Quality Systems & Software

Quality Expertise & SAP Services

Enabling Business & Technology solutions

Enhanced Efficiency & Improved Effectiveness

Lower Costs & Higher Profitability

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Dear colleague,

Let me take this opportunity to introduce you 'Quality Systems & Software' or 'QS&S' for short. We specialize in SAP.

While the strategic importance of SAP technology is crystal clear, companies still fail to reap all the benefits it offers. In fact, many firms continue struggle just to get their systems run. QS&S offers the expert experience required by companies to fully exploit their SAP investment.

We believe that finally it boils down to Quality of expertise - and we pride in bringing quality expertise on the table. Quality is embedded in our company. That's our name.

At QS&S "Quality" says it all! It's in our name and in everything we do. With our quality consulting, companies achieve world-class performance and realize their latent business and technological potential.

You'll find QS&S consultants everywhere. We are   regular participants at the premier SAP events such as ASUG, SAP Financials, SAP Supply Chain, SAP CRM, Reporting and Analytics and Managing SAP Projects conferences. We are also frequent contributors to the industry's leading publications including SAP Financials Expert, BW Expert, HR Expert, SCM Expert, SAPInsiderOnline, SAPtips, and SearchSAP.

I am enclosing some of our white papers for your reference. These represent some of the common business challenges you wrestle everyday. We can help you overcome many of the business challenges of your toughest SAP projects.

Let us know your business goals and we will be proud to offer you our strategic business solutions.

I look forward to hearing from you.

Mitresh Kundalia

Director - SAP Practice

E-mail: Mitresh@QSandS.com

About QS&S

Quality Systems & Software (QS&S) and its group companies, are SAP specialists offering a wide range of consulting services.

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QS&S consultants are well versed in SAP applications (including CO-PA and New G/L), Upgrade projects, New dimension tools (BW, SEM, SCM, CRM, Portals), R2-decommissioning, Archiving solutions, Remote consulting, Production support and IT staffing. We pride ourselves on expertise we deliver to our client. Quality expertise grounded in practical experience.

We have deep insight into strategic, business and operational aspects of an organization. We understand the birds-eye-view and we understand the nut-and-bolts too.

QS&S's core strength is SAP. Our consultants have skills and knowledge across all modules of SAP including Financials (FI, CO, BW, SEM), Logistics (SD, MM, PP, PM, WM) and HR (PD, PM, Payroll).

We provide solutions and services spanning all functional areas of an organization, be it Finance departments, Logistical depots, Sales Offices, HR Departments or IT data centers. We can provide our expertise in these functions:

- Finance, Logistics & HR solutions
- IT solutions
- Business solutions

Finance, Logistics and Human Resources Solutions

With dynamic and fast changing environment, corporate financial departments are facing critical challenges. Regardless of industry, pressure is mounting to build more efficient and accurate financial supply chains that can reduce costs, accelerate speed and comply with statutes.

QS&S's Finance Solutions professionals help finance leaders rapidly identify and implement proven best financial and accounting practices. We use our extensive expertise of finance functions - right from planning and reporting to shared services to financial management. We want CFOs to have confidence in the accuracy of the financials of the organization and we enable finance functions to align with strategic goals or the organization.

QS&S's Logistics Solutions professionals help companies enable and integrate key processes and applications throughout the supply chain.

QS&S's Human Resources Solutions professionals help companies enable and integrate key personnel applications throughout the organization.

IT Solutions

No doubt, IT has become integrated part of a business. One of the most strategic catalysts, IT enables business processes can dramatically improve the overall performance.

QS&S started as an IT software company; provided customized IT solutions to meet the specific requirements of the organization. We provide technical expertise in all the major areas in SAP including ABAP development, Web enablement.

Business Solutions

QS&S provides various other services to organizations to enable companies to constantly improve and continue achieve excellence.

Resource supplementation

Whether you require assistance of a qualified expert for one day or for longer, QS&S can provide you with an immediate cost effective solution to support your needs.

Systems Audit and project review

QS&S can audit your systems and project plans and provide reassurance to the owners of applications.

Remote Consulting

QS&S can also provide you remote consulting, ideal for organizations requiring assistance for specific issue.

Production Support

QS&S consultants can help you support your day-to-day business and applications. We provide expertise in Functional as well as technical modules of SAP.

Services & Solutions

We help companies achieve world-class performance with enablement of business and technology solutions. We use Industry-wide best-practice configuration guides and proven implementation tools to integrate complex business processes with the SAP system. With the combination of Quality of expertise from us and strength of SAP system, we enable companies realize enhanced efficiency, improved effectiveness and overall business goals.

Among other things, specifically, we can provide our expertise in these functions:

* SAP Applications - Finance, Supply Chain & HR solutions
* Initiatives - Upgrade projects, new Dimension tools (BW, SEM, SCM, CRM, Portals)
* Optimizing solutions: R2-decommissioning, Archiving and Data Management
* IT Automation solutions
* IT Staffing
* Remote consulting
* System audit and Project review
* On-site and Off-shore development and system support
* Business productivity solutions - business process re-engineering (BPR)

Clients & Industry Associations

We have successfully completed SAP consulting engagements for various fortune 1000 clients in a variety of industries, including:

* High tech
* Manufacturing
* Networking
* Pharmaceutical
* Entertainment
* Consumer Goods
* Financial Services
* Automotive
* Services

If you have any industry-specific business challenge, be it, determining customer profitability, managing discount programs, improving SAP investment, providing flexible reporting and more, let us know and we will be proud to offer you our strategic business solutions.

In addition, you'll find QS&S consultants everywhere. We are regular participants at the premier SAP events. We are also frequent contributors to the industry's leading publications. Following is the partial list of professional associations:

* America's SAP Users Group (ASUG)
* Managing SAP Projects Conferences
* SAP Financials Conferences
* SAP CRM Conferences
* SAP SCM Conferences
* SAP BW Conferences
* SAP Basis/Admin Conferences
* SAP Reporting and Analytics Conferences
* SAP Financials Expert (FICO Expert) Publications
* CRMExpert Publications
* SCMExpert Publications
* BWExpert Publications
* SAPInsiderOnline
* SAPtips

Our White Papers

We have published more than 50 consulting white papers which cover many of business challenges you wrestle everyday. Here are the abstracts of some of these white papers. If you want to discuss business cases involving these white papers or specific to your industry, please write to Mitresh Kundalia, Director - SAP Practice. He can be reached by E-mail at Mitresh@QSandS.com.

New G/L

"Achieve Balanced Reporting by Automating Document Splitting in the New G/L"

New G/L offers many new features including Document splitting to meet 'IAS-14 Segment Reporting' Requirements. With document splitting, the system splits accounting line items according to specific characteristics. This enables you to create financial statements for entities such as Segments. In this article, the author describes in detail on how to activate the document splitting automatically. The splitting method is the main key to activate document splitting in the New G/L, including splitting rules, business transactions, business transaction variants, and more.

"Unearth the Hidden Secrets of Zero-Balancing in the New G/L"

International financials regulations may require you to zero-balance the financial transactions by certain characteristics - such as, profit center, segment and more. In this article, the author describes how to set-up the zero-balancing characteristics. Also, learn the un-documented feature of how system creates varying number of zero-balancing line items.

"Use Document Simulation in the New G/L to see how the system posts G/L Documents"

In this article the author describes how to leverage much improved functionality of Document Simulation in the New G/L. The classic G/L offers a feature called document simulation that helps you determine how the system automatically generates accounting entries, troubleshoot and fix missing configuration settings, and identify and rectify any mistakes made before posting the accounting transaction. This feature has improved in the new G/L and adds particular benefit to document splitting. Using document splitting, you can balance the document for predefined characteristics at run-time rather than waiting until period-close.

"Do's and don'ts for configuring the new G/L"

In this session, the author explains the New G/L implementation considerations to reduce risk, including master and organizational data management, transactional data integrity, and financial reporting compliance. How to prepare for New G/L implementation challenges. Find out how to ensure data and process integrity by avoiding too many parallel ledger setup. Weigh the impact of data volume by activating document splitting functionality and find out why you to be careful when updating profit centers with segments. Learn about the best practices and configuration tips of utilizing simulation, inheritance, setting zero balance constants and more.

Consulting Notes

"How to avoid inconsistency when you post to COGS account during a billing process"

Creating an Invoice is the most fundamental and basic 'Revenue Recognition' process. Usually, the invoice posts to Revenue (or Discount accounts) during the billing. Did you know that in some industries, you might want to post to Cost of Goods Sold (COGS) account, instead of Revenue account? Typically, this is required when the business purpose of the process is 'Costs Reduction' and not 'Revenue Recognition'. You may think that simply swapping the Revenue account to COGS account may solve your issue. However, be ready for a rude shock. In this article, the author explains behind-the-scenes mechanics on how the financial inconsistency is created and offers you a solution on how to avoid this inconsistency.

"VOFM Routines Help Make Logistics Processes More Versatile"

In the world of logistics, it is so common to see many different and sometimes contradicting business processes requirements. For example, selling a particular product at a regular list price, but, under a specific situation, give it free-of-charge. What makes SAP system so powerful is that you can make it is flexible to adapt to such diverse business requirements. VOFM is one such tool-set which is extensively used, especially in logistics processes. VOFM functions are small but nifty tools, available in your arsenal to add flexibility to the business processes.

"Omnipotent Condition Technique"

Condition Technique is one of the most powerful tools available in SAP. It is extensively utilized within various SAP functions. What makes it so powerful is its flexibility to meet your specific business requirements from basic additions to more complex calculations. Especially within Sales and Distribution (SD) module, condition technique has been utilized extensively, within various processes - pricing calculations, output control, account determination, material determination, free goods determination and more. In this article, the author explains the mechanics of how Condition Technique works and with an example from Pricing function, demonstrates various features available so that it can be used for various scenarios.

"Cost Conditions in R/3 - Are You Sending Your Financials Team an Unpleasant Surprise?"

Almost everyone in SAP community is aware of condition type VPRS, that basically it determines the cost of the material - either standard or moving average, depending upon the valuation of the product. However, very few are aware that something called as 'future price' of the product also has noteworthy influence on how the VPRS cost is determined. Not only that, if not understood correctly it can have negative impact and can cause the differences in your Financials.

"Signs in CO-PA"

Revenues are stored as negatives in Financials. However, the same revenue postings are assigned as positive in SD module.

Since, data can be posted from both modules to CO-PA, it handles signs a bit differently. If not handled properly, it can cause wrong results in CO-PA. In this paper, the author explains the logic for handling signs and how to avoid incorrect results.

"What Is so Special about Statistical Conditions in SD?"

Needless to mention that pricing procedure is one of the most powerful configurations in Sales and Distribution (SD) module, which is used to calculate the price of the item being sold. In spite of general awareness among the business community about the strength of the pricing procedure, many are not aware of the hidden strengths of the components of the pricing procedure. In this article, the author highlights the hidden features of the Statistical conditions and alternative ways of calculating the condition values.

"Find The Hidden Condition Technique in CO-PA and Fine-tune CO-PA Ledger"

Have you ever wished that CO-PA module had a Condition Technique? Guess what? It does, but in CO-PA it is termed as 'valuation with costing sheet'. In this paper, the author unearths the hidden Condition Technique in CO-PA and clarifies some of the terminologies, which have caused it to be underutilized.

"Help Profit Analysts Find Causes and Effect Relationship with 3 CO-PA data Fine-tuning Options"

In this paper, the author explains some of the 'secret' data-tuning techniques, which help you get maximum out of CO-PA module. One of the most important SD Configurations - 'Pricing Procedure', plays a very important role for CO-PA. Author explains how one can fine-tune CO-PA ledger with the help of 'Statistical Conditions', 'Alternative Calculation Type' and 'Sub Totals'.

"What is an Assignment Number and How a Misunderstanding can give an unfriendly surprise"

Often SAP uses the same term quite differently in different modules. One such term is 'allocation'. In CO module, allocation is a term used to transferring costs from one cost center to another. In FI, allocation number is an additional reference field for FI account line item. Realizing the potential confusion, SAP now calls it 'assignment number' in FI. However, whether it is 'assignment number' or allocation number', its usage has remained confusing. In this article, author clarifies some of the potential confusion created by it usage in Customer or Vendor accounts and the corresponding G/L reconciliation account.

"10 Consulting Notes all CO-PA consultants should keep handy"

If a business user has a problem, they call consultants. But, what if the CO-PA consultants need some help? In this article, the author has listed 10 most common business issues in CO-PA module and the OSS consulting notes to resolve these challenges.

"Material Master History Tables: What Happens to Materials in Prior Periods?"

SAP R/3 4.5A stores previous period data for materials in new history tables. Learn how this change improves the MM period closing process and allows you the unprecedented opportunity to view historic material master data. Starting with SAP R/3 Release 4.5A, SAP added functionality to save monthly history of the key material master tables. These material master history tables can be a useful source of information and can form the basis of custom reports to meet specific user requirements. Many SAP standard reports, such as RM07MMFI and FB5L, use these new history tables.

"Avoid a Disconnect Between Your MM and FI Period Closes"

Your cutoff for transactions at close may be affected if you don't understand the relationship between the Materials Management (MM) period close and the FI period close. In this article, the author explains the configuration details so that you can configure your R/3 system to ensure a clean cutoff for MM transactions at period close.

"Are Your Stock Balances Correct?"

In this article, the author answers to six questions along with a little-known report can help you to keep your R/3 Materials Management (MM) and FI stock balances in sync.

"Currency Types: The Key to Reporting Parallel Valuations"

Do you know what the different currency types are, where they are configured, and when to use them? Confusion abounds in this area, especially when dealing with parallel valuation. In the article, the author provides a roadmap to gain control of all of your conversions and valuations.

"Secure Your Revenue Stream: Ensure That SD Billing Document Invoices Are Posted in FI"

It is possible to have an SD billing document without a corresponding FI invoice. This type of error can result in significant under-reporting of revenue. In this article, the author provides the detailed steps to ensure all SD invoices are reflected accurately in FI-AR. Two R/3 modules, SD and FI, cover the order-to-cash process. Invoicing represents the interface between SD and FI, and there is a high risk if the two teams are not working in cooperation. If the teams are not aware of their actions' impact on the others, do not understand the end-to-end process, and do not have clearly defined areas of responsibility, or if they simply do not talk to each other, the results may be disastrous.

"Use Reconciliation Account Determination with a Special G/L Indicator for More Flexible Invoicing"

The author demonstrates how to optimize reconciliation account determination. He introduces the fundamentals of reconciliation account determination, special G/L indicator configuration, and manual adjustments. With examples, he shows how to use reconciliation account determination with a special G/L indicator in the FI-A/R module.

"Nine Tips for Dealing with Zero Decimal Place Currencies"

The U.S. dollar, like many of the world's currencies including the euro, uses two decimal places, which - not surprisingly - is the default setting for R/3. When you roll out your SAP functionality across geographies, however, you may run in trouble coping

with currencies with other decimal-place demands. The author provides tips to help you avoid mistakes when viewing or working with various currencies.

"Which A/R Underpayment Option Should You Use: Partial Payment or Residual Item?"

When a customer makes a payment for an invoice that is a great deal less than the full invoice value, the A/R user has several choices of how to process the underpayment. Both users and consultants are often confused about the difference between two of those options - partial payment and residual item - because they can appear to have similar results. The author explains how they differ by taking the same invoice through both processes.

"Avoid These 11 Common Unit-of-Measure Errors"

To keep your SCM operations running smoothly, learn how to avoid and correct these 11 common unit-of-measure errors that can bring them to a standstill. The crucial role of units of measure (UoMs) in SAP is to give context to quantities. A key activity of an SAP system is maintaining clear communication with external business partners (e.g., sending a purchase order to a vendor for raw materials or sending an invoice to a customer). You can accomplish this communication in a number of ways, such as paper invoice, EDI purchase order, or XML delivery confirmation. Quantity is one of the most important aspects of that communication: You need to be sure that an order for five cases of a material is not interpreted as five pieces or five pallets.

Reporting

"Should I Report in CO-PA or BW?"

You have a choice of three approaches when reporting on CO-PA data: You can report using CO-PA, Business Information Warehouse (BW), or both. In this article, the author compares these reporting options.

"How to Use the SIS Data Warehouse for Management Reporting"

It is so common to see clients developing customized reports to get Sales Bookings information. This approach of developing customized solution is not only inefficient you lose the flexibility of exception reporting. Have you thought about Sales Information System (SIS)? It's a part of standard system with its own drill-down reporting tool. With an example, the author demonstrates how to activate custom-defined SIS structure for anagement Reporting.

"Tips and Tricks to improve CO-PA Reporting performance"

CO-PA reporting performance is one of the most crucial aspects of Profitability Analysis. In this article, author has described some of the most important tips and tricks to improve reporting performance.

"Split and Speed up your CO-PA reports"

Reporting performance is one of the most crucial aspects in CO-PA module. There are few options available in SAP to optimize reporting performance. In this paper, author dem-

onstrates one such trick - to "split" CO-PA reports. Seemingly simple, this trick of breaking one big report into many smaller reports can have dramatic performance improvement.

"10 Best Practices for Designing Summarization Levels"

Summarization Levels are one of the most powerful techniques for improving CO-PA performance. However, if not defined properly, these Summarization Levels can be the source of performance degradation. In this article, author has unearthed secrets behind how SAP system determines which Summarization Level to use. Also, author has   suggested 10 best practices for optimum summarization levels.

"Extract Pricing Conditions From the R/3 Sales and Distribution Module into BW"

The current BW version does not offer extract structures for SD conditions, therefore there is no straight-forward way to transfer SD pricing conditions to BW for further analysis and reporting. In this article, the author reveals a work-around solution and explains how to extract SD conditions to BW.

"What You Should Know About SD Higher-level Item Category's Influence on Financial Reports"

You might think that the item category of a sales document is purely a Sales and Distribution (SD) function. It's true that it primarily controls how the sales item is processed within SD. However, some of the settings have a significant influence on the FI module. In this article, author demonstrates some of the features of SD Item Category and Sales BOM, which can have significant impact on Financials.

"Speed Up Your Report Performance by Knowing Where Your FI Data Is Hiding"

Often at go-live, reports are written that appear to work very well, and then a year or two later, they run very slowly. The reason might be a misunderstanding about the kinds of tables that FI debit and credit data is hiding in. This article explains why it's important to your report's performance for you to know if a table is transparent, clustered, or pooled.

Productivity Solutions

"Plan and Monitor Your Sales Campaigns in the CO-PA Ledger"

Offering discounts is one of the most common business practices to increase the business volume. SD module has rich functionality to handle special prices and discounts. Planning and executing a successful promotion campaign is critical to your business. You want to find out how successful your discount campaign was - whether it was really successful or not. SD module provides something called as 'promotion' and 'sales deals' to group together such conditions. However, did you know that you could transfer these details of 'promotion' and 'sales deals' to CO-PA Ledger too? Did you know that CO-PA Ledger can be used to monitor the performance of these marketing initiatives throughout the cycle of such initiatives - right from budget planning, order Bookings to Invoicing?

"Fast Data Conversions for Functional Analysts with LSMW"

LSMW stands for Legacy System Migration Workbench. As the name suggests, LSMW is used during data conversion and is one of the most powerful tools provided by SAP. One of the common myths among SAP community is that data conversion is handled by technical team members - ABAPers. However, the most important highlights of LSMW is that it is so easy to use that everybody, including functional analysts, can use it! Although, many in SAP community use CATT tool for data upload to SAP, features of LSMW far out-weigh. Easy wizard like step-by-step tasks walk you through the whole process. In this article, author details the features of LSMW and with a business example demonstrates how easy it is to use.

"CO-PA Archiving - Why and How?"

Importance of data archiving cannot be emphasized enough. However, it is an irony that even in companies where archiving is started, many times CO-PA is excluded from the scope. On the other hand, CO-PA should be the first module to get archived. In this article, author explains why CO-PA database grows much faster than you initially thought and how to archive CO-PA data.

"For Enhanced System Performance, One SE16 Call is Better than Two"

SE16 is one of the most frequently used transaction codes, but it comes with a lot of overhead in terms of system memory. In this article, the author reveals one of the tricks to reduce the number of SE16 calls.

"Use CATT to Test Your End-to-End Business Processes"

Computer Aided Test Tool (CATT) is SAP's testing tool for testing various SAP transactions. Though using CATT is fairly simple, many companies do not fully exploit the features. In this article, the author demonstrates how CATT can be used to test end-to-end process like Purchase-to-Pay or Order-to-Cash.

"Use TVARV Variables More Effectively To Fasten Month-End Close"

There is much more to variants than just saving the screen field values. Using variables for variants makes the usage more effective and efficient. Instead of creating a new variant or changing the existing variant each time a field value changes, you can create a variable in table TVARV and assign a variable to field value. These are popularly called as TVARV variables and you can directly manage the variable values using table maintenance. In this article, the author has unearthed hidden secrets of TVARV variables and explained how to leverage these for more efficient use. Also, the author has documented the best practices on managing these TVARV variables to get maximum out of it.

"Can't Get There?: Find the Right Transaction to Display CO Documents"

Sometimes a transaction is not available in the SAP Easy Access Menu, or when you do use the transaction, a cryptic error message results. This type of problem can occur when you try to display CO documents. In this article, the author provides a quick tip to find the right transaction to display the CO documents.

"Enhance User Productivity with a Custom Search Help"

Take advantage of this underused option to add a custom search help without assistance from a programmer or the need for a developer key. Standard SAP provides multiple search helps for customer look-ups but none that allow you to search by, for example, the VAT registration number field. You can easily create such a search help. Custom search helps can increase end-user productivity by simplifying common searches. Often access to transaction codes SE16 and SE17 is restricted because of Sarbanes-Oxley. Adding a search help is a good way to provide ad hoc look-up.

"Tips for Tracking Clearing Transactions"

The author compares the two types of clearing functionality in SAP, clearing with or without posting. In addition, he lists steps that allow you to trace clearing transactions going backward as well as forward.

"Discover Hidden Parameter IDs to Simplify Your FI Settings"

Many users set default values for their FI transactions using transaction FB00 - Accounting Editing Options. However, not all settings for FI/CO transactions are available here. In this article, I'll show you other ways to find and set default values for parameters. I'll also introduce you to some "hidden" parameters.

"Who Changed My Config?"

The author explains how to use the table logging functionality to answer the question, "Who changed my config?" Table logging is a functionality that enables recording of all insertions, deletions, and changes in configuration tables. He says it has proven invaluable in preventing configuration errors from impacting the production systems at his projects.

Project Management

"How to Manage User-exits for multiple projects"

It is common for companies to have many user exits, for managing multiple initiatives in the organization. Managing user-exits is a challenge, as these user-exits are dependant on various factors and many times may hinder the go-live plans. In this article, the author exhibits a technique on how to manage user-exits.

"Account for Time Zone Differences So That They Do Not Affect Your Global Close"

When a global company has a period-end close, a great deal of coordination needs to occur among the independent locations to make sure that tight deadlines are met. The author provides eight tips to prevent misunderstandings that can occur because of timing differences when you have offices in more than one time zone.

Achieve Balanced Reporting by Automating Document Splitting in the New G/L

by Mitresh Kundalia, Director – SAP Practice, Quality Systems & Software

See the rules, steps, transactions, and method for document splitting. Then follow seven steps to configure it in your system.

> **>> Key Concept**
>
> The **splitting method** is the main key to activate document splitting in the new G/L, including splitting rules, business transactions, business transaction variants, and more. It is a component of active splitting. The process is a new capability in the new G/L and was not possible in the classic G/L.

The new General Ledger (new G/L) in the SAP ERP system offers a feature called document splitting. With document splitting, the system splits accounting line items according to specific characteristics. This enables you to create financial statements for entities such as segments and meet the legal requirements such as International Accounting Standards (IAS) regulations for segment reporting. You can find out more information about these requirements by visiting www.iasb.org.

I'll discuss the concepts of document splitting with a simple example of a financial transaction of a vendor invoice. Say you have a vendor invoice that has two expense items totaling $10,000 with $1,000 input tax, so the total is $11,000 (**Table 1**).

If you are responsible for profit center **PC-1** and want to analyze all of the financial transactions for **PC-1**, you cannot do so completely because the **Vendor** account (**A/C**) and **Input Tax** are not assigned to any profit centers. You cannot assign **PC-1** or **PC-2** because these items are for combined balances, not for individual profit center items.

Looking more closely at the financial document, it is clear that the total expenses of $10,000 were in the ratio of 80%-20% between **PC-1** and **PC-2**. Therefore, according to the same

Account Description	Amount	Profit Center
Vendor A/C	-11,000	
Purchases 1	8,000	PC-1
Purchases 2	2,000	PC-2
Input Tax	1,000	

Table 1   Sample vendor invoice accounting entries

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calculations, the **Input Tax** and **Vendor A/C** should also be in the same ratio of 80%-20% between **PC-1** and **PC-2** (**Figure 1**).

Using these calculations, the vendor invoice transaction from the earlier scenario looks similar to what is shown in **Table 2**. If you were to actually post the vendor invoice as shown here, with multiple **Input Tax** and **Vendor A/C** items, you could get the balanced Financials reporting for profit centers **PC-1** and **PC-2**.

While this solves your reporting issue, you still need to be able to post this invoice with split accounting items, as shown in Table 2. Expecting your users to punch in the numbers in calculators, calculate the ratios, and manually split these items is obviously out of the question, so you need to consider how to do this automatically. With the document splitting capability in the new G/L, the user can enter the vendor invoice transaction as shown in Table 1 and the system automatically splits the vendor transaction as shown in Table 2. Before I explain the steps to configure document splitting, I'll describe the three basic steps and the document splitting method.

Document Splitting in the New G/L — Basic Steps

Document splitting is basically divided into three steps: passive splitting, active splitting, and zero-balancing. The system first tries passive splitting, in which it copies rules from a previous transaction. Then it tries active splitting, which includes the rules and method I will cover. Then, if zero-balancing is active, it tries to do zero-balancing. I'll explain each of these in a little more detail.

Passive splitting. You use passive splitting especially with clearing transactions (e.g., payment transaction **F-53**). The system creates a reference to the existing account assignments and uses these account assignments as the basis for the

line items to be split. You cannot change the settings for passive splitting because they are pre-set in the system. For the payment transaction, the system takes the rules from the earlier transaction of the vendor invoice and applies those rules from the vendor invoice.

Active splitting: rule-based document splitting. In active splitting, the system splits the documents on the basis of pre-defined splitting rules. The SAP ERP system is delivered with many such pre-defined rules. If standard splitting rules are not sufficient or you want to enhance the functionality, you can create your own splitting rules. This is outside the scope of this article.

Splitting using zero-balancing. Zero-balancing the document ensures not only that the document is balanced but also that the document is balanced for the characteristics. You can define the characteristics that you want to use for zero-balancing, such as a segment or a profit center. I'll cover zero-balancing in more detail when it comes up in my process.

The active splitting method mentions splitting rules, which are fundamental to document splitting and require a brief

explanation. Splitting rules define which accounting items the system splits and which calculations it uses to split (i.e., based on which accounting items). In my vendor invoice example, you need to split the vendor and input tax items and you use the calculations of 80%-20% based on the expense items. So, the splitting rules for the vendor invoice transaction that you should use are:

- Vendor and tax items are accounting items that you need to split

- Expense items to use as the base items

As another example, if you had a customer invoice transaction you would use the splitting rules:

- Customer accounting items that you need to split

- Revenue items to use as the base items

Document splitting rules are a major part of the document splitting method, which I'll explain next.

Splitting Method

The splitting method is the main key to activate splitting in the new G/L. In
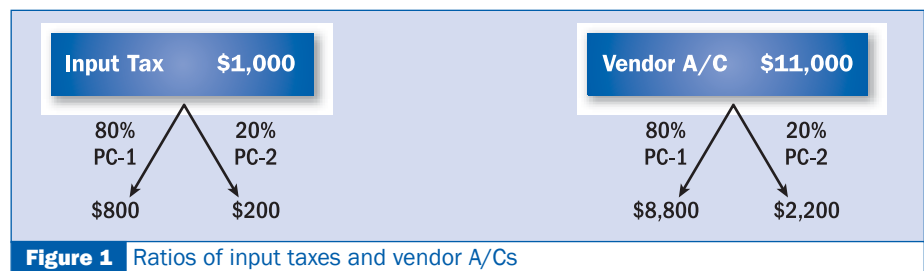
Figure 1   Ratios of input taxes and vendor A/Cs

Account Description	Amount	Profit Center
Vendor A/C	-8,800	PC-1
Purchases 1	8,000	PC-1
Input Tax	800	PC-1
Vendor A/C	-2,200	PC-2
Purchases 2	2,000	PC-2
Input Tax	200	PC-2

Table 2   Sample vendor invoice accounting entries with assigned profit centers

simple terms, it's the list of all splitting rules for all of the business transactions. Technically, it is a collection of the split-ting rules, business transactions, business transaction variants, and more as shown in **Figure 2**. In Figure 2, the values and description in parentheses show the sample values for the vendor invoice example. Also, the new G/L has the pre-defined splitting method **0000000012**, with pre-delivered splitting rules for various business transactions.

Continuing with the vendor invoice example, let's review the Financials transactions in the new G/L. Say you are posting a vendor invoice (transaction **FB60**) to two expense accounts as shown in **Figure 3**. Figure 3 shows a vendor invoice (docu-ment type **KR**) for 11,000 EUR with tax of 1,000 EUR to be posted against two expense items. In **Figure 4**, you can see how this enters the new G/L. The system assigns expense items to profit centers and segments based on the cost centers to which the expenses are charged, whereas the columns **Profit Ctr** and **Segment** are empty initially.

Figure 4 shows the document in the Entry view. The system applies the active docu-ment splitting rules and then splits the document as shown in **Figure 5** (on the next page), which is the G/L view. End users (or in some cases the automated postings your system carries through) do not need to change their ways because they only fill out the Entry view as shown in Figure 4. In the simulation (Figure 5), you can see the result of the split, where the vendor A/C and tax are split in pro-portion to the ratio of the two expense postings.

In splitting the document, the system used the splitting method information of busi-ness transaction of vendor invoice **0300** and document type **KR** to split the vendor and tax items (category **03000** and **05100**) according to the 80%-20% calculations of expense items (category **20000**) as shown in Figure 2.

It is important to recall that document splitting in the new G/L gets the same results as shown in Table 2. Instead of manually adjusting the financial transac-tions, traditionally done at the month-end, you can achieve the same results in real time using the rule-based splitting in the new G/L. Now that I've described the basic elements of document splitting, I'll show you some customization to config-ure it in your system.

Figure 2 Schematic representation of the document splitting method

Figure 3 Vendor invoice (transaction **FB60**)

Figure 4 Entry view

Document Splitting Customization

You can find the configuration for document splitting by following menu path **IMG> Financial Accounting New>General Ledger Accounting (New)>Business Transactions>Document Splitting**. From this menu path, you can follow these steps to customize document splitting in your system.

Step 1. Classify the G/L accounts for document splitting. One of the first steps for configuring document splitting is to assign the item categories to the G/L accounts for your chart of accounts. Item categories are groupings of G/L accounts. Instead of defining the splitting rules for all expense accounts individually, item category **20000** groups all expense accounts together. You could have one rule for all of the expenses. The system comes with pre-defined item categories.

Click on **Classify G/L accounts for Document Splitting** and assign the item categories for the G/L accounts. Instead of assigning the item categories by individual accounts, you should use the range of accounts as shown in **Figure 6**. For example, look at row 8 in Figure 6. Instead of setting the rules for each individual account between **400000** and **419999**, you create a range of those accounts resulting in the grouping category **20000**. Then you don't have to create table entries for 20,000 rows. Recall that splitting rules have item categories for the items to be split and base category items. The SAP system is already pre-delivered with the standard item categories as shown in **Table 3**.

Step 2. Classify document types for document splitting. So that the system considers every relevant financial transaction for document splitting, you categorize the document types to specific business transaction variants. Business transaction variants are a specific version of business

Figure 5 G/L view

Figure 6 Assign categories to the G/L accounts

Account Category	Description
01000	Balance sheet account
01001	Zero balance posting (free balancing units)
01100	Company code clearing
01300	Cash discount clearing
02000	Customer
02100	Customer: special G/L transaction
03000	Vendor
03100	Vendor: special G/L transaction
04000	Cash account
05100	Taxes on sales/purchases
05200	Withholding tax
06000	Material
07000	Asset
20000	Expense
30000	Revenue
40100	Cash discount (expense/revenue/loss)
40200	Exchange rate difference
80000	Customer-specific item category

Table 3 Standard item categories for G/L accounts

transactions, provided by SAP. A business transaction is a general breakdown of the actual business process. Examples of business transactions are vendor invoice, customer invoice, and cash payment. There are various business transaction variants (e.g., vendor invoice or payments) that are already pre-defined in the new G/L. Various document types are linked to the business transactions and business transaction variants.

Click on **Classify Document Types for Document Splitting** to review the configuration and make appropriate changes for the custom document types (**Figure 7**). In my example, I used document type **KR** for the vendor invoice.

Step 3. Define zero-balance clearing account. To create balanced Financials for a specific characteristic, you need to use document splitting with the zero-balance option (**Table 4**). To balance the document on the left for the profit center, you need to post it with a G/L account for zero-balancing the profit center as shown on the right. You need to post two additional accounting line items. Then for these items, you use account number **9999**, as illustrated in Table 4.

After document splitting, the system validates whether the document is zero-balanced for the selected characteristic. If it is not balanced, the system creates a balancing entry using a zero-balance clearing account.

Say you have posted a re-post transaction as shown in **Figures 8** and **9** (on the next page), which reflect the entry view as seen in the data entry and the G/L view as seen with document splitting, respectively. Using document splitting with zero-balancing for the characteristic **Segment**, the system posts the splitting document. For the document to be balanced for the segment, it needs to post an additional clearing account, as shown in Table 4.

In this step, you define a G/L account that you should use for creating the zero-

Figure 7 Classify FI document types

Account Description	Amount	Profit Center	Account Description	Amount	Profit Center
A/C 1001	123.45	PC-1	A/C 1001	123.45	PC-1
A/C 2002	-123.45	PC-2	A/C 9999 Zero-balancing account	-123.45	PC-1
			A/C 9999 Zero-balancing account	123.45	PC-2
			A/C 2002	-123.45	PC-2

Table 4 Zero-balancing account balances the document in the profit center

Figure 8 Entry view for zero-balancing

balancing splitting for the characteristics. You need a zero-balance clearing account (**Figure 10**). You may need to create this G/L account if it does not already exist.

Step 4. Define document splitting characteristics for G/L accounting. In this configuration step, you define the characteristics for which the document splitting rules apply. Common examples include **Business Area**, **Profit Center**, **Segment** (**Figure 11**). For these characteristics, additionally, you specify whether you want to have zero-balancing and whether this characteristic is mandatory. You may want to have the characteristic mandatory to make sure that particular characteristic field value is entered and not left blank.

Step 5. Define document splitting characteristics for CO and post-capitalization of cash discounts to assets (optional). You can define the document splitting characteristics for CO and define post-capitalization of cash discounts to assets. For example, you can define the document splitting characteristics for the Controlling (CO) module that use documents transferred from the G/L. Also, you can define whether the cash discount that could be on the payment of the asset invoice should be capitalized along with the asset itself.

Step 6. Define constants for non-assigned processes. Here you define default account assignments (for example, default segment) as shown in **Figure 12**. As the name suggests, when the system cannot determine the characteristic it uses default account assignments.

Step 7. Activate document splitting. Finally, activate document splitting in the new G/L (**Figure 13**). Check the check box next to **Document Splitting** and enter in the method. As I mentioned before, standard SAP includes pre-defined splitting method **0000000012**, with pre-delivered splitting rules for various business transactions. Note that you activate document splitting at the client

Figure 9 G/L view for zero-balancing

Figure 10 Zero-balancing G/L account required for clearing

Figure 11 Document splitting characteristics for G/L

Figure 12 Constant values for non-assigned processes

level and you can always deactivate document splitting for specific company codes.

The **Inheritance** indicator in Figure 13 derives the characteristics in the document from the other line items. For example, when you create a customer invoice from a revenue item, the system inherits the characteristics in the customer and tax lines automatically. Without inheritance, you would need to define the rules, for example, to achieve zero-balancing. After you activate the document splitting, you can test your document splitting transactions.

Vendor Payment (Follow-Up Process)

As a follow-up process, you can post the payment to the vendor and clear the vendor items. The system first splits the payment document according to the passive document splitting rules for clearing. The payment document uses document splitting rules that you use in the original expense postings. Accordingly, the system creates the payable lines (e.g., **AP-domestic** account **160000**) through passive document splitting rules.

The system splits the vendor payment document as shown in **Figures 14** and **15**. Again note that the system applied splitting rules appropriately for **Petty cash** (account **100000**) and **Input tax** (account **154000**). ∎

Figure 13 Activate document splitting

Figure 14 Entry view for vendor payment

Figure 15 G/L view for vendor payment

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FI/CO EXPERT

Plan and Monitor Your Sales Campaigns in the CO-PA Ledger

by Mitresh Kundalia, SAP Practice Manager, Quality Systems & Software Inc.

Planning, tracking, and evaluating a discount program or any promotional activity can be accomplished using the SD module in concert with the CO-PA ledger in much the same way that the two work together to book orders and billings. While the SD module together with the CO-PA ledger are often used to analyze incoming orders and invoicing, many are not aware that you can combine them to manage and monitor a promotional campaign.

SAP's SD module provides the functionality to record and analyze the prices and discounts associated with promotions. The SD module generates separate condition types to identify discounts and promotional prices. These condition types can be mapped to separate value fields in the CO-PA ledger. By closely integrating the SD data with the CO-PA ledger, you can plan and follow a campaign and evaluate its performance.

The key to this functionality relies on two types of pricing agreements — promotions and sales deals. You may be aware of these pricing agreements if you are familiar with the SD module, but you may not know that they can also be transferred to the CO-PA ledger. Using a technique similar to transferring sales bookings and invoicing information, the planned values for promotions and sales deals can be established in SD master data and passed to the CO-PA ledger. You can configure the system to transfer promotion and sales deals values as characteristics to the CO-PA ledger. This data can be monitored along with booking and invoicing data to get a complete picture of a marketing campaign from sales planning through invoicing, complete with reporting capabilities.

This article examines how SD uses the special pricing agreements to accommodate discount programs and promotions. I will show you how these agreements can be transferred into the CO-PA ledger, and point out some of the obstacles and confusion points that may arise in the process, including the problems associated with transferring lesser-known G record types from SD to CO-PA. I will also discuss how the data can be analyzed in the CO-PA ledger at various stages of the campaign, and show you how to configure your system to support this functionality.

Inside This Issue

Promotions and Sales Deals

Promotions and sales deals are pricing agreements[1] that form a hierarchical relationship. Promotions can consist of various sales deals, and sales deals can act as finer categorizations for promotions. For example, promotions can represent discounts related to a set of product lines such as those found in high-level marketing plans, while sales deals can represent individual customer discounts as well as specific products or product lines with special prices.

I have created an example (**Christmas Promotion 1000** in **Figure 1**) to illustrate the hierarchical relationship between promotion and sales deal agreements. In this example, **Sales Deal 1001** is for customers and **Sales Deal 1002** is for product lines. Note that **Sales Deal 1001**

represents both customer discounts (condition type **K007**) along with customer/product discounts (condition type **K005**), while **Sales Deal 1002** is for product lines (**K004**). Each condition type maintains condition records – e.g., **Discounts** (**K007**) for Wal-Mart is 5.00 percent, whereas **Discounts** (**K007**) for Kmart is 3.00 percent. You use the stan-

dard condition maintenance screens (transaction code **VK11**) for updating these discount conditions.

Whenever a sales order is entered, SD automatically applies the appropriate discounts (if available) in the pricing procedure. In addition, the system captures the relevant promotion number

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[1] Note that pricing agreements are not the same as pricing conditions.

Figure 1   Typical promotion and sales deals

From Our On-Call FI/CO Expert

I am delighted to have been asked to participate in the rollout of a newsletter predicated on the idea that everyone can be a FI/CO expert if certain concepts and mechanics about the modules are clearly explained. The articles I'll write or acquire from colleagues for you will answer one, two, or all three of the questions that I've been asking myself every day of my eight years of customizing SAP FI and CO modules for companies large and small:

(1) What's available in FI/CO?

(2) How does it work?

(3) Why should anyone care?

My goal, and that of the other contributing experts, is to bolster every reader's on-the-job productivity, whether your role is manager, consultant, end user, or executive. My method is to clarify and expose confusing or poorly documented functionalities, terms, and relationships, so that you — the reader — can be in a position to make your own decisions about what to use and how to use it.

Kurt Goldsmith, Enowa Consulting

About Enowa Consulting: Founded in 2003 by four former "Top Tier" practitioners, the U.S. division of Enowa Consulting represents business managers who believe that the I.T. projects with the most predictable results are those with the fewest consultants. For questions or a competitive bid on Quality Assurance roles for projects $10 million and up, contact director Winni Hesel (winni.hesel@enowa-consulting.com). For questions or a competitive bid on a minimalist approach to staffing a rollout, a merger, or a redesign project, contact director Ali Sarraf (ali.sarraf@enowa-consulting.com).

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and sales deal number. It stores the information in the **Sales Document: Item Data (VBAP)** table, which allows you to write basic reports listing the discounts and special prices offered for specific promotions and sales deals. **KNUMA_PI** is the technical field name for promotions and **KNUMA_AG** is for sales deals.

After you create the two pricing agreements in the SD module, you can pass them to the CO-PA ledger as characteristics. Once they are transferred, you can generate drill-down reports to analyze the performance of an entire promotional campaign or to determine how well a discounted price on an individual product is driving sales.

Tapping the Analysis Functionality

In addition to entering special prices and discounts, users can enter the planned values expected to result from

the discounted terms in the SD module, and analyze this data relative to the actual results in CO-PA. This combined functionality allows you to plan, monitor, and analyze the performance of your promotional programs from beginning to end.

Consider the following example: A marketing plan is created that calls for a 5 percent discount for specific customers, which is expected to generate €1 million in sales for a total of €50,000 in customer discounts. These target figures are entered into the SD module using transaction **VK11** as **Planned values (Figure 2)**. By transferring these values into CO-PA, the program can be scrutinized to see how close the campaign came to hitting the €1M/€50K target.

As I indicated earlier, transferring planned values from SD to CO-PA is accomplished in much the same manner that sales bookings and invoices transactions are

transferred. When the **Incoming sales orders bookings** function is activated in CO-PA via the transaction code **KEKF**, condition values for sales orders entered in the source system are transferred to the CO-PA ledger as record type A (Record types in CO-PA identify the source transactions as shown in **Figure 3**). Similarly, planned values are transferred to CO-PA as commitments identified by the record type G (**Customer agreements**). Use transaction code **KES4** to activate the transfer of discounts from SD to CO-PA. The condition types specific to the promotional campaign are set in the **Activate Budget Assignment** screen.

> **Tip!** Although the data in record type G represents so-called planned values, these records are not stored in **Plan Data** table (**CE2**) in CO-PA. Instead, planned values are stored in **Actual Line Items** table (**CE1**) in CO-PA as commitments, which leads to some confusion.

Configuring your system to transfer promotion and sales deal data to the CO-PA ledger as characteristics makes reporting available throughout the life-

Figure 2 Budget planning for condition records

Figure 3 CO-PA record types to identify source transactions

cycle of the campaign, as shown in **Figure 4**. You can configure your system to transfer SD data to CO-PA at the time of sales planning (**KES4**), sales booking (**KEKF**), and invoicing.

In CO-PA, you can design reports to analyze the campaign and track how it is performing at various levels. For example, you can design a report to show how the overall campaign is performing in terms of sales, with the ability to allow users to drill down to see how individual customers are performing. **Figure 5** shows the total revenue for a campaign along with the revenue broken out by customer. In this example, Wal-Mart and JC Penney are performing better than expected, while Macy's and Sears are behind budget, suggesting a strategy change may be in order.

Passing Pricing Agreements from SD to CO-PA

Configuring your system to allow the SD module to pass pricing agreements to the CO-PA ledger is not overly complicated, although the practice is not well known.

You need to add two user-defined characteristics for promotion and sales deals to your operating concern so the values for the pricing agreements in SD transaction table **VBAP** (**VBAP-KNUMA_PI** and **VBAP-KNUMA_AG**) can be passed into

the CO-PA ledger. Although the fields in SD are from a standard SAP table (**VBAP**), you cannot add them as standard fields in the operating concern. Because the **KNUMA_PI** and **KNUMA_AG** fields are eight characters long, you get an error message ("Field name must have between 04 and 05 characters") if you try. I named my user-defined fields **WWPRO** and **WWSDL**, but you can use any name as long as it starts with WW and is four or five characters long.

> **Tip!** Test this configuration in your sandbox first. Once a characteristic is added to the CO-PA operating concern, it is very difficult to remove.

Use transaction code **KEA5** or menu path **COPA IMG>Structures> Operating Concern>Maintain Characteristics>Create/Change** to access the screen shown in **Figure 6**, which is from the IDES 4.5B system. Click the **User-definition** radio button and enter your user-defined characteristic name, in this case WWSDL, along with the description Sales deal. Next, select the button **With reference to existing values** and select the **Data element KNUMA_AG**. Save and activate the characteristic. Following the same steps, create your second characteristic (WWPRO) using Promotion in the description field and **KNUMA_PI** as the **Data element**.

Figure 4   With data from SD, CO-PA can provide details throughout the process, from sales planning through invoicing

Promotion	Sales Deal	Customer	Budget for Season	Orders received during season	Shipped and Invoiced	Status
1000	1001	Wal-Mart	5,000,000	6,000,000	5,500,000	Beating expectations
1000	1001	Target	2,000,000	2,000,000	1,500,000	
1000	1001	Kmart	2,000,000	2,000,000	1,500,000	
1000	1001	Macy's	1,000,000	500,000	500,000	Revise strategies?
1000	1001	Sears	1,000,000	750,000	750,000	Revise strategies?
1000	1001	JC Penney	500,000	750,000	500,000	Beating expectations
		Total	11,500,000	12,000,000	10,250,000	

Figure 5   Sample drill-down report with planned discounts, booking, and revenue details

Once the two characteristics are created, you need to add them to the operating concern structure using transaction code **KEA0** or menu path **COPA IMG> Structures>Operating Concern> Maintain Operating Concern**. Enter the name of your operating concern, in this case IDEA, choose the **Data Structures** radio button, and click on the change icon. Because the characteristics and key figures of the operating concern are the same in all clients, you see an informational message indicating that these changes will be reflected in all clients.

Transfer the two newly created characteristics from the field catalog to the data structure of the operating concern, as shown in **Figure 7**. Save and activate the changes, and generate the operating concern when prompted. At this stage, you have successfully added these two characteristics and the CO-PA structures have been modified to receive promotion and sales deal values.

Maintain TKEZU Entries

The new user-defined characteristics require that you maintain your rules in order to transfer the values to CO-PA. Table **TKEZU** maintains the mapping of transfer values from the source tables in SD to CO-PA. The topic is covered broadly in SAP note 33968; however, I have put a finer point on it in the following few paragraphs. To maintain table **TKEZU** (**Table 1**, on the next page), use the view maintenance transaction code **SM31** or transaction code **SM30** (**View V_TKEZU**).

In this example, I used **XXXX** as a dummy name for the operating concern and **WWPRO** and **WWSDL** represent the user-defined promotion and sales deal characteristics. **SD00**, **SDIN**, and **SDOR** are the business transactions related to the sales processes and must

be maintained. **SD00** is the business process identifying a billing document, and **SDIN** and **SDOR** are the business processes to create a billing document and a sales document, respectively. You need to create entries for these three business processes if you are running R/3 version 4.6B or older. Note, however, that for implementations of 4.6C and

newer, you only need to create an entry for business transaction **KEDR**.

PAPL is the business process to identify profit planning, and it is used for maintaining condition records for planning. You must have **PAPL** entries in table **TKEZU**. Condition maintenance records are not stored in the **Sales Document:**
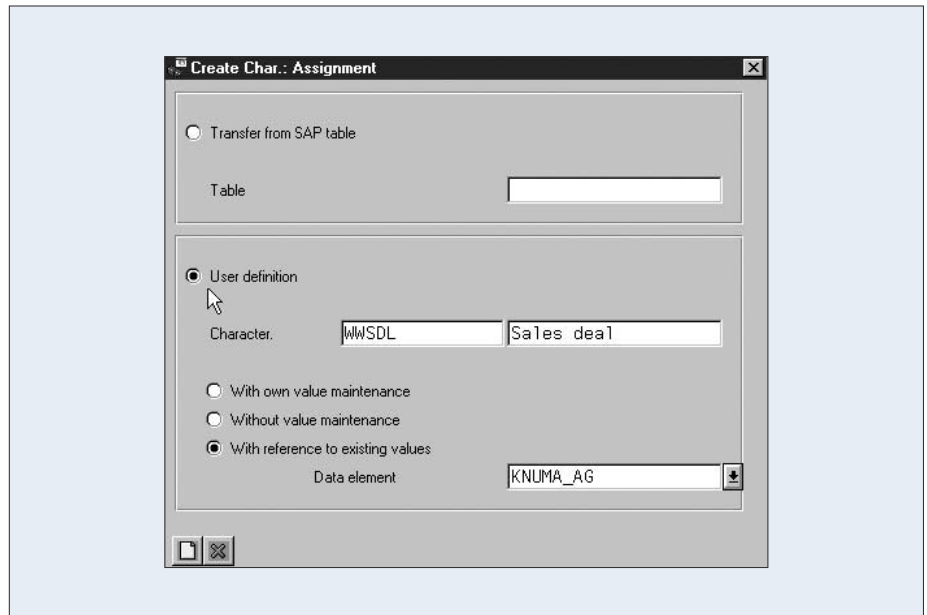

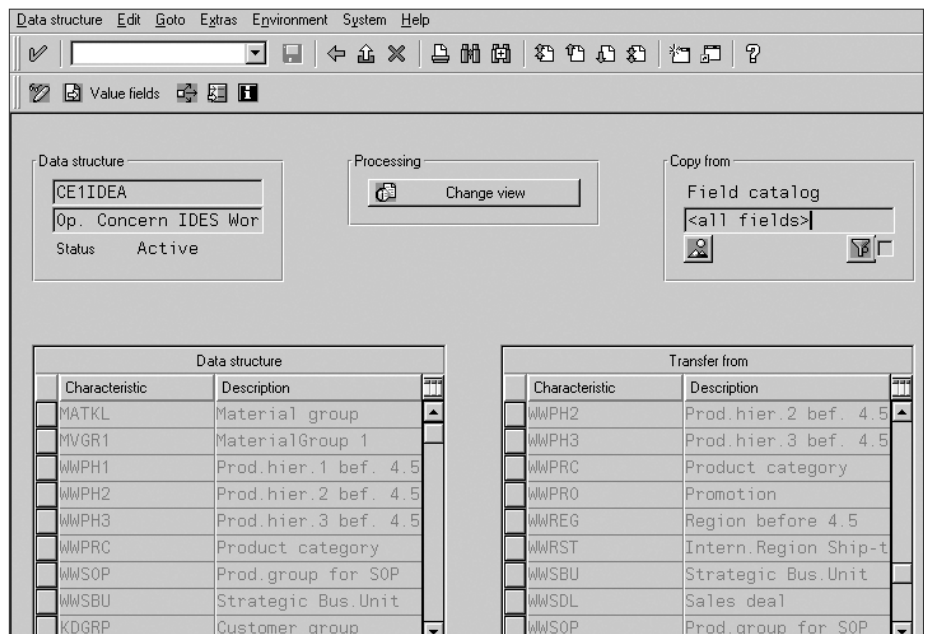**Figure 6**   Create user-defined characteristic for a sales deal

Figure 7   Transfer characteristics from the field catalog and add to the data structure

Item Data (**VBAP**) table like **SD00**, **SDIN**, and **SDOR**. Instead, these values are picked from the **KOMP** structure.

Transferring G Records and Setting Discounts

Next, the system must be configured to allow the transfer of record type G customer agreements for discounts and offers from SD to CO-PA. Use transaction code **KES4** or menu path **CO-PA IMG>Flows of Actual Values>Set Up Transfer of Customer Rebate Agreements** and check the appropriate **Budget as...** for specific condition types, as shown in **Figure 8**.

> **Tip!** Best practices suggest that you avoid transferring all conditions for budget assignment to CO-PA. Instead, transfer only those conditions relevant to your promotion planning. Otherwise, unnecessary data will be transferred, which will increase your CO-PA database and lead to associated problems.

> **Tip!** As noted earlier, you can maintain planned values for conditions in transaction code **VK11**, but the **Activate Budget** assignment checkboxes located in the **Budget as...** column in Figure 8 must be set. If the checkbox is not set, the planned values field is not visible when you are maintaining the condition records shown in Figure 2 on page 3.

Assign Valid Condition Types

After determining all of the discount rates for a sales deal or promotion, you can manage them more easily by collecting the condition types in a

Operating concern (ERKRS)	Field Name (MERKMAV)	Business Transaction (VRGNG)	Table Name (TABLENAME)	Field Name (FIELDNAME)
XXXX	WWPRO	PAPL	KOMP	KNUMA_PI
XXXX	WWPRO	SD00	VBAP	KNUMA_PI
XXXX	WWPRO	SDIN	VBAP	KNUMA_PI
XXXX	WWPRO	SDOR	VBAP	KNUMA_PI
XXXX	WWSDL	PAPL	KOMP	KNUMA_AG
XXXX	WWSDL	SD00	VBAP	KNUMA_AG
XXXX	WWSDL	SDIN	VBAP	KNUMA_AG
XXXX	WWSDL	SDOR	VBAP	KNUMA_AG

Table 1   Maintain **TKEZU** entries

Figure 8   Activate transfer of customer rebate agreements for budget assignment

condition type group. A condition type group limits the number of discount-related condition types that show up when creating a new sales deal master.

Use IMG menu path **Sales and Distribution>Basic Functions> Pricing>Pricing Agreements>Set up Sales Deals>Assign Condition types/Tables to Condition Type Groups** to assign condition type to condition type group **0020**, which is

available specifically for sales deals (**Figure 9**). When defining condition types, make sure to include those custom condition types that you may have created for your client for special customer discounts such as the **ZDIS** condition type in Figure 9.

Business Example

Once your configuration is complete, you can test it with the following basic

business example, which includes creating promotions and sales deals agreements, planning discount values, creating a sales order, and billing.

The first step calls for creating a promotion in the standard system via transaction code **VB31** (menu path **Logistics>Sales and Distribution> Master data>Agreements>Promotion> Create**), and entering the appropriate description and validity period for the promotion along with its organizational data. Via transaction code **VB21**, you next create a sales deal, enter its description and validity period, and link it to the appropriate promotion.

At the **Sales Deal** screen (**Figure 10**), click on **Conditions** to maintain conditions for discounts or special prices, choose the condition type assigned to sales deals, and enter the discount percentage offered to the customer. Using the **Planned basis** field in the **Planned values** block, enter the total amount of sales expected from the discount. Save the conditions, which are transferred to CO-PA as record type G along with the planned value amounts. In addition to the planned values, the promotion and sales deal numbers are transferred to CO-PA. You can use transaction code **KE24** (display actual line items) to view the record type G data.

Now you can create a sales order and test the system to determine if it correctly applies the discounts. When a sales order is created via transaction code **VA01**, the system checks whether newly offered special prices and discounts are in effect. If so, it gets the appropriate promotion and sales deal numbers and applies these discounts automatically to the order. These sales order details, along with promotion and sales deal numbers, are transferred to CO-PA ledger as record type A. Once

the order is billed, the details are passed to CO-PA ledger as record type F.

In this business example, I am using transaction code **KE24** just to review CO-PA line items. You can create a drill-down CO-PA report to do detailed analysis. For example, you could create a CO-PA report to monitor the commitments in record type G, then slice-and-dice on promotion and sales deals. You also could create a CO-PA report to compare commitments and sales bookings and analyze whether you are able to attract business based on planned discounts. ■

Figure 9   Assign valid condition types for sales deals

Figure 10   Sales deal details and assignment to promotion

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10 Best Practices for Designing Summarization Levels

by Mitresh Kundalia, SAP Practice Manager, Quality Systems & Software Inc.

Summarization level is one of the most popular techniques for improving report performance in CO-PA. It was introduced with the 3.0C release and improved in recent releases. Summarization levels, which are presummarized data for specific characteristics, can improve performance dramatically if they are properly defined. However, improperly defined, summarization levels can burden a system to the extent that performance is considerably degraded.

One of the most frequently asked questions about summarization levels is how the R/3 system determines which level to use. You may think the system is going to use summarization level "X," but it uses summarization level "Y" instead.

This article clarifies how the system determines the most suitable summarization level. It then will show you how to use that information to define the optimum summarization level and thus improve your report performance. This information, which comes from my personal experience, is not well documented elsewhere. If you need a refresher on summarization levels, see the sidebar "What Are Summarization Levels?" on page 13.

System Logic Determines the Summarization Level

When you execute a CO-PA report, the system displays an informational message at the bottom of the screen. The message indicates whether the

system found a suitable summarization level. You have probably observed messages such as **Read data from summarization level 310**. So how does the system know which summarization level to use? R/3 follows these five steps to find the most suitable summarization level.

Step 1. The system finds all the characteristics that are required for aggregation in the report: characteristics from general data selection, characteristics used in report row/column definitions, and drill-down characteristics. These form the basis for further selection and requirements.

Step 2. The system finds all summarization levels that have at least all the characteristics listed in step 1, although the summarization levels can have more characteristics. The system marks these summarization levels as suitable. If a characteristic of the summarization level is defined as a fixed value (not as "*"), then that characteristic has to be explicitly defined in the report the same way. Otherwise, the summarization level is deemed not suitable to meet the requirements. For example, if a summarization level is created for customer group 01 and general data selection is for customer group 02, this summarization level is marked as not suitable.

Step 3. For each suitable summarization level identified, the system finds how many characteristics it has to summarize to get aggregated data, the total number of summary table records, and the last

timestamp. The idea is to find which of these suitable summarization levels is optimal, as shown in **Table 1** on page 12.

Step 4. Possible summarization levels are sorted by the number of characters needed to summarize (ascending), the number of records in the summary table (ascending), and the timestamp (descending), as shown in **Table 2** on page 12.

Step 5. Once the summarization levels are sorted, the system chooses the first summarization level, which is optimal for the required characteristics. In simple terms, the system tries to find the summarization level with the least number of "extra" characteristics (i.e., not required for display) and the fewest summary records. Let's say your report requires customer group drill-down and you have two summarization levels, one with the customer group and another with a combination of the customer group and the product group. Although both can give data summarized by customer group, the first is the fastest.

If not defined properly, summarization levels may degrade system performance. With insight on how the system determines the optimal summarization level, you can design efficient summarization levels. The following are 10 best practices for designing summarization levels.

1. Include dependent characteristics in summarization levels. When you include a characteristic in a summarization level, you should include all the character-

istics that are dependent on it. Adding dependent characteristics does not increase the size of the level, but may extend its useability. If you use the system proposal **Extras>Proposal for>Reports**, include dependent characteristics in the definition of summarization level.

For example, if you have included the characteristic "customer" in the summarization level, you should also include all characteristics that are derived from the customer master record (e.g., customer group). If the summarization level contains characteristics from the Sales and Distribution (SD) table **KNVV** of the customer master, the level should also contain the fields that make up the sales area (fields **VKORG**, **VTWEG**, and **SPART**). These fields are part of the key for the customer master.

If the key table has 1,000 unique customer records, even after you add the customer group in the definition of the summarization level, the key table still has 1,000 records. Summary table records also do not increase. On the other hand, the summarization level is more useable — for example, if you have a report with the customer group only as a drill-down characteristic, it could use the summarization level.

2. Do not include constant characteristic values in summarization levels. If a characteristic is a constant — i.e., it has only one possible value — you should either exclude this characteristic or include it with an asterisk (*) to indicate "all possible values."

If the summarization level is defined for company code 0001, for example, then this company code must be defined in the report definition. Otherwise, the system thinks that this summarization level is not suitable. The rule is that if any constants (hard-coding) are in the definition, then these constant values must be defined in the report.

An exception to this practice is for the characteristic "controlling area." In this case, you should not exclude it from the definition of summarization level if it is used in cost center assessment. For cost center assessment cycles, the controlling area is implicitly defined.

3. Avoid fixed characteristic values in summarization levels. In normal circumstances, do not include fixed values for characteristics in summarization levels. There is no advantage in defining four separate summarization levels for four separate company codes such as 0001, 0002, 0003, and 0004 (with the same definitions except for company code).

However, an exception occurs when one of the company codes (0001) is very large in comparison to the others, and you do not need a summarization level to analyze all company codes together. In this case, it may make sense to create one summarization level each for company codes 0001, 0002, 0003, and 0004.

Avoiding fixed characteristic values has a technical advantage, too, especially on Oracle databases. It is often difficult to build summarization levels, and the system causes terminations with error message **ORA-1555 – snapshot too old**. To avoid terminations, the system breaks down a `SELECT` statement on the **CE4**

Summarization Level	Suitable?	Characters Required	Number of Records in Summary Table	Timestamp
1				
2	✓	8	60,000	Mar 1, 2003 8:04 p.m.
3				
4	✓	11	95,000	Mar 1, 2003 8:04 p.m.
5				
6				
7	✓	9	75,000	Mar 1, 2003 8:04 p.m.
8				
9				
10				
11	✓	7	50,000	Mar 1, 2003 8:04 p.m.
12	✓	13	85,000	Mar 1, 2003 8:04 p.m.
13				

Table 1   Suitable summarization levels and details

Summarization Level	Suitable?	Characters Required	Number of Records in Summary Table	Timestamp
11	✓	7	50,000	Mar 1, 2003 8:04 p.m.
12	✓	8	60,000	Mar 1, 2003 8:04 p.m.
7	✓	9	75,000	Mar 1, 2003 8:04 p.m.
4	✓	11	95,000	Mar 1, 2003 8:04 p.m.
12	✓	13	85,000	Mar 1, 2003 8:04 p.m.

Table 2   Sorting of suitable summarizations — the system chooses the first summarization level, 11

What Are Summarization Levels?

The primary purpose of a CO-PA report is to display information in aggregated (summarized) form. If the report has to read the CO-PA data from transaction tables and presummarize it in memory before displaying the data, it takes much longer. The CO-PA module is notorious for having a huge volume of transactions. The report performance can be improved if the presummarized data already exists, so that the system does not have to read transaction data. In short, summarization levels are presummarized data for selected characteristics. (For more information on summarization levels, see the article by Tony Rogan, "Improve Your CO-PA Response Speeds by Summarizing Your Users' Data," published in the April 2002 issue of *FI/CO Expert*.)

Technical Structure

Transaction data in CO-PA is stored primarily in **CE1xxxx**, **CE3xxxx**, and **CE4xxxx** tables (where xxxx is the name of the operating concern).

- **CE4** Segment table (profitability segments)
- **CE3** Segment level (period totals for the profitability segments)
- **CE1** Line items — actuals

Table 1 shows the **CE1**, **CE3**, and **CE4** tables.

If no suitable presummarized data is available, the system reads data from the **CE3** and **CE4** tables. It is easier to

Note! Although CO-PA reports are the primary candidates for using summarization levels, R/3 uses summarization levels in other functions also: cost center assessments to CO-PA, planning functionalities, and LIS-to-CO-PA interfaces.

Segment No.				Customer	Product	Additional Characters		
0477				C081	PROD1			
0478				C081	PROD2			
0479				C081	PROD3			

CE4 — Segment table

Segment No.	Period					Revenue	Additional Value Fields
0477	01/2003					100.00	
0477	02/2003					2,000.00	
0478	01/2003					200.00	
0479	02/2003					4,000.00	

CE3 — Segment level

Segment No.	Period	Document	Item	Customer	Product	Additional Characters	Revenue	Additional Value Fields
0477	01/2003	120007	0001	C081	PROD1		100.00	
0478	01/2003	120007	0002	C081	PROD2		200.00	
0477	02/2003	120008	0001	C081	PROD1		400.00	
0479	02/2003	120008	0002	C081	PROD3		800.00	
0477	02/2003	120009	0001	C081	PROD1		1,600.00	
0479	02/2003	120009	0002	C081	PROD3		3,200.00	

CE1 — Line items (actual)

Table 1   Transactions stored in **CE4**, **CE3**, and **CE1** tables. The blank columns do not represent anything. They are included for comparison purposes only.

What Are Summarization Levels? *(cont.)*

understand the **CE4** table as a key table, and the **CE3** table as a summary table.

Summarization Levels — Data Structure

Summarization levels are further summarizations of **CE3** and **CE4** tables. Similar to the **CE4** (segment table) and **CE3** (segment level) tables, a summarization level consists of two tables: a key table and a summary table. The key table corresponds to the segment table and contains the characteristics that are defined for the summarization level. The summary table contains totals of value and quantity fields. The summary table also contains the characteristics period (**PERIO**), fiscal year, and record type (**VRGAR**).

Table 2 shows how summarization levels further summarize the **CE3/CE4** data. Therefore, when the CO-PA report accesses summarization levels, it needs to access fewer records to display the aggregated information.

Summarization levels for costing-based CO-PA are stored in tables **K81nnnn**, where nnnn is a four-digit running number. Key tables have an odd nnnn and totals tables have the next even number.

Table 2 shows the data in **CE3** and **CE4** tables. Even if the report is required to show data for the customer only, it still needs to read data for products too. The key table and summary table show the summarization level created for the characteristic "customer." Now, with the help of the summarization level, the same CO-PA report has to read many fewer records to display customer information.

How to Build Summarization Levels

Unlike **CE3** and **CE4** tables, which are automatically populated by the source transactions, summarization levels need to be defined and updated manually. You can define summarization levels based on your requirements by transaction code **KEDV**, as shown in **Figure 1**. It is always easier to let the system propose the summarization level (if the option is available) and then fine-tune it. Once it is defined, you need to update the new summarization level with program **RKETRERU** (option **Build new levels**). Periodically, you also need to update summarization levels with program **RKETRERU** (option **Update**).

CE3
Segment Level

PSegment	Period	Revenue
PS1	1/2003	1000.00
PS1	2/2003	600.00
PS1	3/2003	350.00
PS2	1/2003	250.00
PS2	2/2003	350.00
PS2	3/2003	480.00
PS3	1/2003	2000.00
PS3	2/2003	500.00
PS3	3/2003	300.00
PS4	1/2003	1250.00
PS4	2/2003	350.00
PS4	3/2003	250.00
PS5	1/2003	1230.00
PS5	2/2003	300.00
PS5	3/2003	500.00
PS6	1/2003	600.00
PS6	2/2003	700.00
PS6	3/2003	750.00
PS7	1/2003	1200.00
PS7	2/2003	350.00
PS7	3/2003	300.00
PS8	1/2003	200.00
PS8	2/2003	250.00
PS8	3/2003	300.00

CE4
Segment Table

PSegment	Customer	Product
PS1	C1	P1
PS2	C1	P2
PS3	C1	P3
PS4	C1	P4
PS5	C2	P1
PS6	C2	P2
PS7	C2	P3
PS8	C2	P4

K810001
Key Table

PSegment	Customer
PS11	C1
PS12	C2

K810002
Summary Table

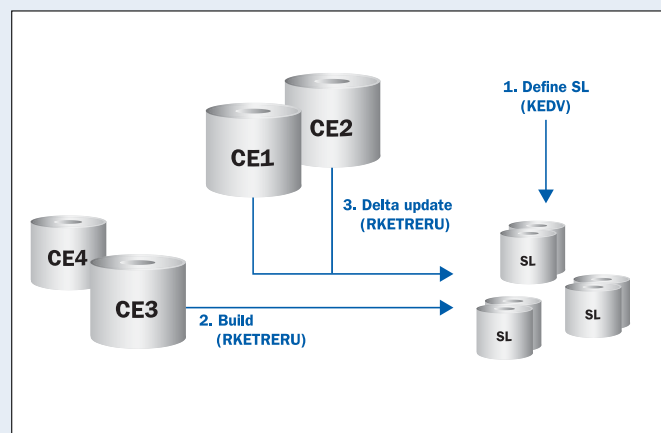| PSegment	Period	Revenue
PS11	1/2003	4500.00
PS11	2/2003	1800.00
PS11	3/2003	1380.00
PS12	1/2003	3230.00
PS12	2/2003	1600.00
PS12	3/2003	1850.00

Table 2   Summarization level for customer

Figure 1   Defining and updating summarization levels

table into multiple smaller `SELECT` statements. As a result, applications don't keep the cursor open for long, and terminations are avoided. However, the statements are broken only if no conditions are specified for the **CE4** table — i.e., fixed values are not used in the definition of summarization levels.

4. Maintain a moderate number of summarization levels (eight to 20 will suffice).
Extensive use of summarization levels improves report performance dramatically. However, in their enthusiasm, customers may create too many. Eight to 20 summarization levels are always sufficient. For a simpler setup (e.g., one company code, one controlling area, one plant, one sales organization), four to six summarization levels should suffice. For more complex scenarios (e.g., a conglomerate with multiple legal entities and a resulting complex organization), it is not uncommon to have more than 20. This is not a hard and fast rule. The basic idea is not to overdo it because summarization levels occupy data space, and they have overheads, too.

5. Avoid redundant summarization levels.
If one summarization level contains another, make sure the two are not too close to each other. Let's say you have summarization level 0002, which contains all the characteristics of summarization level 0001. Typically, it does not make sense that summarization level 0002 would have only one or two characteristics more than SL 0001, and with very few extra records. In this case, summarization level 0001 is not very useful. Also, you should avoid a summarization level with nearly as many records as the segment level.

6. Build all summarization levels to have the same timestamp.
It is advisable for all the summarization levels to have the same timestamp so that all have "current" status for consistency. If you

have many summarization levels, it is advisable to build all the smaller summarization levels together in the first run and then build the larger ones. Once all the summarization levels have been built, update them again in one final run so that they all have the same timestamp. When you update all the levels together, you achieve the same time frame for all levels so that any two reports always have consistent data, even when they read it from different levels.

7. Delete older summarization levels.
This sounds obvious, but you should delete older summarization levels that are not being used. In a dynamically changing environment, some of the summarization levels that were required in the previous year may now not be used at all. With the use of transaction code **KEDV**; check the **Date last read** status of the summarization level, as shown in **Figure 1**.

8. Update summarization levels daily.
It is usually sufficient to rebuild a summarization level once and to update it periodically. Do not update summarization levels more often than necessary. Usually once each night is sufficient.

9. Keep 30 minutes distance from mass data postings when updating summarization levels.
To maintain consistency, the system does not include data records created in the last 30 minutes (this is termed a "safety delta") when updating summarization levels. In that sense, the summarization level doesn't include the exact totals. However, when the report is executed, the system adds these so-called "missing" records to show the correct result.

Figure 1 Checking when data was last read

So that the report does not have to read many of these missing records, it is advisable to run the update job at least 30 minutes later than a typical mass update job (e.g., invoices creation). For example, let's say your company has a periodic job of creating invoices at 10 p.m. daily and updating the summarization levels at 10:15 p.m. The summarization level keeps a safety delta of 30 minutes and includes only those records created before 9:45 p.m. The invoice records created at 10 p.m. are excluded, and every time you run a CO-PA report, the report has to read these missing lines. This affects report performance. In this case, it is advisable to run the summarization update job after 10:30 p.m. daily.

10: Periodically fine-tune your summarization levels.
Periodically review the definitions of summarization levels and adapt the definitions to suit the recent changes in your organization. If you are changing the definition of summarization levels, make sure that the earlier reports are still able to use the new summarization level. When you change a summarization level expecting improvement, make sure nothing has fallen through the cracks. You can quickly execute earlier CO-PA reports to make sure R/3 displays the message that it is using a summarization level in the status screen. Also, it is a good idea to periodically check how the summarization tables are growing. ■

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Ask the BW Expert

Extract Pricing Conditions from the R/3 Module into BW

by Mitresh Kundalia, SAP Practice Manager, Quality Systems & Software

Dear BW Expert,

*I cannot find an InfoSource for pricing conditions for sales documents in the standard business content. Can you point me to an InfoSource that extracts pricing conditions for sales documents from the **KONV** table in R/3?*

Satish Hiranandani, Hewlett-Packard

Dear Reader,

Unfortunately, the current BW system lacks the extract structures you're looking for to transfer sales document pricing conditions from R/3. The Logistics Extraction Cockpit (LO Cockpit) does not have an extractor for the sales orders or billing document condition values contained in R/3 table **KONV**.

It's common for BW practitioners to attempt to make up for the missing extraction technology by writing customer enhancement **RSAP0001** (**EXIT_SAPLRSAP_001**) for transferring pricing conditions. This is a mistake that can cause performance issues because the system reads conditions data in a loop. In addition, **EXIT_SAPLRSAP_001** is called at the time of extraction and the conditions can change by the time the data is transferred, causing reporting inaccuracies and other problems.

However, there is an effective workaround based on subtotal fields in R/3 for transferring Sales and Distribution (SD) module pricing conditions into BW. Subtotal variables are used to calculate and temporarily store important condition values during pricing calculations in fields that are accessible for extraction.

What Are Subtotals?

Before I explain my solution, I'd like to tell you a little more about subtotals and what they do in R/3 so you can better understand the workaround. The R/3 system ships with more than 20 subtotal variables, and they are an important component of its pricing procedure. Used to determine an item's selling price, pricing procedures consist of various condition types such as categories of prices, discounts, surcharges, and taxes that are totaled together. **Figure 1** shows an abbreviated example of a typical pricing procedure (**RVAA01**) with columns for both condition types (**CType**) and subtotals (**SubTo**).

The subtotal code, which is represented as **1** in Figure 1, determines into which variable the subtotal is placed. **Figure 2** shows that the value of step **100** is assigned to subtotal variable **1**, which means the **Gross Value** amount is stored in **KOMP-KZWI1**. Variable codes **1** through **6** indicate that the values are carried over to the **KOMP** structure. These values are permanently stored in tables **VBAP** (**Sales Document**: **Item Data**) and **VBRP** (**Billing Document: Item Data**). In Figure 2, note that subtotals codes **7**, **8**, **9**, and **A** through **C** are reserved for special purposes and should not be used for customizing.

Subtotal variables fulfill a couple objectives in R/3. They are used to total more than one row of pricing

	Step	Cntr	CTyp	Description	Fro	To	Man.	Mdt	Stat	SubTo	AltCTy	ActKy
	8	0	EK01	Costs	0	0	☑	☐	☐		0	ERL
	11	0	PR00	Price	0	0	☐	☑	☐		0	ERL
	13	0	PB00	Price (Gross)	0	0	☑	☐	☐		0	ERL
	14	0	PR02	Price Increased	0	0	☐	☐	☐		0	ERL
	20	0	VA00	Variants	0	0	☐	☐	☐		0	ERL
	21	0	ZA00	General variants	0	0	☐	☐	☐		0	ERL
	100	0		Gross Value	0	0	☐	☐	☐	1	2	
	101	0	KA00	Sales Promotion	0	0	☐	☐	☐		0	ERS
	102	0	K032	Price Group/Material	0	0	☐	☐	☐		0	ERS
	103	0	K005	Customer/Material	0	0	☐	☐	☐		0	ERS
	104	0	K007	Customer Discount	0	0	☐	☐	☐		0	ERS
	105	0	K004	Material	0	0	☐	☐	☐		0	ERS
	106	0	K020	Price Group	0	0	☐	☐	☐		0	ERS
	107	0	K029	Mat.Pricing Group	0	0	☐	☐	☐		0	ERS

Procedure **RVAA01** Standard
Schema (Pricing Sales/Distribution)

Figure 1   Typical pricing procedure

procedures when the rows are not sequential (**Figure 3**). To calculate the sum of **ZK11** and **ZK12**, for example, you would assign subtotal variable **E** to each of the rows with these condition types. The total is then stored in field **XWORKE**. Subtotals also perform other roles such as providing access to specific condition-type values when row numbers are not available.

Subtotals Workaround

Subtotal fields can be used to transfer condition values into BW via sales orders and billing documents screens in SD. These are the **KZWI** fields numbered **KZWI1** through **KZWI6** in tables **VBAP** and **VBRP**. You can display these tables **VBAP** or **VBRP** via transaction code **SE11** and review the technical fields (**Figure 4**).

The standard InfoCube **0SD_C03** (**Sales Overview**) contains all the transaction data from sales orders, deliveries, and billing documents. It is updated via the following InfoSources:

• **2LIS_11_VAITM** (sales document)

• **2LIS_12_VCITM** (delivery item)

• **2LIS_13_VDITM** (billing document item)

InfoCube **0SD_C03** contains InfoObjects **0SUBTOT_1S**, **0SUBTOT_2S**, **0SUBTOT_3S**, **0SUBTOT_4S**, **0SUBTOT_5S**, and **0SUBTOT_6S** that correspond to six subtotal fields (**VBAP-KZWI** through **VBAP-KZWI6**) in SD.

Let's say your company uses the pricing procedure shown in **Figure 5** on the next page, and you need to extract and transfer the following values:

• ***Gross value for Item**

• ***Net Value of Item**

Figure 2   Subtotal (**SubTo**) variables and their corresponding fields

Figure 3   Subtotal variable **E** totals condition type **ZK11** and **ZK12** in **XWORKE**

Figure 4   Technical table structure showing the six subtotal (**KZWI**) fields

- *Net Value of Item 2

- *Freight

- *Total Discounts

Use transaction code **V/08** to tweak the pricing procedure by adding subtotal variables to the **Sub**. **To** column as shown in **Figure 6**.

The pricing procedure is altered such that the **Gross value for Item** entry is assigned to variable **1**, which is stored permanently in table **VBAP** (or **VBRP**) as **KZWI1**. The extract contain fields **VBAP-KZWI1** through **VBAP-KZWI6** so the value is extracted to **InfoObject 0SUBTOT_1S**. Similarly, the other values are stored as shown in **Table 1**.

Note! In this example, I have assigned subtotals to only a few rows of the pricing procedure. The standard system supports only six such subtotal fields. Refer to SAP note 155012 if you want to transfer more subtotal fields.

Limits to the Workaround

This workaround has a couple limitations. The condition values are correctly updated and stored in the table once the revised pricing procedure is in place. However, the workaround will not change values for historical transactions. Table entries for historical transactions are already stored, and the condition values will not be recalculated.

If you are using the Sales Information System (SIS), you also need to see if that information structure uses subtotal values. For example, information structure **S001** uses subtotal variable **1** and updates the gross value of incoming orders. If you are making changes to an existing assignment, make sure that it does not affect your SIS.

Step	Cond Type	Description	From	To	Stat.	Sub. To	Alt. CTy	Acct Key	Value
10	PR00	Base Price						ERL	110.00
20	PR02	Price Increased						ERL	5.00
100		* Gross value for Item							115.00
105	K005	Customer/Material Discounts						ERS	-7.00
110	K007	Customer Discounts						ERS	-6.00
200		* Total Discounts	101	199					-13.00
800		* Net Value of Item							102.00
810	HD00	Freight						ERF	3.00
815	KF00	Freight						ERF	4.00
900		* Net Value of Item 2							**109.00**
940	VPRS	Internal Cost			X	B			
950		* Profit Margin					11		

Figure 5   The column **Value** display the sample condition values and is not part of an actual pricing procedure

Step	Cond Type	Description	From	To	Stat.	Sub. To	Alt. CTy	Acct Key	Value
10	PR00	Base Price						ERL	110.00
20	PR02	Price Increased						ERL	5.00
100		* Gross value for Item				1			115.00
105	K005	Customer/Material Discounts						ERS	-7.00
110	K007	Customer Discounts						ERS	-6.00
200		* Total Discounts	101	199		5			-13.00
800		* Net Value of Item				2			102.00
810	HD00	Freight				4		ERF	3.00
815	KF00	Freight				4		ERF	4.00
900		* Net Value of Item 2				3			**109.00**
940	VPRS	Internal Cost			X	B			
950		* Profit Margin					11		

Figure 6   Pricing procedure with subtotal variables added to specific rows

Value	Field name	Value	InfoObject
Gross value for Item	**KZWI1**	115.00	**0SUBTOT_1S**
Net Value of Item	**KZWI2**	102.00	**0SUBTOT_2S**
Net Value of Item 2	**KZWI3**	109.00	**0SUBTOT_3S**
Freight	**KZWI4**	7.00	**0SUBTOT_4S**
Total Discounts	**KZWI5**	-13.00	**0SUBTOT_5S**

Table 1   Condition values stored in tables **VBAP** and **VBRP** can be extracted to BW

Rumor has it that SAP realizes the importance of extracting pricing conditions. Watch the release notes to see if and when the functionality becomes available. Until then, you'll find that my workaround solution does the trick! ■

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Copy Control Gives You Flexibility to Manage Your SD Document Flow

by Mitresh Kundalia, Director – SAP Practice, Quality Systems & Software Inc.

Your system has to manage a multitude of sales, delivery, and billing documents. R/3 offers a powerful piece of configuration that controls how the source documents are copied into target documents in a document flow.

Document flows are sequences of documents that make up a business transaction in ERP systems like R/3. They link documents together and allow relevant data to be copied from one document in the flow to another. When a delivery document is created, for example, the system copies the relevant information from a sales order. Document flows are crucial to the Sales and Distribution (SD) module.

> **>> Key Concept**
>
> In R/3, **copy control** allows you to move critical data from a source document to a target document and plays a key role in creating documents that make up a document flow.

With copy control, documents such as sales orders can be generated based on information in existing sales, delivery, and billing documents, which are the components of some of the most common document flows in SD. The copy control function also provides the mechanics for performing other tasks such as checking what prerequisites must be met before any copying can take place.

Copy control settings are a flexible piece of the configuration that determine how information is moved from source to target documents in a document flow. Copy control's role in this process is to manage all the copying required for subsequent documents.

In this article, I will provide you with an overview of the copy control functionality and the various flexible features it offers. My focus is primarily on the copy control settings for billing documents, but the concepts are similar for copying information into sales and delivery documents. I will also detail the role that source and target document types and pricing types play in the process as well as explain how ABAP routines control certain copying prerequisites.

Configure Copy Control

As noted earlier, copy control manages the creation of sales, delivery, and billing documents in SD. Sales documents often reference other sales documents including quotations, contracts, and sales orders, which can be created from invoice documents. Billing documents can be created with references to delivery documents, sales documents, or other billing documents. Delivery documents are created using sales orders as their source.

Examples of the various copy control options for target and source documents are summarized in **Table 1**. Customizing copy control functionality is done within SD or by entering the transaction codes listed in the table.

Note the naming convention. Transaction codes for copy controls begin with **VT**, the third letter represents the target document, and the fourth letter represents the source document. Sale documents are designated with an **A**, an **F** is used for billing documents, and an **L** is for delivery documents.

Target document	Source document	Transaction code
Sales document	Sales document	**VTAA**
Sales document	Billing document	**VTAF**
Delivery document	Sales document	**VTLA**
Billing document	Delivery document	**VTFL**
Billing document	Sales document	**VTFA**
Billing document	Billing document	**VTFF**

Table 1

Figure 1

Build a Basic Bill

One basic application of the copy control function is to create a billing document. Billing documents are usually generated after a sales order ships or an order for a service item is completed. Using copy control, the billing document data is sourced from a sales order along with other documents, eliminating the need to re-enter information. The system automatically copies pricing information from the sales order to the billing document as well as the date, which is based on the delivery document, and other relevant information from preceding documents in the document flow.

There are three scenarios for creating billing documents with copy control. Billing documents can be created with references to delivery documents. If no delivery is involved such as for services-rendered con-
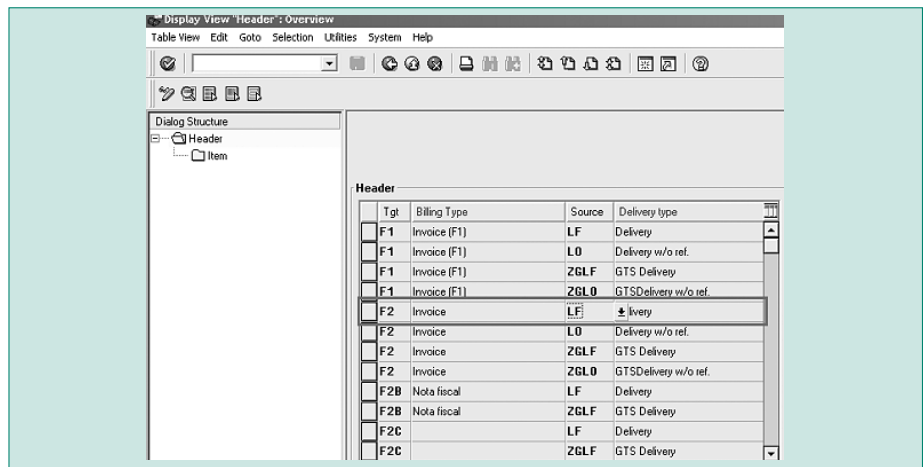
tracts, a billing document can be sourced from a sales document. Billing documents can also reference another billing document. The system can then generate an invoice cancellation document using the original billing document if it is cancelled. I will walk you through each of these.

Unique copy control settings must be configured for each of the three billing scenarios and there are separate customizing options for each. This is true for all documents created with the copy control functionality. Copying prerequisites must be set if you wish to establish requirements prior to transferring data. You also define how data transfer takes place between the source and target documents as well as how the quantity and values are updated. The settings are maintained at the header- and item-line level and, if required, at the schedule-line level for sales documents. The copy control for billing documents is configured within **SD Customizing>Billing>Billing**

The principles used to create billing documents are the same for creating sales and delivery documents with copy control.

document>Maintain copying control for billing documents.

Delivery Documents to Billing Document Targets

Enter transaction **VTFL** to manage the copy control functions for billing document targets with delivery document sources. Document types determine the copy controls. For this example, I have used a couple of the most common document types. An **Invoice** billing document is the **F2** target referencing an **LF Delivery** document source (**Figure 1**).
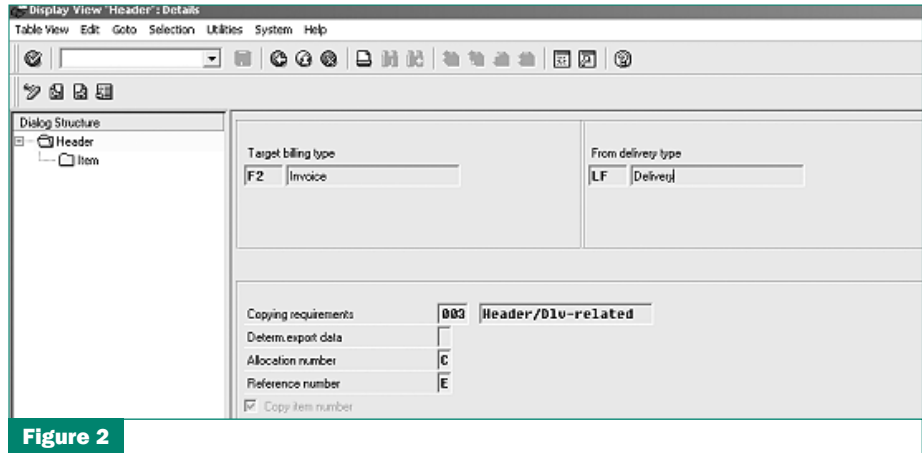
Figure 2

Double-clicking on the row moves you to the header-level copy control configuration screen (**Figure 2**). The header-level settings determine the copying requirements, export data, allocation number, and reference numbers.

The copying requirements are small ABAP routines that dictate what (if any) prerequisites exist for each document type. At the header level, for instance, these routines can be used to validate document headers before copying. In my example, information from the **LF Delivery** document type is copied to billing document type **F2**, and the copy requirements determine what data will be exported.

The **003 Header/Div-related** setting requires the system to check whether there are any blocks on delivery headers and, if so, prevents the information from being copied to the billing documents.

The **Determ. export** data field specifies how the system determines export data. For example, when dealing with customers from countries where the economic or political conditions are not stable, it often makes sense to redetermine the export data in the billing document rather than simply referring or copying the export data from the delivery document.

The **Allocation number** is a user-defined field on the billing document and accounting document that can be used to provide

additional information. You can choose, for example, to enter the delivery number on the billing document you are creating. Then, you don't have to revert back to the delivery document when viewing the billing document. Allocation number options are selected from a drop-down menu (**Figure 3**) accessed by clicking on the **Allocation number** field.

The reference number refers to a field in the accounting document header. You can define the **Reference number** field when creating a billing document by choosing from a list of options offered in the field's drop-down menu (**Figure 4**). It allows you to provide additional information such as a vendor invoice number or a customer's check number.

In addition to the allocation and reference numbers, you can copy item numbers from the delivery document source. Set a flag in the **copy item numbers** check box and item numbers are copied to the billing document.

Item-Level Settings

In addition to header-level settings, you must also configure settings at the item level and item-category level. Click on the **Item** folder in the **Dialog Structure** field (**Figure 5**). Setting the item-category level determines the copying requirements for an item as well as the data transfer logic for invoice tables.
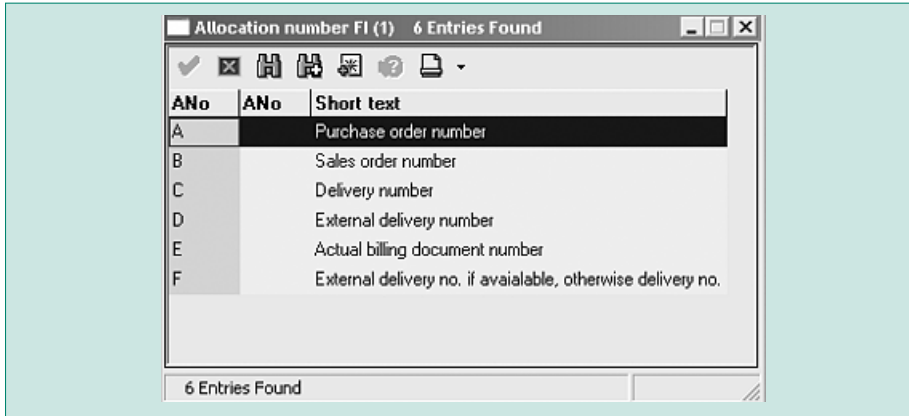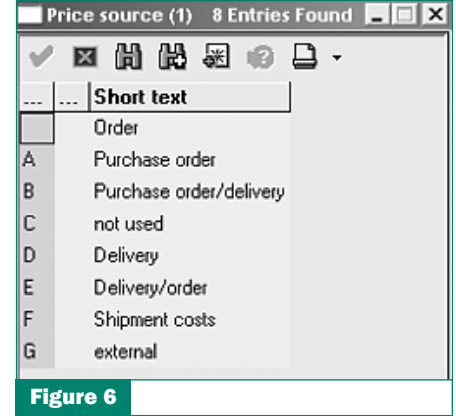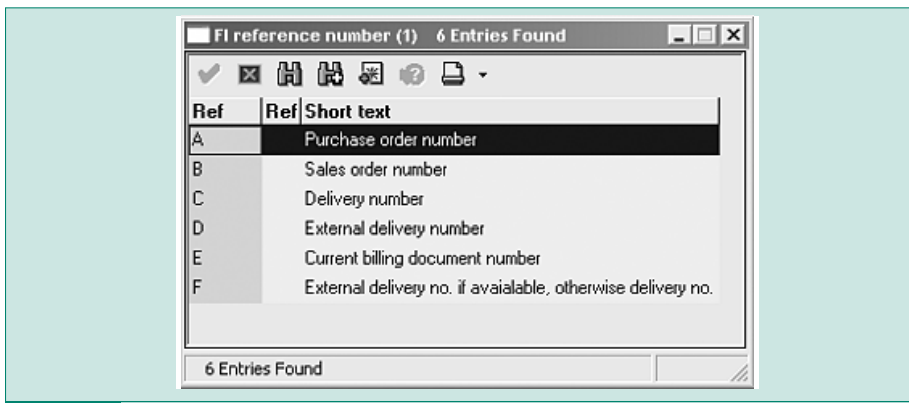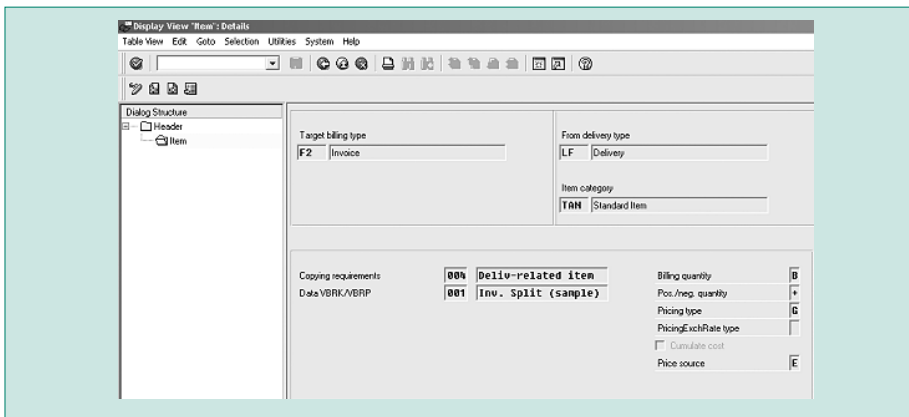
Figure 3

Figure 6

Figure 4

Figure 5

billing document. In the R/3 system, billing information is stored in tables **VBRK** (billing header) and **VBRP** (billing item data). Data transfer is managed with VOFM routines and accordingly, a routine number is defined in this field. In my example, I've shown data transfer routine **001**, which is a standard data transfer routine that determines how the system splits the invoices.

For billing documents sourced from delivery documents, the billing quantity can be defined as the delivered quantity less the already invoiced quantity when multiple deliveries and invoices exist. This is a mathematical formula performed automatically by the system when the **Billing quantity** field is set to **B**.

No new pricing calculations should be done at the time of billing. Prices should be carried over from the sales order, where conditions such as discounts have been defined. Pricing types define how condition types are determined and if they need to be recalculated or copied as is. Setting the **Pricing type** with a **G** value copies the pricing elements unchanged, but redetermines the taxes.

The **Price source** setting controls from where and in what sequence the conditions from the reference documents are copied to the billing document. The various price source options are chosen from a drop-down menu (**Figure 6**) that you access by clicking on the **Price**

These settings establish what quantity to bill and how pricing should be carried out. In this example, **TAN** populates the **Item category** field.

Like in the header-level controls, the **Copying requirements** field at the item level defines VOFM routines. The ABAP code might be used to check for billing

blocks at the header level, and similar VOFM routines would check the item-level billing blocks at the item level. In both cases, the copy requirement routines determine the prerequisites that must be met before copying takes place.

The **Data VBRK/VBRP** field manages the data transfer from a delivery to a

source field. Option **E** is used in this example, which determines the conditions from a delivery.

Source Sales Documents to Billing Document Targets

The document types in **Figure 7** determine the copy control for billing documents with reference to sales documents. I'll show you an example using an **F2** target (**Invoice**) with an **OR** (**Standard Order**) source. These are common billing and sales document types.

Settings at the header level for sourcing a sales document to a billing document (**Figure 8**) are similar to sourcing delivery documents, except for the copying requirements, which are order related in this case rather than delivery related.

The item-level copy control settings are configured as shown in **Figure 9**. In the first example, I used the item category **TAN**, which includes a delivery component. In this example, I used item category **TAD** for services, because with a service you invoice after an order and do not need to accommodate any delivery information.

For billing documents created from sales orders, the billing quantity is determined based on the order quantity. Set the **Billing quantity** field to **A** using the drop-down menu. This calculates the order quantity less the invoiced quantity. The definition for billing quantity **A** is predefined in SD and does not need to be maintained. The other fields in this screen including **Copying requirements**, **Data VBRK/VBRP**, and **Pricing type** are maintained as they were in the earlier example.

Billing Document from a Billing Document Source

If you need to cancel a billing document in SD, R/3 does not delete it from the system. Instead, it creates another billing document with equal but opposite
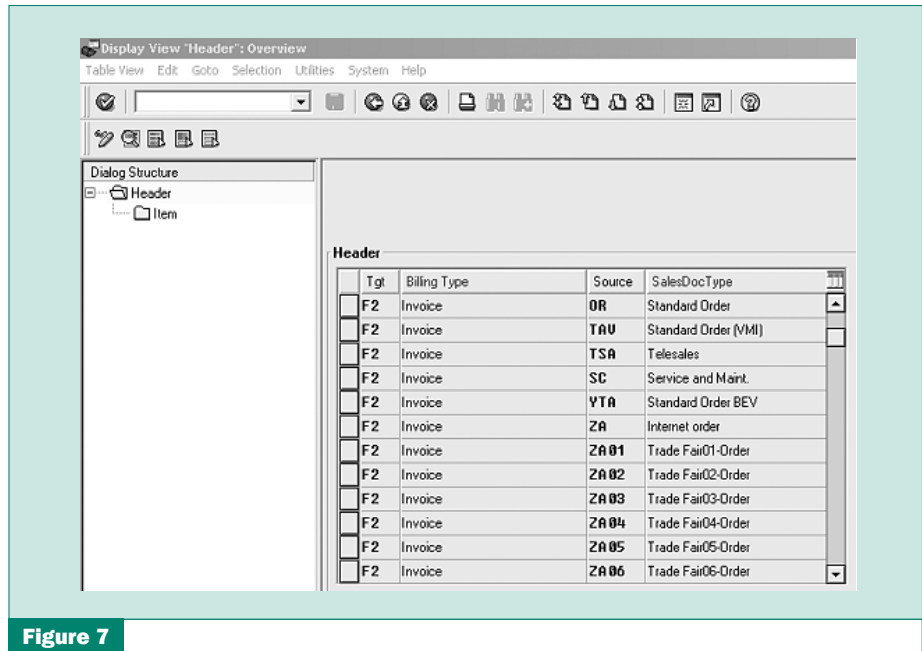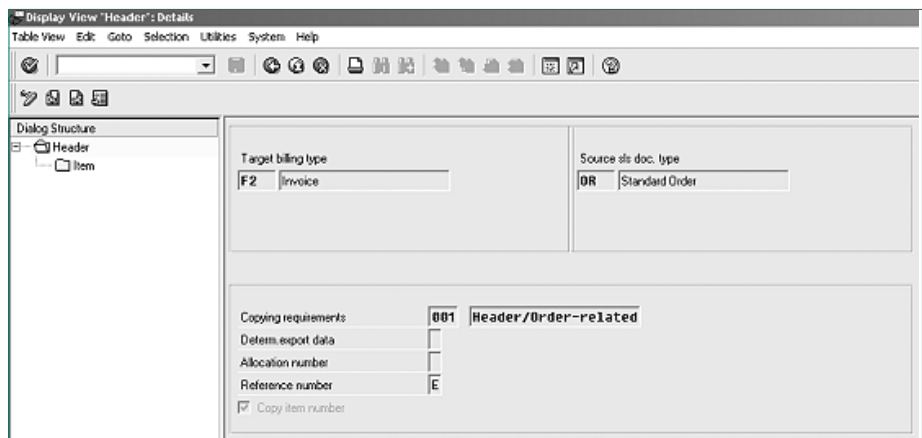

Figure 7

Figure 8 Header-level copy control settings for sourcing a sales order document to an invoice target
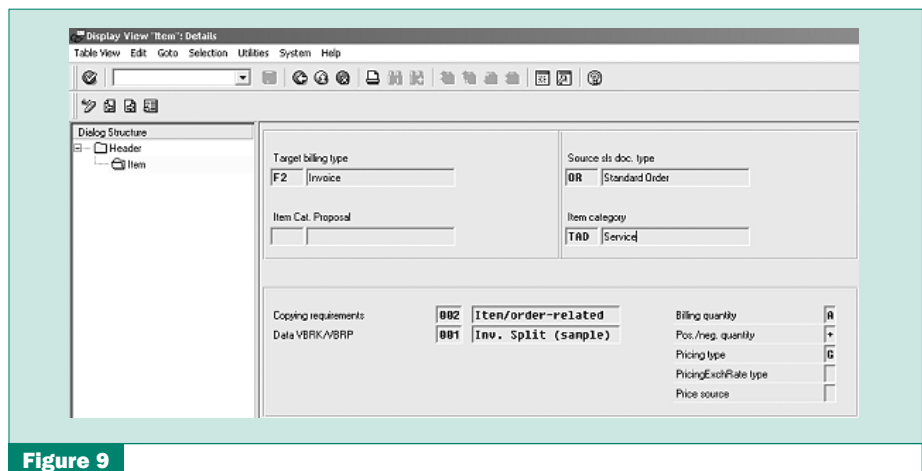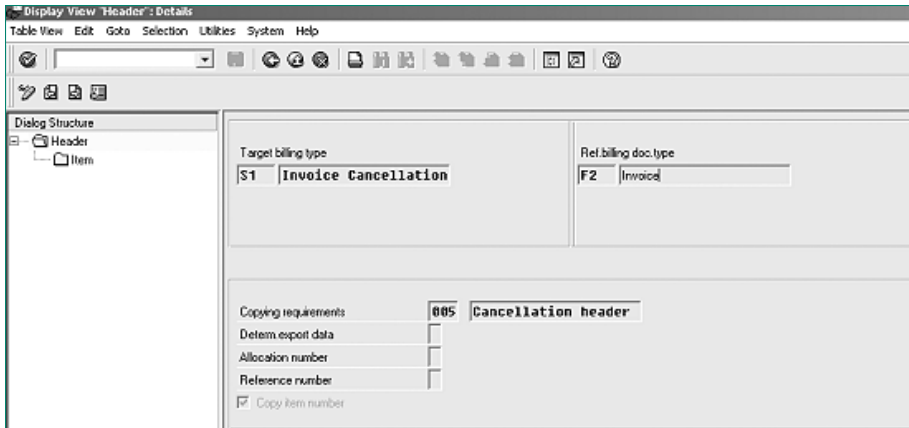

Figure 9

Figure 10 Header-level settings for a billing document target with a billing document source
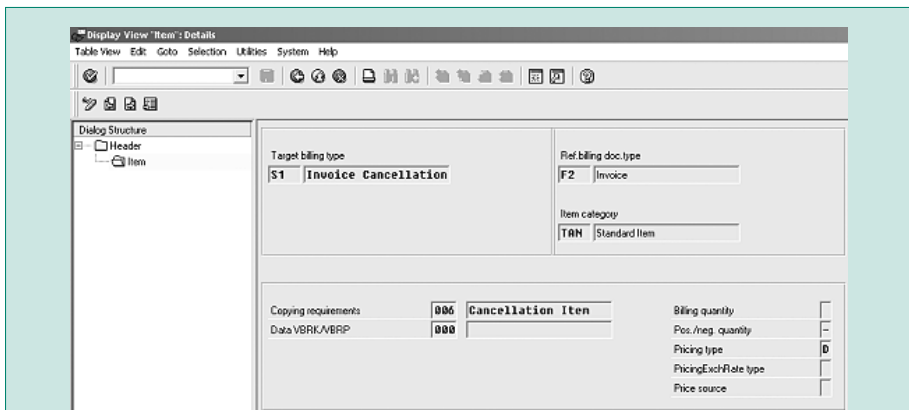

Figure 11 Item-category level settings for sourcing a billing documents to a target billing document

amounts and assigns a different billing type, an invoice cancellation. For these cases, the copy control allows you to create a billing document based on another billing document.

The **Invoice Cancellation** target header-level settings shown in **Figure 10** use an original billing document as a source. The header-level settings are similar to the item-category level settings shown in **Figure 11**. Most of the settings perform the same functions discussed in the prior examples. You should be aware of a couple of exceptions, however.

When creating an invoice cancellation from a billing document, the pricing elements should be copied exactly as they were in the source document. No changes

should be made. The **Pricing type** is always set to **D**, which dictates that the copy pricing elements are copied unchanged.

Billing Document Summary

You can see that the copy control function is a critical piece for customizing in SD. **Table 2** on the next page offers a summary of the settings I used for targeting data to billing documents. Understanding the influence each of these settings has on how and what data flows from source documents to target documents will provide you with a clear picture of what is possible using copy control. Remember that these settings are some of the more common options

employed in SD and they can be customized significantly.

Similar to creating billing documents, as I noted earlier, copy control settings also work for sales documents and delivery documents. For predefined sales and delivery document types, configuration settings are already maintained in the standard system. If you want to change or modify the settings, instead of modifying the standard settings, you may create another Z set of document types for your custom needs. ■

For information on this author, see his biography on page 13.

	Delivery document to billing document	Sales order to billing document	Billing document to billing document
Select document-type configurations	**LF** source to **F2** target	**OR** source to **F2** target	**F2** source to **S1** target
Header level			
Copying requirements	**003** — Header (Delivery related)	**001** — Header (Order related)	**005** — Header (Cancellation)
Allocation number	**C** — Delivery number	N/A	N/A
Reference number	**E** — Current billing document number	**E** — Current billing document number	N/A
Copy item numbers	Yes	Yes	Yes
Item level			
Item category	**TAN** — Standard item	**TAD** — Service item	**TAN** — Standard item
Copying requirements	**004** — Delivery-related item	**002** — Item/order-related item	**006** — Cancellation item
Data **VBRK/VBRP**	**001** — Invoice split	**001** — Invoice split	N/A
Billing quantity	**B** — Delivered quantity, less invoiced quantity	**A** — Ordered quantity, less invoiced quantity	N/A
Pricing type	**G** — Copy pricing elements unchanged, but redetermine taxes	**G** — Copy pricing elements unchanged, but redetermine taxes	**D** — Copy pricing elements unchanged
Price source	**E** — Delivery/order		

Table 2

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