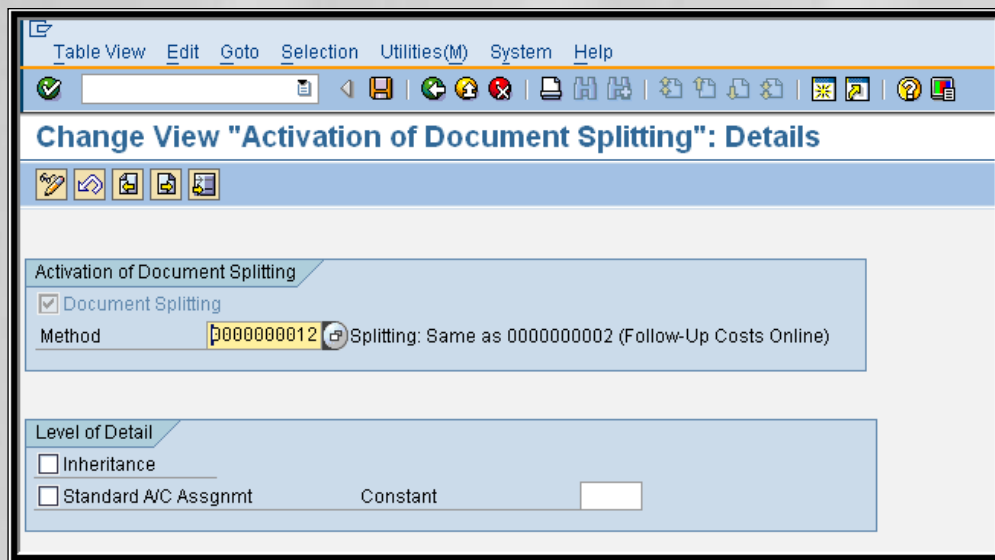


Figure 5: Assigning a Document Splitting Method (Default Method Shown)

- **Define Business Transaction Variants** – It is important to understand what a business transaction variant is before you create a new one. A business transaction is assigned a business transaction variant, which contains the information necessary for document splitting. Some standard examples are shown in Figure 6: "0200" for customer invoice and "0300" for vendor invoice, etc. Business transaction variants consist of item categories, each of which contains information relevant to the splitting process. SAP provides a single standard business transaction variant (0001) that contains all the standard item categories. You cannot create new business transactions, but you can create new business transaction variants. To do so, you would need to carry out the configuration activity shown in Figure 6.

Once you are on the screen shown in Figure 6, you need to select the desired business transaction and then double-click on the "Accounting transaction variant" node in the Dialog Structure. Let's say you want to create a business transac-

tion variant for the customer invoice business transaction (0200). Highlight the row containing the customer invoice business transaction (0200). Then, double-click on "Accounting transaction variant" in the dialog structure on the left. You will be taken to the screen shown in Figure 7. The screen displays the default business transaction variant (0001). In order to create a new one, you need to click on the "New Entries" button, enter the technical key or the code for the variant (like "0001", albeit in the customer namespace), and provide a description.

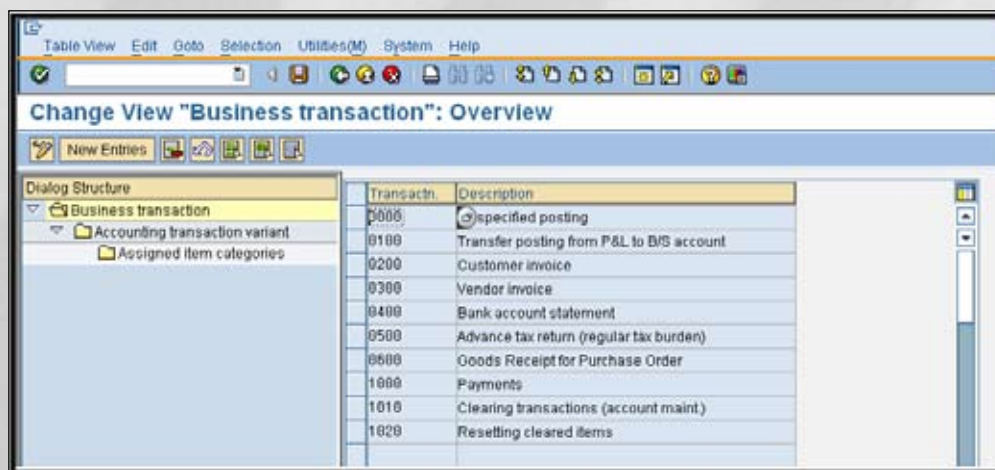


Figure 6: Creating a New Business Transaction Variant

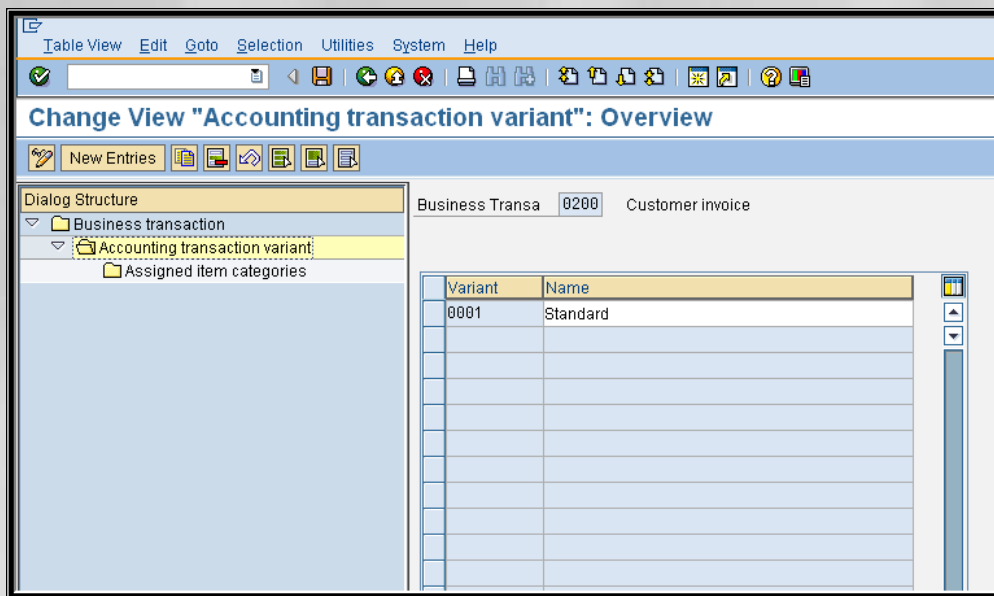


Figure 7: Example of Creating a New Business Transaction Variant

For this example, I created a variant called “Z001”. The system automatically assigns all item categories and default settings for this business transaction (customer invoice) to this variant. Now, with this new variant highlighted, double-click on the “Assigned item categories” node from the Dialog Structure. This will take you to the screen shown in Figure 8. Depending on your business scenarios and rules, you may then make the item categories “Forbidden” and/or “Required” and/or “Only once”. If your business rules allow, you do not need to turn on any of these indicators for any item category.

Important Master Tables

Every SAP application has a set of important tables associated with it, and there is such a set in the document splitting realm. I sometimes find it easier to browse information by just going to the contents of database tables directly with transaction SE16. Figure 9 lists of some of the important (master data) tables that contain information pertinent to document splitting.

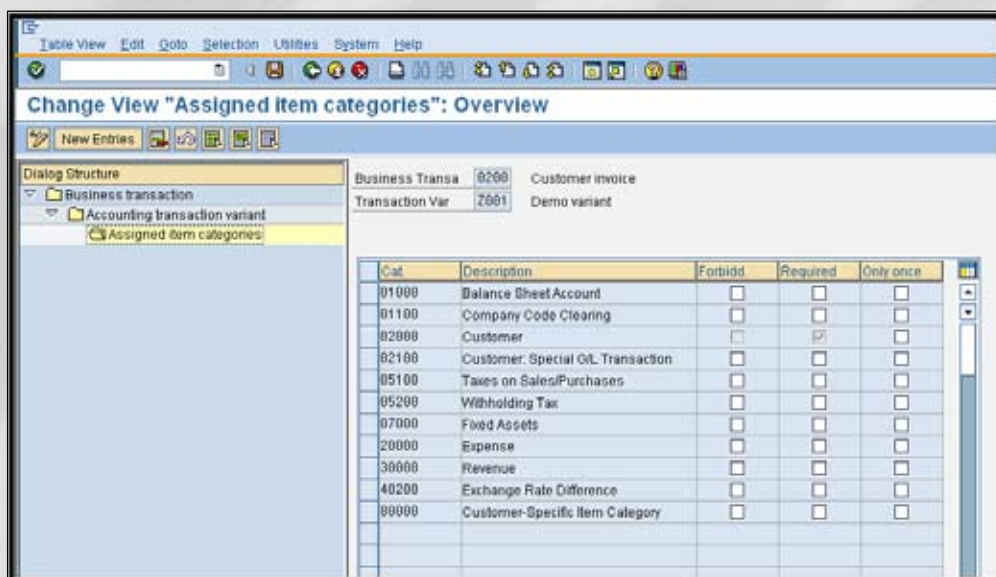


Figure 8: Configuring Desired Settings in the Assigned Item Categories

Other Useful Information

Based on my experience with the New G/L and document splitting in particular, I have put together a list of tips that may be helpful to your business:

- When document splitting is activated in the New G/L, an accounting document has two views: an Entry view and a General Ledger view. The former view shows the document the way you entered it, (i.e. prior to the split). The latter view displays the document in its post-split form. This is an important distinction.

You will not see the effects of splitting in the Entry view.

- When you create your own splitting rule, it makes sense to copy from the SAP default (0000000012) to the new one. You should then make changes to the new one – this is more convenient and will prevent you from having to reinvent the wheel.

- There are several OSS notes at SAP's Service Marketplace that contain resolutions to bugs in the New G/L area, along with other important information. You can learn more about the workings of the New G/L by browsing these notes. Please keep in mind that you will need a valid Service Marketplace ID in order to be able to access them. Here are some of the notes that I've found relevant and useful:

– 871277

– 891144

– 922743

– 961937

– 890237

– 1005749

Conclusion

Document splitting is an important feature of the New G/L. When set up properly to meet your financial accounting requirements, you can derive significant benefits from the ability to split document lines in real time. In this series of articles, I have hopefully provided you with a good understanding of document splitting and its capabilities. I hope you have found this series useful and will be able to leverage the information that I shared with you.

Technical Name of Table	Purpose
T8G01	Splitting methods key table
T8G01T	Text table for splitting methods
T8G02	Item categories key table
T8G02T	Text table for item categories
T8G03	Business transactions key table
T8G03T	Text table for business transactions
T8G031	Business transaction variants key table
T8G031T	Text table for business transaction variants
T8G20	Splitting Rule: Header Data
T8G21	Splitting rules for item categories
T8G21A	Splitting rules for base item categories
T8G022	Splitting rules for additional items
T8G28	Item categories permitted per business transaction variant
T8G29	Item categories permitted per business transaction
T8G30A	Account determination keys for document splitting
T8G30AT	Text for account determination key
T8G30B	Account determination for document splitting
T8G40	Account determination objects for document splitting
T8G41A	Table for constants
T8G41AT	Text table for constants
T8G41B	Constant values table

Figure 9: Important Tables Relevant to Document Splitting

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Sea Cap P01: Exploring the Tidal Wave of Power in CKAPP01

By Sutrisno Japit, Japit, Inc.

***Editor's Note:** Ahoy, mateys! In the vast ocean of Material Masters, there are many materials that are void of standard cost estimates. How do we bring them ashore (or, in the technical seas, restrict their selection)? Sutrisno Japit comes aboard the SS SAPtips Journal once more to help us reel in this treasured list using CKAPP01 and other SAP® queries there for the catching!*

Introduction

As usual, I picked an intriguing title in order to get your undivided attention. As an SAP expert, I know you are not expecting to read another sequel to the "Pirates of the Caribbean", but I figured this would get you wondering "what's up?" In this article, I would like to clarify transaction CKAPP01 (affectionately known as Sea Cap P01), the business situations in which it is applicable, and its limitations. I will then show you how to create a simple SAP query that you can use as a supplement or replacement for CKAPP01. Throughout the article, I am adding relevant screen shots that I captured using an IDES 4.7 (Extension Set 2.0) System. If any of the described functionalities are not applicable in previous releases, I will note them accordingly in the article.

So what is CKAPP01? The CKAPP01 transaction is used to list materials that do not have standard cost estimates. Since not all materials will have standard cost estimates, CKAPP01 allows you to restrict your selection through various fields in the Material Master. By default, CKAPP01 automatically excludes materials with material types that do not allow creation of a Costing view. The reason for this is that a material must have a Costing view in order to be costed. You can use transaction OMS2 to review Material Types that allow maintenance of Costing views.

Figure 1: Initial Selection Screen for CKAPP01

Getting Started

Figure 1 shows the initial selection screen for transaction CKAPP01. If you are using SAP version 4.70 or later, you can save the list of materials to be costed in a selection list. You can subsequently cost these materials through transaction CK40N.

Restricting Your Selection

Additionally, you can restrict your selection using the (Dynamic selections) button. You can restrict using materials fields in the MARA (Material –General View) and MARC (Material – Plant View) tables. This is handy if you want to exclude materials that have been flagged for deletion or materials of a specific material status (such as: Blocked for Costing).

If you have saved the results in a selection list, you can further edit it using transaction CKMATCON (see Figure 2). Using the Additional Selection Criteria button, you can remove materials that do not have accounting and/or Costing views from the list. This may be useful if your material types have changed several times during the test of time.

CKAPP01 relies on material maintenance status value (MARA-PSTAT) in the selection of data. Material maintenance status indicates views that have been created for a material. Figure 3 shows the pre-defined Material Maintenance Status.

The system maintains material maintenance status in multiple Material Master tables, including: MARA, MARC, and MBEW. From time to time, these material maintenance status fields may get out of sync from one another. Luckily, SAP provides Z programs to sync up these fields. Check out OSS notes 113966 and 550276. You may want to schedule these Z programs periodically as part of your early warning system.

CKAPP01 is a wonderful report to use during go-live of the Product Costing module. However, even though CKAPP01 lists out materials that remain to be costed, it does not differentiate between old standards versus new standards. Today, most companies release new standards several times in a year. Logically, we would like a report that lists out materials that do not have new standards. Well, you can do that easily with a simple SAP query.

**Logically, we would like a report
that lists out materials that do
not have new standards.**

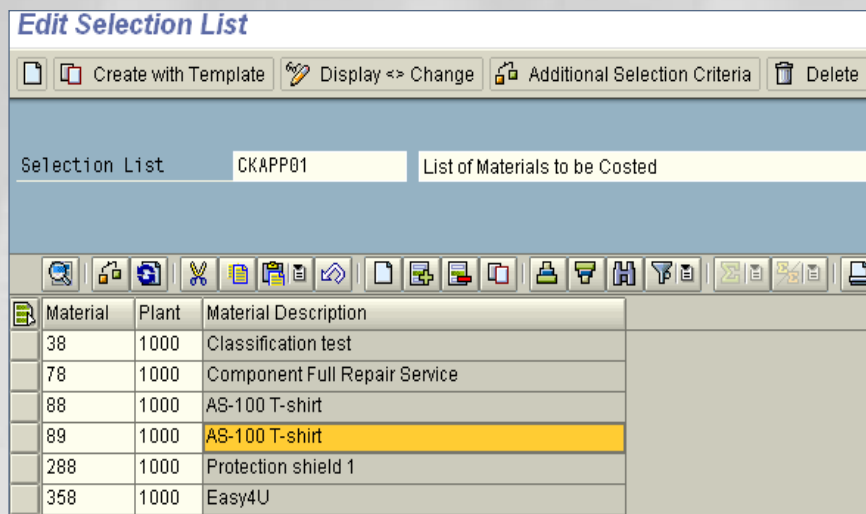


Figure 2: List of Materials to be Costed

User department	Maintenance status
Work scheduling	A
Accounting	B
Classification	C
MRP	D
Purchasing	E
Production resources/tools	F
Costing	G
Basic data	K
Storage	L
Forecasting	P
Quality management	Q
Warehouse management	S
Sales	V
Plant stocks	X
Storage location stocks	Z

Figure 3: Material Maintenance Status

Figure 4: Header Definition for InfoSet ZCKAPP01

With a Little Help from an SAP Query

Start by creating an InfoSet to join MBEW, MARC, and MARA tables, using transaction code SQ02. Figure 4 shows the header definition for my InfoSet called ZCKAPP01.

In the InfoSet, I joined MBEW with MARC and MARA using the “Additional Table” function.

For the sake of simplicity, I joined MARC and MBEW using MARC-WERKS and MBEW-BWKEY (Figure 5). Technically, this is not correct. However, for my SAP environment and for most others as well, plant code is the same as valuation area. Through the join of MBEW, MARC, and MARA tables, my InfoSet can provide the same selection criteria as CKAPP01 and additional criteria for selection of new standards. I chose the relevant fields and assigned them to field group 01 (Material Valuation). See Figure 6.

When standard cost estimates are released, the system updates the standard price in the Material Master and sets MBEW-PPRDL (Period of

Figure 5: SELECT Statements Joining MBEW with MARC and MARA

Field Group/data fields	Technical name
01 Material Valuation	
Do Not Cost	MARC-NCOST
Period of Future Standard Cost Estimate	MBEW-PPRDZ
Fiscal Year of Future Standard Cost Estimate	MBEW-PDATZ
Period of Current Standard Cost Estimate	MBEW-PPRDL
Fiscal Year of Current Standard Cost Estimate	MBEW-PDATL
Material Number	MBEW-MATNR
Valuation area	MBEW-BWKEY
Valuation Type	MBEW-BWTAR
Plant-Specific Material Status	MARC-MMSTA
Cross-Plant Material Status	MARA-MSTAE
Flag Material for Deletion at Plant Level	MARC-LVORM
Flag Material for Deletion at Client Level	MARA-LVORM
Maintenance status	MARA-PSTAT

Figure 6: Field Group for InfoSet ZCKAPP01

Figure 7: Selection Criteria for Query ZCKAPP01

Current Standard Cost Estimate) and MBEW-PDATL (Fiscal Year of Current Standard Cost Estimate) fields accordingly. These two fields hold the year and period in which the standards were released. By having these two fields in our selection criteria, we can list materials that have not been released successfully in a particular year and period.

Figure 7 shows the selection criteria for the query that was created based on the InfoSet. In this case, we are listing materials that do not have standard costs, that were released in period 7/2007. Using other selection criteria, we are excluding materials that carry non-blank material status, are flagged for deletion, or do not have either Accounting or Costing views. Figure 8 shows the multiple selection criteria for the "Maintenance Status" field.

The query displays a list of materials that do not have standard costs that were released in 7/07 (see Figure 9). You can use this query to verify mass release of your standard cost estimates (i.e., to make sure that standard prices have been updated in Mater Masters successfully).

Since the system updates MBEW-PPRDZ (Period of Future Standard Cost Estimate) and MBEW-PDATZ (Fiscal Year of Future Standard Cost Estimate) fields after a successful marking of standard cost estimates, you can use these fields to verify mass marking of your standard cost estimates as well.

Material	ValA	Cmnt FYYear	Current Per.
358	1000		000
521	1000		000
817	1000		000
819	1000		000
820	1000		000
947	1000	2006	008
968	1000		000
989	1000		000
1008	1000		000
1018	1000		000


Figure 9: Output of the ZCKAPP01 Query

SAPtips

► On FI/CO

Conclusion

I hope this query can become a valuable addition to your costing toolset. It is always nice to have a report to confirm that mass changes (such as marking and release) have been carried out successfully.

Sutrisno Japit, *Japit Inc.* Sutrisno has over ten years of SAP implementation experience. He specializes in the FI/CO/SD modules and their integration to PP and MM. In addition to his functional knowledge, he is also an expert in user exit development, report development, and transaction automation. You may contact the author at SAPtips.Authors@ERPtips.com. Be sure to mention the author's name and/or the article title. 

Rock Those Enterprise Reports with BEx Report Designer

By Peter Scott, Traxion Consulting, Inc.

Editor's Note: *Want your reports to go from blah to WOW? Think that's only possible with a fancy third-party tool? Surprise! SAP® NetWeaver™ BI offers a pretty user-friendly design tool in BEx Report Designer. Peter Scott shows us how to use this tool to take Enterprise Reporting in SAP to new heights. Learn how to format, color, and do all sorts of neat tricks so that your next presentation gives the 411 with a bit more panache!*

Introduction

SAP power users and end users alike have many more options available to them with respect to reporting using the latest tools found with SAP NetWeaver BI. It's become much easier to create formatted reports optimized for presentation and printing since the introduction of the BEx Report Designer. This task, referred to as Enterprise Reporting by SAP, enables the preparation of financial data (typically) in the form of reports in a highly formatted layout.

The BEx Report Designer is a user-friendly design tool that provides capabilities similar to that of a basic word processor such as Microsoft Word; it should address the reporting and formatting needs of many SAP customers—without the addition of third-party tools such as Business Objects' Crystal Reports. While at this time, it's not nearly as feature-rich or powerful as Crystal Reports, we can expect SAP to continue to invest and develop the BEx Report Designer, and roll out additional capabilities with future releases and support packages.

SAP power users and end users use Business Explorer (BEx) tools to create queries and analyses on the Web or with the BEx Analyzer and to distribute them

using the portal. The BEx tools are fully integrated with one another, using straightforward user interfaces. The reports created with the BEx Report Designer are optimized for presentation and printing, and therefore have limited options for interactive analysis. Rather than being a solution for all types of reporting, the BEx Report Designer satisfies one type of analysis within the broader spectrum of enterprise reporting. Dynamic ad-hoc reporting should still be addressed with the BEx Analyzer, Web Analyzer, and/or Web Applications, which include the use of the BEx Web Application Designer.

Getting Started

To use the BEx Report Designer, you must first have a query or query view that can serve as a data provider for the report. The query or query view must contain a column structure in the Query Definition. Most formatted reporting, which typically lies in the realm of finance, is well defined in terms of the number of rows and columns that make up the presentation. As such, it is highly recommended that you also incorporate a structure into the Rows of the Query Definition so that the query results are a fixed matrix with N rows by M columns.

The BEx Report Designer is best launched as a stand-alone desktop application (see Figure 1) from the Busi-

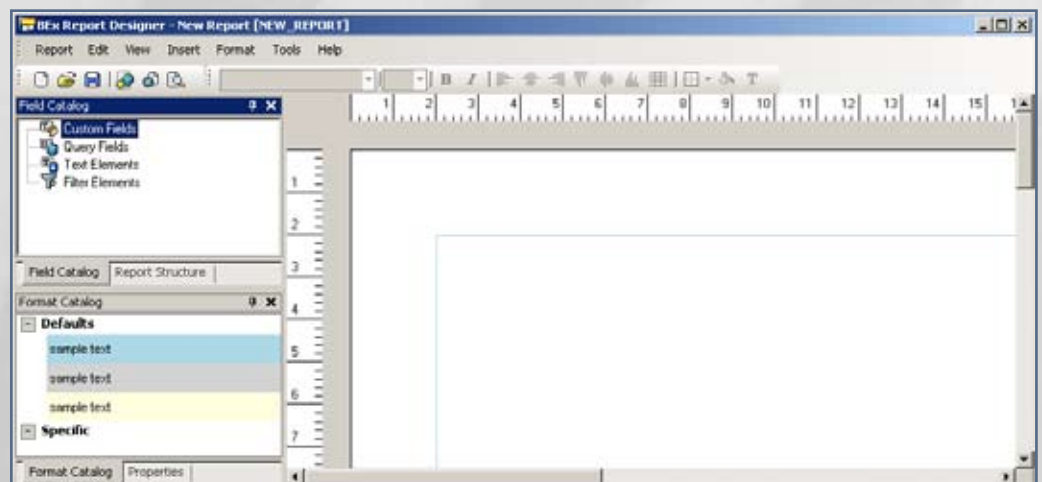


Figure 1: The BEx Report Designer

ness Explorer folder (typically found in the Start Menu of Windows-based systems). Once launched, the BEx Report Designer provides a graphical environment to design a report, which is typically comprised of a page header, the body of the report, and a page footer. In this article, we will demonstrate how to take a basic query definition to a highly formatted state in just a few steps.

Once launched, the BEx Report Designer provides a graphical environment to design a report.

Designating the Source

Using the BEx Report Designer menu path, select Insert Data Provider, to designate the source for your report focus. See Figure 2.

Choose an existing Query Definition that has structures defined for the columns (pre-requisite) and for the rows (recommendation). An example is shown in Figure 3.

From the Insert Data Provider pop-up window (shown in Figure 4), select your query.

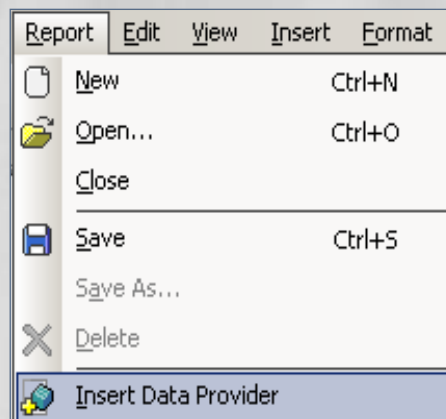


Figure 2: Inserting a Data Provider

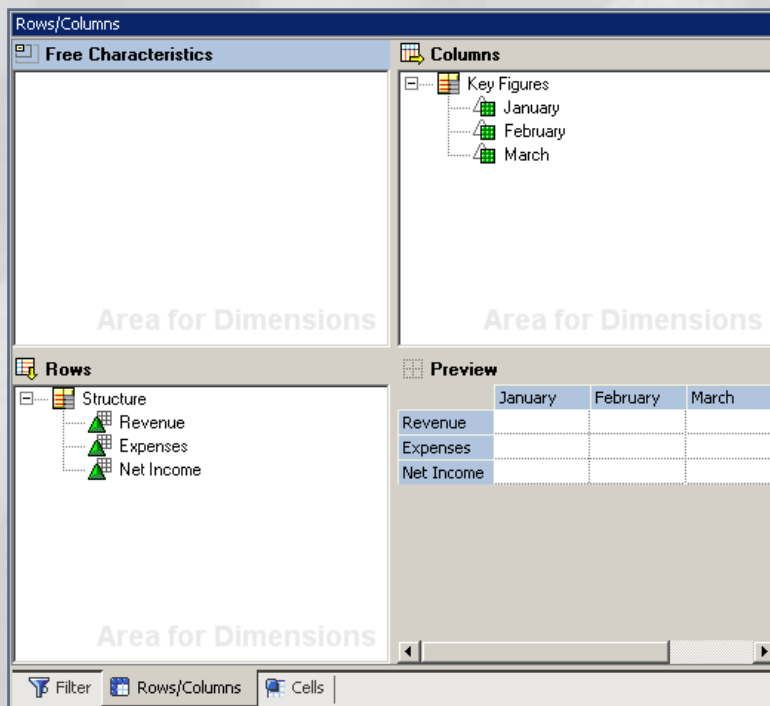


Figure 3: A Query Definition with a Structure Defined for the Rows and the Columns

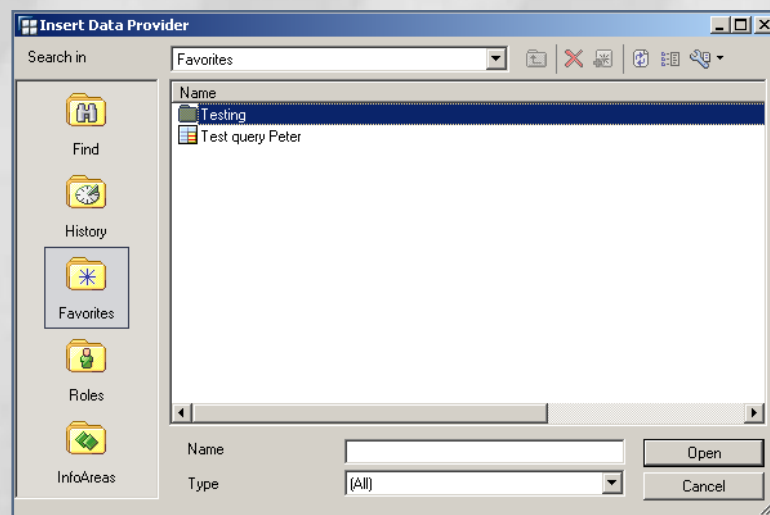


Figure 4: Use the Search Features on the Left to Locate Your Query Definition

	January	February	March
[Struct.]Text			
Revenue	[January/Revenue].Val	[February/Revenue].Val	[March/Revenue].Val
Expenses	[January/Expenses].Val	[February/Expenses].Val	[March/Expenses].Val
Net Income	[January/Net Income].V	[February/Net Income].V	[March/Net Income].Val

Figure 5: The Data Provider Gets Displayed as a Table with Default Formatting Applied

The selected Data Provider will be displayed as the body of the new report being developed (see Figure 5).

Formatting Options

The BEx Report Designer allows a user to customize each row, column, and cell as required, and has many formatting options. The following functions are available from the formatting toolbar shown in Figure 6:

- Font
- Font size
- Bold
- Italic
- Left justified
- Center
- Right justified
- Align at top
- Centered vertically
- Align at bottom
- Align columns
- Borders
- Fill color
- Font color

Colors

The default color scheme consists of gray and blue background colors for the header row and resulting data respectively. Saving and executing the report onto the Web delivers a result similar to that illustrated in Figure 7.

To define your own color scheme, simply right-click on a highlighted row and choose Cell Format → Background Color (see Figure 8).



Figure 6: The Formatting Toolbar of the BEx Report Designer

Struct.	January	February	March
Revenue	300	350	400
Expenses	200	225	250
Net Income	100	125	150

Figure 7: Default Output for a Query Using the BEx Report Designer

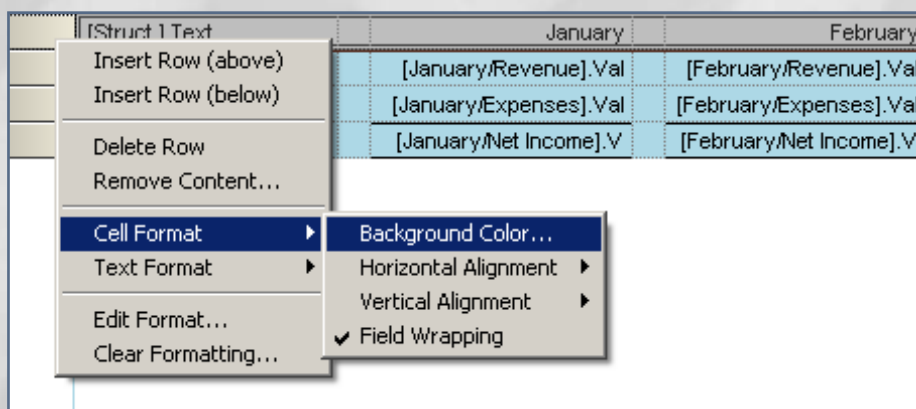


Figure 8: Modifying Background Colors for an Entire Row

Basic color can be used, or custom colors can be defined to match exactly with a company's official color scheme. Background colors can also be defined for individual cells, if required. I selected a background color of white from the color palette screen shown in Figure 9, for all the rows in the report under development.

Borders

The border tool allows a report to be structured similarly to that of basic financial statements, which show sub-totals, totals, and highlight key information. The border tool is analogous to the Microsoft Excel border function. To insert formatting lines, highlight the appropriate row, column, or cell, and use the Borders tool found in the formatting toolbar (as depicted in Figure 10).

Adding a top and bottom border (line) for the results of the Net Income row will better represent the results shown in the report. The report shown in Figure 10 has also had some spacing columns put in place to add separation to the top and bottom borders that will be evident for each of the months January through March. To insert a spacer column, highlight an existing column and right-click to choose Insert Column (left) or Insert Column (right). Figure 11 illustrates the context menu presented.

Sizing Columns

You can resize the newly inserted columns to an appropriate width by simply selecting the column, and using the Properties window to define the width as a set number of pixels. A width of 15-30 pixels is a decent range to use. The Properties window shown in Figure 12 also provides text and background formatting options.

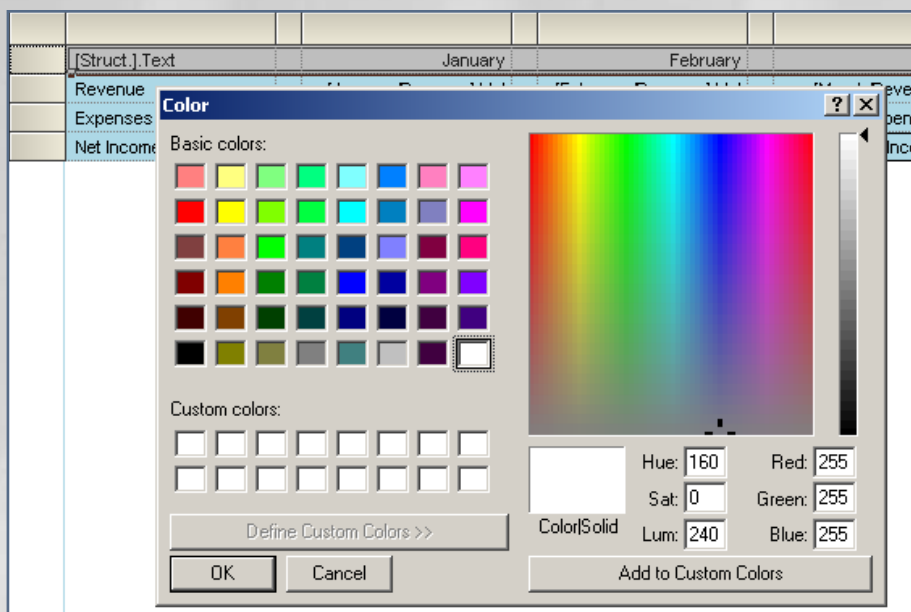


Figure 9: Defining Background Colors (from a Basic List or Custom Defined Colors)

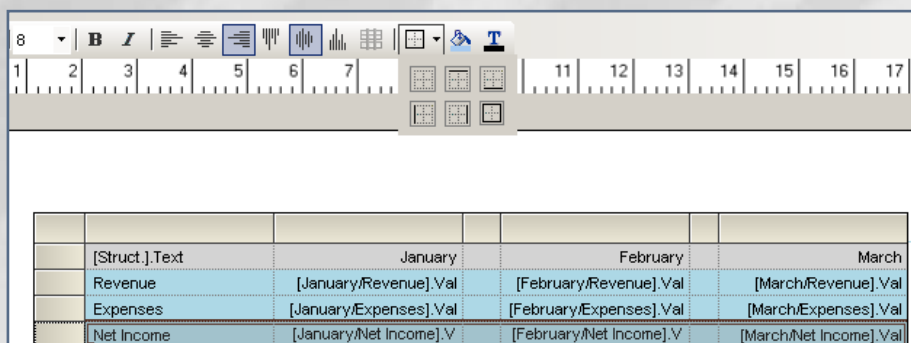


Figure 10: Highlighting a Row and Assigning Border Properties from the Formatting Toolbar

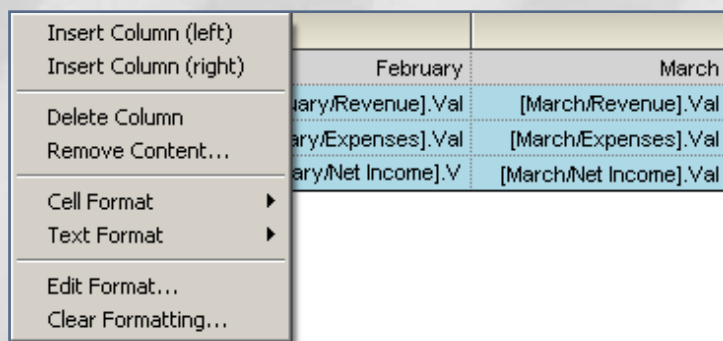


Figure 11: Adding and Removing Additional Columns

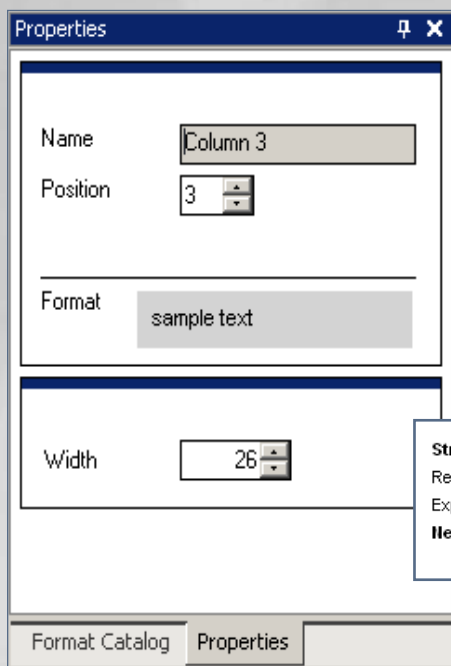


Figure 12: Setting the Width in Pixels for a Spacer Column

Figure 13: A Sample of an Income Statement with Formatting from the BEx Report Designer

Struct.	January	February	March
Revenue	300	350	400
Expenses	200	225	250
Net Income	100	125	150

After adjusting the background colors, font properties, inserting and resizing additional columns, and adding borders, the report starts to look and feel like a financial statement. Figure 13 displays the steps completed thus far.

Other Options

One of the really great features of the BEx Report Designer is the ability to insert blank rows, columns, and cells in order to add custom text to provide more information about the report, or to overwrite the default descriptions for objects that were defined in the Query Definition. The custom text option is a great tool for analysts to add commentary on results, or to provide end users with more information on the defined key performance indicators. Figure 13 carries a description from the row structure called Struct. This will be replaced by a more appropriate label called Accounts.

Custom text is added by first right-clicking on Struct. in the body of the report, and choosing Remove Content.

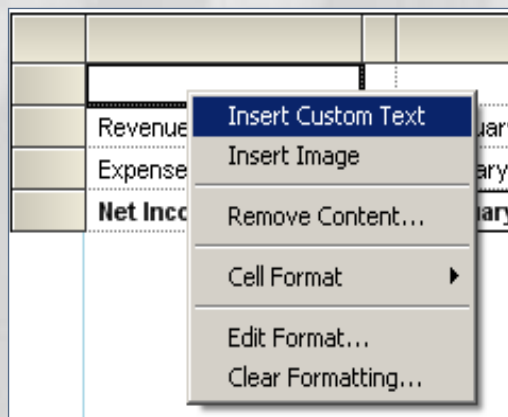


Figure 14: Replacing Cell Contents with Custom Text

Right click again on the empty cell (shown in Figure 14) and choose Insert Custom Text.

Clicking on the new cell that has a placeholder for Custom Text allows a user to directly type in the appropriate description for that cell. In this example, the word Struct has been replaced with Accounts. Figure 15 highlights the changes.

	January	February	March
Accounts			
Revenue	[January/Revenue].Val	[February/Revenue].Val	[March/Revenue].Val
Expenses	[January/Expenses].Val	[February/Expenses].Val	[March/Expenses].Val
Net Income	[January/Net Income]	[February/Net Income]	[March/Net Income].Val

Figure 15: Further Formatting a Report with Custom Text

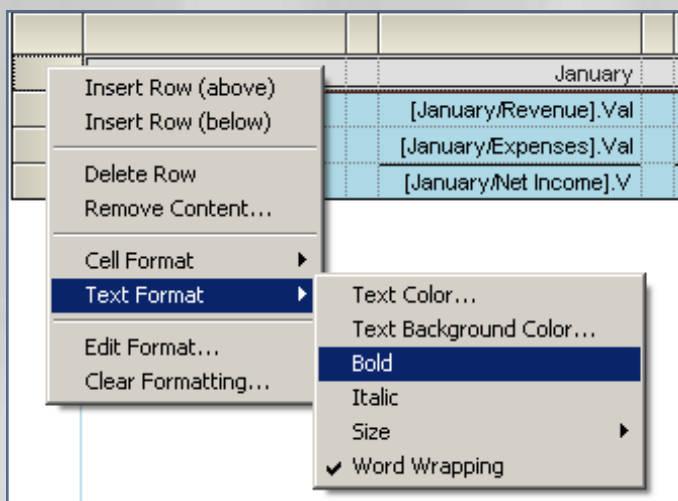


Figure 16: Applying Text Formatting to a Cell, Row, or Column

Additional test formatting can be done through the Context menu (see Figure 16) by right-clicking on an individual cell, and choosing text format. Text size, color, and properties (bold, italic) can be applied as necessary.

Accounts	January	February	March
Revenue	300	350	400
Expenses	200	225	250
Net Income	100	125	150

Figure 17: An Example of a Brief Income Statement Using the BEx Report Designer

Applying just a few simple changes to the default format provided by the BEx Query Designer can make your next presentation much more interesting and attention grabbing. The cumulative results of the above mentioned steps are depicted in Figure 17.

From this point, the report can be enhanced further by adding a header or footer, an image using the MIME repository, or published as a .PDF, using the integrated functionality. In the menu bar for the BEx Report Designer, choose Report & Print Version. The report is automatically converted to a PDF document, which is then displayed. You can print and distribute this document as required.

Conclusion

The functionality available from the BEx Report Designer today is limited and will be improved upon over time. Certain menu path options allude to this by clearly stating that a selected feature is currently not available. While a short-term limitation, this is certainly good news for power users looking to further leverage the BEx suite of tools, and for companies who are looking to go wall-to-wall with SAP for their ERP and BI solutions.

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Building the SOA City – Part II: Programs to Business Processes

By Axel Angeli and Lynton Grice

***Editor's Note:** We've all been there lately. We make a call to a company—local or national or even international—and the person who answers the phone is sitting in a call center located half way around the world. Yet, somehow, this individual knows the answers to our questions with the same certainty as if they were sitting in the company's headquarters. How does this happen? It's all part of globalization, aided by SOA—Service Oriented Architecture. In Part II of their series, Building the SOA City, Axel Angeli and Lynton Grice take us behind-the-scenes as to how the various components of an SOA are used to streamline business processes and make it possible for someone in New Delhi to have, at their fingertips, the information you need to know when you make that call.*

Introduction

Panta rhei – “Nothing is as stable as change”

The purpose of an SOA is to provide a fertile ground to allow for restructuring the IT landscape in light of the Internet, and the future of pervasive computing. SOA is not a goal but rather a strategic master plan toward greater, more powerful, and more efficient IT. SOA will easily free up to ninety percent of current inefficiently-used resources, and use them in other ways to gain greater business benefits. The savings are made through technical means like conversion utilities, a common enterprise service bus, and central repositories that make flexible and agile recombination and reuse of existing programs as easy as possible. But that is not all: SOA will literally introduce a new dimension in computing by presenting the ubiquitous ground for parallel and asynchronous processing as the standard way of assembling algorithms. This new gain in complexity will lead to an outburst of new possibilities in computing.

Pizza Pronto?

If you've recently ordered a pizza to be delivered from a local pizzeria, then you may well have unwittingly become part of a new flavor of both Globalization and Service Oriented Organization. Let us assume you live in Pizzburg and you dial the number of the pizzeria. A nice, polite person picks up the phone and says “Pizza

Pronto, Giovanni speaking, how can I help you?” This person helps you make your choice and notes down your order, delivery address, and payment information. Half an hour later, you call the same number again to ask why the pizza has still not been delivered. “Pizza Pronto, Carla speaking, how can I help you?” Now it is Carla and she quickly checks with the pizza driver, and then advises you that the delivery guy has been held up in a traffic jam but is now only ten minutes away. So far, so conventional. But what happens behind the scenes? Did you ever ask yourself who the person on the other end of the phone line might be, where she or he is actually sitting, and how the communication with the pizza driver takes place? If you are very misanthropic, you may think that your polite helper does not really talk with the driver but simply makes up a story and just treats your case as any other case. The truth may be much more hi-tech than you would imagine. The person that picks up the phone is sitting in one of the better call-centers in Calcutta, India. She (or he) is speaking an accent-free English (or Spanish, German, Polish; wherever the call comes from) and, on the monitor, the menu of the pizza service of your hometown is immediately displayed when the call comes in. Whenever the driver changes a place or gets delayed somewhere, he sends an SMS text message to signal the situation. When you complain about the pizza being late, the town map is displayed and the service agent in Calcutta can immediately tell how far the driver is away from your place.

SOA is not a goal but rather a strategic master plan toward a greater, more powerful, and more efficient IT.

Globalization Needs SOA

This scenario is a result of Globalization. In our case, India takes over local services, with the decisive factor here being the ability to speak the language of the caller perfectly well. That is the human part that is inevitable in any service driven world, in addition to the wide range of technical tools to assist the process.

What does this example have to do with a Service-Oriented Architecture? Mainly the fact that this scenario is so dependent on an agile electronic and computer assisted communication structure that it could not exist without a Service Architecture. Let's do a brief anatomy of the technical landscape of a global call center.

- We'll start with the guy sitting in front of the computer and waiting for the next call to come in. Directly in front of him is a computer that is connected to some kind of Customer Relationship Management (CRM) software. This software will store the name of all the pizza products, some pictures of them, and the latest prices. Here we can find the first challenge. How can we keep the offers and prices up to date? Will there be a way to signal if one of the pizzas is no longer available?
- Luckily, our CRM system is able to link directly to the restaurant's computer system where the restaurant employee can immediately mark a product as "sold out". This works with a SOA. The restaurant's computer needs some form of master data management to be able to identify the current offerings as a service in such a way that the CRM system can access that service in real time. Typically, this would be some sort of Web service that can be invoked easily over the Internet.

This scenario is so dependent on an agile electronic and computer-assisted communication structure that could not exist without a Service Architecture.

- Then, we are somehow connected to software that displays a map of the restaurant's delivery service area. We can simply call the Google maps for that purpose, (another public service in our landscape through a standard Web-service client).
- The driver in Pizzburg has a modern GPS (Global Positioning System) that regularly pings the current position of the driver to a central server from which the CRM system can immediately check the

last reported location. The data is queued in a staging area.

Making Money with SOA: 90% Savings Today

Figure 1 shows a brief calculation of how much money the SOA development approach would have saved us. This is a typical calculation that we made from the estimates in man-days, to compare costs of developing the project traditionally or with an SOA approach. Traditional development would mean that we develop most components end-to-end, on our own.

The remarkable point is the fact that the scenario here had so many technical specialities that it would have been difficult (if not impossible) to bring all the necessary know-how into the project. We also did not consider (in the calculations) the gain in quality with an SOA by sheer reuse of the components. The more frequent a component is used, the less likely it is to contain substantial unknown errors. Traditional components are developed individually for a dedicated task. They are developed, tested, and used exclusively by a single consumer.

Virtualization

Let's look at the component that determines, in real-time, if a certain pizza can be baked or not. We find that we are dealing here with a sort of master data management task for a restaurant. We, in fact, have the most topical master data stored on the restaurant's computer (material data management system) in Pizzburg, and it needs to be synchronized with the CRM system in India.

While this appears to be relatively easy, we should not forget that there is hardly a modern ERP system that can handle such a scenario. Just think of SAP with two independent instances. How nice would it be to keep the material data in one instance and just use them ad hoc in the other instance when they are needed? Figure 2 shows the process as it is today contrasted with a possible future scenario.

What to do	Traditional (man days)	SOA (man days)
Building the master data link	10	25
Recognizing telephone caller ids	120	5
Display town map	120	2
Inject SMS messages into CRM	Failed *	5

** This component was never developed, as the necessary intellectual and technical capacity to build an SMS bridge to SAP could not be found.*

Figure 1: Comparing Development Costs Between Traditional and SOA Projects

This concept of virtualization is an essential building block of SOA. The purpose of an SOA is to restructure the IT landscape in consideration of the Internet and the future of pervasive computing. An SOA requires breaking down existing enterprise applications into small and atomic components that can be consumed by other programs as services. The SOA provides the technical structure for conversion utilities, a common enterprise service bus, and central repositories. This will allow flexible and agile recombination and reuse of existing programs, as easily as possible. However, allowing for reuse requires the serving applications to have certain characteristics. If (and only if) the older applications can expose the essential logical steps of their behavior as an API, then they are ready and well-suited for the SOA structure. That brings us to one of the premises of an SOA.

An SOA requires breaking down existing enterprise applications into small and modular components that can be consumed by other programs as services. In our example of the virtual MARA, it is important that SAP® introduces a virtualization layer for database table access in the ABAP language.

Today you code:

```
SELECT SINGLE * FROM mara WHERE matnr = 'M4711'.
```

This call reads the table MARA from the currently connected database. You could now read data from a remotely installed SAP instance with an RFC call (e.g., through the function module RFC_TABLE_READ) or a suitable BAPI. But this is not satisfactory; after all, wouldn't it require changing the code wherever you accessed MARA directly with a "Select" statement? In addition, coding a "Select" is not only easier, but is also much more flexible than a function module.

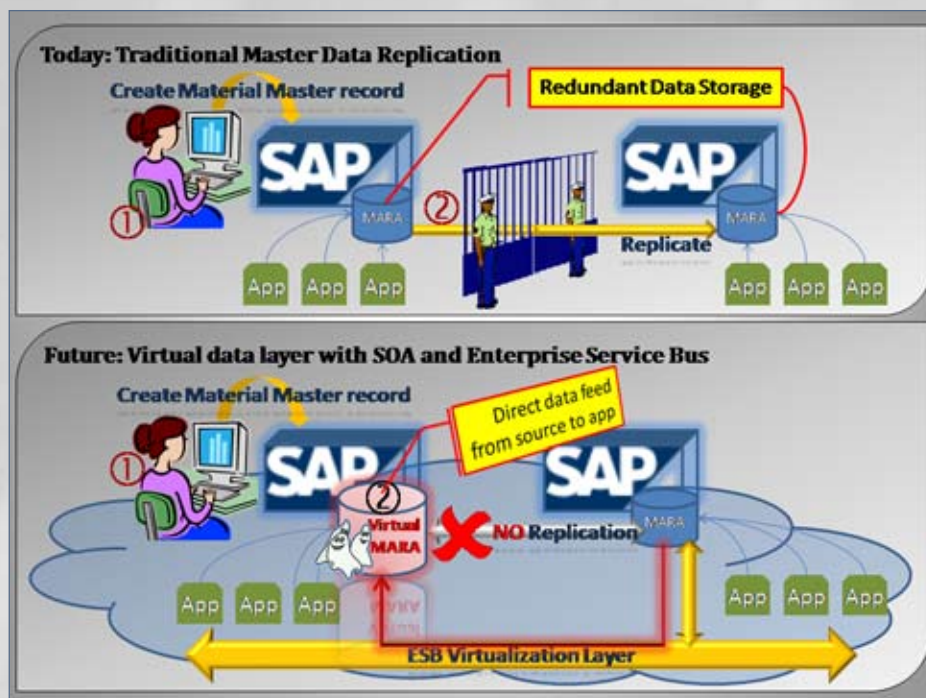


Figure 2: Master Data Management in a Future SOA Landscape

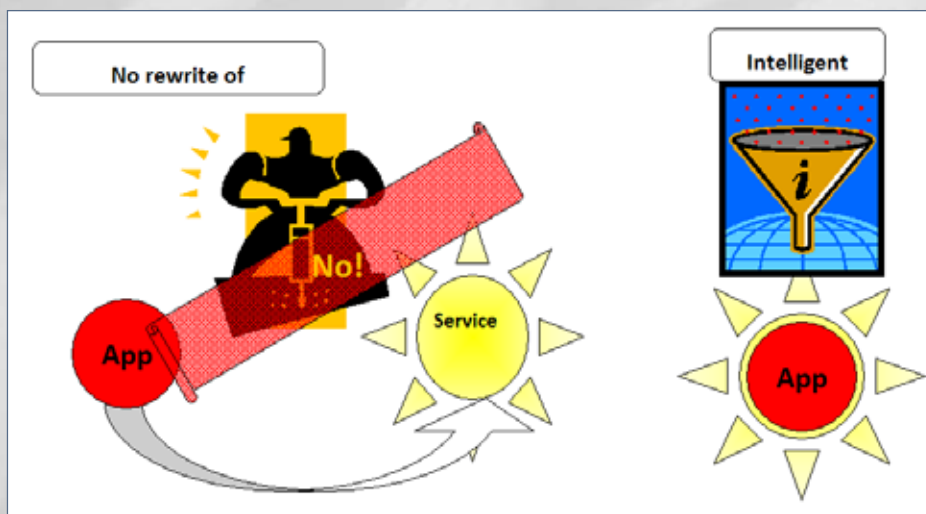


Figure 3: Wrap Rather Than Rewrite the Application

To introduce a virtualization layer into SAP, the correct place would be the ABAP database abstraction layer. This is the place where the ABAP Open SQL statements are translated into real database commands, and all communication with the DB takes place. It would be relatively easy and safe to build functionality that checks whether a table like MARA is located in the current instance, or hosted centrally on another instance as a common shared table. Let's wait and see if SAP comes up with a solution; only recently has Walldorf made a proper U-turn in strategy, with ABAP development once again following the real practical needs. See Figure 3.

Services

When building services for an SOA, we concentrate on building wrappers and proxies to access existing enterprise functionality, and on commonly used utilities, like accessing the ESB elementary components such as email, databases, message queues, and user interfaces. Rewriting an application for SOA may be an option in rare cases, but SOA can only be the trigger to do so. The reason for rewriting a working application can only be that the existing code is insufficient, either in the sense of a lack of functionality or with respect to poor quality. If, however, the program works satisfactorily, it is wiser to build wrappers around it (see Figure 3).

SAP-literate people have used services in the form of BAPIs for quite a long time. They have been designed as a wrapper around the business functionality and the business objects within R/3 that allow access from anywhere. They can be accessed via the RFC protocol, or in later versions of the ABAP kernel (also as Web services) with ease. The SAP ABAP database abstraction layer is also a wrapper that simply acts like a middleman between an existing application and a requesting program. Generally ABAP is a fairly mature SOA application framework, far more mature than most of the competing solutions that are mostly incomplete, or can only act as a bolt-on to an application suite.

Software Development in the SOA City

Thinking in terms of the SOA structure for software development will require a radical change. While we traditionally develop hybrid applications that literally “compile” all the necessary functionality into one single program, SOA requires letting go of this quick and dirty way of writing a program.

Instead, programs need to go and components need to come in. Applications will then be a pure assembly of existing components. The difficulty here is to find a well-balanced compromise of the features a component should possess as a service. If a component is incomplete, it is of no use. If there are too many features, they will not be used.

FUNCTION BAPI_SALESORDER_CREATEFROMDAT2.

```

**-----
**"Lokale Schnittstelle:
** IMPORTING
**  VALUE(SALESDOCUMENTIN) LIKE BAPIVBELN-VBELN OPTIONAL
**  VALUE(ORDER_HEADER_IN) LIKE BAPISDHD1 STRUCTURE BAPISDHD1
**  VALUE(ORDER_HEADER_INX) LIKE BAPISDHD1X STRUCTURE BAPISDHD1X
**  OPTIONAL
**  VALUE(SENDER) LIKE BAPI_SENDER STRUCTURE BAPI_SENDER OPTIONAL
**  VALUE(BINARY_RELATIONSHIPTYPE) LIKE BAPIRELTYP-RELTYP
**  OPTIONAL
**  VALUE(INT_NUMBER_ASSIGNMENT) LIKE BAPIFLAG-BAPIFLAG OPTIONAL
**  VALUE(BEHAVE_WHEN_ERROR) LIKE BAPIFLAG-BAPIFLAG OPTIONAL
**  VALUE(LOGIC_SWITCH) LIKE BAPISDLS STRUCTURE BAPISDLS OPTIONAL
**  VALUE(STRUN) LIKE BAPIFLAG-BAPIFLAG OPTIONAL
**  VALUE(CONVERT) LIKE BAPIFLAG-BAPIFLAG DEFAULT SPACE
** EXPORTING
**  VALUE(SALESDOCUMENT) LIKE BAPIVBELN-VBELN
** TABLES
**  RETURN STRUCTURE BAPIRET2 OPTIONAL
**  ORDER_ITEMS_IN STRUCTURE BAPISDITM OPTIONAL
**  ORDER_ITEMS_INX STRUCTURE BAPISDITMX OPTIONAL
**  ORDER_PARTNERS STRUCTURE BAPIPARNR
**  ORDER_SCHEDULES_IN STRUCTURE BAPISCHDL OPTIONAL
**  ORDER_SCHEDULES_INX STRUCTURE BAPISCHDLX OPTIONAL
**  ORDER_CONDITIONS_IN STRUCTURE BAPICOND OPTIONAL
**  ORDER_CONDITIONS_INX STRUCTURE BAPICONDx OPTIONAL
**  ORDER_CFGS_REF STRUCTURE BAPICUCFG OPTIONAL
**  ORDER_CFGS_INST STRUCTURE BAPICUINS OPTIONAL
**  ORDER_CFGS_PART_OF STRUCTURE BAPICUPRT OPTIONAL
**  ORDER_CFGS_VALUE STRUCTURE BAPICUVAL OPTIONAL
**  ORDER_CFGS_BLOB STRUCTURE BAPICUBLB OPTIONAL
**  ORDER_CFGS_VK STRUCTURE BAPICUVK OPTIONAL
**  ORDER_CFGS_REFINST STRUCTURE BAPICUREF OPTIONAL
**  ORDER_CCARD STRUCTURE BAPICCARD OPTIONAL
**  ORDER_TEXT STRUCTURE BAPISDTEXT OPTIONAL
**  ORDER_KEYS STRUCTURE BAPISDKEY OPTIONAL
**  EXTENSIONIN STRUCTURE BAPIPREX OPTIONAL
**  PARTNERADDRESSES STRUCTURE BAPIADDR1 OPTIONAL
**-----

```

Figure 4: The Sales Order BAPI Suffers Both from Affluence and Missing Functionality

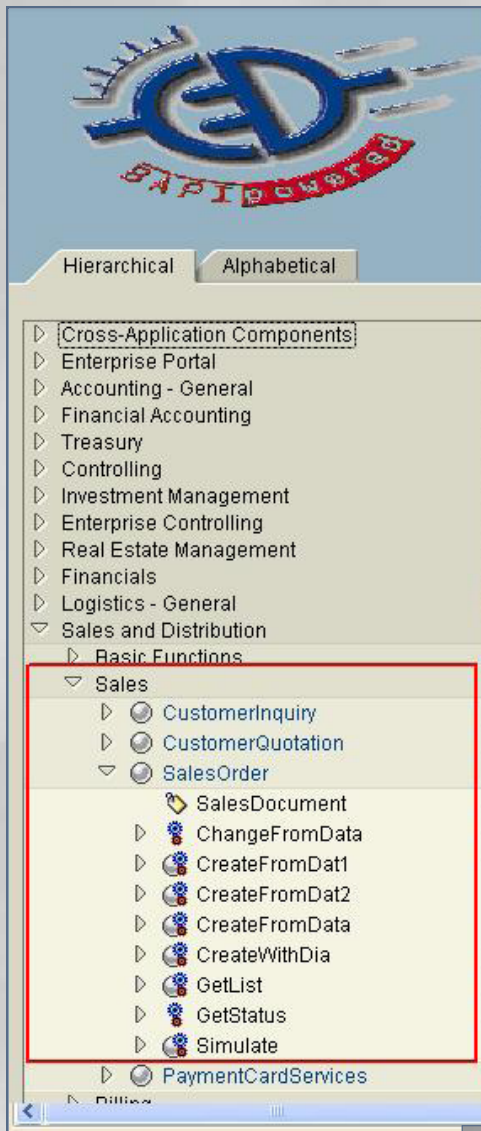


Figure 5: Sales Order BAPI (to Provide a Read Method)

Examples of feature-overloaded components can be found everywhere. Just look again at the sales order BAPI (Figure 4), which has so many parameters that it takes days to understand which ones are mandatory and which are not.

The function module BAPISDORDER_GETDETAILEDLIST does the job partly, but with an incompatible interface, as you can see in Figure 5.

Staging

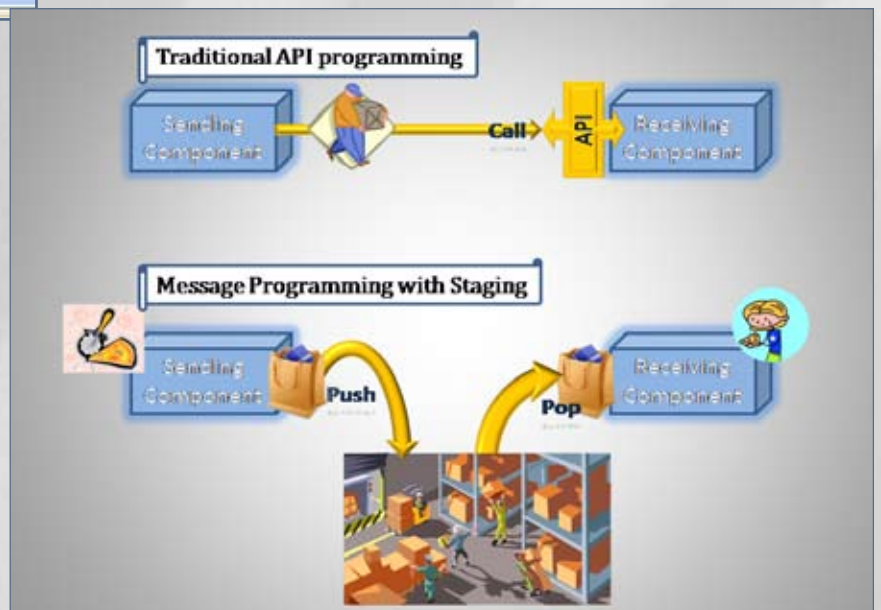
The focal point of every component development is the interface. Client and server programs need to have a way to exchange data so that both understand the data. While this problem can be solved with mappings, there is a more complex problem when working in a distributed environment like the Internet. Sender and receiver of the data packets may work at different speeds.

If a pizza in the oven is ready, but the waiter is still busy with another client, we cannot leave the pizza in the oven. We need to take the pizza out and put it in a place where the waiter can pick it up as soon as he passes by.

Such a place where we can temporarily store an object (the pizza) is called a staging area. These staging areas are the essential difference between SOA development in a distributed environment, and classical programming. A calling program will no longer talk directly to a receiving component, but simply drop the data container to a staging area where the calling program picks it up (Figure 6).

An example of an incomplete component would be a BAPI that does allow creation of a business object, with no way to modify or read it. Unfortunately SAP neglected this crucial component of the SOA framework in the recent years, so there are still many BAPIs that are incomplete (e.g., the BAPI for sales orders that allows creating sales orders with no compatible function to read the sales order again).

Figure 6: Traditional API Programming versus Message-Based Development



The Magic of Queues

The implementation of a staging area is covered in detail in the documentation for message queues. These queues serve as temporary and reliable data storage. There are many variations of queue implementation. From the name, we immediately think of the very sophisticated, database-driven, professional queuing systems like Microsoft MSMQ, WebSphere MQ (formerly known as MQ-Series), or the Open Source Apache ActiveMQ. However, any file system can be viewed as a queue; picture a scenario in which we interpret a folder as the queue and the files as the messages. Email boxes are also classical queues that receive and store messages, and allow for asynchronous handling.

Let us now take a little journey through the SOA garden and demonstrate the real magic of queues by discussing and practically demonstrating a real-life RFID ("Radio-Frequency Identification") scenario.

Practice: Making RFID Work with Queues

In order to shape your understanding on how queue processing works, we have picked one simple example out of some current SOA projects. We have an RFID reader from Siemens that is already intelligent enough to deliver reader data in a convenient XML data format. The data from the reader is transported to an SAP instance, where it can be used by an application.

Let's start with the difficulties we'll encounter.

While the reader can send XML, it does it via a simple, plain TCP/IP Telnet protocol; we need to have an agent that triggers the data stream and listens to the incoming reader data.

Problems with this scenario:

1. The reader fires several times per second, but may not immediately interpret the reader data content.
2. The reader message format may change as the reader model changes.
3. The data should not be volatile (not be lost when the SAP system is down).

4. There should only be one record per tag sent to SAP, even if the tag is read multiple times (in fact, a single tag may fire a thousand times).

We have not found a single person who can solve all these issues right away. A lot of experimenting and studying is necessary. So, we took the issue list and tried to solve every issue in an isolated environment, independent from each other.

For instance, when we receive duplicate data, we need an agent to review the data stream and aggregate it to a single result record. Therefore we defined a message queue as a staging area where we expect the reader handler to deliver the messages. In our case, we decided to simply write the messages to a folder in the file system with the intention to replace it with an MSMQ implementation eventually. Our aggregation routine will now find all the messages in a folder, and can review them to check if there are duplicates.

The basic Telnet protocol has been kept really basic. It reads the data stream as it comes in and puts it in an in-memory queue. A second asynchronous task empties the memory queue and copies the messages, message-by-message, into the staging area. In Figure 7, we show the overall landscape of our scenario, with a lot of intermediate queuing involved.

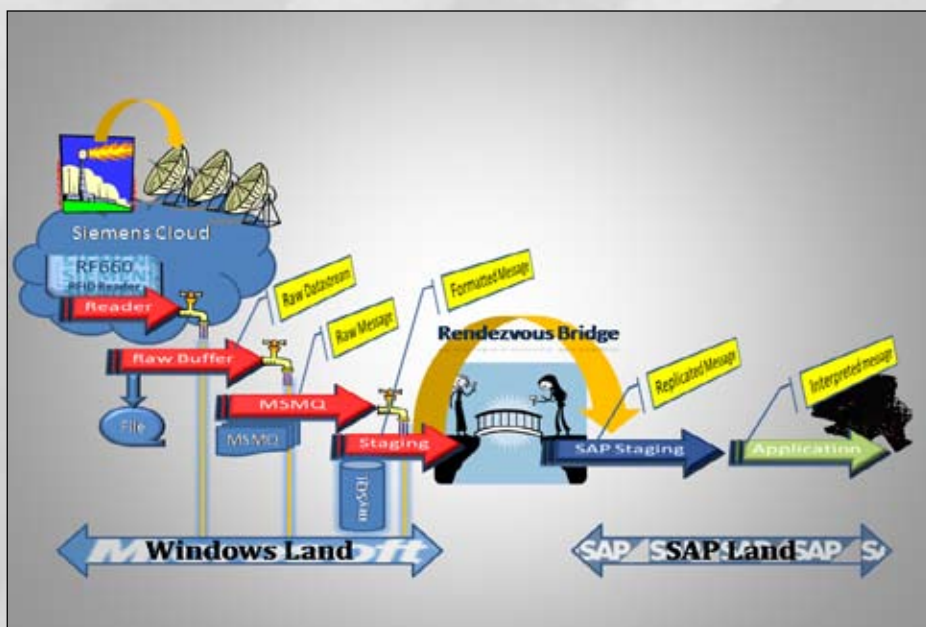


Figure 7: Software Development with Queues

RFID Technical Process Flow

So are you ready to see this RFID scenario in action?

Figures 8 through 14 show the process running, and how the messages are “staged” at each step in the scenario.

Before we start, it is perhaps important to see how communication with the RFID reader is achieved using the traditional protocol TELNET. Figure 8 shows the “host greeting” XML message being sent to the reader and the huge array of messages that stream in after that.

The technical process consists of a number of “Python scripts” that provide the necessary services for the scenario to run from end-to-end. The Python components have been written in a very “event-driven” nature whereby the communicating services react to certain events that tell them, for example, that it is their turn to do something with the incoming RFID tag messages. The “event-driven architecture” (EDA) provides a truly asynchronous/staging sequence of events that is extremely easy to understand and troubleshoot.

Figure 9 shows the start of the technical process, whereby the “RFID receiver service” creates a socket connection to the RFID reader, passes in the “host greeting” XML message (just like the TELNET session above), and then sits back and receives the RFID tag messages.

```
jupiter.logosworld.com - PuTTY
<message><name type="c">hostGreetings</name><paramGroup name="readerGreetings"><
messagingVersion> GR_XML_2.0 </messagingVersion><appVersion> RF660R Configuratio
n Software V1.1.0 </appVersion></paramGroup></message>
<message><name type="r" status="ack">hostGreetings</name><paramGroup name="reade
rGreetings"><readerName>SIMATIC RF660R Portal Reader</readerName><firmwareVersio
n>V1.1 (01.01.00.00 01.08)</firmwareVersion><fpgaVersion>V0.44.2</fpgaVersion><c
onfigVersion>USER</configVersion></paramGroup></message><message><name type="n">
ter</name><ter>112,2,3,3,300833B2DD9014035050000,53584</ter></message><message>
<name type="n">ter</name><ter>112,2,3,3,300833B2DD9014035050000,53584</ter></me
ssage><message><name type="n">ter</name><ter>112,2,3,3,300833B2DD9014035050000,
53584</ter></message><message><name type="n">ter</name><ter>112,1,3,3,300833B2DD
9014035050000,53585</ter></message><message><name type="n">ter</name><ter>112,1
,3,3,300833B2DD9014035050000,53585</ter></message><message><name type="n">ter</
name><ter>112,1,3,3,300833B2DD9014035050000,53585</ter></message><message><name
type="n">ter</name><ter>112,1,3,3,300833B2DD9014035050000,53585</ter></message>
<message><name type="n">ter</name><ter>112,1,3,3,300833B2DD9014035050000,53585
</ter></message><message><name type="n">ter</name><ter>112,1,3,3,300833B2DD9014
035050000,53585</ter></message><message><name type="n">ter</name><ter>112,2,3,3,
300833B2DD9014035050000,53586</ter></message><message><name type="n">ter</name>
<ter>112,2,3,3,300833B2DD9014035050000,53586</ter></message><message><name type
="n">ter</name><ter>112,2,3,3,300833B2DD9014035050000,53586</ter></message><mes
sage><name type="n">ter</name><ter>112,2,3,3,300833B2DD9014035050000,53586</ter
></message>
```

Figure 8: RFID Tag Messages Streaming Back Using Telnet

```
def handle_read(self):
    data = self.recv(10000)
    buffer = self.prev_right_buffer + data
    buffer = buffer.replace("</message>", "</message>***")
    msg_list = buffer.split("***")
    last = msg_list[-1]
    if last.find("<message>") == -1 or last.find("</message>") == -1:
        self.prev_right_buffer = last
        msg_list.pop()
    else:
        self.prev_right_buffer = ""
        memory_queue = self.memory_queue
        for msg in msg_list:
            memory_queue.push(msg)
            self.event.set()

def handle_write(self):
    sent = self.send(self.buffer)
    self.buffer = self.buffer[sent:]

Debug I/O (stdin, stdout, stderr) appears below
<message><name type="n">ter</name><ter>108,1,3,3,300833B2DD9014035050000,828073</ter></message>
<message><name type="n">ter</name><ter>108,1,3,3,300833B2DD9014035050000,828073</ter></message>
<message><name type="n">ter</name><ter>108,1,3,3,300833B2DD9014035050000,828073</ter></message>
<message><name type="n">ter</name><ter>108,1,3,3,300833B2DD9014035050000,828073</ter></message>
<message><name type="n">ter</name><ter>108,1,3,3,300833B2DD9014035050000,828073</ter></message>
<message><name type="n">ter</name><ter>108,2,3,3,300833B2DD9014035050000,828074</ter></message>
<message><name type="n">ter</name><ter>108,2,3,3,300833B2DD9014035050000,828074</ter></message>
<message><name type="n">ter</name><ter>108,2,3,3,300833B2DD9014035050000,828074</ter></message>
```

Figure 9: Real-Time RFID Tag Reads

¹ Python is a dynamic object-oriented programming language that is a true winner when it comes to agile SOA development. (<http://www.python.org/>)

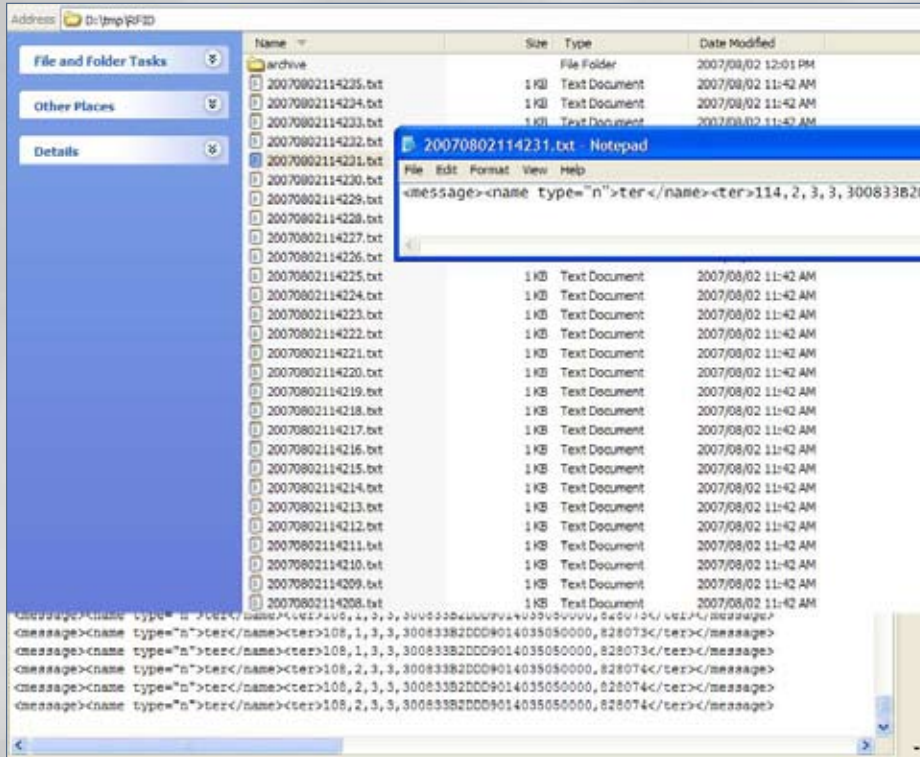


Figure 10: RFID XML Tag Messages Written to the File System (Staging Area)

As soon as the RFID tag messages are received, they are immediately written to a “memory queue”, and once there, they are given a unique “timestamp” and then are written to the file (queue) system. Figure 10 depicts the real-time RFID tag reads being written to the first “staging area” – the file system.

From here, another Python service (that is running) immediately recognizes that new files have arrived, and sends the messages off to Microsoft Message Queue (MSMQ). Figure 11 illustrates the running code and the debug messages, showing that new files arrived and were immediately transported to MSMQ.

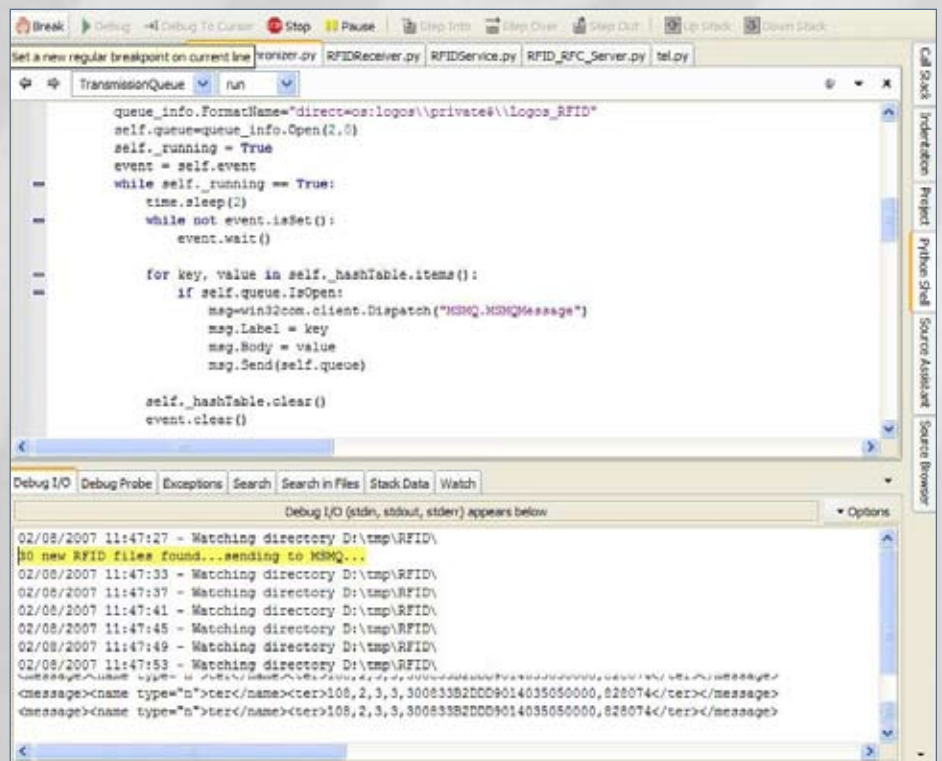


Figure 11: RFID XML Tag Messages Transported to MSMQ

Figure 12 simply shows the RFID tag messages sitting in MSMQ. Queues bring about such a great asynchronous flavor to integration, and MSMQ fits perfectly into this scenario.

How Much Time Does This Take?

The screenshot shows the Visual Studio IDE with the following components:

- Top Pane (Source Code):** Displays the code for `DBSynchronizer.cs`. The code uses a `while` loop to process messages from a queue. It includes a `count` variable and a `while` loop that processes messages until `msg` is `None`. The code is as follows:


```

while self.event.isSet():
    self.event.wait()

    count = 1

while 1:
    msg = self.queue.Receive(ReceiveTimeout=1000)
    if not msg is None:
        db_queue.push(msg.Body, msg.Label)
        count = count + 1
      
```
- Bottom Pane (Debug I/O):** Shows the output of the program. It includes tabs for 'Debug I/O', 'Debug Probe', 'Exceptions', 'Search', 'Search in Files', 'Stack Data', and 'Watch'. The 'Debug I/O' tab is selected, showing the following log:


```

No debug process
Options
Creating connection to MySQL...
Waiting for EVENT to process messages...
EVENT raised...ready to process 10 messages...
Message 20070802114234inserted into MySQL...
Message 20070802114235inserted into MySQL...
Message 20070802114236inserted into MySQL...
Message 20070802114231inserted into MySQL...
Message 20070802114232inserted into MySQL...
Message 20070802114233inserted into MySQL...
Message 20070802114212inserted into MySQL...
Message 20070802114213inserted into MySQL...
Message 20070802114210inserted into MySQL...
Message 20070802114211inserted into MySQL...
Committing work...
Waiting for EVENT to process messages...
EVENT raised...ready to process 10 messages...
Message 20070802114229inserted into MySQL...
Message 20070802114228inserted into MySQL...
Message 20070802114229inserted into MySQL...
Message 20070802114222inserted into MySQL...
      
```

SAPtips.com

QUEUE	SEQUENCE	DB_TIMESTAMP	TAG_TIMESTAMP	STATUS	MESSAGE
	78	2007-08-02 12:04:00	2007-08-02 11:42:34	100	<BLOB>
	79	2007-08-02 12:04:00	2007-08-02 11:42:35	100	<BLOB>
	80	2007-08-02 12:04:00	2007-08-02 11:42:36	100	<BLOB>
	81	2007-08-02 12:04:00	2007-08-02 11:42:37	100	<BLOB>
	82	2007-08-02 12:04:00	2007-08-02 11:42:38	100	<BLOB>
	83	2007-08-02 12:04:00	2007-08-02 11:42:39	100	<BLOB>
	84	2007-08-02 12:04:00	2007-08-02 11:42:40	100	<BLOB>
	85	2007-08-02 12:04:00	2007-08-02 11:42:41	100	<BLOB>
	86	2007-08-02 12:04:00	2007-08-02 11:42:42	100	<BLOB>
	87	2007-08-02 12:04:00	2007-08-02 11:42:43	100	<BLOB>
	88	2007-08-02 12:04:00	2007-08-02 11:42:44	100	<BLOB>
	89	2007-08-02 12:04:00	2007-08-02 11:42:45	100	<BLOB>
	90	2007-08-02 12:04:00	2007-08-02 11:42:46	100	<BLOB>
	91	2007-08-02 12:04:00	2007-08-02 11:42:47	100	<BLOB>
	92	2007-08-02 12:04:00	2007-08-02 11:42:48	100	<BLOB>
	93	2007-08-02 12:04:00	2007-08-02 11:42:49	100	<BLOB>

Figure 14: RFID XML Tag Messages in MYSQL Table

that the reader type may change easily and that the SAP system is not available at all times. In addition, we had no resources familiar with all of the involved technologies. As a practical matter, this resulted in a sequence of components that could be developed by different people. In order to guarantee the data communication between the components, we agreed on simple data storage like the file system or an ODBC database. We chose these as we knew that any data store can essentially be seen as a message queue, so that we could assume that at least one of the IO mechanisms could be read (and written) by the developers.

Writing the actual components typically took less than a couple of hours. Testing could be accomplished in one day, on average. In our case, it was two people testing for half a day. Putting the components together depended on the number of links; we had four of them. Altogether, the whole scenario was developed in approximately 10 man-days. We have to add an overhead of another 20 man-days of training and research, to get acquainted with the somewhat new technologies like Python and MSMQ, but this will not occur when we build the next interfaces.

Less Is More: Saving Money and Time and Win Quality

In this installment, we demonstrated that it's possible to save money and time when developing for an SOA.

The savings are so impressive that we can even allow for "playing", research, and training within the same budget limits of a traditional development project. But that is not all; the holistic way of development in SOA also adds to the quality of the product (system), and makes solutions possible that could not have been achieved otherwise.

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Just the Fax, Ma'am: Simple Front-End Faxing from SAP®

By Roger Myers, eBusiness Specialist, Brenntag Canada Inc.

***Editor's Note:** Unless the big thrill of your day is running to and from the printer, to the fax, and hanging around waiting for a confirmation, you're going to LOVE this tip from Roger Myers. With some relatively simple configuration, your users can be sending faxes FROM THEIR DESKS through SAP. Let Roger walk you through the setup on both Windows and SAP, and before you know it, your company will be saving time, paper, and money on outbound faxes. Now, that's something to get excited about!*

Overview

I work as an application developer, in a small SAP shop. We are always on the look out for low cost, innovative solutions where we can leverage existing tools and infrastructure to meet the requirements of our business. The tip in this article explores one such opportunity.

For a number of years, our users had been looking for the ability to fax documents directly from SAP to our customers or suppliers. Unfortunately, our volumes were low. We explored several fax solutions, but could never make the business case to justify the expense of the hardware, software, and software maintenance fees.

Starting a few years back, we began the process of upgrading our LAN servers from Microsoft "Windows 2000" to "Server 2003". Somewhere along the way, we recognized that Microsoft had started to bundle a basic fax server in their 2003 server product.

We began to look at the fax server a little closer and found it provided a great option for desktop faxing. The setup appeared to be straightforward, following the online documentation. We wired up the fax server on one of our LAN boxes, plugged in an external fax modem, and discovered we had a fax printer sitting on our network just like any other printer.

Once the server was set up, we simply installed the printer on the local machine using the add printer functionality on a Windows PC and we now had the capability to fax outbound docs from the desktop.

One of the nice features about this fax setup is the Send Fax Wizard, and how nicely it integrates with Microsoft

Outlook's contact lists. If a fax number is stored on a contact in Outlook, it can be pulled into the fax message with a few mouse clicks. Another nice feature on the outbound side is email notifications. Users can be notified by email if the message was sent successfully or if it fails for any reason.

Inbound faxing worked equally well. Inbound faxes could be routed to a printer, emailed to an address for subsequent distribution, written to the file system, or any combination of the above.

Desktop faxing for documents external to SAP was good; however, it was not what we were really looking for. Somewhere along the way we started looking at output devices in SAP in search of an easy way to tie our new fax printer with our ERP system. We started with the output device LOCL.

If a fax number is stored on a contact in Outlook, it can be pulled into the fax message with a few mouse clicks.

LOCL will spool printed output to the default Windows printer on the local desktop. We added our fax printer to a local workstation and set the fax printer as the default. Next, in SAP, we printed a purchase order to the output device LOCL and waited. The SAPLPD window popped up and logged the progress of the spooling operation. Next, the Send Fax Wizard appeared. We completed the wizard and sent the fax.

The entire setup was surprisingly simple and clean.

Since most users would not accept a fax printer as their default Windows printer, we needed SAP to be able to find the fax printer on the local PC. To do this, we created an output device in SAP called ZFAX. The output device was created as a front-end printer mapped directly to the fax printer. In this scenario, the key requirements are:

- The fax printer must be installed on the local workstation.

- The name of the fax printer is unchanged.

Note: The name of the workstation fax printer must match the name of the printing device our SAP printer is mapped to.

We have deployed this setup to our regional offices. The LAN server in each office has been configured for faxing. We defined a specific output device in SAP mapped to each specific fax server. We now have outbound front-end faxing from SAP deployed throughout the company.

The appeal of this setup was how it allowed us to meet a business requirement without having to purchase additional software, incur additional license costs, or hardware (with the exception of a fax modem for our servers).

Not all solutions are perfect and this one is no exception. This setup is for front-end printing only. When an SAP document is pushed to the fax printer, a user needs to be logged into the front-end workstation to provide the addressing and other bits of information. We have not found the key to totally automate the entire process from end to end.

Despite the lack of background processing capabilities, our users are much happier now than before. Prior to implementing this solution, they would print a document, walk to the printer, take the output to the fax machine, and send. They would then return to the fax machine for the send confirmation. Now our users can do it all from their desktop and the confirmations are emailed back to them.

Setting Up the Windows Fax Server

You will need a fax-capable modem, an analog phone line, and "Windows 2003 Server". A standard external serial fax modem will work fine if your server has a serial port. If not, you can purchase an internal fax modem

card and install it on the server. We never tested USB modems since we had a bunch of older modems kicking around from our dial in networking days long before VPN. Our servers have serial ports. Your server administrator should be able to install the modems in short order, particularly if it is plug + play.

It goes without saying, you will need an analog phone line to transfer the data.

The Windows fax server is not installed by default on "Windows 2003". Your first task is to ensure the fax capabilities are enabled. On the server, navigate to the "Control Panel" and select "Add or Remove Programs". Next, click on the "Add/Remove Windows Components" option, scroll down to the item called "Fax Services", and ensure it is checked. If not, check the item and follow the prompts to install. See Figure 1 for an example.

Once the fax capabilities are enabled, we need to configure the fax server.

Microsoft has done a really good job of documenting the configuration of the fax server in the online server Help. To access the configuration Help files, launch the "Fax Server Manager" on your server.

To get there, click "Start → All Programs → Accessories → Communications → Fax → Fax Service Manager."

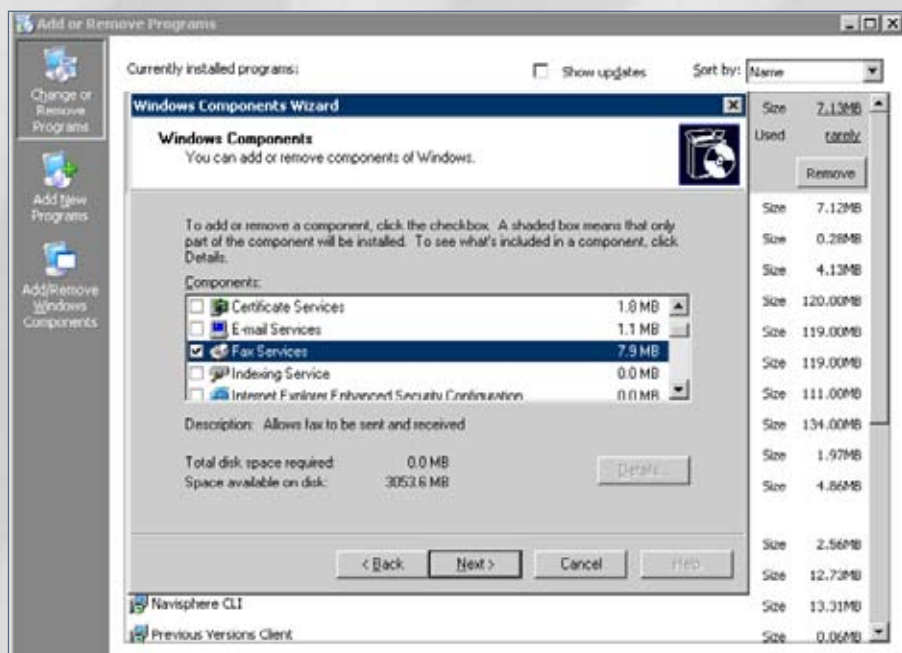


Figure 1: Select the Fax Services Option

Once the fax server and modems are installed, you are ready to start configuring. For the sake of brevity, I won't be going into all of the details around configuring the fax server. If you follow Microsoft's installation guide, you will be up and running in short order.

From the "Fax Service Manager" (see Figure 2), you can quickly access the Help files for setup instructions and for troubleshooting any challenges you may have in getting the fax server configured for outbound transmission.

Before we leave fax configuration, there is one key point that I overlooked in my first setup. In the "Fax Service Manager", expand the "Devices and Providers" folder, then expand the "Devices" node, and finally select your modem with a right-mouse click. From the Context menu ("Microsoft Fax Service Manager: Devices" in Figure 3), ensure the item "Send" is selected.

With the fax server installed, you'll need to add the printer to the local workstations that will be faxing data (from SAP or any other desktop application). The fax server sits as a shared printer on the "Windows 2003" server. Add the printer to the local PC as you would any other printer. Test the functionality by faxing a desktop document. Once you are satisfied the fax server is working properly, it's time to move to SAP.

Setting Up the Fax in SAP

In order to push spooled SAP output to the fax server,

we need to define a printer or "output device". To do this, you will need the necessary authorization to access

"Spool Administration" and perform the required functions.

To configure your output device, navigate to transaction "SPAD". Ensure you are in "Change" mode.

- Click the button "Output Devices"
- From the menu item "Output Device", select "Create" or click on the "Create" button on the toolbar.

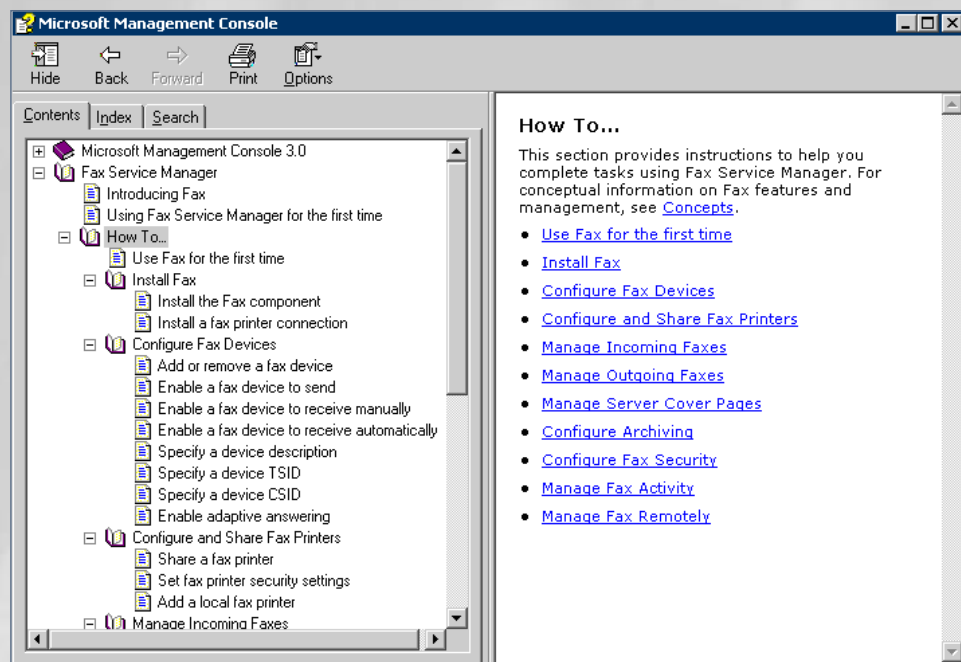


Figure 2: Select the Fax Service Manager Help Files

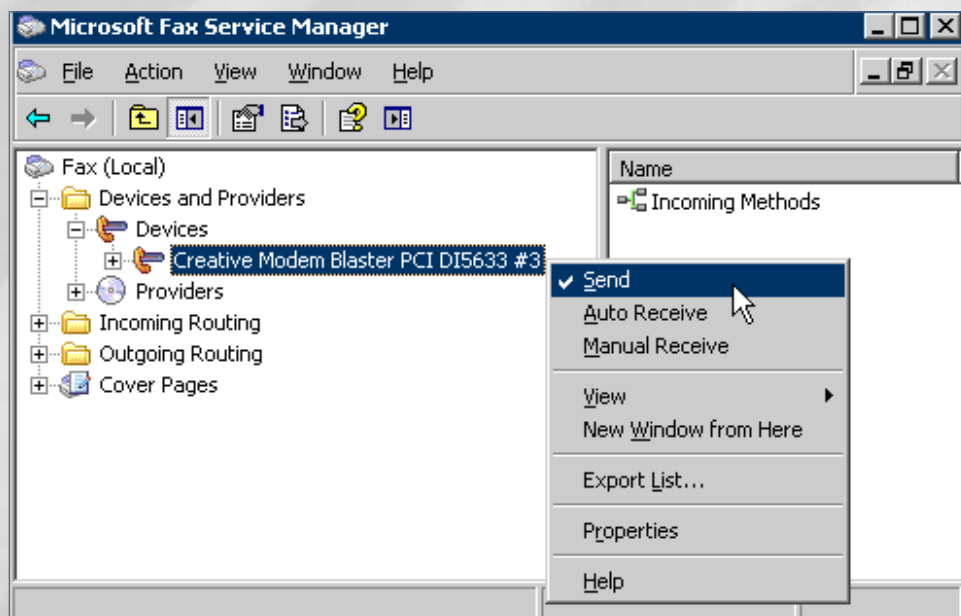


Figure 3: Ensure the "Send" Option Is Selected

- Enter a name for your “Output Device,” followed by a four character “Short name”. For example you could use “ZFAX” for both.
- Next we populate two key fields under the “Device Attributes” tab (Figure 4). These settings may vary depending on your release. Select the device type “CNSAPWIN – MSWindows driver via SAPLPD” from the drop-down list.
- For the “Device Class”, choose “Standard printer” from the list.
- Next select the “Access Method” tab.
- In the field “Host Spool Access Method”, select “F: Printing on Front End Computer”.
- Enter the path to your server fax printer in the field “Host printer” using the format “\\<server name>\<fax printer name>”
- Mark the checkbox “No Device Selection at Frontend”. This keeps users from having to choose from a list of front-end printers on their local PC.
- Save and activate. The configuration is done.

Testing the New Fax Feature

The next thing to do is to fax something to someone.

Run a report, or call any list transaction. When the report or list is displayed, print it. Enter your new SAP fax printer as the “Output device” and print. The first thing that happens is a “SAPLPD” dialog launches as the data is being pushed from SAP to the Windows fax printer. Figure 5 shows an example of the SAP_LPD log.

Figure 6: SAP_LPD Log

Figure 4: Configure the Device Attributes

Figure 5: Access Method Tab

```
SAPLPD.LOG - SAPLPD
File Protocol Options Debug Language Help

(7:18:23 AM) Icon DLL loaded.
(7:18:23 AM)
(7:18:24 AM) Network Communication via SAP-NILib
(7:18:24 AM) Hostname: RMYERS-PC
(7:18:24 AM) IP Address: 16346112.2089886680.32.1223880
(7:18:24 AM)
(7:18:24 AM) SAPLPD Version 6.28 for Windows/NT (OPT) is listening
(7:18:24 AM) OS-Info: version = 5.1, build = 0/2600, text = Service Pack 2
(7:18:24 AM) Copyright © 1992-2001 SAP AG
(7:18:24 AM)
(7:18:33 AM)
(7:18:33 AM) Receive job for printer \\server\share\fax (Berkeley LPD protocol / RFC1179)
(7:18:33 AM) send_status called
(7:18:33 AM) send_status called
(7:18:33 AM) send_status called
(7:18:33 AM) send_status called
(7:18:33 AM) send_status called
(7:18:33 AM) Job 000000842900001.CRM for user RMYERS queued.
(7:18:33 AM) Start printing job 000000842900001.CRM on printer \\server\share\fax
```

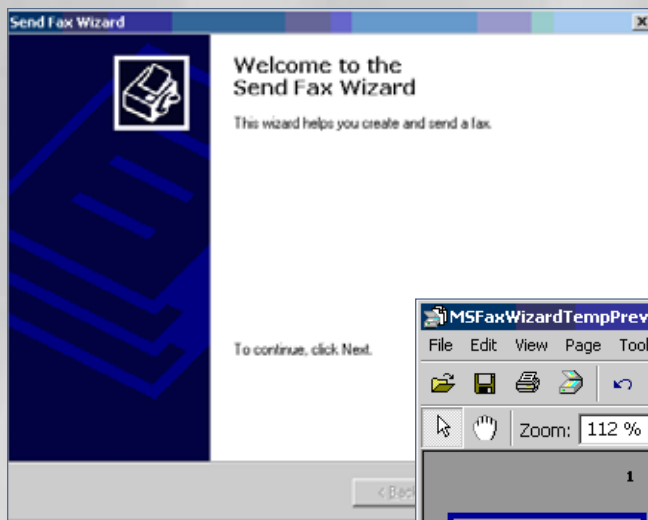


Figure 7: Send Fax Wizard – Initial Screen

Then the “Send Fax Wizard” opens up (see Figure 7). Step through the wizard, populating the recipient’s name and fax number, and then complete the Send options as required. If you are using Outlook as your mail client, you can pull fax numbers from your “Contacts”.

You can preview your fax in the default fax viewer (as the last step) before sending. See Figure 8.

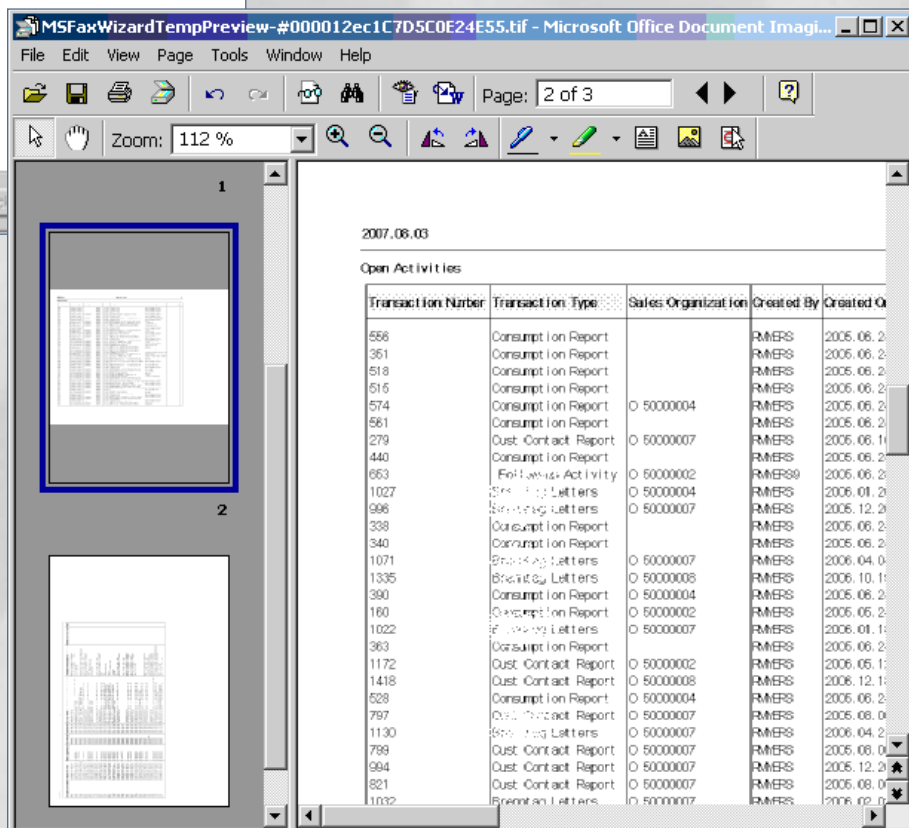


Figure 8: Default Fax Viewer Window

Summary

The fax setup we’ve just wired up will meet most front-end fax requirements. Unfortunately, because a user needs to interact with the “Send Fax Wizard” in order to route the fax to its destination, our setup will only apply to online faxing. Background fax jobs won’t work with this configuration. The “Windows Fax Server” does have a scripting API if you want to get creative. We’ve never felt the need.

If you are looking for a relatively painless and low cost way to provide your user community with outbound faxing from SAP (or any other desktop application), this will work well for you.

Roger Myers, *eBusiness Specialist, Brenntag Canada Inc.* Roger has been working with SAP since 1996 as a senior SD consultant and application developer. He spent ten years in industrial sales and marketing before moving into information technology. Skilled in ABAP, SAP workflow, and Web development, Roger is always on the hunt for cost effective solutions to the day-to-day issues facing the user community. Roger is currently the Program Chair for the ASUG Small and Medium Enterprise (SME) Special Interest Group and would love to hear from any SMEs out there. You may contact Roger at SAPtips.Authors@ERPtips.com. Be sure to mention the author’s name and/or the article title.

The “FOR ALL ENTRIES” Construct: A Guide for Developers and Consultants

By Rehan Zaidi, Siemens Pakistan

***Editor’s Note:** If you’re a developer tasked with getting lots of data from a database, the “FOR ALL ENTRIES” clause serves a useful purpose—provided you know how to prevent it from slowing up performance. Rehan Zaidi takes us through the concept of the “FOR ALL ENTRIES” construct for SAP® ABAP programs, including providing code examples as well as techniques for improving performance.*

Introduction

Fetching huge amounts of data from a database is a common task assigned to SAP developers. An option employed by many programmers in Open SQL is the “FOR ALL ENTRIES” clause. This construct has numerous advantages; however, it may affect your program’s runtime, especially when a large amount of data is involved. It is, therefore, absolutely necessary for developers to thoroughly understand the coding and execution of this clause.

The aim of this article is to help you understand the concept of the “FOR ALL ENTRIES” construct in order to use it effectively in your SAP ABAP programs. Here are some of the questions that this article will address:

- What is the syntax for employing the “FOR ALL ENTRIES” construct in custom ABAP programs?
- How is this construct interpreted and executed at the time of program run?
- What are the various techniques for improving the performance of programs containing the “FOR ALL ENTRIES” paradigm?

I will start with an explanation of the “FOR ALL ENTRIES” construct and its advantages. Then, I’ll discuss the execution of programs that use this construct, and how the system interprets it in order to access data from database tables. Finally, I will discuss the various techniques by which you may fetch huge amounts of data from the database without affecting the performance of your programs.

Figure 2: Example of a Statement Using the “FOR ALL ENTRIES” Variant

The “FOR ALL ENTRIES” construct is a special form of the WHERE clause of the SELECT statement.

This article is primarily intended for ABAP developers. I will assume that the reader is familiar with basic ABAP concepts and has the knowledge of Open SQL in an SAP environment. For more information, refer to the SAP documentation on <http://help.sap.com>. All the coding examples have been taken from Release 4.7.

Overview

The “FOR ALL ENTRIES” construct is a special form of the WHERE clause of the SELECT statement. It is used to devise conditions based on the rows and columns of an internal table. This internal table is referred to as a reference table. The basic form of syntax for this construct is shown in Figure 1.

The WHERE condition may be specified by using (as operands) the fields of the reference table. The system then performs a comparison using all entries in the internal table. The construct returns (as result) the entire set of entries from the database table that matches the given condition based on the internal table data. Any duplicates are then deleted from the result set.

Consider the example shown in Figure 2.

```
SELECT * FROM <DATABASE_TABLE>
  "FOR ALL ENTRIES" IN <INTERNAL_TABLE>
 WHERE <CONDITION>.
```

Figure 1: Generic Syntax of a FOR ALL ENTRIES Construct

```
SELECT * FROM SFLIGHT .....
  FOR ALL ENTRIES IN ITAB1
 WHERE CARRID = ITAB1-CARRID AND
        CONNID = ITAB1-CONNID.
```

This selects all entries from the database table SFLIGHT for which the value of the CARRID and CONNID fields are equal to that of the rows contained in the internal table ITAB1. Any duplicates from the solution set are then removed.

The statement shown in Figure 2 is a replacement of the loop and select construct. Alternately, this statement may be written shown in Figure 3.

```
LOOP AT ITAB1.
  SELECT * FROM SFLIGHT .....
  WHERE CARRID = ITAB1-CARRID
  AND CONNID = ITAB1-CONNID.
  .....
  .....
ENDLOOP.
```

Figure 3: Alternate Statement for the "FOR ALL ENTRIES" Construct

The "FOR ALL ENTRIES" construct will return the sum of all rows that are read if a separate SELECT is written for each row of the internal table ITAB1, and an appropriate comparison based on the CARRID and CONNID fields is made.

In case the reference table contains no entries, the entire WHERE condition is simply ignored by the system and all entries from the relevant table are accessed. Consider the example shown in Figure 4.

```
SELECT * FROM SFLIGHT .....
FOR ALL ENTRIES IN ITAB1
WHERE CARRID = ITAB1-CARRID
AND CONNID = ITAB1-CONNID
AND FLDATE = '20070128'.
```

Figure 4: Statement for Accessing Flight Information

If the table ITAB1 is empty, the entire WHERE condition is ignored and all entries are read from the table SFLIGHT.

You may also specify the UP TO N ROWS addition to this statement as shown in Figure 5.

In this case, the entire union set is first determined. Then the duplicates within the solution set are eliminat-

```
SELECT * FROM SFLIGHT UP TO 5 ROWS
FOR ALL ENTRIES IN ITAB1
.....
```

Figure 5: Using the UP TO N ROWS Variant

ed, and finally the first five rows are selected and made available to the program.

There are two advantages that this construct provides to consultants and developers:

- It reduces the number of ABAP statements within a program. The programmer avoids using nested select statements or nested loops.
- A large set of data within the database and the internal table upon which the condition is based may be involved.

Execution of the "FOR ALL ENTRIES" Construct

In order to get the best possible advantage of your code, you need to understand how the "FOR ALL ENTRIES" construct fetches data. Let's take a look at what happens when such statements are executed.

At the time of execution, the SELECT statement with the "FOR ALL ENTRIES" variant is passed on to the database interface. The database interface does not execute a loop on all entries of the reference table. Rather, the construct is converted into a SELECT statement that is based upon the values of the reference table (connected via OR conditions in the WHERE clause). Suppose the "FOR ALL ENTRIES" statement is run on the database table ZTAB and internal table ITAB1 with field contents shown in Table 1.

FIELD1	FIELD2
VAL1	VAL2
VAL3	VAL4
VAL5	VAL6
....

Table 1: Field Contents of ITAB1

The translated select statement is one shown in Figure 6.

However, if the number of rows in the reference table is very large, all the field values are not listed in one OR


```
SELECT * FROM ZTABLE
WHERE
( FIELD1 EQ VAL1 AND FIELD2 EQ VAL2 ) OR.
( FIELD1 EQ VAL3 AND FIELD2 EQ VAL4 ) OR.
( FIELD1 EQ VAL5 AND FIELD2 EQ VAL6 ) OR...
```

Figure 6: The Equivalent SELECT Statement Translated by the Database Interface

statement. Rather, they are broken down into a number of OR statements, and each statement retrieves data in separate blocks. The data fetched as a result of each block execution is then combined, and any duplicates are removed. This data is then sent to the program running on the application server.

The number of OR statements executed and the number of reference table values used in each SELECT depend upon an important system parameter RS_DB/MAX_BLOCKING_FACTOR. The recommended value of this parameter is from 10 to 50 (but this may be changed by the administrator). The number of reference table rows used in a single block is equal to the value of this parameter's value, whereas the number of blocks may be calculated by dividing the total number of rows in the reference table by the value of the maximum blocking parameter.

Suppose there are 10,000 entries in the reference table, and the value of the RS_DB/MAX_BLOCKING_FACTOR is set as 10. In this case, the OR statement contains values from 10 rows of the reference table and 1000 (10000/10) block requests are made to the database.

Note: The value of the system parameter RS_DB/MAX_BLOCKING_FACTOR determines the number of database block requests made. The standard program RSPARAM may be used to display the parameters value.

Optimizing the "FOR ALL ENTRIES" Construct

When the database table and the internal table involved are very large, the "FOR ALL ENTRIES" construct may lead to a significant decrease in system performance as well as large program runtimes. A number of factors (if considered wisely) may lead to better optimization of the involved statements. Let's look at these problems individually:

- A problem arises when the reference table used does not contain any rows. This leads to the selection of

all rows of the database table in question. The "FOR ALL ENTRIES" construct may lead to a significant decrease in program speed, especially for huge database tables like BSEG, MSEG, and so on. Therefore, make sure the reference table is not empty.

- Another problem occurs when the driver table contains duplicate records. This may cause duplicate rows to be selected from the database table that are then deleted by the SAP system. This puts an extra load on the system and may reduce performance.

You must therefore make sure to delete any duplicate records from the reference table prior to the execution of the "FOR ALL ENTRIES" statement.

- If the entries in the reference table contain randomly placed values, there is more time involved. It would be better if the values in the reference table are close to each other. Another way of improving the performance of your program is to sort this internal table before using the "FOR ALL ENTRIES" statement. When the values are sorted and closer to each other, it is more likely that duplicate entries will be read from the database within the same request, and there is less chance for redundant data to be read in multiple database requests.
- As previously mentioned, the more entries in the reference table, the slower the program becomes. One way to reduce the entries in the reference table (without losing necessary information) is to use Ranges in your program. In this case, however, there is some extra programming involved in expressing the reference table rows into a range table. Furthermore, the "FOR ALL ENTRIES" statement also needs to be modified.

Note: Ranges are also internal tables that are defined using RANGES keyword. In addition to RANGES, SELECT-OPTIONS may also be used.

Suppose you have a statement like the one that appears in Figure 7 and it needs to be converted to one that addresses ranges.

```
SELECT FIELD1 FIELD2
FROM ZTABLE INTO .....
"FOR ALL ENTRIES" IN ITAB1
WHERE = ITAB1-FIELD3.
```

Figure 7: Statement to Be Converted into Address Ranges

A corresponding range R_ITAB1_FIELD3 is defined. This range table has four fields, namely SIGN, OPTION, LOW, and HIGH. In our case, the SIGN field should contain the value "I", the OPTION field should be equal to "BT", whereas the LOW and HIGH fields should contain the minimum and maximum limits of the range within which the reference table values fall. For example, if the FIELD3 of the reference table contains values ranging from 00002000 to 00002999, the corresponding row of the range table will look like the one shown in Table 2.

Field Name	Content
SIGN	I
OPTION	BT
LOW	00002000
HIGH	00002999

Table 2: Field Contents of Range Table R_ITAB1_FIELD3

This range table is then used instead of the reference table, with slightly varied WHERE clause as shown Figure 8.

```
SELECT FIELD1 FIELD2
FROM ZTABLE INTO .....
"FOR ALL ENTRIES" IN R_ITAB_FIELD3
WHERE FIELD3 >= R_ITAB_FIELD3-LOW
AND FIELD3 <= R_ITAB_FIELD3-HIGH .....
```

Figure 8: The Equivalent Form Having a Range Table

The construct shown in Figure 8 returns the same set of data as the previous code, but extremely fast.

This range method has a few limitations:

1. The field in the internal table that is being used in the WHERE clause must be convertible into a range. Typical values that fulfill this requirement are number fields such as document number, etc.
2. For practical purposes, it would be best if the range table contained only one entry, and worst if you have the same number of rows as you have in the reference table. Usually, you will end up with the table having a few entries, which is desirable.

Conclusion

In this article, I reviewed the basics of the "FOR ALL ENTRIES" construct, and the coding that lets you incorporate it in your programs. I discussed in detail, the ways you may write programs that use this construct in order to perform efficiently. I hope this article has provided you valuable insights and will help you incorporate optimized database access functionality in your programs quickly and easily.

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Midsize Companies and the “Human Side” of SAP® Implementations

By Jon Reed, JonERP.com

Editor’s Note: A friend from the past returns! Former SAPtips Journal Managing Editor Jon Reed had his ear to the ground at this year’s ASUG/SAPPHIRE event and learned a few things about SAP’s expanding role in midsize companies—especially about the “people factor”. In this article, Jon once again shares his knowledge with our readers, including the highlights from his podcast with Dan Lubin, Director of Information Technology at Abiomed.

Introduction

Midsize companies are giving SAP serious consideration for their ERP installations because SAP has proven itself. Gone are the days where SAP’s price tag and implementation challenges were enough to scare smaller companies away, before they could give SAP a serious look.

At this year’s combined ASUG/SAPPHIRE conference, I had a chance to hear from a number of managers at midsize companies who were in the process of implementing SAP. My goal was to find out what worked and what didn’t, and to come away with some “lessons learned” about SAP’s expanding role in the ERP midmarket.

Some of what I learned confirmed what we would all expect to hear about SAP’s ability to deliver value through one integrated software instance, while some of what I learned genuinely surprised me.

After the conference, I had a chance to explore these themes in more detail when I interviewed Dan Lubin, Director of Information Technology at Abiomed, about their whirlwind 28 week All-in-One SAP installation. (My full interview with Dan is available as a podcast on JonERP.com). My goal during the talk with Dan was to get his insights on how to manage the “human side” of an SAP implementation – a question that is very important to midmarket companies, all of which have strict parameters in terms of ERP project staffing and budgeting.

In this article, I’m going to present the highlights from my conversation with Dan. I will also share themes from other presentations (by midmarket

companies) I attended at ASUG/SAPPHIRE 2007.

I’m going to divide this article into several sections, each with a different emphasis, including:

- A review of the clichés about SAP implementations that turned out to be true.
- Key ways that SAP is delivering value to medium size companies.
- Components of the SAP product line that are generating the most interest and return on investment.
- Things I learned about SAP in the midmarket that surprised me.
- A review the key “human factors” on SAP implementations.
- Some of the best practices companies have developed to ensure that their users embrace the changes in their day-to-day roles (that SAP invariably brings with it).



The Clichés are True – Successful SAP Implementations Boil Down to Common Sense

I’m not going to waste time in this article going into deep detail about standard implementation tips that have now become clichés. However, not all clichés are true, and not all SAP installations are successful, even with today’s robust support “Ecosystem.” So someone out there must still be ignoring these common sense implementation principles.

True “Keys to SAP Success” Clichés

1. **Executive buy-in must drive the project.** It’s quite simple: history now shows that SAP projects without executive buy-in fail. The only exceptions are projects that are so small in scope that top-level buy-in is not needed. But I don’t consider those smaller scale projects true ERP initiatives.

2. **SAP's project methodology works and should not be deviated from.** SAP's ASAP methodology is no longer a clever "damage control" marketing ploy, yet to be tested on real projects. ASAP is now a trusted and well-honed blueprint. The most frequent "lesson learned" I heard from midmarket panelists? Don't veer off SAP's project blueprint, especially when it comes to that big no-no: making complex modifications to the software.

Dan Lubin emphasized this point as he looked back on Abiomed's first SAP installation. As he put it, "SAP gives you not one, not two, but five or ten best practices that you can adopt in your implementation. Where we decided that we had to be special, where we were so unique that we couldn't use any of those best practices, where we did something completely different – we now realize we've taken on either a management burden or a maintenance burden for those proprietary processes. If we could do it all over again, we would have pushed harder to align with SAP best practices."

Gary Rietz, CIO of Ubiquity Brands, who appeared on a panel I attended at SAPPHIRE, shared his company's unique way of keeping the desire to modify SAP under control: "Essentially, at our kickoff, our CEO said, 'It's vanilla, it's vanilla, it's vanilla, and if anybody wants to do otherwise' – he then wrote his cell phone number up on the board, and said: 'Call me.'" That's one way to stick with SAP's program and nip "scope creep" in the bud.

3. **SAP is a business process implementation and must be driven by business users, not IT.** Engaging business users and driving the SAP project from the vantage point of industry best practices is the secret to all successful SAP implementations. Information Technology (IT) folks are still instrumental to the process, but they must accept the role of facilitators rather than being in the driver's seat.
4. **Start small – smaller scale installs are more successful than "big bangs."** This common sense lesson is not as ironclad as the others; I still run into successful "big bang" SAP installs. But for the most part, companies are succeeding with SAP by starting small and manageable, gaining momentum, and applying the success and wisdom from the first projects to their second and third phase initiatives.
5. **You are only as good as your data.** The verdict is in: without a well-thought-out and well-implemented

master data scheme applied within the SAP system, the SAP implementation will not deliver on its potential.

Today's successful SAP installs focus on pulling the core processes into SAP and pulling the plug on best-of-breed systems.

6. **Best-of-breed doesn't work.** There was a time when many companies tiptoed into SAP, unwilling to let go of their "best of breed" systems, which they would then try to integrate with SAP. Everyone had a lot of fun giving that approach a try – IT folks in particular loved working weekends tying products together from vendors that didn't like each other and whose products didn't like talking to each other. This was a costly and complicated road.

Today's successful SAP installs focus on pulling all the core processes into SAP and pulling the plug on the best-of-breed systems. The only exceptions? Companies are still using best-of-breed software for mission-critical aspects, like shop floor operations. But this generation of SAP installs is the most successful precisely because companies have relinquished the best-of-breed concept and use it only in "must have" situations.

7. **People matter.** It's the ultimate cliché: your installation is only as good as the people who run it. This is such a cliché that we tend to nod along without realizing there are specific things we can do to support the "human side" of an SAP project. I'll cover some of these tips in the last section of this article.

How SAP Is Delivering Value to Midsize Companies

In the SAPPHIRE sessions I participated in, I heard some common answers to that all-important question: Which aspects of SAP provided the most "instant return on investment?" I will list these in relative order of priority.

1. **Core SAP implementations provide a "single source of the truth" and deliver companies from the headache of managing chaotic, "multi-sys-**

tem” legacy environments. Most initial midmarket SAP installations are nothing fancy, just the core SAP modules and architecture for starters, with maybe one add-on component of choice (CRM, SRM, etc.) But companies are deriving huge cost savings (and reducing Tylenol intake) simply by shutting down the “legacy spaghetti” and bringing their core ERP operations together in one SAP instance.

Of course, once all the transactional data is captured in one system, even more value can be extracted. But the first simple step of bringing the processes under one vendor’s roof reaps big dividends. Bill Rogers, VP and CIO of Goss International, had a really funny comment about this. Appearing as part of a SAP-PHIRE panel, Goss said that his company acquired three new plants whose IT strategy resembled “Noah’s Ark – let’s buy two of everything and figure out how to put them together.” Simply reducing this duplication within SAP provided huge value.

2. **A well-integrated SAP instance is a huge boost for global operations.** More often than not, today’s midmarket companies are global in scope. SAP has made global operations more efficient for many companies, particularly in terms of functionality that helps with multi-lingual operations, multi-currency scenarios, and compliance with local and regional tax codes.
3. **SAP is delivering more sophisticated industry-specific functionality.** SAP used to pay lip service to industry functionality while the reality was often sketchier. Industry solutions had their own upgrade cycles and the whole idea of leveraging SAP’s industry know-how seemed like a case of over-promising and under-delivering. But the latest releases of SAP make industry pre-configuration easy to implement, and numerous companies cited the value of this out-of-the-box content.
4. **SAP doesn’t force companies to take less functionality anymore.** In the last section, I talked about the end of the best-of-breed days. What happened in the 2000-2003 years is that companies had to make tough choices: if they standardized on SAP, that meant settling for inferior functionality in areas such as HR, CRM, and supply chain management. Today, that is not the case. I heard more than a few managers say how pleased they were to find that when they unplugged their best-of-breed systems to standardize on SAP, in many cases the SAP functionality was just as good, or at least in the same ballpark, as their

best-of-breed systems, while providing all the benefits of superior integration.

5. **SAP is providing value to companies involved with mergers and acquisitions and dealing with compliance and financial reporting.** Several panelists noted that SAP provides a great roadmap for consolidating companies after acquisitions, and dealing with the compliance and reporting issues entailed in acquisition and post-acquisition activity.
6. **Considering its depth of functionality, SAP is surprisingly affordable and easy to implement.** I almost can’t believe I’m typing this, but SAP has figured out how to price its solutions in a way to get “into the conversation” when smaller companies look at ERP systems. This wasn’t always the case, but enough panelists offered their own honest comments on this to assure me that it was indeed the truth.
7. **The most popular “value add” areas of SAP include Business Warehouse (BW/BI), Global Trade Services (GTS), and handheld device integration via CRM and RF/barcoding.** BW was by far the most common product cited by name when panelists were asked to cite the component within SAP that had helped their company the most. BW’s ease of reporting, for both user and executive teams, was noted, as well as a reduced dependency on IT for effective reporting. I was a little surprised that GTS was mentioned as frequently as it was, but many companies are raving about it. It was not as surprising to learn that the integration of portable mobile devices, both for salespeople and on the warehouse floor, was a point of emphasis.

Surprises about Midsize SAP Installations

There were a few trends I noted at the conference that surprised me:

1. **Midsize companies are not moving aggressively into SAP’s most hyped products (xApps, Enterprise SOA, MDM).** I was expecting to hear more about companies using SAP’s most hyped products. But in fact, most companies were focused on the value delivered by SAP’s core ERP release, with perhaps one add-on component they were looking into, such as CRM or APO. I thought it was especially surprising, given the amount of emphasis the panelists put on getting master data right, that very few of them were actually using SAP’s own Master Data Management (MDM) product that runs on the NetWeaver™ architecture.

However, what did come across clearly is that companies did perceive a benefit in SAP's vast product suite and increasing Web services capabilities. The panelists running on NetWeaver were definitely looking into some targeted Enterprise SOA initiatives, and those not yet running on NetWeaver were looking in that direction in the not-too-distant future.

Many panelists noted plans to open up their systems to trading partners, suppliers, and customers as "next phase" projects in the works.

While many midsize companies were not currently focused on SAP's advanced products and Enterprise Services capabilities, the fact that SAP did have the deepest and most forward-thinking functionality of any ERP vendor did impact their initial selection of SAP. The verdict? Companies will move in the direction of NetWeaver-enabled Enterprise SOA, but on their own timeframes. Many panelists noted plans to open up their systems to trading partners, suppliers, and customers as "next phase" projects in the works.

2. **Companies are pulling business process experts into permanent IT roles.** Several companies mentioned that they have had success beefing up the SAP skills in their IT department by taking exceptional users from the project team and putting them in long-term IT roles. The most common example? Bringing a user with deep expertise in a particular SAP module, such as Financials or Human Resources, and setting him or her up as a permanent liaison between the functional users and the IT team. At first, it seemed odd to think about pulling business users into IT roles. But I think that's indicative of a trend we are seeing with SAP's latest releases: an increasing convergence of functional and technical skill sets. Given that convergence, pulling functional folks into IT roles makes a lot of sense.
3. **Companies are outsourcing more than just ABAP programming.** It was not a surprise to hear that midsize companies were finding value in "offshoring" ABAP development projects. What was more surprising was hearing how many companies are

outsourcing other aspects of their SAP implementations. I heard from companies outsourcing payroll functions, accounts receivable functions, and other general back-office functions. A surprising number of companies were outsourcing their entire IT operation pertaining to SAP, opting for hosted application environments. Some reported success with SAP Hosting; others relied on other third-party solutions. The ERP hosting market has not been a hot market up to this point, but perhaps as more midsize companies evaluate the pros and cons of maintaining SAP applications in-house, we will finally see a pickup in the market for hosted ERP environments.

4. **SAP is now enjoyable to use.** SAP has known for a long time that it could stand to be more user-friendly. You used to hear jokes at every SAPHIRE gathering about people stumbling onto ABAP code still written in German. In the late '90s, SAP launched the EnjoySAP campaign, specifically to promote SAP's commitment to an easier-to-use SAP. To be fair, SAP has gradually improved its user-friendliness with each major release cycle. But this was the first year where I heard numerous panelists gush about their users' enthusiasm for their SAP environment – without any apparent solicitation. Several companies mentioned that their own users were driving the push for new upgrades and new functionality because they were so sold on what SAP had to offer them.

SAP Still Comes Down to People - Tips for Handling the "Human Side" of an SAP Implementation

On my recent podcast with Dan Lubin of Abiomed, which was hosted by SearchSAP's Jon Franke, we had a chance to dig more deeply into the human issues of handling an SAP install than we usually get to hear about. Dan spoke frankly about how his team overcame burnout and managed to achieve a live environment that not only achieved business goals, but also met the ultimate criteria for SAP project success: enthusiastic user buy-in.

Here are the keys to Managing the "Human Side" of an SAP Project:

1. **Detailed user documentation may be a pain, but it's well worth the effort.** It makes sense that the time spent developing quality (not just run-of-the-mill) user documentation pays off. But Dan Lubin's take on this subject still got my attention: "The areas that put a lot of effort into documenting the business processes – the areas that put the most time into the

most boring part of the implementation, which is writing everything down – are the areas that are having the most success with SAP a year later.

2. Put your most talented people on the project.

Clearly there is a cost to putting your best people on the SAP project – they were already doing something pretty important. But several SAPPHIRE panelists emphasized that any pain caused by losing a talented person from a different role was well worth enduring for the payoff of getting the best people onto the SAP project.

- 3. Users may have to give up some flexibility when moving to SAP.** This should not be denied, but addressed in a thoughtful way. Flexibility is an interesting and perhaps even controversial topic in the SAP community. On the management level, what we hear is mostly rave reviews about how flexible SAP is becoming – meaning that in the era of NetWeaver and Service-Oriented Architecture, it is easier than ever to customize SAP without having to do expensive and problematic custom development. The consensus is that SAP provides much more flexibility “out of the box” than it used to.

But on a user level, SAP is not always the most flexible system. Part of the payoff of SAP is that when you install it properly, you standardize your business processes and procedures, which has huge payoffs in terms of reporting and compliance. But it also means users can’t “go rogue” and do their own thing.

Dan Lubin faced this issue at Abiomed: “The way I explain it internally is, ‘Where process and practice didn’t meet, people have felt more pain,’” says Lubin. “It’s a good thing, because we’ve taken variability out of the execution of processes, which means that we’re executing consistently. But, at the same time, that can be interpreted negatively to mean that we’ve reduced our flexibility. I think that’s an area where people continue to get more and more comfortable.”



Dan Lubin, Abiomed

A common example of flexibility tradeoffs cited by conference panelists was in the area of e-procurement. By standardizing procurement processes and vendors throughout the enterprise, many companies enjoyed big cost savings through SAP. But it did force some users to change their “ad hoc” approach to procuring supplies.

So how do you handle a situation in SAP where users have some gripes about the rules of the new system? That leads us to the next lesson...

By standardizing procurement processes and vendors throughout the enterprise, many companies enjoyed big cost savings through SAP.

- 4. When in doubt, over-communicate.** During our talk with Dan Lubin at Abiomed, I was struck by how aggressively they sought to involve users in every phase of the implementation. Regular communication was the key to addressing any issues of discontent, whether it was the long hours of the implementation deadlines, or the impact of SAP’s structured workflows on day-to-day job roles.

Lubin put it this way: “We spent a lot of time over-communicating. We bought a lot of lunches. You spend a lot of time trying to communicate with folks one on one. You do everything that you can – making sure that people understand, one: that they’re appreciated, two: that their efforts are important and valuable, and three: that everyone is working towards a goal. And what you have to do is continue to raise the visibility of that goal.”

Sometimes, companies make the mistake of assuming that users will “buy in” to the new ERP system as long as the new software improves the company’s financial picture. But while bottom-line success is important, that’s only one piece of achieving buy-in. Another key is making sure that SAP is enjoyable to use, and SAP has come a long way in that regard. But the third factor is the one that Abiomed excels at: taking the time to get management in the same room with the key users and forging working relationships.

When the inevitable “burn out” period comes during the go-live push, the time you have spent on those relationships pays off.

We asked Dan about that very topic. How did they address the strain that almost always occurs before the finish line? “The further into the project, the more people started to get that level of exhaustion, and certainly, it’s just something that you have to manage,” says Lubin. “And, again, you manage it through communication. You manage it through lending a kind ear. And you manage it through highlighting people’s successes, giving them an extra hand when they need it, and ultimately rewarding them for their successes as we get the project completed.”

Dan makes it sound so simple, yet I’ve spoken with a lot of consultants, and a lot of project team members, who found themselves on projects where these common sense principles of communication were not utilized.

Conclusion

SAP is not the only viable ERP solution for midmarket companies, but judging from all the success stories of ASUG/SAPPHIRE 2007, there’s no question that SAP has come to the table with a well-tested product that offers bottom-line functionality at an affordable price. SAP also offers a range of functional enhancements and enterprise services when companies are ready to add them. The presentations I attended convinced me that SAP has finally found a way to offer a streamlined product with a project-tested methodology, without sacrificing its greatest strength: deep, industry-specific functionality.

Having said that, the hard-won lessons from these ASUG/SAPPHIRE ’07 panelists bring one point home: SAP doesn’t install itself, and without the right implementation approach, a quality product guarantees nothing. It’s still about the people, and people have been known to be difficult. But a good project plan still goes a long way. I hope this article has shed some light on the keys to building an SAP environment that users look forward to working in.

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Optimizing Financial Investment and Technology Use for Business Health

By CJ Rhoads

Editor's Note: *CJ's back and she's switching gears! After years of research and countless articles on how to get the most out of your IT investments, Dr. CJ Rhoads is taking a closer look at overall business health and the role IT plays in the bigger financial picture. If you've believed that effective technology use can only enhance business, you need to read this series of eye-opening articles. In this issue, CJ gives you the 411 on when you're likely to get a great ROI, and when you need to hold your dollars for other investments.*

Changing Focus

For years, most of my research has been focused on helping businesses gain maximum value for the money spent on information technology. From 2003 to 2006, my focus was on effective technology use. During that time, I tested and confirmed many different hypotheses regarding the factors that go into effective technology use such as:

- 1) Ensuring that both the CIO and the CEO are involved in the decision making.
- 2) Seeking information from knowledgeable, smaller consultants, rather than top big name consultants.

Within the last year, I have noticed something else about effective technology use; sometimes being effective in technology use encourages unhealthy business behavior.

I can see the puzzled look on your face. How can utilizing technology effectively lead to unhealthy business practices? Consider it this way: if a person is a hundred pounds overweight, exercising and eating less is healthy behavior. But if a person is already five pounds underweight, skipping a few meals or spending hours exercising is clearly unhealthy behavior.

With that realization in mind, I recently began changing my focus from just information technology to ensuring overall business health. Information technology (IT) is just one part of the system, but it is important to see how IT integrates into all of the other systems for overall business health.

I have noticed something else about effective technology use; sometimes being effective in technology use encourages unhealthy business behavior.

Three Parts

This article begins a three-part series within the CIO Corner that will focus on how IT influences business health. In this issue, we will drill down into the financial investment aspect of IT. Next time, we will take a look at the IT staffing experience. The third installment will provide some insight into planning.

Optimizing Financial Investment involves several best practices that we'll cover:

- Apples to Apples ROI Analysis
- Recognizing IT as an Accelerator
- Avoiding the Proverbial Vacuum (Make Financial Decisions in Context)
- Supporting the Hedgehog
- Understand the Technology

Apples to Apples ROI Analysis

In previous articles, we've discussed the fact that Return On Investment Analysis doesn't work well for IT projects because IT is a relatively new type of expense and the accounting standards necessary to compare apples to apples have not yet been developed. Because of the lack of standards, even an honestly calculated ROI is bound to show a bias that may lead to the wrong decision.

So the first step in optimizing financial investments is to be sure that any numbers are apples to apples comparison. Although GAAP (Generally Accepted Accounting Principles) don't properly accommodate information

technology expenses, we should be sure that whatever guidelines we use for capitalizing and categorizing IT-related expenses are consistent throughout the organization; the same is true when comparing two different RIO analyses.

Recognizing IT as an Accelerator

One of Jim Collins' research findings for his book *Good to Great* (HarperCollins, 2003) was that information technology is an accelerator. The accelerating impact IT has on business health does not distinguish between good and bad; the acceleration can occur in either direction.

In other words, if the business is starting to go downhill, an investment in information technology will accelerate the decline. Spending money on IT can cause the business death knell to toll much earlier than if there had not been an investment. We can see this influence in the next point, which reminds us never to assess an investment in a vacuum; all investments should be made in a real world context.

Avoiding the Proverbial Vacuum

Imagine that we are members of the senior decision making team in a manufacturing company that makes tubes for CRTs (Cathode Ray Tubes - the kind used in big, fat televisions and computer monitors). We notice that our sales are beginning to slip, so we feel we have to cut costs drastically. Our top notch information technology folk have brought a new IT system to our attention, and the ROI looks very attractive. According to the financial analysis, we can double our CRT output with three quarters of the staff. The financial investment will start paying back in six months. The IT people feel like this is a slam-dunk decision. Of course, we should invest in this new system, right?

(Hint: Only if we want to go bankrupt three years earlier than we would have had we said "no" to the new system.)

**To support business health,
financial investment decisions
must be made within the context
of the real world.**

Investing in a new system to increase production on a declining product would be an example of a bad financial investment. Nothing is going to stop the decline and eventual death of the CRT industry, and investing in a new system (because the short payback is enabled by the capitalization of the system) would just deplete the financial resources that would be better used to replace the dying CRT manufacturing with a different business. In this case, we would be depreciating the new system long after the last CRT was manufactured.

(Hint: Notice how the whole scenario would change if we switched our hypothetical team to an LCD manufacturer [the type of television/computer screen that is replacing the CRT]? In that context, because of the fast-growing market for High Density televisions and LCD computer screens, an investment in an IT system to double capacity would accelerate the growth and profit of the company.)

A bad financial investment decision can result from separating the projected numbers from the real world. Too often, the financial investment decision is made in a fantasy world of ever increasing sales volumes. To support business health, financial investment decisions must be made within the context of the real world, a process Jim Collins calls Confronting the Brutal Facts.

Supporting the Hedgehog

Another Jim Collins concept is the Hedgehog. A business excels when it focuses on its core competency; the one thing that it can do better than any other company. The financial investment in an IT project must therefore support the hedgehog concept.

When it comes to ERP systems, this concept often means that it makes sense to implement them backwards. What do we mean by backwards? Well, most ERP systems implemented module by module start with the general ledger "backbone" and move on to accounts receivable, sales order, advanced pricing, etc. But if our business' claim to fame is our great customer service, it might make sense to implement our ERP system backwards, implementing the advanced pricing and sales order modules before the accounts receivable or general ledger financials. (Of course, most ERP systems would not technically be able to implement the new system this way, but from a process perspective, doing so would make more sense.)

Understand the Technology


Another common mistake involving information technology investments has to do with understand-

ing the underlying technology. Too often, we rely on the “expert” advise from those who stand to gain from our financial investments into some technology that is ahead of its commercial time. Nanotechnology? Sure -it sounds great, the capabilities may be enormous, but unless you actually want to use it, waiting twenty years is a much safer bet.

Investing in an ERP system in the late eighties and early nineties, we now know, was a crap shoot. Projects had a 50/50 chance of succeeding. Now that the industry as a whole has learned from its mistakes and has figured out what ERP can and cannot do, the investment is much more likely to succeed (and cost a lot less than it did in the early nineties). It often makes much more sense to invest in a technology after the hoopla has died down.

Optimizing Financial Investment in Technology

Optimizing the investment in technology has some very specific issues that do not exist with other capital investments, like buildings or factories. For overall business health, it makes sense to pay attention to the differences and ensure that our financial investments add to our overall business health. We will continue this series of CIO Corner articles by addressing first, some IT staffing considerations, then in the third installment, we will provide some insight into planning.

Dr. CJ Rhoads is a well-known guru, speaker, and author on how to make better decisions about business strategy and technology. Rhoads is the founder of ETM Associates, Inc., a Douglassville, PA based enterprise technology management consulting firm (ETMAssociates.com). She's also an Associate Professor in the College of Business at Kutztown University, as well as author of over a hundred published articles, dozens of manuals and whitepapers, and two forthcoming books. She can be reached at CJRhoads@ETMAssociates.com. 

Because Working With SAP® CAN BE Funny

We've all been there. . .the user who thought his computer died, only for someone in IT to determine that, yes, it's pretty hard to work when your PC is UNPLUGGED. Or how about the user who panics when a message comes on the screen that says "Job Terminated", thinking this means a trip to the unemployment line? And what help desk hasn't received a frantic call asking "Where's the 'any' key? It's saying to press it and I can't find it!!" Face it—those little moments give us some much needed comic relief in what can otherwise be a fairly stressful work place. They give us tales to tell around the water cooler and watch as our colleagues' eyes get big with disbelief, before they double over in gut-splitting laughter.



Now, we want to hear from you. We want you to share with us, and your fellow readers, some of the stories that have given you, or your colleagues, something to chuckle over (and over and over again). Here's an example of what gave us a giggle here at SAPtips:

"A consultant tells us that one of his clients asked him if he had ever accidentally entered a sales order in the production system, instead of the test environment. He thought it over, and said, "Yes, I might have done that." The client then said that they had shipped the product and the customer had paid for it!"

Here are the rules:

1. Keep it G-rated.
2. Don't use names of the not-so-innocent.
3. Keep the story under 200 words.
4. Have fun!

Stories can be submitted to Colleen Low Larkin at Colleen.Larkin@ERPtips.com
(subject line: "SAPtips Funny Stories #1").

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So, send us your "war" stories and see if you can make us laugh!

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Andy's personal goal for 2007 is to help more clients optimize their use of JD Edwards and SAP, and realize more value for their software investment.

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