

Perhaps your company already has the information, but it will be as well for you to confirm estimates of how often various business functions are likely to be performed in the future. A frequently-performed operation should always be designed to be as fast and as economical in system resources as possible. Rare operations may be allowed more time and may be scheduled for off-peak hours perhaps.

### **Anticipating the Unexpected**

An emergency is usually an occasion where the system must respond quickly. But do you know what types of emergency could occur? Do you know their costs and the likelihood of their breeding complications? Who shall do what when something rare happens should be part of the system design. Nothing should be totally unexpected: There should be no gaps in emergency provision. It does not necessarily cost a lot of money to get people to think the unthinkable: But it may be expensive to prepare a reasonable action plan on the day when something goes wrong. These contingency plans may have to be set up for automatic initiation, much in the manner of an emergency power generator that has been programmed to start itself if the normal source goes offline.

On the other hand, experience with disasters and catastrophes has demonstrated that some designs of system and some distributions of knowledge are more prudent than others. The Internet is an example of a system designed to carry on working, even if a considerable amount of damage has been done to its components. The knowledge of how to run the system resides in many places, and there are many pathways along which this information can flow. An alternative approach is to consolidate the knowledge in a central location and defend it robustly.

Another example of a distributable system is medical knowledge. It may be a better strategy to have many people who can do simple medical procedures rather than rely solely on a few who can perform any procedure. The latter approach depends on being able to move the patient to the medical experts when necessary.

The target concept should include what has to be done in the normal course of business and a recognition at least of the types of emergency that could arise.

### **Computing the Extent of Change**

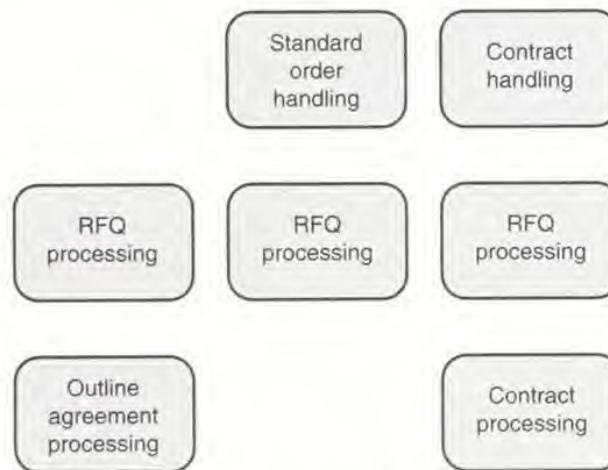
Change is costly. Paint the walls and people spend time discussing the effect. Changing a procedure bit by bit, by the evolutionary method, is a common practice in all walks of life and places of work. Traumatic or at least discontinuous changes in the form of revolutionary workplace upheaval may have to be a consequence if you decide to go for a target system concept which is quite unlike anything current. The benefits of large scale change must outweigh the inherent costs.

Changing the SAP standard business programs so as to make them better suited to what you want to do is much easier than it sounds because the system has a myriad of supporting functions to help you see how things are progressing and to propose sensible additions and refinements to help you get everything right the first time.

But you do have to arrive at a firm specification of where you are going and where you are starting from.

### Selecting Functions from the R/3 Reference Model

As you work down the process matrix which shows what you are going to need in the way of programmed functions, the R/3 Reference Model will be able to present you with scenarios that you will recognize: sales order processing, physical inventory taking, personnel recruiting, and so on. Figure 6.2 illustrates the top level of the process selection matrix. By selecting any item on the display and using the special function keys, the user can see any level of detail about the item of interest. This is referred to as "drilling down."



**Fig. 6.2** The process selection matrix shows what is in the R/3 Reference Model.

### The R/3 Analyzer Determines Processes

As the target concept for the system to support your new enterprise is refined, it can be approved, stage by stage. After the design of a component has been approved, the R/3 Analyzer will automatically select the relevant underlying R/3 processes.

If it should happen that there remain some aspects of your target concept that are not available in a standard business function in the R/3 Reference Model, then you must initiate the process of developing enterprise-specific scenarios from which the programmers can create enterprise-specific processes to be added to your company's version of the standard R/3 Reference Model.

### Assigning Responsible Organizational Units to Functions

The first stage of allocating functions to organizational units will probably be targeted on the names and structure of departments and work sections that exist already or are anticipated for the new organization. You will probably wish to assign jobs to the traditional teams that are best able to do them.

However, as you go about this procedure, it may become obvious from the R/3 Analyzer that there could be a different organizational structure based on the way the standard business functions of the R/3 Reference Model interact with one another and with the activities you have identified from your study of the current situation.

For example, the R/3 Reference Model will not expect there to be any gaps in the communication channels between departments, nor will it welcome any manual entry of data onto documents that the standard R/3 system will normally complete automatically, as far as possible.

In particular, you may be prompted into recommending that one or more layers of supervisory staff and management be ablated from your organizational chart.

And as you rationalize the structure of your target organization, so the information flows between the new units will fall into place in a better scheme of doing business. Indeed, it may be the recognition that you have suggested unnecessary information channels that prompts you into revamping your structure.

Under the guidance of the R/3 Analyzer, the continuous business process re-engineering cycle is just about inevitable. The following steps will be suggested:

- Describe the present situation.
- Model it from the R/3 Reference Model.
- Study the five views of the model.
- Make needed changes.
- See the new description displayed by the R/3 Analyzer system.
- Repeat the cycle, if necessary.

### **The Target Enterprise Model**

Eventually, adjustments will be stopped and you will be left with the target model of the enterprise you wish to create. It is an integrated model because you have built it by selecting standard business functions from the R/3 Reference Model. It should be close to what you want because you started with a description of the current situation and followed the advice of the R/3 Analyzer. Then, you accepted the information flows that it suggested as essential if the system is to remain a viable and integrated one.

There could be two types of discrepancies between your target enterprise model and the ideal:

- The R/3 Reference Model does not include a function that your particular business requires.
- The selection you have made from the R/3 standard business software covers the processes you need but the ensuing system does not seem to be an exact fit to your requirements and the user interface does not bear the unmistakable imprint of your business and your corporation.

The first discrepancy is a signal to look in the R/3 Reference Model again more carefully. If there is still something missing, then this will have to be defined as a new program development project for work with the ABAP/4 programming language supported by the

ABAP/4 Development Workbench, which is discussed in Chapter 27, “ABAP/4 Program Development with the R/3 Workbench.” Meanwhile, your target enterprise model will have to be content with a definition of the information flows and functional specification for the new component until it has been developed and tested.

The second discrepancy between the target enterprise model and what you really want is a matter for customizing.

### **The R/3 Analyzer Selects Predefined Customizing Activities**

The SAP R/3 standard software is designed on the assumption that the client company will want to alter it. Yet the client company does not want to have the software rebuilt in its entirety. And at no stage in the modification process does the client want to have the system fail because of a programming error.

The SAP approach to customizing is to have all the software refer to parameters that are stored in tables in standard formats. The customizing module gives the implementing company access to these tables but not to the underlying software. Therefore, the client cannot do anything that will crash the R/3 system.

For example, a standard business program to conduct warehouse management will refer to a table of the types of storage facility that might be found in a warehouse. All the common types of bin and pallet, rack and marked floor space, and so on, will be in the table. If your company needs something different, it can be added to the table and you will be prompted to supply the details of how it is to be handled, its size and capacity, for instance. If there are items in the table that you will never need, they can be deleted from it.

With a minimum of manual effort, you can complete the customizing process because the system will propose all the customizing activities that are needed according to the functions you have specified in your target enterprise model.

## **Rough Survey Procedure**

Although the procedure is referred to as “rough,” the method entails a precise formal process of capturing the system relationships of the current situation in a format that can readily be adjusted to correspond with the R/3 Reference Model. By so doing, the opportunities for improvement of the current situation will become apparent, and the means to effect the necessary changes will be identified in the suite of standard business programs of the R/3 system.

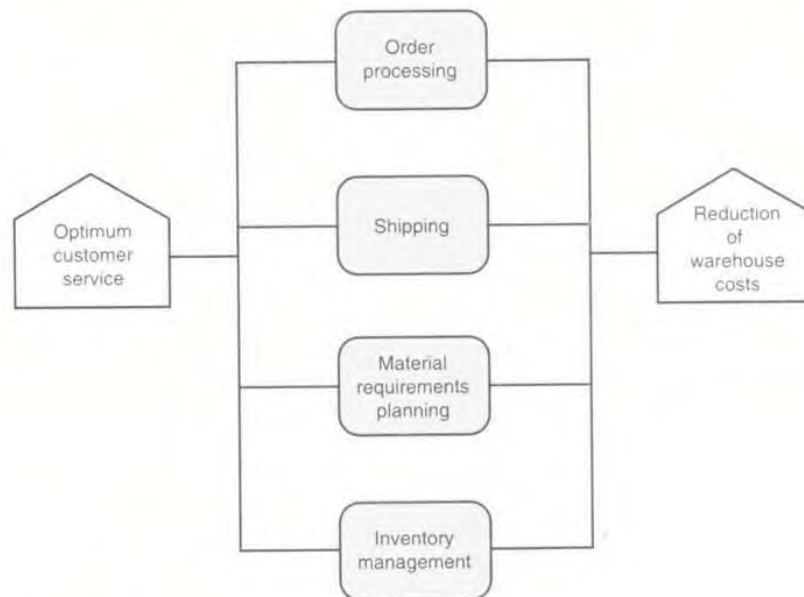
The procedure for conducting a rough survey of the present situation begins with the identification and recording of the objectives of the organization and the units in the company at present responsible for these activities.

### **Objectives and the Organizational Units Responsible**

By mapping the objectives of the company and the departmental units responsible, it is possible to discern the following types of imperfection in business system design:

- Functions that are specific to the company, not because they are unique in the industry, but because they have developed piecemeal as the company found it necessary to elaborate its procedures to cope with new circumstances
- Functions performed redundantly by two or more work units, or without purpose by one
- Functions that lack information technological support and which could be improved if it were to be provided
- Discontinuities in the flow of information or control caused by unnecessarily strict demarcation between unit responsibilities
- Data held in more than one place
- Information captured or entered manually when it is already available in the system
- Data transcribed from one medium to another

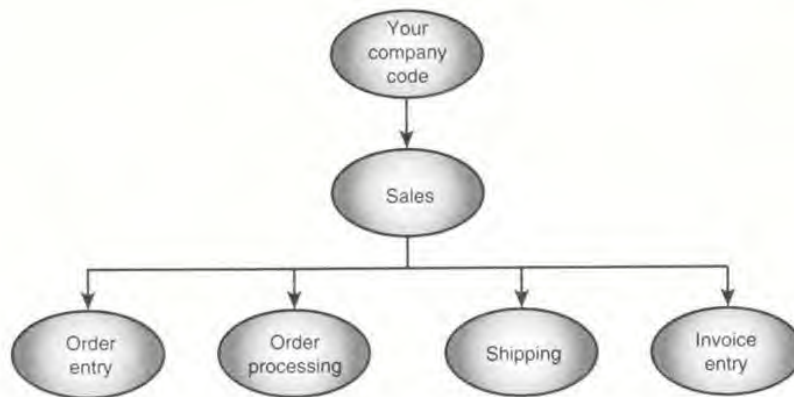
Figure 6.3 suggests that each objective depends on the successful performance of certain functional areas. Similar objectives diagrams can be created at any level of detail.



**Fig. 6.3** The objectives diagram shows the functional areas responsible.

#### Existing Organizational Structure

The traditional organization chart can be used in the SAP R/3 system to depict the management relationships between the existing departments and work sections. Figure 6.4 is part of such a chart.



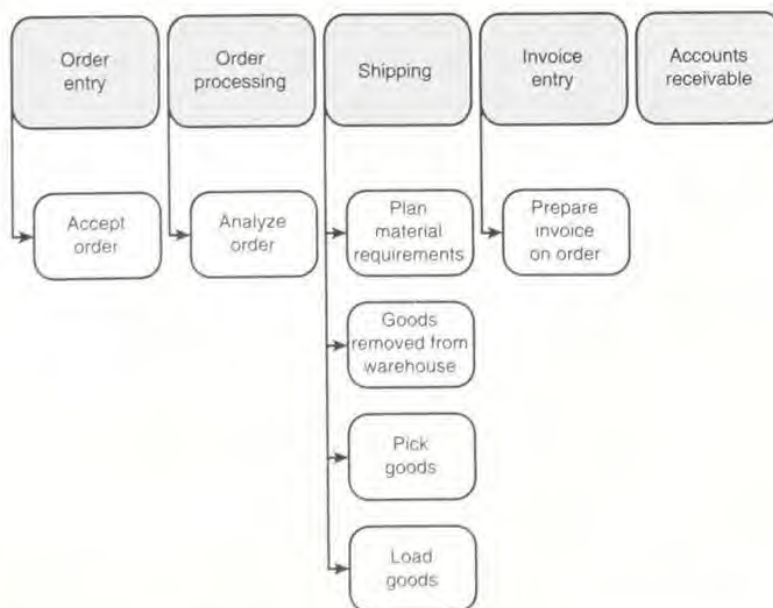
**Fig. 6.4** Example of a current organization chart.

The R/3 Reference Model includes typical chart sections which can be edited and articulated to create a graphical model of the current situation.

### Function Trees

The complexity of business processes makes it necessary to use some form of hierarchical structure to depict the fact that each process is made up of a series of sub-processes in the form of event driven process chains, each of which can entail lower levels of event driven process chains.

The most informative way of describing the current processing structure of your company is in the form of function trees, using the format and models of the R/3 Reference Model and adapting the elements until they accurately represent how you do business at present. Figure 6.5 illustrates part of a function tree.



**Fig. 6.5** The function tree should define the scope of the organizational unit.

Your first edition of the function tree for a department may well use the terms and labels your company is familiar with. On the other hand, you may well find that the R/3 Reference Model will suggest the names of functions that are somewhat different. In particular, you may find that the scope of functionality that you have subsumed under a single function title is defined by the R/3 Reference Model in terms of several sub-functions that appear to increase the complexity of the work of the department. In the illustration at figure 6.5, for instance, Order Entry subsumes Accept Order; and Order Processing subsumes Analyze Order. The differences include a recognition that the entry of an order from a customer should concentrate on efficiently capturing an accurate picture of exactly what it is that the customer wants; whereas the analysis of this order is beginning to take account of how the customer requirements are to be met. The same person may do both: But there are two points of view, two sets of priorities.

The R/3 Reference Model may offer a simplification of your existing procedures. Your target concept of how the R/3 will be used to run your new business design may have fewer elements than your model of the current situation. This can happen because the R/3 design will take it for granted that the computer system will have access to a comprehensive database and sufficient speed of retrieval to make good use of it. As soon as you know what the customer wants, the system can tell you how to arrange for it to be provided. The same person can carry out several steps of the process with the support of the technology.

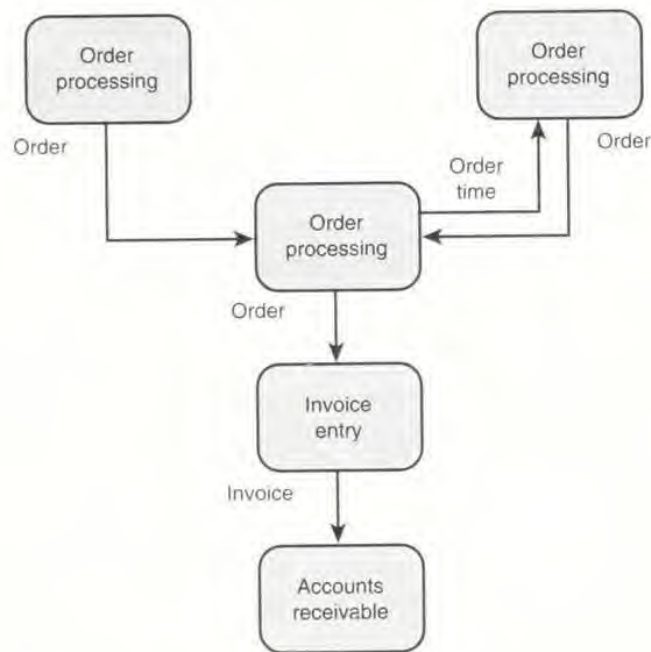
### **Information Flow Mapping**

In the process of capturing an accurate picture of how business is carried on at present, your “rough” model should be supplemented and informed by a view of your company as a series of information flows between organizational units or other entities such as database records. A SAP document is a carrier of data and therefore a collector of data. Figure 6.6 is part of an information flow map and suggests this dual role of the SAP document.

The definition of a SAP document allows for any form of data element to be handled as a document with a header of its own or as a document item in a larger document. There is no limit to the size or complexity of a data structure that can be handled as a SAP document. Therefore, the information flows in a model of your existing company will be treated as documents or document items in any SAP R/3 system you may implement.

During the rough modeling of your existing system, you may find it useful to develop very detailed charts of the information flows necessary to get business done efficiently. There are two techniques that should not be overlooked: Stimulus Discrimination and Response Differentiation.

**Stimulus Discrimination.** What are the different things and situations that trigger actions in your company? There should be a long list of events to which your company is sensitive.



**Fig. 6.6** Information flows will contribute to SAP documents.

Your sales departments will be sensitive to opportunities to detect potential customers and determine their requirements. Your marketing people will want to notice changes in the target groups who might be responsive to your approaches. Your manufacturing facilities will need to be monitored to see that they are working well and that new inventions and developments are considered to update the plant. These are examples of the gross stimulus types that your business procedures must be prepared to accommodate.

At a finer grain level, your sales department, for example, will probably have different procedures for regular customers and one-time customers. So the detailed procedures have to include a data capture operation that determines which type of customer is being processed. The data capture may be a simple matter of identifying an inquirer as a previous customer, and confirming that no details have changed. Or a one-time new customer may have to be subjected to inquiry techniques to establish the name and address information, and so on.

These trivial examples illustrate the technique of compiling a list of all the stimulus situations of importance:

- Previous customer
- Regular customer
- New customer or prospect
- One-time customer, and so on

The outcome of this stimulus discrimination should be a set of elements which represent the occasions when a collection of data from outside the system is essential. The information required will be that which is sufficient to determine precisely which stimulus of interest has occurred. Such an occasion will be defined in the SAP system as an event. However, at the rough stage of system description, information flow models may suffice with the graphical elements labeled with the stimulus of interest.

The method of information flow mapping should show how each stimulus of interest leads to a different response. There may be a certain amount of grouping of stimuli, where several different events in the outside world are treated as equivalent by the system, although it is usually the case that the variants of a stimulus class retain their individual identity because of one or more data elements that are carried through the processing sequences.

**Response Differentiation.** In parallel with the compilation of a list of the stimuli of interest, it is worth compiling a list of the varieties of response that are in evidence in your company. For example, it may be the case that different customers enjoy different terms and conditions of payment. Why is this? How does the system user know which terms should apply? How are new customers assigned to the more favorable terms?

If you know that your company has, say, eleven different sets of credit conditions, then you will be prepared to find eleven sets of stimulus conditions that are necessary and sufficient to mandate the assignment of any fresh customer to the appropriate condition.

You may be unlucky. You may find that your company responds differently to different customers for no reason that you can discern. You have discovered an information gap where there should be an information flow.

**Back-to-Front Information Mapping.** When your auditor comes to inspect your annual accounts, he or she is entitled to select a value on the financial documents and demand to see how it was computed. Which pieces of data were processed to arrive at this figure?

When your SAP system is fully implemented, you will be able to select any figure in the accounts and use the special function keys to trace back to the primary documents and the information they carry to see for yourself how the final total was compiled. You can drill down the value of the inventory, for example, until you are looking at the subtotals for each warehouse, and for each warehouse you can drill down on the total for a material and so on until you are looking at the valuation given to each batch or each inventoried item of stock.

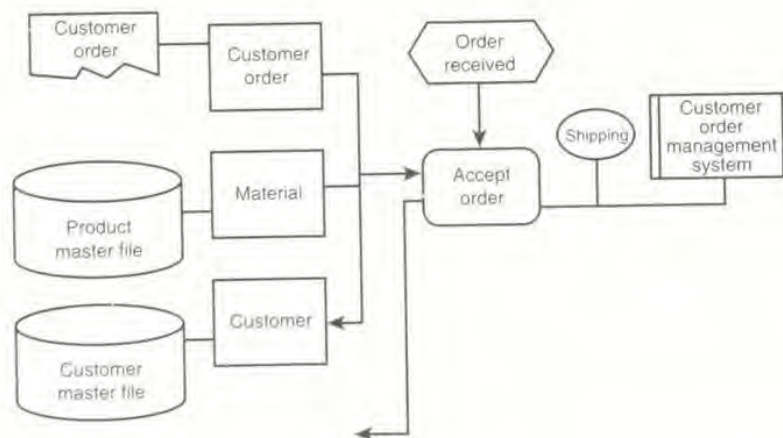
The back-to-front method of analyzing your current business system follows the same logic as your auditor. You list all the outputs from your company and keep asking to see how they were produced until you have traced their history back to the input of the information and materials which took part in their production.

Of course, if you have already compiled a comprehensive list of the different responsive actions that constitute the repertoire of your business, and if you have also compiled a list of all the situations and events that will trigger an action from at least one part of your organization, then you will have to hand much of the information needed to conduct a back-to-front scrutiny of how your company's outputs came into being.

The way that the SAP systems describe stimuli and responses is designed to sit comfortably on the logic and mechanisms of computer programming. By and large, the systems do one thing at a time. Complicated things are done by processes chained together and triggered by a specific event.

### Process Chains

Each process of your existing business system requires an input, such as a document, a person, or device to recognize that it is significant and deserves a response, and a further inflow of information and perhaps material as the process carries out its activities. Figure 6.7 illustrates part of the complex of process chains associated with order handling.



**Fig. 6.7** Customer order handling is a process chain.

When the function of the first process has run its course, the next process in the chain is initiated by the passing on of information in the form of a document, and perhaps material.

The more precise your knowledge of the process chains in your business, the better will be your models of the current and future systems.

### Reviewing the Rough Survey

The rough survey of the existing situation in your company entails specifying the following:

- Objectives
- Organizational chart with responsibilities assigned
- Function tree

- Information flow diagram
- Event driven process chains

To achieve this, you may call upon the R/3 Reference Model to show models of typical structures which you can copy and modify to reflect how you do business. You may wish to call for lists of the significant stimulus events to which your company must respond; and you will need to identify all the different forms these responses can take. You may even check the validity of your data by the back-to-front method of tracing how and why things are done as they are.

The next step is to convert your rough survey of the existing situation into the target concept, the enterprise model which will be the design for your future business system. The tool for achieving this is the R/3 Analyzer.

## Technical Elaboration of a Target Concept

Technical elaboration is the process of specifying exactly which SAP standard business programs are to be used to run your target business. You also have to make arrangements for these standard programs to interact so as to achieve exactly the result you require.

In the beginning is the process selection matrix.

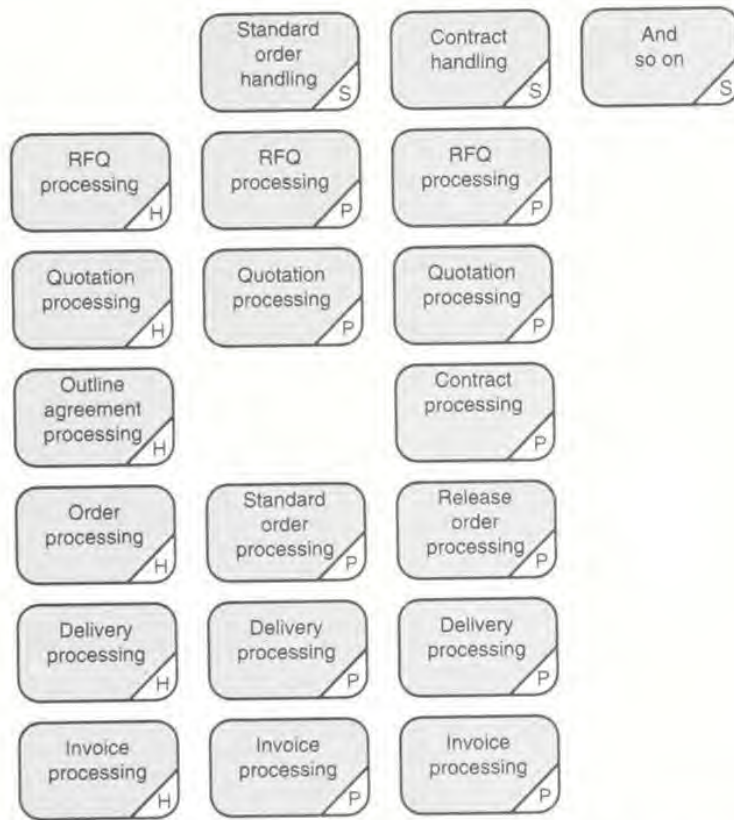
### The Process Selection Matrix

Each application has a comprehensive process selection matrix which you can use to identify the standard business functions that you require in your target concept system. Beneath each item in the matrix is another process diagram at a more detailed modeling level. Figure 6.8 begins to suggest how the process selection matrix can handle the complexity of an integrated business application.

At any stage in a process diagram, the chart may indicate a process pointer symbol to indicate that the process chain may continue through another series of event driven process chains that may constitute another module or application that cannot be shown directly connected with the chart currently on display.

**Company-Specific Functions.** If you should find that the R/3 Reference Model does not contain a standard business function that can be adapted to serve one or more of the functions in your chart of the current situation, you may decide to inscribe this function on a new function symbol and add it to your model. The system will be aware that you have created your own version of the R/3 Reference Model and the whole process will be treated as an Engineering Change Management activity. The original R/3 Reference Model itself will not be modified.

The unique new function will have to be subjected to program development work to establish the program to execute the new functions you require.



**Fig. 6.8** The SD-Sales and Distribution application has a comprehensive process selection matrix.

The R/3 Analyzer includes the navigation component of the ARIS Toolset to which the other components may be added if extensive program development work is intended.

**Deleting Functions.** As you proceed through the selection process, you may come upon functions that are not required. If you check the "functional use" attribute of one of these functions, you will discover whether it is optional or mandatory. If a function is marked as mandatory, then it may not be deleted from the process selection matrix because it includes processing upon which other functions depend. If a function is optional, you can delete it from the matrix and it will form no part of your target concept.

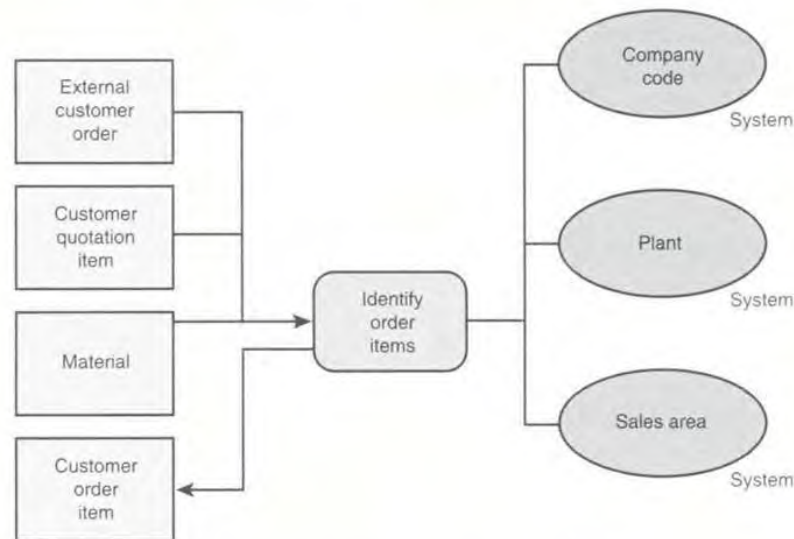
**Additional Standard Functionality.** The process selection matrix may indicate that there are certain functions in the system which you do not require in your target concept. These additional functions are of two categories:

- Functions that are almost certainly of no benefit to the target concept system
- Functions that were not specified in the description of the current situation, and which were not necessarily envisaged as part of the new enterprise, but which would indeed be very useful if they were included in the target concept

If a function is of no benefit and it is an optional function, then you may delete it. Mandatory functions cannot be deleted: Potentially useful functions should be retained, even if they are optional.

### Input and Output Information Objects

Many functions need data. This they must get from an information item. All functions create information items when they are activated, even if it is only the date and time when they were called. Standard SAP functions accessed from the R/3 Reference Model will show which information items they need and which they will create. Figure 6.9 shows how information inputs and outputs are mapped in the Analyzer.



**Fig. 6.9** A function requires information input and creates output.

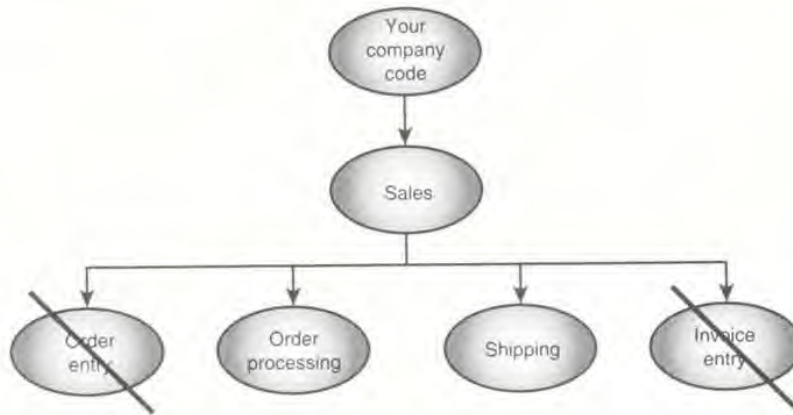
It may be the case that your model of the existing situation necessarily includes information items that are not mentioned in the R/3 Reference Model standard version of the function you are considering. For example, you may have some data on a storage medium used in a system which will be rendered obsolete by your new implementation. The legacy data objects necessary to the functioning of your target system can be so identified in the target model. And the SAP support system will be able to provide the data transfer mechanisms to integrate the legacy records with your target system.

## Revisions of Organizational Structure

Client, Company Code, Plant, and Activity Center are all examples of R/3 organizational units that can be associated with particular functions. If you examine the structure of the R/3 functions, you will see that the standard system of R/3 organizational units is applied. You will be able to determine, for instance, whether a particular function is normally executed at the Company Code level or at the Activity Center level.

If you adopt the standard R/3 Organizational Structure for your target concept, you will find that the integration of the various programs is automatically affected and authorization structures can be applied without difficulty.

There can be a reduction in the number of organizational units needed if the standard functions already include the processes carried out in some of the units. Figure 6.10 illustrates such a reduction.



**Fig. 6.10** The target organization has fewer units than the current.

## Attributes for the Analysis of Models

Each data object in the SAP R/3 system is made up of a set of data elements arranged in a structure. Into these data elements can be placed values or parameters which control the way the data object is used. If the data object represents a standard function, then some of the data elements will be used to control the operation of this function: If the data element is changed, then the function operates in a different manner.

The symbols on a chart used to model the existing situation in your company, and the symbols in a chart of your target concept, are data objects. Some of the data elements control the visual display of the symbol when it appears in a chart. Some of the data elements contain information which can be used to carry out quantitative and qualitative comparisons of different models of your existing or target system.

### Modeling Objects

The following data objects are used to depict event driven process chains:

- Events, hexagonal blocks
- Functions, blocks with rounded corners
- Control flows, dotted arrows
- Logical operators, circles
- Information objects or materials, rectangles
- Organizational units, ellipses

Each object has a unique identification number for each example of its use. Your actual model symbols will have a different set of identification numbers to the objects depicted in the model of your target concept.

**Types of Comparison Between Models.** The following comparisons illustrate the type of results that can be achieved by using the data elements of the data objects that are used to assemble the models:

- Comparing different variants of a target process
- Comparing a target process with the original R/3 Reference Model process
- Comparing the actual process currently in operation with the corresponding target process
- Comparing the actual process with the corresponding process in the R/3 Reference Model

**Dimensions of Model Comparison.** The data attributes of the elements used to model business processes in the R/3 Reference Model, in your target concept, and in your model of the existing situation, where you have used the corresponding processes, can be subjected to the following types of analysis:

- Quantity of data and frequency of use statistics
- Time data to be used to compute throughput times, delay times, processing times, transmission times within the process
- Statistics and time data aggregated to higher order processes
- Cost data assigned to various cost types to be used to derive indices which reflect the processing costs

**Manner of Use Data.** The functions include data elements to indicate how the function is performed according to the following categories:

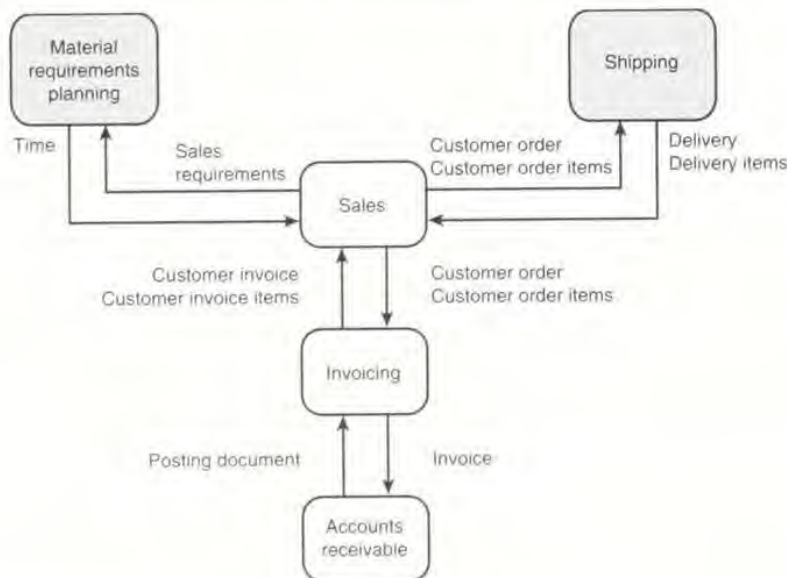
- Online, interactively with the user
- In batch mode, without interacting with the user
- Automatically, without interacting with the user
- Manually, by the user without system support

**The Quality of a Function.** The data structure of a modeling element includes a provision to store the degree of user satisfaction with the function. This will depend on the scope and content of the function. For example, a function performed online using interaction with the user may not offer all the choices required. The quality of satisfaction is expressed as "good," "satisfactory," or "poor."

## Future Information Flows

When the target model of your business has been created under control of the R/3 Analyzer, the standard business functions that have been identified from the R/3 Reference Model will have been transferred automatically to your model. If you call for an information flow view of this model, you will see that the information flows between functional elements have been depicted. Figure 6.11 suggests how the data flowing between functional elements is transcribed onto standard SAP documents as specific document items, or updates to the header information.

You may adopt the standard titles for the documents or use your own. From your survey of the existing situation, you will be able to see how the information pathways suggested by the R/3 Reference Model relate to the information flows you have identified.



**Fig. 6.11** Information flows become SAP document items.

In particular, the R/3 Reference Model will indicate that the receipt of each document at a function will be the occasion for a transmission back to the sending element of a document, which serves to confirm the receipt of the first transmission and to provide a report on the current status of the process.

For example, a customer order document, with details of the customer order items, will be sent to Shipping from Sales. When the shipping process has been completed, the delivery document, with details of the delivery items, will be sent from Shipping to Sales as confirmation that the shipping processes have done what they are supposed to do. If, for any reason, the delivery is incomplete, then the details will immediately become apparent to the Sales department, who will be prepared to discuss the facts of the delivery with the customer should a query arise.



A manual system may not be able to carry out this type of routine confirmation in detail for every function: Under the SAP discipline, it is standard practice.

The integrated functions of the R/3 system are predefined with the necessary information flows established through the system of SAP documents, which ensures that the detailed functioning of the system is logged in the form of electronic documents stored under the master record headings of the functions involved in the communications. The Sales department will be able to look at the stored documents that record the activities of the Shipping section in connection with their customer orders. The materials requirements planners will be able to see how they were kept informed of the sales requirements, and how they transmitted their schedules back to the Sales department.

When you see how the R/3 system can be arranged to carry out all the business functions you will need in the enterprise model of your future organization, and when you look at the information flow views of it, or the process chains, or the responsibilities, then you may get some ideas about changing the organizational structure of your company to make better use of your new system.

If your company is prepared to adjust to future changes, as indeed it must, then you will want to ensure that the information flows to and within your company are aligned to this objective. For example, you will want to check that there is a flow of information from Production to Purchasing to report on the suitability of the materials being delivered from the various suppliers. This flow ought to include all the factors which might impact on current production and any indicators of how things might change in the future.

## Future Organizational Structure

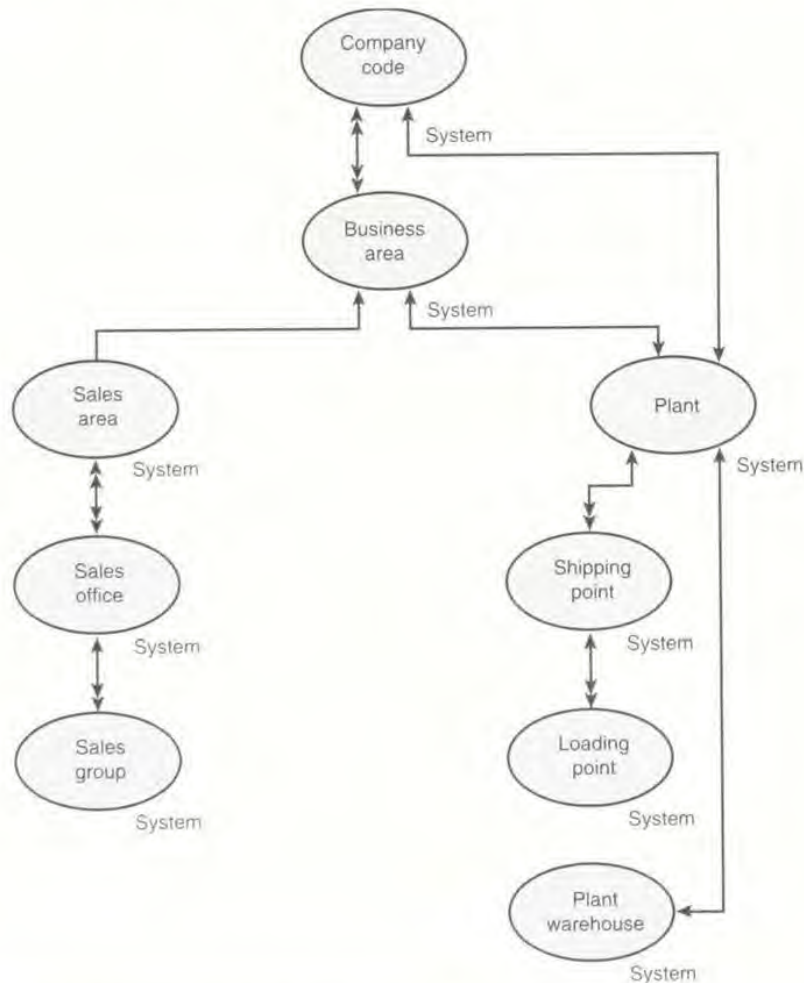
Passing a piece of work from one person to another is disruptive and inevitably takes time which may not result in significant added value to the product being handled. It is the same with information processing work: The fewer changes of staff, the better. It is most important to minimize the number of transitions from one department to another. Your organization should be arranged so that the work flow crosses departmental boundaries only with good reason.

In the example fragment of an enterprise model, the existing situation portrayed a work section devoted to data capture for the purpose of order entry. Another set of people was employed to enter the data needed to create invoices. Both sections may have been in the habit of typing the name and address of the customer. Why not combine the sections and have the computer type the details from existing records wherever possible? Figure 6.10 shows this example.

### Modeling Organizational Structure

The standard SAP organizational structure is used in the R/3 Reference Model to arrange the levels in the display of the organization and the associated functions. All the elements are assigned identification numbers that also echo this structure.

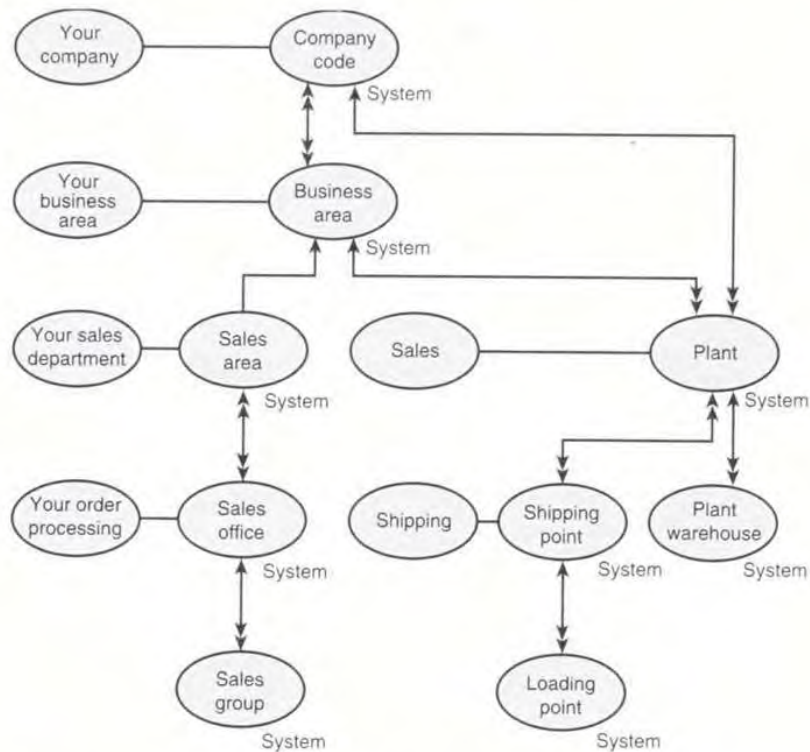
In the R/3 applications, the standard organizational structure is replicated and also used to shape the display of the elements. Figure 6.12 shows part of the R/3 Reference Model. It contains only one definitive reference model for each element. Your model can freely replicate and rename these reference items.



**Fig. 6.12** The R/3 Reference Model has the basic elements.

When you take over a copy of the R/3 Reference Model to use as the basis for your target enterprise model, you can insert the elliptical symbols to represent the organizational units of your target company structure. Each unit can be assigned the title currently in use, or the system can be left to assign names based on the R/3 Reference Model. Figure 6.13 depicts part of a target enterprise model.

The elliptical symbols are attached by simple lines to depict the fact that certain functions in the model are the responsibility of specific named units in your company.



**Fig. 6.13** The target concept organization adds to the R/3 Reference Model.

Because the system underlying the R/3 Reference Model is structured according to the standard SAP system of organizational structure using the Client, Company Code, Business Area, and Plant series of levels, the relationship between the organizational units of your target enterprise must necessarily follow the same hierarchical pattern. You may have to take this into consideration in order to harmonize your new structure with your new business support system.

## Review of the Required Organizational Changes

You will have been on the alert for signs of blemishes in the existing system which you want to avoid in the design of your new system. Organizational breaks, missing information technology, and discontinuities in the use of information media are the main snags.

If major changes need to be made, then you will have to present a case for these changes based on the details of the defects discovered and the possible consequences of leaving them untreated. On the benefits side of the account, you will want to draw attention to the time saved by having the system provide data and work procedure suggestions wherever it is possible to do so. The improved service to the customer and better use of supplier resources will be noted as consequences of having fewer transfers of business across departmental boundaries.

## Transfer of Results for Customizing

The Customizing module recognizes that over 4,000 different types of activity may take place to effect improvements to the target model of an enterprise before it reaches the peak of its potential performance.

The nature of these fine-tuning adjustments ranges from a subtle choice of batch sampling statistical techniques to the presentation of the date and time in the format customary in the user organization. The aim is to make sure that the steps of the event driven process chains are carried out correctly and in the most efficient manner. This process is discussed in Chapter 7, "R/3 Customizing."

The work of customizing does not normally proceed until the target concept has been fully elaborated under the R/3 Analyzer using the R/3 Reference Model as its database. When the target concept has been submitted and approved, your selection of functions from the R/3 Reference Model, which is the embodiment of your target concept, will be the object upon which the customizing module will work in order to complete the fine-tuning of the system functions before the system goes live.

## Summary of SAP R/3 Implementation Procedure

The R/3 Analyzer provides powerful tools to model business processes transparently. You can see what processes and information flows are entailed in what you do now and in what you might want to do in some future enterprise.

There is a powerful form of documentation in the R/3 Reference Model itself because it can be used to display an actual or target model from any of five viewpoints. There is also a related system of online documentation in the form of supporting texts and demonstrations of concepts. Chapter 24, "R/3 Online Documentation Support," discusses this.

There is a comprehensive system of SAP training courses.

When it comes to implementing a specific system, there is a standard procedure whereby a suite of central application modules can be controlled by adjusting tables of parameters that govern how the various event driven process chains are to be used.

The user implementation teams can manipulate the parameters of the standard functions without affecting the way they interact with one another and without impairing their fundamental efficiency that is determined at the level of the ABAP/4 programming language in which the standard functions are written.

The user client does not have access to the code of the standard business functions.

Unique customer-specific functions can be developed in the ABAP/4 language and integrated in the target system. Client companies may also add functions to form their own version of the standard R/3 Reference Model using the ARIS Toolset.

Future changes and adjustments to the target concept system can be modeled and simulated by the R/3 Reference Model in advance of implementation.

## From Here...

- How is the data stored?

The system of data objects is discussed in Chapter 4, "R/3 Architecture."

- How do you find out what SAP standard business functions are likely to be needed for your company?

See Chapter 5, "The R/3 Reference Model."

- I need to find details about a specific application.

See Chapter 9, "World Wide Business Computing Systems," for an introduction to the SAP modules.

- My interest is in an overview of running the whole complex of standard business software in practice.

See Chapter 11, "A Computing Center Management System," and Chapter 26, "Understanding the OSS-Online Service System." Chapter 28, "R/3 Business Workflow Management," may also be of interest.

## Chapter 7

# R/3 Customizing

The SAP R/3 system contains a model of itself in the form of the SAP R/3 Reference Model, which records all the standard business functions available in the system. They are shown in a neutral or paradigm form which is subsequently converted into an enterprise-specific organizational structure. The process of achieving this transition begins with analyzing your business, continues with a selection from the standard components, and ends with the fine-tuning of the whole system, which is termed “customizing.”

This chapter will show how the Customizing elements of the SAP R/3 system components combine to support the adaptation of the standard functions of the SAP R/3 Reference Model to the business process systems that your company requires.

## An Overview of Customizing

Customizing is a fine-tuning activity carried out on a system that is already running in prototype form. Its design has already been through many processes, each of them guided and supported by a specialized SAP tool that is able to pass on its output to the next tool in the process.

### Analysis of the Existing Situation and the Target Concept

The SAP R/3 Reference Model is a data structure which can be consulted to determine just which standard business functions are available in the SAP R/3 system as predefined integrated programs. The best way to consult it is by using the SAP R/3 Analyzer, which is discussed in Chapter 6, “Tool-Supported Optimization with the R/3 Analyzer.” The Analyzer will guide you through the process of describing your current system and the target concept of your business that you are aiming for. The Analyzer will help you look at your two companies, existing and target, from the following points of view:

- The process view depicts a company as a structure of event-driven process chains that carry out the necessary work when the right event conditions are in place.

In this chapter you will learn:

- Who performs customizing?

The system prompts and the experts in your business supply the responses.

- What do I need to know about ABAP/4 programming to use the Customizing system?

Nothing.

- What if I make a mistake?

The IMG-implementation guide will suggest corrections in most cases. If not, the logging system will enable you to recover to the point before you made the mistake.

- The information flow view allows you to see how each activity gets the information it needs, and who is responsible for sending it and keeping it up to date.
- The data cluster view sets out all the items of information that have to be captured and stored in a systematic manner so that they can be found again when they are wanted.
- The function view shows how your company has high-level functions that depend on lower-level functions, and so on, down to the functions responsible for handling the information and materials passing through the company.

By looking at all these views of your present situation and of the situation when your target concept has been implemented, you can progressively refine your target to make proper provision for the market and manufacturing or purchasing conditions your company will have to confront during the long lifetime of the software you are designing for your target concept.

### Selecting Functions for the Target Concept

Having drawn up various views of your target concept after inspecting similar views of the existing situation and consulting the long-term plans of your company, you will be faced with the task of selecting functions from the many that are available in the SAP R/3 system. You will want to do this carefully because you may decide that the SAP R/3 Reference Model does not include all the specialized functions that your target concept will entail.

**Company-Specific Functions.** Before you express a need to develop new software, you should use the SAP R/3 Analyzer to explore the possibilities of setting the control parameters of existing functions to achieve the results you seek. If you are still unsatisfied, you should look at the most promising functions and see if you could add what is called a "customer exit." This is an interface, normally quiescent in the function, which can be activated as a way of launching out of the function in a controlled manner in order to execute a piece of program that you have developed to do that extra piece of work that is not part of the function's everyday repertoire.

If you cannot get a simulation of your target concept to perform as you want it to, even with extra customer exits, you have to go over to the ABAP/4 Development Workbench, where you will find the tools necessary to carry out major surgery on copies of existing functions in order to build the functionality you desire.

When you have selected from a standard SAP R/3 Reference Model the functions you need, and when you have built any extra programs, you have to get the whole system customized. All the necessary routines are already in the SAP R/3 system and its applications.

## The Beginnings of Customizing

Fine-tuning of your system begins with the approval for your target concept. You will have already gone through the meticulous discipline in which the process selection

matrices have been used to select just those functions that are directly needed for your enterprise, together with certain others that will be suggested by the system because they are mandatory stepping-stones to the results you are seeking.

As the system becomes aware of the details of your target concept during the process of identifying functions from the process selection matrix, it can select for itself those Customizing activities that it knows will have to be performed before the new system can go live and work properly from the start. There are some five thousand Customizing activities to choose from.

### Objectives

Customizing has to achieve three objectives—economically in terms of cost and manpower, but reliably in terms of building a system that will stand up to battering by real and sometimes erroneous data and real and sometimes careless users.

SAP R/3 Customizing has three jobs to do, as follows:

- Introducing and extending SAP R/3 system applications, smoothly and transparently
- Adapting the neutral reference functions to the company's target concept in detail
- Controlling and documenting the process of introducing the system

## Milestones in the Delivery of a System

It is always possible to look back on a complex project and divide it into milestone stages identifying the significant events. What is much more difficult, and much more productive if done well, is to set out these stages beforehand.

There follows a summary of the procedural model recommended in the SAP IMG-implementation guide, which is written and structured using hypertext techniques that enable the online reader to move quickly to information relevant to the task in hand.

The implementation guide in its computer-assisted manifestation is at the core of Customizing. It will remind you of what must be done and keep track of what has been done. And it will be tailored to your target as soon as you have decided which applications you are going to be using.

### Concept and Plan

To arrive at a definition of the target concept and a plan of how to get there entails both requirements analysis and conceptual design. The organization of the development project itself has to take place alongside the work on the target.

**Requirements and Project.** Somebody has to gather together all the requirements from all the responsible departments concerning the new system and its purposes. Then there has to be an organizational plan of the project activities and a declaration of the standards to be achieved and the tests to be applied to the work to prove the quality.



**System and Training.** The installation of the SAP R/3 system has to come early in a project because the tools will need it, although you can get a long way along the line by using the PC versions of the SAP R/3 Analyzer and the R/3 Reference Model. Training will have to take place on the tools and the system. Everyone in the project will have to learn the SAP concepts and methods.

**Project Functions, Interfaces, and System Infrastructure.** The functions, procedures, and responsibilities have to be set out for the project team. Then work has to start on designing the interfaces required by the target system and the infrastructure it will need in terms of all the physical facilities and resources that will have to be in place in addition to the software.

### **Documented Prototype**

The plan arrived at by the foregoing procedures must be checked for quality before work begins on the prototype. To realize it, detailed design has to be completed and implemented for at least the interfaces and the most frequently called procedures. Organizational structures and basic data must be determined during this stage.

Printed forms, reporting, and authorization need attention next before the prototype can be subjected to proper quality checking.

### **Productive System Ready**

With the prototype working and approved, the productive system enters its final planning phases. User documentation should have been written by your implementation team by now.

The productive environment, peopled with trained users who can call on a competent system administration, is essential. The new organization should be in place and archiving should be well under way.

Before the productive system can be given a quality check, there will have to be an analysis of the likely loading on the system. The integration of the system components should be tested and the final manual entry of master data completed.

### **Optimization**

With the system operational, the two tasks are to optimize both the technical operations and the organizational. Tools are available for measuring system component performance. The Computer-Aided Testing System (CATT) is an example.

## **Two Model Companies**

The SAP R/3 system is delivered complete with Client 000, which represents a neutral test company with the following attributes:

- A simple organizational structure
- Consistent parameters for all applications

- Country-specific accounting schemes
- Standard settings for account determination
- Configurations for control of standard transactions
- Example profiles

The example profiles included in Client 000 are as follows:

- Dunning and Payment
- Material requirements planning and forecasting
- Pricing
- Message control
- Printout and form layouts
- Authorization structure

The test client 000 can be used to explore the integration of the various system components and the way they are controlled by the SAPGUI-Graphical User Interface. According to the type of business conducted by your company, you can set up a working model which uses the functions supplied to demonstrate how your target system might be developed.

It is of course important for the implementers to engage the interest of many people in the organization because it will be necessary to use their experience to improve on whatever system is operating at the time. The test client 000 can provide this demonstration and invitation to cooperate.

Client 001 is reserved for production-related preparatory activities. It lacks master data and movement data. No company-specific parameters have been defined. Standard settings are available for some functions. If your company uses workshop data collecting devices, for example, the client 001 can be used to check that they can be properly linked through the standard R/3 interfaces.

## The Procedure of the Customizing Menu

Each SAP application contributes a Customizing menu as an alternative to the IMG-implementation guide. The following information types—infotypes—are addressed in both the system-aided guides and the Customizing menus:

- Concept information
- Dependencies
- Standard settings
- Recommendations

- Activities
- Status management
- Documentation

The intention of using a standard set of infotypes is to ensure that all applications and their users can interpret the data stored in any of the databases. The infotype signals how the data is to be decoded and how it is used in business programs. There may be several thousand infotypes in use in an implementation.

### **Transactions for Setting Parameters**

The user is guided on the basis of business criteria and objects to conduct the essential setting transactions. It is not necessary to know the names of any tables, table relationships, or transaction codes.

The IMG-implementation guide itself provides a plan of activities. Information can be stored on deadlines, resources, and status management. The IMG acts as a dedicated project manager system. Project-specific documentation can be assigned to every element of the guide so that it becomes an effective record of how the Customizing took place.

Entire organizational units can be copied, deleted, and provided with new parameters.

## **From Here...**

- What are the detailed methods for interfacing?

Chapter 3, "System Architecture and Distributed Applications," outlines the system architecture including interfacing.

- I am ready to begin a new project.

The SAP R/3 Analyzer is discussed in Chapter 6, "Tool-Supported Optimization with the R/3 Analyzer."

- Where is Customizing most extensively used?

All applications use it. Materials Management, described in Chapter 22, "Understanding the MM-Materials Management Module," entails very detailed data modeling.

- What comes next after Customizing?

Either your system goes live, or you have a project on the ABAP/4 Development Workbench, which is described in Chapter 27, "ABAP/4 Program Development with the R/3 Workbench."

## Part III

# Complex System Management

- 8 Continuous Business Development
- 9 World Wide Business Computing Systems
- 10 The Open Information Warehouse and Enterprise Data Models
- 11 A Computing Center Management System



## Chapter 8

# Continuous Business Development

The context into which a SAP system will be introduced will seldom be a green-field site for a business that is unique because nothing like it has ever been seen before.

The system will be part of a continuous business development. And as the analysis proceeds, it will become more clear just where the business could, with advantage, be developed. As the first modules of the system go live, there will be a further flood of information on how the business can be improved.

Should you be in the advantageous position of being able to direct the analysis of the data that will inevitably be stored by the system, you will be able to prepare reports to show the best ways of continuing the development process. The SAP modules are designed to facilitate continuous development, not for the sake of running a more elaborate system, but for the purpose of making your business more effective and efficient.

Whether you are looking at an existing computer-supported business, a manual system, or a recent implementation of a SAP integrated suite of applications, there are certain issues that you ought to address before you take any further steps to develop your business processes.

## Contemplating a Transition from Traditional Accounting

Auditors who are used to inspecting the financial documents of a company are sometimes very street-wise. They have seen it all before. They can teach the computer people a thing or two.

### Comments on Data Recording

In the days of the handwritten ledgers, there was always a chance that the chief accountant would let you write a marginal note to explain an entry in the ledger. But a computer system will encapsulate the entry with the original annotations, never to be altered. The lesson to be learned from this is that the

In this chapter you will learn:

- What are the lessons to be learned from the pre-computer world of accounting?
- What does SAP say about system design procedure?
- How do you recognize the need and prepare for business change?
- What should the business reengineering project manager define as the aim of the first phase of the project?

modern system must be very strict about enforcing a consistent input convention, a policy, a habit, a set of rules that are obeyed by everyone and can be interpreted and be informative to a stranger, an auditor for example, some months after entry. All users have to be as accurate in memorandum fields as they are in the fields that will be checked by the accounting procedures.

### **A Design Checklist**

The SAP Design Checklist points to issues that have to be taken into account before beginning implementation or at an early stage. Product IMG—Implementation Management Guide, is a detailed support system for implementation.

The SAP R/3 Analyzer provides tools and prompts for eliciting the necessary preliminary information, but the customer management team will have to arrive at suitable conclusions and decisions.

The task of technical interviewing to determine how work is currently progressed is an art form requiring talent and patience, not to mention an efficient and flexible recording method for which the usual surrogate is a secretary. The modern methods are described in Chapter 6, "Tool-Supported Optimization with the R/3 Analyzer."

## **How Are Things Done Now?**

One of the obvious starting points for business process reengineering is a description of the current mechanisms, be they mediated by people or by machines. There are three possible sources for this invaluable information, and usually they will not correspond on all or even any points of detail.

These sources of a view on how things are done now are the management, the documentation, and the people who do the work.

### **Management's View of the Current System**

Obviously there are some aspects of a business that are known to some managers but not to the workforce and which are not documented.

Then there are some aspects of the business that the management has initiated but not followed up in close enough detail to determine whether their intentions have been put into practice in the way they instructed.

Finally, there are aspects of the business that have developed through local initiatives, for good or for ill, and have not come to the notice of management. Operational doctrine has been recognized as what happens as a matter of custom and practice in addition to or in spite of what instructions have been received from management or what is written in the documentation. Operational doctrine is not necessarily better or worse than the doctrine set out in the book. It is a neutral term.

### **Documentation on the Current System**

It is rare that the current system is fully documented to the extent that a suitable person could do any job, albeit slowly, by following exactly the instructions in the book.

What may be available is the specification drawn up when the system was being put out to tender or when the contractor confirmed what was being implemented. However, the chances are that the system developers and programmers were too busy designing and programming to find time to document everything. And any aspects of the business that were not captured by the software or paper system forms are not likely to be available for inspection by anyone seeking to reengineer the business process some time later.

Embarrassing though it may be to read, one of the most valuable documents pertaining to the current system would be a log of the complaints and snags encountered by its users, including the customers and suppliers—who must be counted as prime users of any business system, even if they press none of its keys.

The user training staff members are a good source of information on the current system. They will perforce know their specialty well through having had to explain it many times and coach many beginners in its subtle ways.

Trainers will also have a hidden agenda of ideas that they promote on top of or in spite of the official doctrine. They will know ways of using the current system to navigate around problems that were not anticipated by the designers or not thought serious enough to warrant additional software or hardware investment. In the craft trades, there are always to be found some tools that have been constructed or reshaped by the users to make them more effective.

### **Operational Doctrine**

Operational doctrine is what you pass on unofficially to your fellow workers in order to make their tasks more successful. It may be a habit of taking a break even if the phone is ringing, or it may be the infamous device of the absent principal. "I am terribly sorry, but my boss has instructed me not to allow anyone a discount." You may pass on operational doctrine in a formal lecture to every newcomer, or you may not even realize that you are a role model for how to survive in the workplace.

There may be an unofficial practice of entering data that is known to be faulty so the difficult work item may land up on the supervisor's screen and, with luck, be dealt with by someone on the next shift.

Not all operational doctrine is bad for business. The implementers of a SAP system have tremendous scope for building into the new system all the best elements of the operational doctrine that have evolved through experience with its ancestor, whether this was a computer system or a paper-and-people system.

Wisdom from operational doctrine does not come without effort. It is amazing how many experts on all subjects pronounce on what is happening, or what has happened, or what is there, without ever having visited the place.

A token visit to the site is better than no visit at all, but the more time spent with the people closest to the work, the better. In skills analysis work, it used to be considered only right and proper that the analyst should have a try at performing the skill. An expert would be on hand to give help and guidance, and if he were really kind, he would

set up the job so that the poor old analyst would have a reasonable chance of not making too much of a fool of him- or herself, or worse.

There are two reasons to justify trying the job for oneself. It might become apparent just what sort of job it is for the person doing it on a daily basis, and it might demonstrate to the expert that you think this job important enough to spend a little time looking at it. If you are really lucky you will be able to spend enough time on the spot to allow a little discourse on what really matters and what the challenging aspects are.

Listen very carefully to what is said when you have been on site for some time. So often the most valuable information does not come to light until the contact has matured to the extent that jokes may be exchanged. Listen with utmost care to the last few moments of your contact with the person who knows most about the job and the system.

### **Layers of Decision**

As more and more business processes are mechanized and automated, and as more and more communication channels converge on each individual, it is clear that the responsibility for taking decisions has moved down the management chain.

The telephone operator in touch with a client does not have to transfer the call to someone else for a decision, because the information and the logical basis for a decision are on the screen as soon as the needs of the client can be identified. Indeed, there may well be no telephone operator as such in a telesales organization.

Because the system can take decisions on the basis of prearranged logical rules applied to the individual case, there is no need for a wise supervisor to take part in the interaction with the client. One layer of decision-making has been let go.

The SAP implementers have to be very careful to check out who makes what decision in practice, whatever the books may say. If the business process reengineering fails to make use of the speed and data access of the new systems, it will fall into the trap of simply copying the existing mechanisms, rather than creating new methods based on experience of the old, coupled with the benefits of the new technologies. Will it still be necessary to do things in the old way when the new systems are in place?

The most significant of the benefits of the new systems is the ability to take decisions rapidly and reliably.

### **All Good Ideas Have Already Been Suggested**

People at work think a lot. They have ideas. They may not tell just anyone about these ideas for fear of ridicule. They may not allow them to appear in written reports.

Essential reading for the SAP research team are the reports on the current system and the business conducted on it. Essential listening is what anyone says about the current practices, whether it is good or bad, whether said in earnest or in jest.

Reading and listening are like brainstorming: much is useless; but you cannot tell which is which until afterwards. And a really good idea may be mentioned only once. With all

this flow of written material and site visit anecdotes, the SAP researcher needs to be disciplined to look out for the soft spots, the opportunities for improvement.

## Researching the Decision to Reengineer Business Processes

The cost and importance of this decision call for the most careful research and preparation, so that the decision is taken on the basis of what really matters and with each of the options given proper consideration. These research resources allocated to prepare the decision may go to waste; the actual benefits may differ in magnitude and direction and may pop up in unexpected places. Nevertheless, the decision to reengineer should be given the best possible chances of being the correct one.

## Why Projects Fail

Although there are many reasons why reengineering projects fail, there are some obvious ones that should be considered by all concerned. Preparation may be ill-informed or totally absent; inadequate software or hardware may have been installed; application implementation may be incompetent and poorly resourced. Under each of these headings there are a number of factors that are worth taking care of.

## Using a Project Research Team

To prepare for the important decisions, a research team seems an obvious necessity. Yet it is not uncommon for this team to be built from a variety of experts who are so knowledgeable in their own specialties that they cannot be spared to devote any attention to the project. The team does need time to do its work. It also needs discretion, insulation from the possibility of traumatic job turbulence, as well as expertise out of the ordinary.

Who should be in the team? The contractor may have to mix with the in-house research and development people. Expertise, fresh eyes, familiarity with the vendors, products, customers, competitors, and the marketplace as a whole: these are the qualities to be on the lookout for.

## Tasking the Project Research Team

The purpose of establishing a project research team is to set up a good decision structure in which each option is supported by the relevant information. The team members will need to know the scope of this decision structure: how wide or how narrow is their brief? Should they consider any relevant issue, whether it be related to business, personnel, hardware, or software in content?

There are certain issues to be raised before deciding to implement SAP: consistency between modules, terminology, programmed function keys, conventions in screen layouts, languages, currencies, legal requirements, pricing data on invoices, health and safety, reporting, tax management, and rounding.



It is indeed providential that the SAP designers have built a tool to monitor and prompt all these decisions before the system goes live. It is described in Chapter 7, "R/3 Customizing."

## The ABAP/4 Development Organizer

The ABAP/4 Development Organizer is a component of the ABAP/4 Development Workbench. The Organizer is a support tool for the development and maintenance of large software systems developed in SAP R/3. The target users are teams of developers and individuals: centralized efforts and local. Members of a project group may work on one or several computers.

Development projects are best divided up into various jobs, each of which is the responsibility of an individual or the leader of a project group. Any development object that is changed by a person or group assigned to a job will be automatically logged and then reserved exclusively for that specific job. No other developer may alter that object until it has been released by the job team that first changed it. Others can look at it, run it, copy it under a different identification, but only the developer who "owns" it for the time being can make any alterations.

By adopting this principle of a developer owning an object until it is finished, individual jobs can be released independently of one another. Changes are managed.

In addition to being assigned a responsible developer, each object under development is associated with a development class that designates the application area of the object. This allows the object to be found and the knowledgeable people to be identified.

When the development of an object has reached a satisfactory stage, it is released. Current versions of this object are then stored automatically, and the newly released version becomes immediately available to all applications that use it.

Developmental changes are usually first confined to a family of separate test systems, where their effects can be evaluated before being combined and transferred to productive systems.

Each transfer of a changed object from a test system is automatically logged, so that any problems arising may be attributed to the specific transfer responsible. It is usual to perform a simulation using the changed objects before allowing them to be transferred to the target system.

Part of each development job is to arrange hierarchically organized documentation that covers the aims of the project, its status, and any special aspects. The result is that any changes can be tracked and related to the stored versions they have superseded.

### Software Engineering

The SAP approach to software development seeks to establish for each development project a structure of self-contained partial functions. They are self-contained in that an individual developer or a team may work on one of them knowing that their efforts will lead to a programming component that will integrate with SAP R/3 and the work of

other developers. A partial function is a method and a computerized mechanism that will work effectively within the scope defined for it, not necessarily a complete function that an end user might invoke.

Because the work units are self-contained, they can be tested and adjusted before being built into larger sequences.

Whatever the size and scope of a software engineering development, whether it be a partial function or a complete application module, there are four distinct phases that should be resourced and documented for what they are.

**Conceptual Design Phase.** The first phase of a development project should reach its conclusion with the production of a conceptual design for the new business program. Conceptual design will seldom proceed in an orderly sequence; but there are four elements which should be recognized and documented: preliminary study, analysis, design, and presentation.

**Preliminary Study of Value Adding Pathways.** The preliminary study is focused by an overall aim. In general terms, this aim is to optimize performance and cost all along the pathways within the company where value is added, including the process of business process reengineering itself. The preliminary study should make a business case to justify the selection of business functions for development.

**Analysis of the R/3 Reference Model.** The R/3 Reference Model is discussed in Chapter 5. It is a part of the R/3 Basis system which can be used to determine which of the standard R/3 applications and functions should be selected and customized to suit your company's requirements.

**Design from the EDM-Enterprise Data Model.** Design is the explication of the right system concept in detail sufficient for its worth to be judged.

The EDM-Enterprise Data Model is derived from the R/3 Reference Model. It provides the business processes of your company as you would like them to be when the new development is completed: process, function, information flow, data, and organization. These views are discussed in Chapter 10, "The Open Information Warehouse and Enterprise Data Models."

**Presentation of the Preliminary Study.** Presentation is the process of building consensus up to the highest management level for the direction and cost of the development. There will have been a considerable amount of interchange between those who have clear ideas about how the business processes should be developed, and those who know what is achievable with the resources available in the existing system and within the existing staff. Additions to either of these and the allocation of funds for this purpose have to be approved on the basis of the presentation of the results of the preliminary study.

**Defining the Application Structure.** The second phase of a development project is entered when a budget has been allocated on the basis of the preliminary study for the purpose of elaborating the conceptual design so as to match the structure of the R/3



functions in detail. The main task will be to define the data architecture, the database organization, and to create a prototype of the intended system component. There should be iterative early prototyping of components with end users.

**Realization and Implementation.** The third phase of a development project begins when the data object management policies begin to be implemented.

For example, any data that will be accessed by the new business function being developed will have to be made available to it. If it is data that is already in a SAP application, then it will be in a format that is already compatible. If it is held in a legacy system for which there is a standard SAP interface, then the data can be accessed online or transferred in a single operation before the new function goes online. Should it be the case that the data in the legacy system is not in a format for which there exists a standard SAP interface, then arrangements will have to be made to have an ABAP/4 interface program written or for the data to be converted by an agency.

The development team has to ensure that all the fields specified in the Enterprise Data Model have been checked to confirm that they contain the proper data or will be able to access it when it is needed.

**Final Test and Installation.** The fourth phase of a development project has to include user training followed by a final test in which the new function is subjected to the demands it will meet when operational.

A new piece of program is an extension of the EDM enterprise data model and must be tested to ensure that it integrates properly. This entails an additional test which is carried out when the new components and the existing EDM are merged. A mass test and runtime analysis are needed to measure the effects of heavy system loads and prove that the resource allocation provisions are working and can meet the demand. At this stage it is normally necessary for the new function to be authorized for release which will allow it to be called by authorized users.

## Making the Decision to Reengineer Business Processes

When all the research has been done and the information presented, there will come a series of decision stages that entail weighing intangibles and estimating probabilities. There are some well-known phenomena that may appear under these conditions. Human beings are not always very clever when it comes to picking winners. It is best to be aware of how good intentions can be led astray when dealing with intangibles and uncertainties.

**Let's Face It**

Office automation following on mechanization means the end of work for many people. If the human resources philosophy is really applied thoroughly, there can be a minimization of disturbance to those who find themselves without work. Fortunate are the personnel managers who have a means to relocate their staff in new jobs.

**There Are Pitfalls**

Input errors can give a lot of trouble if they are not detected at the time. Stress and anxiety can move a decimal point without being noticed, the person on the phone may not be the one you were expecting, and you may have called up the wrong screen. Modern business systems try to reduce the opportunities for input error by narrowing down the possibilities and having the operator choose from a list rather than enter the identifier, although there may be speed advantages in allowing people who know what they are doing to anticipate and type ahead.

Misunderstanding what is being said may occur through language and technical communication difficulties. Having the operator paraphrase what was thought to be the requirement may help; and the system can suggest what might be a standard wording. These are techniques that some operators have evolved for themselves and which can easily be supported by SAP and made available to all.

Misinterpretations of incidents and situations may give rise to operational problems. One tactic is to have the operator complete a checklist which is adjusted online so as to avoid asking for any information that is already known from the records or which can be inferred by answers to previous questions. For example, staff at a bank that accepts telephone transactions used to ask how they might help; now they begin by asking for your ZIP code, name, and initials. This allows their system to offer your last known address, which they recite for you to confirm before they move on down their list of questions. It is a quick procedure, and seems friendly.

Misreading of trends has caught many a businessperson. Something that changes only slowly or in subtle ways that are not thought important at the time can cause trouble. If one is reengineering a business process with a SAP system, there is no difficulty at all in having data analyzed to reveal any trends, however gradual. But what is not possible is for SAP to infer a trend when no data have been collected that could bear upon it.

Are customers buying mobile phones because they are fashionable, because they save time or money, or because they might come in handy in the event of a breakdown or threatening event? In the absence of any pertinent data, the SAP system may be able to provide an analysis of customers over several parameters, one of which might suggest a possible explanation. Further data must come from talking to customers, and so the SAP screen will have to be used to record free-text notes or perhaps a choice of key words or an entry in an analysis field based upon answers to some questions.

This example illustrates the use of modern technology to collect current data on what relevant people are thinking: what customers say; what suppliers say; what inquirers are



asking about. And the facilities of SAP support such research studies from the exploratory stages right through to the stage where hard data can be collected.

The system will be ready to discern trends in the data as soon as any basis for the analysis can be specified.

Waste has always been a soft spot, whether in time, material, energy, or personnel. Business process reengineering can be the opportunity to set up methods for monitoring the consumption of these resources and for comparing one situation with another, one accounting period with another.

Profit and loss have always been part of business monitoring. Nowadays there are few work people who are totally out of contact with the computer, so there is the possibility of online assessment, in profit and loss terms, of the performance of managers, supervisors, operators, contractors, even advisors.

One might argue that the sort of monitoring of performance that can be carried out by the system is rather trivial: hours worked, calls made, expenses, sales, profits, staff turnover—a mixed bag indeed, some items more important than others, depending on the company and the person being monitored.

## Monitoring the New Business

Is it too outrageous to claim that to reengineer a business by applying the SAP concept is to make it a new business?

If it is indeed a new business, it is right and proper to consider how and in what ways it is to be monitored. On what basis shall it be declared a success?

There are some favorite indices of success that are not unimportant, such as profit. Nowadays the success of a business will be judged in part on the basis of its effect on the environment. The employees will have their own dimensions for judging company performance.

However, a project to reengineer some business processes should not get very far before setting out some criteria by which it can be judged. What are to be the indicators of project progress, success, and failure? Where are the critical places to look for telltale signs of whether a project is going well or badly? Which numbers or other indicators should be scrutinized? Where are the pressure points to stop bleeding? Is there anywhere that the stick could be applied?

These queries that have to be answered in the context of a business process reengineering project if it is to be cost-effective are not peculiar to the computer industry. They are matters to which leaders of all work teams should give high priority. They apply with no less force to work teams of one, where the leader and the worker are the same person. You have to know where you are going in order to tell if you are progressing in the right direction.

## From Here ...

- Quality management is the name of the game.

The SAP concept of quality management is integral in all the applications and development tools. Consult Chapter 17, "Understanding the PP-Production Planning and Control Module."

- The problem is getting the right staff.

There is an interesting collection of components associated with the Human Resources application explicated in Chapter 21, "Understanding the HR-Human Resources Module."

- Our company is not ready to take the plunge.

You will find some good ideas and not a few powerful techniques set out in Chapter 28, "R/3 Business Workflow Management." Apply this method of serious business workflow control, and you will soon see how to further elevate your chances of business survival.





## Chapter 9

# World Wide Business Computing Systems

You may have a world wide business that you run on the back of an envelope; or you may have a worldwide computing system that does hardly any business at all.

## Multinational Accounting

Three groups of factors are important to centralized multinational companies—language, currency, and legal business practices, as follows:

Operating screens and reports must be available in the language of the users.

Amounts must appear in the local currency.

The taxes, legal financial reports, and payment methods must be those acceptable to the host nation.

If the corporation has subsidiary companies trading in more than one nation, there may have to be an additional language and currency for use by head office, plus methods of making adjustments for any differences between accounting or other business practices in the overseas host nations.

The SAP system makes copious provisions for all three groups of factors.

### Language

SAP supports an increasing number of languages. Each language is designated by a code that is entered during the logon process or defaults to the language defined in the user profile. Screens and online reports will appear in the language of the logon.

### Operational Currencies

The following currencies have been defined for operational purposes; Their codes are assigned to each function by default, which you may alter:

Local currency—is also the reporting currency for the company code

Document currency—the one specified for entry on SAP Documents

This chapter is about the enhancements of the SAP R/3 system that are designed to make productive world-wide business processing an everyday affair.

- So many regulations!
- I have some departments where you can hear almost any language under the sun being spoken.
- My chief accountant gets mad if you speak to him about currencies.
- The legal department keeps itself very busy with the regulations of other countries.



Group currency—an alternative to document currency for group reporting

Updating currency—defined for posting debits and credits to the GI-General Ledger in parallel with the local currency

Credit limit currency—the currency chosen to maintain the credit limit

Ledger currency—an alternative to the updating currency for that ledger

Additional currency assignments are available in the SAP Foreign Exchange Management component, which is part of TR-TM Treasury Management.

### **Currencies in Transactions**

Each company code has a local currency for reporting. The system records amounts in this local currency and also in a currency that has been specified as the document currency, which will be used on all documents in addition to the local currency.

You can enter documents in any currency.

You have the following two options for converting currencies:

Enter an exchange rate when you enter the transaction document.

The system translates between document and local currencies by referring to a table of daily exchange rates.

The system can be customized in various ways, including the following:

A specific user is obliged to enter amounts in a particular currency, which can be the local currency or the document currency.

A specific user may be permitted to enter amounts in either local or document currency.

Whatever the customizing arrangements, the system will display amounts in both local and document currencies. It will round off minor differences using rules established for this purpose. These differences can occur when several line items are converted and then added in both currencies.

Customer monthly debits and credits are kept by the system only in local currency. The reconciliation account for the Accounts Receivable sub-ledger is kept in local currency and in all the other currencies that have been posted.

### **Currency Exchange Differences**

A line item may be expressed in a currency other than the local or document currency. You can enter payments to clear such foreign currency line items using either local or document currency.

The payment expressed in the system document currency will have been converted from the local currency at an exchange rate adopted by the system according to the rules laid down for assigning the daily exchange rate. If this rate has changed from the rate

prevailing when the invoice was written, the payment amount may not match the open item amount. In such cases, the system will automatically calculate and post an exchange difference entry to a separate account established for this purpose.

### **Currency Translation in Consolidation**

There are three basic currency conversion methods used in the consolidation of group accounts, as follows:

- Reporting date method
- Modified reporting date method
- Temporal method

Groups of items in the balance sheet and profit and loss statement are converted at one of the three following exchange rates:

- Reporting date rate
- Average rate
- Historical rate

FI-LC Consolidation can translate any items at any rates and use any of the methods for any of the individual companies. There are several problems for which this program provides solutions, as follows:

- Exchange differences between the date of the transaction and the date of the currency conversion
- Rounding differences

The assets history sheet using rates current on the reporting date

If a transaction difference is posted, the previous translation differences will have to be reversed.

The international law requires that all inter-company balances be eliminated before presenting the balance sheet and profit and loss statement. All possible pairs of individual companies must be investigated for evidence that they have been trading with each other.

If the individual companies have installed and configured SAP accounting applications, there will have been automatic dual currency accounting in which every transaction is documented at the time in both the local currency and the currency designated for all transactions in the group. The FI-LC component will allow you to trace any currency translation differences between the local currency at the prevailing rate of exchange and the transaction currency. An exchange rate difference correction can then be posted in the balance sheet account designated for currency translation gains and losses and thus brought into the consolidated financial statement.



**Foreign Currency Valuations**

At the end of each posting period and at the end of the year, you may have to value open items that are expressed in foreign currency. You may need to value by a method for local tax purposes different from the method that stockholders in the parent company will want to see in balance sheet and the profit and loss statement. The SAP method is to define two parallel valuation areas, each of which may value open items by a different method.

When the time comes to post a foreign currency payment, the system will clear any currency translation gain or loss that has already been recorded. The posting destination account may depend on the currency and the type of transaction. In any event, the system records on each open item the accumulated translation difference.

There is then a choice of displaying in your local currency either the historical original value of each open item or the current value.

When you clear an item such as this, the system automatically reverses this translation gain or loss. You thus have the capability to monitor the situation at any time, not only at period end.

## **SAP Foreign Exchange Management System**

The purpose of the Foreign Exchange Management system is to record, monitor, and settle foreign exchange contracts. Unlike most other foreign exchange systems, the SAP Foreign Exchange Management system is not targeted at banks. It is directly integrated with TR-CM Treasury, Cash Management and automatically posts entries to FI-Financial Accounting.

The system has international functionality and supports the international communication standards. Its distinctive feature is that it links foreign exchange contracts to the specific open items that are being hedged.

The instruments of foreign exchange are constantly being developed and supplemented by new instruments. You can easily incorporate new means of foreign exchange trading. The instruments currently recognized include the following:

- Various forward exchange transaction types
- Combination of hedging and use
- Global and individual hedging

The standard business functions of SAP R/3 are available to the Foreign Exchange Management system and integrate with it as follows:

- Cash management
- Automatic posting

- Automatic correspondence
- Document history
- Links to contracts, purchase orders, invoices
- Control by internal checking
- Centralized foreign exchange management
- Introduction of new instruments such as options and futures
- Flexible reporting
- Word processing and graphical presentation of reports

### **Foreign Exchange Business Types**

A business type defines the business transaction as a program object and controls the processing logic in the system, including the data recorded by the system and how they are obtained.

The business type can determine the following operational details, for example, the following:

- Sequence of screens for data entry
- Data fields to be mandatory, optional or suppressed
- Manner in which TR-CM Cash Management and FI-Financial Accounting applications are updated by the Foreign Exchange Management System

The controlling functionality of business types can be adjusted online.

The system is provided with definitions for the most common business types covering the foreign exchange market instruments. You can define an internal business type and assign it to transactions by entering its code. The codes can be used to sort your business into the appropriate journals. Such internal business types can be used to control foreign exchange trading within a group of companies and support the concept of a centralized treasury department. There is an extensive range of SAP TM-Treasury Management components.

You can define a statistical business type for a special task. It will not update the TR-CM Cash Management system or any FI-GL, General Ledger balances, and in this respect is analogous to planning data.

### **Foreign Exchange Management Function Types**

A function type defines the stage or milestone that a foreign exchange contract has reached in its life cycle when you post the transaction. You can decide which steps are relevant for your company. The following is an example:

- Initiating a transaction
- Modifying



Prolonging

Settling

Each transaction will generate a document on which will be recorded the business type and the function type, and hence the stage reached by a foreign exchange contract.

The business type and the function type together control the data entry and processing. The specific function type will determine the following:

What appears on the data entry screen and which fields are suppressed

Which fields require data and which are optional

The control and release function

The confirmation printout

The integration of data into account

The system will automatically record all changes to a foreign exchange contract in the form of documents that log the changes of function type from initiation to settlement and archiving.

## **The INT-International Development Application**

There is an established range of enhancements to the SAP R/3 system that are designed to customize a worldwide system according to the international trading communities in which it operates. These are presented as modules of the INT-International Development Application as follows:

IN-APA Asian and Pacific Area

IN-EUR Europe

IN-NAM North America

IN-AFM Africa and Middle East

IN-SAM South America

## **Foreign Trade**

The SD-Sales and Distribution application includes a module that is specialized in the regulations governing foreign trade.

### **SD-FT Foreign Trade**

The following functions are available in the SD-FT Foreign Trade module:

FT-Processing

FT-Declarations to Authorities

FT-Export Control

FT-Preference Agreements

FT-Control

### **Export Data Records**

Where your company is operating in a business zone in which local export and import rules are in force, the SAP applications can be configured with the appropriate processing logic. For example, the European Community has imposed special rules on international business transactions since January 1993. The INTRASTAT procedure requires that reports be submitted periodically to the appropriate national authority for all export transactions within the community. The following export data items are relevant to INTRASTAT reporting, and are managed automatically by the SD-Sales and Distribution system and quoted in the delivery and billing documents:

Community code, country and region of origin of the product are stored in the master record

The route planned for delivery, which will determine the customs office and the mode of transport

The business transaction type and the export procedure

The customer master records will include the value added tax VAT REG NO field in which the company's VAT registration number is stored. It applies at the company code level of organization structure, and therefore to all structural elements below it.

### **Country-Specific Regulations**

The business practices and legal requirements of specific countries extend over the following kinds of issue:

Legal Reporting

Valuations

Taxes

Payment Processing

The following examples illustrate the differences in national codes of practice that can be installed as integral components of a specific SAP R/3 system:

Federal Republic of Germany—Check/Bill of Exchange

Switzerland—POR Procedure

France—LCR and LCC

Italy—Ricevuta Bancaria



## Special National Human Resources Features

A substantial part of the HR-Human Resources application is already defined to accept international operations as a normal part of business. However, there are some aspects that require the integration of supplements programmed to recognize differences in the legal requirements and business practices of different nations and different business communities.

### HR-Human Resources National Supplements

The national supplements provide dynpros and the associated screen designs, which can take advantage of different language pools, to conduct the human resources business functions according to the customs, terminology, and legal requirements of the country concerned. With globalized enterprises, the personnel administration need not be for the country where the functions are being utilized.

### Multilingual Capabilities

Applications and modules within applications can be presented in any of the supported languages. Alternatively, the application can be maintained in the language of the host installation and then any of its constituent functions can be assigned a different language according to the user profile of the person logging on to operate it.

**Language Text Pools for ABAP/4 Programs.** When the code in an ABAP/4 program requires a text element to be displayed on a screen, it specifies the number of the text element to be used. The code does not have to be changed in order to access another element if the language of the user is changed. The language in which the text element is presented is determined by the language selected by the user profile.

Language Text Pools are used for screen layouts, online help, and online documentation.

**Pictographic Languages.** The DBCS is a double-byte character set system that can support the pictographic languages that have a large number of characters—Japanese and Chinese, for instance.

**Wide Character String Handling.** The ABAP/4 language has been extended to recognize data type W, for wide character fields, and some other functions that permit double-byte characters to be mixed with normal single-byte characters in the same field.

## From Here ...

- The technical problems of worldwide computing seem insurmountable.

You might feel that, but the SAP standard business software has been there before and already sorted out all the technical problems. See Chapter 3, "System Architecture and Distributed Applications."

- Where is it possible to find out exactly which function is in each module?

You will find a method of locating functions described in Chapter 5, "The R/3 Reference Model." See Chapter 6, "Tool-Supported Optimization with the R/3 Analyzer," for a discussion of business process optimization using the R/3 Analyzer.

■ What is an Enterprise Data Model?

A good one will show you what makes your company tick. Try Chapter 10, "The Open Information Warehouse and Enterprise Data Models."

■ What about head office functions?

There are two possibilities: Chapter 14, "Understanding the Enterprise Controlling Module," and Chapter 15, "Understanding the TR-Treasury Module." Or you might prefer Chapter 12, "Understanding the FI-Financial Management Module."

■ Where can I find more information on the topics covered in this chapter?

See Chapter 21, "Understanding the HR-Human Resources Module," and Chapter 20, "Understanding the SD-Sales and Distribution Module."





## Chapter 10

# The Open Information Warehouse and Enterprise Data Models

The purpose of an information warehouse is to provide technical, business, and statistical data for any part of the corporation that might need it. The purpose of an enterprise data model is to provide a structure into which data can be fitted so as to make sense to those who contemplate it.

The warehouse provides the information; the enterprise model gives it business meaning.

## The Open Information Warehouse Concept

The concept of an open database includes the notion that all data is stored in tables that are apparently ready to be instantly inspected and used without any need for complex data retrieval instructions in a specific language peculiar to the one vendor.

An open information warehouse suggests that all the information is readily available in a form ready for use without the need for special access operations. There is also the implication that the inventory of the warehouse is comprehensive and up-to-date.

### Data Sources

SAP information systems are available for all the main applications and are an integral part of their operation. They are an obvious source of data concerning their specific areas of business activity. And they already cooperate with one another so as to share master data such as supplier details and materials master data. They are also integrated with the financial accounting modules.

If the open information warehouse is to be developed in support of the EIS-Executive Information System, then there will be a demand for information from the TM-Treasury Management module, which could include online information links to the financial and materials market information systems provided by non SAP vendors.

This chapter begins by identifying the sources of business data and then goes on to relate it to models of the enterprise:

- What is the difference between a data model and a reference model?
- What is a data dictionary?
- Is there any difference between "data" and "information"?
- How do you find your way in the information warehouse?



The following SAP sources contribute to the open information warehouse:

Financial Information System (FIS), see Chapter 12, "Understanding the FI-Financial Management Module"

Controlling Information System (CIS), see Chapter 13, "Understanding the CO-Controlling Module"

Purchasing Information System (PURCHIS), see Chapter 20, "Understanding the SD-Sales and Distribution Module"

Materials Management Information System (MMIS), see Chapter 22, "Understanding the MM-Materials Management Module"

Production Information System (PPIS), see Chapter 17, "Understanding the PP-Production Planning and Control Module"

Shop Floor Information System (SFIS), see Chapter 17, "Understanding the PP-Production Planning and Control Module"

Plant Maintenance Information System (PMIS), see Chapter 19, "Understanding the PM-Plant Maintenance Module"

Sales Information System (SIS), see Chapter 20, "Understanding the SD-Sales and Distribution Module"

Human Resources Information System (HIS), see Chapter 21, "Understanding the HR-Human Resources Module"

## **The DMS-Document Management System**

The resources of the DMS-Document Management System will be at your disposal to help you find what you require in the open information warehouse. The R/3 Classification System comprises many functions designed to help you locate information held in document form. You may search on the basis of subject matter and you may search for an item because you know it is linked with a data object such as:

Another document

A material identified by its material number or by its name, or part of its name

An item of equipment where you have given its name or only the identification of the activity where it is used

A project identified by its number, the person responsible, the purpose, and so on

A quotation

A sales order

A customer or a vendor identified by an attribute in the master records

## EDM-Enterprise Data Models

The purpose of an enterprise data model is to make sense of and take account of how the business uses the data structures defined in the active ABAP/4 data dictionary.

The enterprise data model is built from entity-relationship elements that portray the relevant information objects and their relationships from a business standpoint.

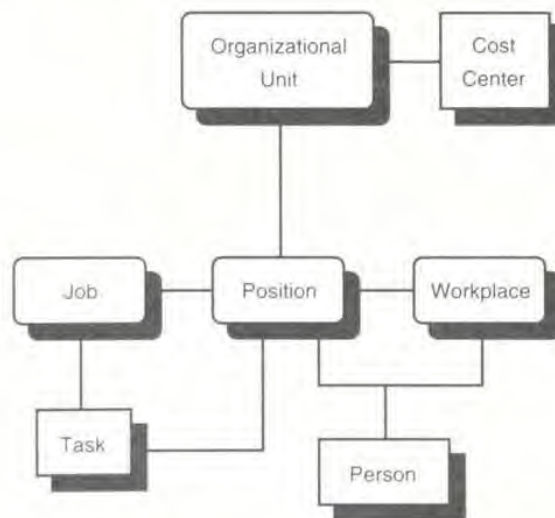
For example, the following relationship is between data structures seen from a data processing standpoint:

$$\text{Value S} = \text{Value C} + \text{Value P.}$$

The same relationship may admit a different interpretation when seen from a business perspective:

Profit **is** Sales Revenue **less** Costs.

One view is a model for the computer to specify the calculation procedures; the other is a model of how the business can survive and flourish if the management can manipulate the values in a certain way. These examples are obviously a little sparse. Part of a slightly more developed model is shown in figure 10.1.



**Fig. 10.1** Part of an Enterprise Data Model.

### Object Types in an Enterprise Data Model

The following object types appear in the example model fragment:

**Organizational Unit**, which is part of the R/3 Reference Model and will be assigned the name of the operating company or department that the enterprise data model is being used to represent

**Position**, which is modeled from the R/3 Reference Model and named to suit the specific company with a title such as Sales Representative

**Workplace**, of which there may be several assigned the same position, each able to accommodate one person

**Job**, which is a set of tasks based on a specific workplace but not necessarily the only set of tasks performed there

**Task**, which is a component of a job and usually comprises a fairly well-defined set of work input materials or messages for which there are appropriate work procedures

Two other object types, not part of the Human Resources Organization and Planning component, are necessarily addressed by relationships in this arena. They serve to particularize any instance of the model by naming a person who is assigned to perform a job and therefore is attached to a workplace which carries the responsibilities of a position, and a **Cost Center** such as a specific plant or department.

### Relationships in an Enterprise Data Model

The data model fragment in figure 10.1 implies the following relationships:

A named person **holds both** a Workplace and a Position.

The Workplace **is part of** the Position.

The Position **is part of** an Organizational Unit.

The Organizational Unit **is allocated to** a particular Cost Center.

The Position **describes** a Job.

The Job describes one or more Tasks.

A Task describes a special case of a Position.

There is a system of graphical symbols that are used by the R/3 system to display different views of the Enterprise Data Model so as to emphasize the relationships between the objects of the model.

### Organizational Structure in an Enterprise Data Model

The SAP R/3 general organizational units relevant to all applications are taken from the standard reference that is the R/3 Enterprise Data Model:

**Client** is the highest level in R/3. The data of one client may not be accessed by another client. There is often a training client and a testing client, in addition to the client code that represents your group or corporate identity and under which the SAP system runs normal business. Some data is managed at the Client level because everyone in the corporate group of companies will want to refer to exactly the same information and be certain that it has been maintained up-to-date and correct. Vendor addresses would be an example of data managed at the client level.

**Company Code** signifies a legal unit under the Client which produces its own financial documents, the balance sheet, and the profit and loss statement, and may well maintain them continuously reconciled.

**Plant** is an organizational unit that is seen as central to the production planning concept. A plant can be a production site, or it can be a group of storage locations that share materials. Plant is the unit for which MRP prepares plans and maintains the inventory. It is the focus of MM-Materials Management. Each plant will have been given planning and control elements such as material, inventory, operations, work centers, and so on.

The lower levels of organizational structure will tend to be specific to the application. For example, the lower levels of a warehouse data structure will reference warehouse areas and perhaps bin types and bin numbers, whereas the lowest level in a human resource personnel data structure will be an individual person.

## From Here...

The open information warehouse is a concept that is able to be realized in practice because all the integrated SAP system components can be called upon to supply data that is structured in accord with the enterprise data model that has been established for your company. Particular details are discussed in the chapter concerning the R/3 application module to which the data of interest belongs.

- How is the data stored?

The system of data objects is discussed in Chapter 4, "R/3 Architecture."

- How do you find out what SAP standard business functions are likely to be needed for your company?

See Chapter 5, "The R/3 Reference Model."

- How are the materials master records managed in the continuous processing industries?

See Chapter 18, "Understanding PP-PI Production Planning for Process Industries Modules."





## Chapter 11

# A Computing Center Management System

The purpose of the Computing Center Management System (CCMS) is to provide an efficient and flexible system for monitoring and controlling the SAP system and its application modules. It is required to manage the routine tasks of monitoring and controlling background processing and database backups. The intention of the design of the CCMS-Computing Center Management System is to build into it the best methods of discovering problems as early as possible.

The complexity of modern worldwide business systems raises certain questions which have to be answered by being able to point to reliable and tested software and hardware that has been proved to be able to cope with this complexity. The following are some of these questions:

- Can the CCMS-Computing Center Management System manage very large networks and global companies?

The CCMS combines with the various host and application system platforms to build an integrated large network manager.

- Is the CCMS-Computing Center Management System an open system?

SAP extensions of the SNMP-Simple Network Management Protocol have been developed to provide various MIB-Management Information Bases. These are designed to interface with all types of systems and system platforms.

- What happens if a component of a distant system breaks down?

A global alert monitor function will display this fact in the CCMS-Computing Center Management System.

- In a global system, where are the computing loads managed?

The CCMS-Computing Center Management System is able to assign users to sufficient free capacity and oversee the time controlled distribution of system resources.

This chapter covers the following areas:

- System performance monitoring and watching for early signs that might presage problems;
- Tools for controlling and managing the workloads over a distributed and complex system;
- Methods of arranging open interfaces in large R/3 installations and heterogeneous system platforms, so as to integrate with a diversity of network services and third-party applications;
- Security, reliability, confidentiality, and integrity.



- How is the management of backing up data arranged in a global system?

The backup and recovery of data can be supervised through the CCMS-Computing Center Management System, together with the associated security and authorization.

## CCMS Components

The components of the CCMS-Computing Center Management System are included in the standard R/3 system.

The SAP-GUI Graphical User Interface is provided with functions and control options that are easy to interpret by virtue of the extensive use of graphics, and easy to use by selecting items on the screen and applying the special function keys. Beginning with R/3 Release 3.0, the CCMS functions are supported by the SM-Service Management component which is designed to enhance computer center management.

The CCMS receives notification of service requirements which it can relate to its model of the equipment in the system. This model represents the hardware, software, network addresses, cables, and other items from which the network is built. Furthermore each component, such as a local network server, is represented with all its dependent software and hardware, and the object networks such as LAN (Local Area Networks), and WAN (Wide Area Networks).

Each item has been assigned standard partner activities so that appropriate service contractors can be identified if a fault arises. The accounting and pricing arrangements are also set up for each activity so that the administration of the service contracts may proceed efficiently and largely automatically.

The SM-Service Management component also responds to change notices so as to maintain the network models.

## CCMS Integration

The SAP R/3 CCMS-Computing Center Management System is integrated with the facilities of the various host platforms and operating environments. For the R/3 system to qualify as an open system, it must support the interaction of any of its applications with any other to the extent that any of the user interfaces should be able to access any of the applications, which should be able to exchange data with each other. The interplay of applications depend on a shared system of international standards for interfaces, services, and data formats.

The following international standards are supported by R/3:

- **TCP/IP**, Transmission Control Protocol/Internet Protocol, is the standard network protocol for open systems and is supported by all R/3 applications.
- **RFC**, Remote Function Call is the SAP ABAP/4 programming language adaptation of Remote Procedure Call which permits other systems to call R/3 applications.

- **CPI-C**, Common Programming Interface-Communication is a set of standardized definitions for program to program communication across systems.
- **SQL**, Structured Query Language, is the ANSI, American National Standards Institute fourth generation language for manipulating data.
- **ODBC**, Open Data Base Connectivity, is a Microsoft standard for table-oriented data access based on SQL definitions.
- **OLE**, Object Linking and Embedding, is a Microsoft technology that permits objects to be connected and incorporated across multiple files and programs.
- **X.400**, is a series of recommendations for message handling systems with extensive security options. These originate from the ITU, International Telecommunications Union through its agency, CCITT, International Telephone and Telegraph Consultative Committee.
- **X.500**, is a series of standards for directory services, also issued as ISO 9594, drawn up by the CCITT. These standards require the use of directory user agents to control access to a directory information base.
- **MAPI**, Messaging Application Programming Interface, is part of the Microsoft WOSA, Windows Open Service Architecture.
- **EDI**, Electronic Data Interchange, is a standardized scheme for exchanging business data between different systems by means of defined business documents such as invoices and orders.
- **CAD**, Computer Assisted Design, is supported by a series of standards for the transmission and storage of technical documents, including drawings and textual materials.
- **COLD**, Computer Output on Laser Disc, is a method of writing image data for optical archiving which is used by the SAP ArchiveLink to store digitized bit-mapped pixel data which is directly linked to documents and data that are coded and which therefore can be used to retrieve the stored image.
- **Technical Subsystems**, which are company-specific devices to interact with plant controls and instruments through interfaces adapted for this purpose.

### Open Network Management Platforms

The overall manager system for an association of large, heterogeneous networks from a variety of vendors may be considered to be a manager of the more local network managers of the constituents of the network. The difficulty is to create a system which allows the components sufficient flexibility to interact with each other without losing the advantages of control by a "super-manager." The central controller has to have intimate knowledge of the details of all the elements.

By contrast, an open network management platform is a product which allows all user direct management of the network technologies. Under these conditions, there is no need for each component network to have its own separate network manager.



This concept is also referred to as “Enterprise Management” and is discussed in Chapter 14, “Understanding the Enterprise Controlling Module.”

**Open Network Management Protocols and Application Interfaces.** Although various management protocols have been developed, the formative standard for open management platforms has been SNMP, Simple Network Management Protocol.

The success of an open network management platform depends, not only on a shared management protocol, but also on the availability of an application programming interface (API) for each of the applications in the network. An API should be a well-defined and thoroughly-documented method of exchanging data and commands with the application, no matter which platform it is running on, or which vendor provided it.

A SAP Management Information Base is the data interface between the R/3 system and additional services, not necessarily on SAP system platforms. The open systems philosophy is designed to effect seamless integration with all systems, whatever their origin and configuration.

The following products are examples of open network management platforms that have been accepted by a significant number of user organizations:

- SunConnect SunNet Manager
- Hewlett-Packard OpenView
- IBM NewView/6000

These products extend the CCMS facilities to the large network environment with the additional functionality needed to manage the network nodes and the operations centers.

From the R/3 CCMS you can query the current configuration and status information of all internal and external systems. The status information from the integrated R/3 applications can be combined with alarms from other networks, other systems and from specific specialized applications. You are then in a position to use your central display to present the total system information that is necessary for global problem solving.

The way to global control of automated systems is opened up by this approach. The open network management product can be tailored to the requirements of your global integrated systems by means of a central specification of operator profiles and an integrated set of customizing specifications that can be extended to include all the significant system components.

The essential functions can be controlled through any combination of these systems in order to provide the following services:

- Event control
- Messaging
- Problem handling

## System Monitoring

The elements of system monitoring fall into two sections: alarm services and system performance monitoring.

The focus of these activities is the global alert monitor function, which is supplemented with various other monitors for detailed analysis and record-keeping.

### Alarm Services

The status of each system component is tested and logged at frequent intervals, together with information on the queues waiting for service and, if there are any, the error messages generated by the local controlling systems.

**Global Alert Monitor.** The purpose of the global alert monitor function is to assemble in one integrated display system all the alarms and warning messages that have been generated by the peripheral systems and their communications. This information can be displayed under the standard SAP-GUI, Graphical User Interface, which allows the user to select any item and drill down to see the documents which contributed to its calculation: the data and the calculation formulas and conditions.

**Database Monitor.** The automatic function of the database monitor is to keep track of the free space available and the volume of traffic to and from each database. The systems will also be logging the date and time of each transaction, so that the database monitor can derive performance measures to assess all the significant dimensions of the operation of the database complexes.

**Operating System Monitor.** The operating system monitor will be tracking the availability of main memory and disk space in order to be able to assign processing workloads to those parts of the global system that can best handle them.

Again, the performance of the system under scrutiny will be measured, for example, in terms of central processing unit task times and throughput capacity.

**Network Monitor.** The visual display of the network monitor is supplemented by listing displays to show the integrity of the network and the loads on it at all times. These utilization statistics are continuously logged and may be analyzed online.

**Job Scheduling Monitor.** For the processing of background jobs and the allocation of system resources, the job scheduling monitor concentrates on the incoming requests and the reports of the status of the systems needed and available to meet them.

**Applications Monitoring.** The application server statistics compiled by the computer center are an important source of information needed for strategic and tactical planning at the global level. In addition, lists can be compiled for any data of interest, and then subjected to whatever statistical analysis will best reveal their significance.

### Performance Measurement

There are two main reasons why the performance of an integrated system should be measured. The first is to determine the data which can be used in the future to balance

the work loads and prevent bottlenecks. The second is to identify those functions that are most frequently called so that they may be considered for technical improvement to increase their efficiency.

The CCMS module includes tools to monitor the runtime performance of R/3 applications in, for example, the following respects:

- Response time of dialogs
- Number of dialog steps per hour
- Central processing unit utilization and load factor

## System Control

The essence of computer network system control is to plan what data processing and storage requirements will be met by the system resources that will be available at the time. It is necessary to know which resources are available and what work loads have already been assigned to them. The endeavor is much like any process controlling: perhaps quicker, and certainly demanding in expertise and rapid decision-making.

### Optimizing the Load Distribution in the Client/Server Environment

The optimizing function is a development of resource planning, which has always been a combination of predicting the future requirements and applying historical data about how operations consume resources.

The database has to include measurements of the performance of the system components. And there must also be estimates of the loads which the planned requirements will place on them.

Over and above the assigning of work loads to resources that will be available to handle them, there has always had to be an element of safety planning: keeping capacity in reserve in case a critical resource breaks down.

As a result, there has developed a culture and discipline of safety stocks and reserves, which becomes manifest in guidelines for the utilization of capacities. Work loads are shared so that no resource is overstretched while an equivalent capacity is underutilized.

In the context of a computer-based production system, there is an indispensable requirement for fast and accurate displays of the status of all the production resources and planned requirements. When the production resources are the computers and networks themselves, the same requirement exists. Processing loads and computing capacities have to be integrated with the database operating and capacity factors.

**Assigning Users to Sufficient Free Capacity.** Having a network with a central global planning and control capability can make it possible for the total productivity of the system to be much increased, since the CCMS will be aware of the requirements for data processing and the planned availability of the resources. The users can be assigned to the capacities that will be best able to cope.

The system functions for distributing loads can provide a load-balancing service for groups of users who share the same set of dialogs. When you sign on to work in a particular area, such as SD Order Entry, or Accounts Payable in financial accounting, you will be assigned automatically to a server that is for the moment handling the smallest load.

### **Time Controlled Distribution of System Resources**

When there is a choice between background and online processing, there are obviously more degrees of freedom for the system resource planners. If the network spans time zones, the daily load patterns may be used to plan a timetable of resource allocations.

The following operating modes are pre-defined:

- Online operations where most work processes are defined as dialog processes
- Nighttime operation where most work processes are defined as background processes
- Maintenance operations which are restricted to certain authorized users

Processing control for the operator-less nighttime mode is based on the following types of function:

- Recognition of different classes of job
- Responses to external events
- Starting and controlling external programs by means of RFC remote function calls
- Reservation of processing resources according to the priority of background jobs

The Computing Center Management System also operates its own system of priorities to ensure the scheduling and monitoring of data backup and recover tasks in conjunction with the application processing workloads.

## **System Services**

The system services emanating from the CCMS in addition to the global alert monitoring function are essentially those entailed in looking after background processing and the safety functions of backup, recovery and security.

### **Background Processing**

The planning of system resources will seek to make best use of background processing whenever there is no absolute requirement for online immediate response. There are several methods of anticipating the online requirements so that the background processing can provide support in the form of data that has been selected and processed on the basis of the likely needs of the online user.

For example, the user who habitually works with material masters of certain types will appreciate it if the central management system has already updated these masters before his daily work schedule begins.



**Backup Management**

One of the key benefits of being linked to a system with a formal backup management system is the security of being able to recover much of earlier work in the event of a local system failure.

Yet the costs of comprehensive and frequent backup can be considerable. A policy for backup management has to be in place, and the ideal owner of this policy is the CCMS which can also ensure that it is obeyed.

The HP OmniBack II system is an example of a backup system. It can reach 20 gigabytes per hour.

While this type of system is in operation, it is essential that access to certain records is blocked so that they are available for backup. This is implemented in the R/3 system during the transaction processing.

**Online Data Backup.** As the speed of available backup equipment increases, it becomes increasingly feasible to adopt a regime of online backup where the records are copied very frequently indeed.

The faster the rate of transactions in a system, the shorter should be the interval between backups so as to minimize the loss of data if any part of the system should go offline. The method of disk mirroring effectively maintains the backup continuously as a faithful replica of the operational storage medium.

**Recovery**

Recovery from a disruption and the restoration of records that have been backed up are subject to the same developments as the backup operation itself. The frequency of the operation and the resolution of possible conflicts between the old records and the new are matters of the utmost importance that have to be controlled by rigid rules programmed into the system.

**Security**

The measures that are taken for backing up data and restoring it under controlled conditions after a disruption are clearly central to the maintenance of data security.

The invasion of a system by unauthorized users and unregistered programs has to be prevented at all levels. If the CCMS can indeed monitor the status and performance of all the components in the global system, there will be the opportunity to alert the peripheral units of any unexplained irregularities, and to measure the extent of the impairment.

A suite of authorization policies and security procedures is obviously essential. It is provided as an integral part of the R/3 system and therefore extends to all SAP applications that are integrated with it. However, the security, reliability, confidentiality, and integrity of data and programs held in non-SAP satellite systems have to be ensured by attention to the details of these specific components.

## Simple Network Management Protocol Applications

The R/3 system can be used to report the configuration and status of any system component integrated with it by using the SAP Management Information Base system which is based on the Simple Network Management Protocol.

### Data Collector Interfaces

The data collector interface currently monitors information from the following systems provided by the Remote Network Monitoring Management Information Bases (RMON-MIBs) maintained by special network analyzers:

- Ethernet
- Token Ring
- FDDI
- ATM

These sources provide network information about, for example, the current segment loads and collision rates.

### EarlyWatch

The purpose of the EarlyWatch system is to monitor a system and detect the possibility of operating problems before they have had time to disrupt production. A team of experts is available to interpret the information gathered through the SAP Management Information Base system using the Simple Network Management Protocol.

Chapter 26, "Understanding the OSS-Online Service System," discusses this further.

## From Here...

- What is the central manufacturing management equivalent of the CCMS?

Manufacturing can be controlled from the CCMS-Computing Center Management System. The LO-LIS Logistics Information System, described in Chapter 14, "Understanding the Enterprise Controlling Module," includes components that collate information from each of the R/3 applications that are installed, such as SD-Sales and Distribution, PP-Production Planning, MM-Materials Management, PM-Plant Maintenance, and QM-Quality Management.

- How is a global organization controlled?

See Chapter 14, "Understanding the Enterprise Controlling Module."

- Can I arrange continuous monitoring and consulting?

Chapter 26, "Understanding the OSS-Online Service System," describes an extensive monitoring and consulting facility to which you can subscribe.





## Part IV

# Steering the Corporation

- 12 Understanding the FI-Financial Management Module
- 13 Understanding the CO-Controlling Module
- 14 Understanding the Enterprise Controlling Module
- 15 Understanding the TR-Treasury Management Module
- 16 Understanding the PS-Project System Module



## Chapter 12

# Understanding the FI-Financial Management Module

The SAP product module FI-Financial Accounting comprises a number of components. They may be installed and configured in various combinations to suit the individual implementation.

This chapter will remind you of the basics of double entry bookkeeping and how they are enacted in a modern integrated management system.

## The SAP R/3 FI-Financial Accounting Programs

The SAP FI-Financial Accounting components are discussed in the following sequence, together with some topics which are relevant to them all.

FI-GL	General Ledger
FI-AR	Accounts Receivable
FI-AP	Accounts Payable
FI-AA	Asset Accounting
FI-LC	Consolidation

Accounting is a source of support for the people who do things. At its best it sheds light on the value of what they are doing and the value of the materials they use and those they throw away. It should help them waste less and add more value by using information and skill. Those who have invested in the company will also want to see how things are going. They will want to look at the annual accounts, for a start. At its worst, accounting is the painful process of collecting a confusing blanket of numbers to throw over an enterprise that is really a waste of time and resources. There is a legal requirement to publish the financial documents: But it may take an expert to discern just which elements of the business are contributing to the value of the material and information passing through the company, and which are not.

Some of the main topics in this chapter are

- The General Ledger is where the information is accumulated for the balance sheet and profit and loss statement.

- What are the Personal Accounts in the General Ledger?

Accounts Receivable and accounts Payable.

- What is Financial Controlling?

It is the process of planning the value flows in an organization and then recording the actual values for comparison with the plan.

The possibility—indeed, the necessity, for all but the tiniest of firms—of managing the accounts on a computer opens the opportunity to make one of two mistakes at the design and implementation stage.

The first mistake is to overlook the many ways in which the computer can add value to the information and material work items passing through the company. For example, the computer can make sure that the customer is provided with exactly what he needs and is properly billed so that he pays for it. Manual systems can be used to serve this purpose if the person in charge of them is diligent and energetic. By contrast, the computer can be diligent and energetic in business where everything is going according to plan, and can also detect slow responses on both sides, and call attention to this imperfection—not simply by ringing an alarm bell, but by gathering together the pertinent information and presenting it to a suitable person to take a decision.

The second mistake in conceiving a computer-assisted accounting system is to assume that it is simply a matter of mechanized books.

The computer can be made to be good at what it does only if it is endowed with impeccable behavior. As far as possible, it must be incorruptible. Entry errors may occur which are not detected at the time. In such instances, it must be possible to trace the origin of the error, make corrections to the accounting, and perhaps take steps to make this type of error less likely in the future, or at least have it detected at the time. The SAP system takes this moral stand very seriously. Each time a transaction takes place between SAP and the outside world, a SAP Document is created and stamped with the date and time. The terminal device signs the document, and the user is obliged to leave his or her identification there too. From this moment of formal entry launching the transaction, there is no further opportunity to annotate or adjust anything illegal. The time-stamped SAP Document recording the entry event will be locked. Therefore it is best if it is checked before it is launched, and it would be very helpful to append any annotations or explanatory remarks at this stage. There will usually be a choice of standard annotations to cope with most eventualities, plus the possibility of entering free text by way of explanation.

If the transaction is legal but in error, then a correcting transaction must be enacted. This too will leave its mark on the audit trail by generating a SAP Document.

Accruals are an essential part of modern online accounting. Costs and charges, possibly profits as well, are linked to the time period and cost or profit center to which they belong, rather than to any general fund. The aim is to reveal the true value to the company of whatever activity is using its resources.

### **Checking the Data**

Checks are made at every stage where an automatic assessment can be made as to whether the information coming in is reasonable. Do the figures balance? Is this transaction legal? Has this decision-taker been authorized to make this choice?

SAP standard business software is built around the aim of providing continuous measurement of the profitability of everything that is going on. Each business function will be recording how often it is used and how long it takes to do its work. And this kind of performance information will be available to illuminate any scrutiny of how resources are being utilized.

This sophistication in accounting performance measurement, provided as standard in the SAP systems, is additional to the Generally Accepted Accounting Principles (GAAP); but it may well make a very significant difference to the figures on the profit and loss account.

The ideal accounting system will be able to recreate an unbroken audit trail from each and every transaction to the balance sheet and profit and loss account of the company. The auditor should be able to point to any number on the financial documents of the company and ask to see how it was computed, right back to the documents that came from the outside world to carry the information that found its way into the computer.

SAP FI-Financial Accounting can always deliver an unbroken audit trail, because every external and internal transaction creates a record in the form of a SAP document, which can be called to substantiate the audit and prove the credentials of the company's accounts.

And upon this foundation it is possible to demonstrate just how the system is complying with the GAAP tenets as applied to computerized accounting systems. The GAAP requirements arise from a set of statutory regulations, decrees and ordinances that embody the experience of the accounting professions and serve as the basis upon which each nation may develop additional accounting traditions and requirements.

### **Worldwide Accounting**

SAP International Development is a set of models, one for each geographical area of the world, to enable the SAP system to take account of the rules and practices of the major trading communities.

INT-International Development module includes the following components:

IN-APA	Asian and Pacific area
IN-EUR	Europe
IN-NAM	North America
IN-AFM	Africa and Middle East
IN-SAM	South America

These modules are fully integrated into the R/3 system during implementation. They are additional to the standard R/3 provision for translating screen text and currency values to suit the local language, local currency, and reference languages of the group head office system.

FI-AP Accounts Payable and FI-AR Accounts Receivable are sub-ledgers of the FI-GL General Ledger and completely integrated with it. They are sometimes referred to as the Personal Sub-ledgers because they contain information that is associated with customers and vendors and might be subject to rules or customs of privacy and nondisclosure.

The balance sheet has a Receivables Account in which line items in customer accounts are subtotaled or totaled. The Payables Account in the General Ledger subtotals or totals the line items from the vendor accounts.

Each customer transaction updates the balance of the Receivables Account in the General Ledger and each vendor transaction updates the balance of the Payables Account in the General Ledger.

TR-CM Cash Management is concerned with bank balances and cash, usually on a daily basis. The associated sub-ledgers will have accounts in the General Ledger and will therefore be integrated with it. The transactions of the various types of Cash Management will include the following functions:

- Reconciling and sorting bank accounts
- Planning short- to medium-term cash requirements and cash investments
- Buying, managing, and selling securities, loans, and time deposits
- Managing foreign exchange

PA-PYY Payroll, FI-AA Asset Accounting and MM-Materials Management also have sub-ledgers and balance sheet accounts which enable them to integrate with the General Ledger in the same way as Payables and Receivables.

For each of these transactions in the sub-ledgers and the FI-General Ledger a SAP Document is created, which can be used to keep track of any element of the transaction details recorded in it. Material code number, asset number, personnel number of the entry clerk—these are all examples of transaction details that can be used to retrieve transactions for analysis.

The FI-General Ledger module also offers some of the facilities of an extended general ledger, even if the SAP Extended General Ledger system has not been installed. The extended facilities allow you to enter cost data such as cost center, cost unit, and project identification with each transaction.

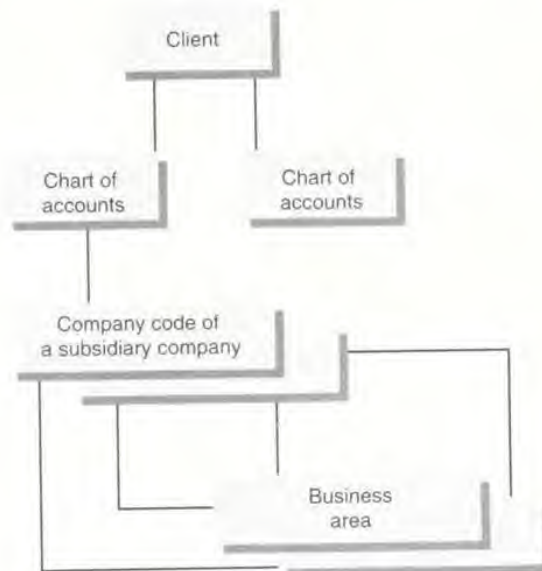
After each transaction, because the General Ledger will have been updated, you can display or print lists of updates to the balance sheet and profit and loss statement. You can also print or display balance sheet reports and any other report of the financial system.

### **Configuring and Customizing FI-Financial Accounting**

The SAP R/3 system with the FI-Financial Accounting Application installed will have been configured for a particular country. The features specific to the accounting laws and customs will have been configured to operate correctly.

The system will also have been configured to comply with GAAP, the Generally Accepted Accounting Principles.

A typical national chart of accounts will be in place. If you have a multinational installation, the necessary additional charts of accounts will be installed.



**Fig. 12.1** The Client is the unique pinnacle of the enterprise.

If you install another SAP application, the system will generate the FI-General Ledger accounts required automatically.

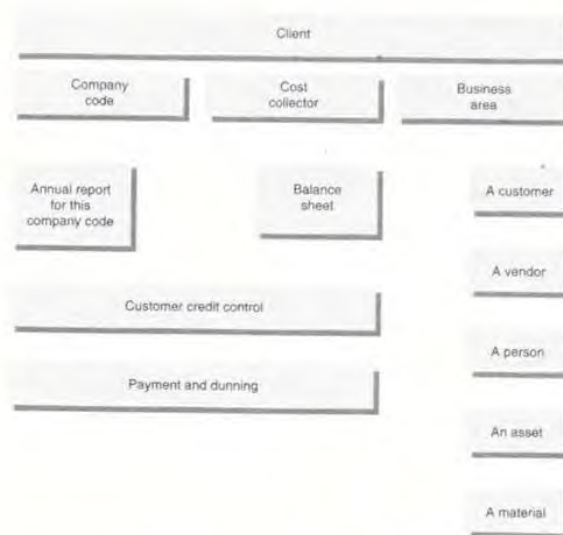
The parameter settings for specific countries will have been adjusted to suit a particular delivery client for your first installation. This is usually treated as your standard SAP Client. It will be assigned a client code which will ensure that all data and documents are identified as belonging to this client. Client 000 may be used for training purposes and Client 001 for testing. If you install an application additional to the R/3 system, you can allow the specific parameter settings to be installed in your standard client account; or you may prefer to create a set of separate client codes, one for each of your individual companies if you have a multinational group.

### FI-GL General Ledger

The internal accounting system of a company is designed to control costs. Investors in the company will want to know how the capital of the company has been assigned in the external accounting system that comprises the general ledger.

For convenience, the general ledger will be supported by as a set of sub-ledgers including accounts receivable, accounts payable, fixed assets, human resources, and materials.

The external accounting system should show what the company is worth.



**Fig. 12.2** The Enterprise Data Model can represent all the business objects and processes, and their interrelationships.

### A Chart of Accounts in Common

Following the principle that any number that appears on the external account documents should be amenable to analysis into its constituents, the cost accounting system should have been supplied with all the expense and revenue entries. Costing data allocated to period or product line will also be posted to the general ledger via a common chart of accounts which is shared by both the financial (external) accounting system and the cost (internal) accounting system.

The general ledger is a series of account balances. Modern online accounting maintains the general ledger balances continuously. Data that have been entered and posted will be posted immediately to the general ledger and also to the CO-Controlling system if it has been installed. The balance sheet and the profit and loss account are based on the general ledger.

The accounts that are named in the general ledger are called general ledger accounts. One or more general ledger account balances can be derived from a corresponding sub-ledger specified in the chart of accounts.

An extended general ledger uses accounts that are based on a range of sub-ledgers that allow analyses from different points of view. For example, accounts may focus on cost centers, product costs, or activities. These options are provided by using the CO-Controlling system as an internal accounting system. Entered data posted to the general ledger will be posted to the CO system and its components as part of the extended general ledger.

### Integration of Accounting Through the General Ledger

The general ledger is the source from which are built the external accounting documents, the balance sheet, and the profit and loss statement.

Because this information is to be audited, it will have to be supported by audit trails that show how each summary total has been computed.

If there exists a complete audit trail, there also exists the possibility of using the information therein to make some decisions before the end-of-year results are derived.

Making interim decisions on the basis of accounting information is the province of business controlling, for which the SAP CO-Controlling module has been developed. This will be examined at length in Chapter 13, "Understanding the CO-Controlling Module."

Controlling depends on detailed record-keeping in which the individual transactions retain their identity, their date, their sources, and the identification of the users who worked on them. Only if the accounting information is retained in this fine detail can the controlling functions assemble it and manipulate it to discern what is happening in the business. If the decision-makers cannot establish what is happening, they will be prone to take no action when they should, take action when they should not, or take with enthusiasm completely the wrong action.

The work units of a business controller will probably be the line items of the business transactions and the statements from the journal, the accounts, the trial balance, and the final statements. These will provide fundamental monitoring of business direction in terms of movement and progress, strategic goals, and operating tactics. These are the primary results achieved as a result of investing human and financial capital in the company.

The copious and comprehensive data arising from the SAP standard procedure of capturing all transaction information in the form of SAP Documents can be subsequently analyzed. For example, there can be valuable additions to primary results in the form of interpretations of the data that picture the company from various points of view. A look at profit and loss for each activity over each operating period might be illuminating, for example.

These additional analyses of the accounting data may serve to prompt and direct an interim change of direction or emphasis; but they may also form the essential inputs to business planning.

Profit centers may focus the analysis. Geographical business areas may be of interest. Product groups will often be worth assessing in terms of profit contributions.

Clearly the data should be held centrally if you are seeking widespread analyses; and if you want the information to be up-to-date, then records of every transaction must be available to contribute to the analysis if required. The General Ledger and its Sub-ledgers in the SAP online accounting system provide this central source.

From this source in the General Ledger can be extracted comprehensive analyses of important ratios such as cash flow proportions and workload per person.

Liquidity must be watched. With general ledger accounting, it can be forecast by taking cognizance of projected cash disbursements and receipts in the short and medium term.

If a business plan has been created in the SAP system and efficient tools are available to assist, then the actual results can be compared to planned ones in whatever dimensions and ratios are of interest.

Planning that is integrated across an entire company will have to include plans for the balance sheet and for the profit and loss (P&L) statements. Cash plans will be required which include project receipts and payments.

Controls over the ongoing activities of the company will begin by comparing the balance sheet and the P&L statements, year on year. Short-term cash management using projected cash payments and receipts and a daily financial statement may well be essential. Control of ongoing business can also make good use of financial analyses, comparisons, and ratios based on the organization's structure in terms of business areas or units.

Sub-ledgers can be the means by which control is exercised over the entities they represent. Receivables and Payables can be managed by inspecting analyses of due dates, amounts, selected customers, regions, and so on. Assets may attract the attention of controllers because of automatic reports of their ratios, depreciation, capitalized cost, and net book value. Inventory transactions, invoices, and personnel expenses are other examples of aspects of a business that can be made available to controllers, because the SAP system has the unbreakable habit of capturing all transactions from all system components in the form of SAP Documents that can be collated and analyzed into whatever informative structure is logically feasible.

The logical qualification is an obvious reminder that data that have not been entered into the SAP system at some stage or other cannot take part in subsequent analysis.

If, however, the necessary primary data are in the system, then automatic profit and loss information can be computed. Overheads can be monitored and attributed to such headings as cost center and order settlement. Product cost accounting can shed light on the costs of ongoing jobs. Technical and commercial projects can be monitored, controlled, and brought into the plans. Profitability analysis will be possible on the basis of cost of sales and period accounting.

At any time it is possible to clear individual line items in business transactions and effect a reconciliation of separate controlling units with the General Ledger.

### **General Ledger Accounting Routine**

Each business transaction creates a record in the format of a SAP document. The transaction may be part of a batch input, or it may be the result of a dialogue transaction at a terminal. The transaction will be checked and validated as far as possible and returned for correction if necessary.

When the transaction is posted, it is stored on the record log as a SAP document. The system updates the daily journal file and posts the transaction to the appropriate reconciliation account of the General Ledger. At that moment, the related account balances, trial balances, balance sheet, and P&L statement reports will be accessible on the screen.

Special document types and posting keys provide access to particular types of transaction:

- Customer or vendor invoices
- Cash receipts and disbursements
- Inventory transactions
- Allocations or distributions for cost accounting
- Transactions involving two or more profit centers
- Transactions involving two or more company codes
- Statistical postings (noted items, guarantees, and so on)
- Special business transactions (down payments, bills of exchange, and so on)

Entering and posting a transaction document immediately updates both financial accounting and cost accounting. The General Ledger and its Sub-ledgers use the information, and so do the cost analyses that are elaborated from the data.

The transaction log is available to feed the General Ledger and the subsystems managing asset accounting, inventory accounting, cost accounting, order and project accounting, product costing, profitability analysis, as well as the sub-ledgers of accounts receivable and payable.

And from any or all of this the finance and controlling information system can extract and present whatever primary or derived information is required.

Integrated real-time bookkeeping ensures that verified data are available for processing in all areas at once by automatically clearing cost accounting transactions in the general ledger and its sub-ledgers.

The financial and cost accounting systems are constantly reconciled at the level of the individual general ledger accounts. These accounts are named in the common chart of accounts.

### **The Chart of Accounts**

The chart of accounts is used to configure any account in the general ledger so that it will serve two purposes:

- Permit entry of transaction details required by the business
- Provide for any balance sheet or profit and loss statement required by law.

The business will want to plan and operate some logistic processes—and exercise financial control. The law demands proper external accounting practice so that shareholders can value their holdings and see that taxes are paid.

The processes of the business can be classified broadly according to the focus of the activities and their managers.

The first group of General Ledger accounts monitors activities that are concerned with building the productive resources of the company:

- Procurement of investment items such as fixed assets, current assets, and financial assets
- Extraordinary expense or revenue

The next group of accounts deals with how the day-to-day production and processing activities affect the value of the company:

- Procurement of materials
- Consumption of company resources
- Valuation of finished or semi-finished products

The third group is of activities with their own accounts in the General Ledger to show how sales of products are set against costs to yield the financial statements:

- Sales revenue or sales deductions
- Closing to balance sheet and profit and loss statement

### **Account Classes**

External accounting balances are classified into account classes using the chart of accounts. For example:

- Fixed assets and long-term capital
- Finances, current assets, short-term capital
- Non-operating expense and revenue
- Materials or stock
- Primary cost elements
- Secondary cost elements
- Job order cost elements
- Stock of finished and semi-finished products
- Yield or changes to stock or capitalized internal activity
- Closing balances

**Internal Controlling Account Classes**

Controlling balances arrived at by internal accounting fall into four categories according to their purpose. Project cost settlement or job order costing allow for the fact that purchases and allocations of resources may have to be made in order to carry out projects and complete specific job orders that may not yield any financial return during the current accounting period. These costs are therefore treated as investment.

Cost center accounting is used to gather specified types of cost under the heading, which is most useful for business purposes. These cost centers may correspond to departments or they may be used to associate costs with, for example, a specific plant or item of equipment that is considered as a focus for understanding and managing the enterprise.

Job order or product costing is the traditional process of associating costs with specific orders from customers or for internal production work, of which the manufacture of goods for inventory would be a common example.

Profitability analysis is the process of relating the financial yield of part of the enterprise to the costs of owning and running it. There are no restrictions on how the parts to be analyzed are defined. The profitability of a work unit may be of interest; or the value of carrying out a change of procedure may be the target. The wisdom of all business decisions may have to be assessed in relation to the short- and long-term profitability of the consequences.

Integration of accounting can be demonstrated by the fact that the common chart of accounts can both record all the costs and revenues and also provide all the factors needed for financial control via internal accounting.

The chart of accounts installed in a specific implementation must comply with statutory requirements under company law as it is practiced in the host country. It must also embody the essential elements of GAAP, the accounting principles that set the standard for a reliable accounting system.

**The Two Primary Functions of the General Ledger**

The FI-GL General Ledger component recognizes that there are two main reasons for asking for reports from a general ledger.

**Monitoring Financial Health.** Shareholders may be very interested in the financial statements required by law: the balance sheet and the profit and loss statement. These two financial documents are the basis of external accounting, because they reveal the financial health of a company.

The profit and loss computations depend on closing the accounts in the general ledger at the end of the financial year. One of the primary functions of the general ledger is to allow this year-end closing to take place in an orderly manner.

**Reviewing the Results for the Year.** The other primary function of the general ledger is financial accounting for the current fiscal year.

The function of collecting and recording data from transactions is one part of financial accounting. Posting data and effecting reconciliation on a continuous basis make up the other part.

The SAP system creates a document for each transaction that can be used for a flexible reporting and analysis system, with the ability to establish a valid audit trail using these recorded transaction documents.

Reconciliation is effected at the transaction level before an entry is posted, but there has to be a closing of the reconciliation accounts at the end of the month and then at the end of the year. A facility exists in R/3 to call up daily or monthly reports at any time.

### **Special General Ledger Transactions**

The accounts in the special general ledger are reconciliation accounts for special sub-ledger transactions that do not directly involve sales or purchases and may not be balanced with the Receivables and Payables. The special general ledger indicator is a single character code to distinguish these transactions from sales to customers or purchases from vendors. The following transaction types are examples of special general ledger transactions:

- Acquisitions
- Dispositions
- Depreciation
- Transfers
- Down payments
- Bills of exchange
- Monthly payroll
- Period closing entries

### **Year-End Closing**

The law for closing a fiscal year requires entries to closing accounts for the balance sheet and profit and loss statement. The SAP FI System ensures that year-end closing entries are transferred from sub-ledgers such as:

- Accounts Receivable
- Accounts Payable
- Fixed assets

Provision is also made for closing entries manually and individually. You can close a fiscal year at any time. The flexible online reporting system will offer separate formats of the financial documents for tax authorities, stockholders, legal consolidation of associated companies, and so on.

### Complex Organizations and the Chart of Accounts

The chart of accounts has to include all the general ledger accounts in an accounting system. You can specify what transaction data goes where, so that each account will contain all the required details for closing. Internal accounting will usually require that certain types of data be sent to each of the accounts that are used in the controlling functions.

There are two possibilities for using a common chart of accounts in a complex organization:

- You may have a centralized organization in which there is the maximum number of accounts at group level in a uniform chart of accounts that will apply to all company codes in the group.
- You may be a decentralized organization in which each company code has its own chart of accounts.

In either case it is possible to use sample accounts taken from the reference system with transfer rules for individual company codes. This allows each company to have some flexibility while operating to a common chart of accounts.

### International Taxation

The SAP system is international. The taxation functions commonly needed have been programmed as standard business functions with tables of parameters available for customization to the organization and to the specific operational features required.

When you use the SAP system, you will have signified the country where your company is located, and if prompted, the country where your vendor or customer is located. The system will adopt the taxation regimes appropriate to each of these countries.

The system calculates tax or adjusts it automatically. When you enter the transaction you cause the system to create the SAP document containing all the details. Then it immediately posts the taxes as it updates the accounts. The required tax reports are generated automatically.

### Standard Taxation Functions

The FI-Financial Accounting module includes the following standard international taxation functions:

- Taxes on sales and purchases
- Bills of exchange tax
- Tax base for tax calculation
- Definitions of all required tax rates
- Methods for the determination of due dates for tax payment
- Tax calculation procedures

- Tax base for cash discount
- Dependent taxes as surcharges or deductions
- European Community acquisition tax
- Division into deductible and nondeductible taxes

Withholding tax can be programmed to suit your requirements. The process makes use of the following functions:

- Tax base
- Definition of all required tax rates
- Flagging of all vendors affected
- Determination of due dates for tax payments

The system verifies withholding tax when you enter a vendor invoice and payment. You do not have to check the tax entries later. The necessary reports are prepared automatically.

Although the system will adopt the appropriate standard tax regime as soon as you have indicated the country, you can adjust parameters to meet your specific tax requirements. For instance, you may have to make adjustments to the standard procedure because of a change in the national taxation regulations, or because you are working in a country that does not exactly follow any of the standard tax regimes programmed into the system.

Country-specific tax requirements are notified in the SAP INT International component, and may have been used to customize your particular implementation.

### **Examples of Country-Specific Taxation Requirements**

Specific taxation rules for charging, disclosing, and paying tax are accommodated by customizing each company code operating in that country. Specific forms of payment and common payment media are prepared for each country.

The following examples illustrate the range of differences that can be handled by the system:

- German-speaking countries in Europe require a tax adjustment if the payment for an invoice is net of cash discount. Other countries calculate tax liability on the invoiced amount.
- Different countries have their own arrangements for tax exemptions and delay of liability.
- Withholding tax is subject to wide differences in scope and method.

### **Intercompany Accounting**

A group comprising two or more individual companies will have an organizational structure designed to facilitate day-to-day operations. For example, each company may buy

material and manage a warehouse. Each may run a sales and distribution division. To increase the complexity of the organization somewhat, suppose there is also a head office, which functions as a separate company.

The head office, as a company, may have oversight of two other companies. Each of these business units will incur expenses and probably enjoy revenue.

For the sake of business convenience, it may well happen that two or even three of these units will combine to make a purchase, perhaps at a discount because of the size of the order. One payment to the vendor will be made against one invoice.

Again for good business reasons, the units may join forces to provide a service to a customer. For example, Purchasing may provide the material goods, and Distribution may look after their delivery. Again, one payment from the customer will be made against one invoice.

If each of these business units is managed as an individual company, all intercompany transactions within the group and with customers and vendors must obey the rules of intercompany accounting. In particular, transactions must leave records that will allow intercompany business to be legally audited so as to give a true picture of the group as a whole and of the individual companies when it comes to drawing up the financial documents.

With modern online computerized accounting systems, the balance sheets and the profit and loss statements of the group and each individual company will be readily available at any time.

The principles of intercompany accounting are applied when your company is part of a group; they also apply when your customer or your vendor is part of another group.

The SAP accounting system uses methods that support intercompany transactions and complies with GAAP.

### **Intercompany Expense and Revenue Postings**

Two divisions of a group, each with a separate company code, may jointly make a purchase or issue goods. (The same principles apply if more than two company codes are involved.)

You have to enter and post the expense item in both company codes, but you post only one vendor account in one of the company codes. It does not matter which one.

The system will automatically calculate and post the Receivables and Payables between company codes, just as if you were entering a regular transaction in one company code.

The system will create line items for Receivables and Payables between company codes. It will also generate a SAP document in each company code. As it does so, it will assign a unique intercompany transaction number, which will appear on all documents and vouchers.

The debits do not have to equal the credits in each company code; only within the entire intercompany transaction do they have to balance.

**Paying for Intercompany Purchases**

Several companies in a group may purchase from the same vendor. You can pay for the purchase by making a single payment, with the vendor account number being the same in the vendor master record in each company in the group. One company has to keep a central bank account to be used to pay on behalf of the other companies.

**Cash Receipt for Two or More Company Codes**

Some of the companies in a group may have customers in common. If one of these customers offers payment for two or more company codes in the group, you can use this procedure:

- Match open items to the amount of the payment.
- Process the selected items, sharing the payments flexibly if necessary.
- Apply cash discount calculations in each company.
- Clear documents for each of the companies.

The system will automatically post the required clearing account in each company.

**Head Office—Branch Accounts**

Your supplier may be a branch with its own account, but its head office may wish to receive your payment. In this case you can enter its head office account number in the master record for the branch vendor. When you enter a transaction to the branch account, the system will post the transaction to the head office account, leaving a cleared entry on the branch account to show who supplied the goods or service.

The master will include data about the branch and a reference to another master to give details of the head office. By this means, dunning letters can be sent to the head office, the branch, or both for overdue refunds, for example.

**Vendor Payments to an Alternative Recipient**

Your supplier may not have to deal with its payments due. For example, it may have a head office that will receive payment. You can record in its master data the account number of this alternative recipient. The system will then process return transfers and other vendor payment business through the banks to the alternative recipient.

If you do post vendor invoices to an affiliate, you have to record in the master data of the branch vendor a group-wide company account number that will be used during consolidation to eliminate the invoices that would otherwise appear twice in the company accounts. The system will be able to look at the transaction documents bearing this group-wide company account number and identify any entries that are replicated because the payment was made to an affiliate that was not the original vendor.

**Intercompany Payments**

One vendor may have supplied several company codes in the same group. The payment system can make one payment and then settle the intercompany accounts by calculating and posting Receivables and Payables between company codes.

The transaction needs you to define one of the company codes and enter it as a normal paying company. The system will assign the document a unique intercompany identification number which will be used to ensure that the other members of the company code group will pay their shares.

**Eliminating Intercompany Payables and Receivables**

FI-Financial Accounting will eliminate intercompany balances by open item only if each trading partner has been marked in the vendor master record. You must also ensure that the reporting procedures inform the consolidating department of the numbers of these trading partners, at least on the items relating to intercompany Payables and Receivables, revenues and expenses.

The law requires that all intercompany balances be eliminated before presenting the balance sheet and profit and loss statement. All possible pairs of individual companies must be investigated for evidence that they have been trading with each other.

In practice, significant differences between the way individual companies keep their records may make complete elimination impractical. The most frequent causes of discrepancies in elimination are as follows:

- Currency translation differences
- Differences in the timing of entries for goods in transit between individual companies
- Specific reserves set aside for doubtful accounts
- Liabilities that are not acknowledged in the records

The cause that is most difficult to handle is currency translation; the others can usually be resolved by applying corporate policies in a thoroughgoing manner.

If the individual companies have installed and configured SAP accounting applications, there will be automatic dual currency accounting in which every transaction is documented, at the time it occurs, in both the local currency and the currency designated for all transactions in the group.

If the FI-LC Consolidation component has been installed and configured in your company, it will allow you to trace any currency translation differences between the local currency, at the prevailing rate of exchange, and the transaction currency. An exchange rate difference correction will then be posted automatically in the balance sheet account designated for this purpose, and thus brought into the consolidated financial statement.

**Language Differences**

R/3 is an international system. The names of all general ledger accounts can be translated if the language key is entered together with the name of the account in the target language. This process can be repeated for all languages in the group. By this means you might add or modify general ledger account names in the language of the holding company, and later log in and call for the account balances in the language of your log-in profile.

In a listing of the charts of accounts, each chart will be annotated to show the main language and all the alternatives available.

**Currency**

The following operational currencies have been defined and their codes are assigned to each function by default (you can alter the default settings):

- Local currency is also the reporting currency for the company code.
- Document currency is that specified for entry on SAP documents.
- Group currency is an alternative to document currency for group reporting.
- Updating currency is defined for posting debits and credits to the general ledger in parallel with the local currency.
- Credit limit currency is that which has been chosen to maintain the credit limit.
- Ledger currency is an alternative to the updating currency for that ledger.

Additional currency assignments are available in the SAP Foreign Exchange Management component.

**Currencies in Transactions**

Each company code has a local currency for reporting. The system records amounts in this local currency and also in a currency that has been specified as the document currency, which will be used on all documents in addition to the local currency.

You can enter documents in any currency.

You have two options for converting currencies:

- Enter an exchange rate when you enter the transaction document.
- The system translates between document and local currencies by referring to a table of daily exchange rates which is either updated manually or maintained automatically by a link to a separate database.

The system can be customized in various ways, which include:

- A specific user is obliged to enter amounts in a particular currency, which can be the local currency or the document currency.
- A specific user can be permitted to enter amounts in either local or document currency.

Whatever the customizing arrangements, the system will display amounts in both local and document currencies. It will round off minor differences, using rules established for this purpose. These differences can occur when several line items are converted and then added in both currencies.

Customer monthly debits and credits are kept by the system only in local currency. The reconciliation account for the Accounts Receivable sub-ledger is kept in local currency and in all the other currencies that have been posted.

### Currency Exchange Differences

A line item can be expressed in a currency other than the local or document currency. You can enter payments to clear such foreign currency line items using either local or document currency.

The payment expressed in the document currency will have been converted from the local currency at an exchange rate adopted by the system according to the rules laid down for assigning the daily exchange rate. If this rate has changed from the rate prevailing when the invoice was written, the payment amount may not match the open item amount. In such cases, the system will automatically calculate and post an exchange difference entry to a separate account established for this purpose.

## General Ledger Master Data

General ledger master data are comprised of the following:

General data about each account:

- Account number
- Account name
- Type of general ledger account

Data for each company code:

- Currency
- Whether managed on an open item basis or not
- Sort basis when line items are displayed

You can enter this master data through the FI system for each account separately or by groups of accounts. Your installation may have a configured SAP data interface to allow direct input of master data under certain conditions.

### Maintaining General Ledger Master Data

Accounts can be added to the general ledger, and certain parameters can be modified. You can block and delete accounts during the fiscal year. As in all SAP R/3 directories, matchcodes set up by the individual user can be used to find specific accounts by entering an easily-remembered name or title.

Your activities with general ledger accounts will be logged, as are all transactions, so that all modifications can be traced.

## **Instructions on Administering General Ledger Accounts**

An open item is one that can be partially settled; it remains open until the item has been fully cleared. If an item is not to be managed on an open item basis, the settlement has to be in full or not at all. Rules can be established—for example, in the partial payment of accounts outstanding, to determine that the largest items should be settled first, or perhaps those that have been open longest.

Such manipulations may not be permitted in some general ledger accounts, because that would destroy their informative nature.

By and large, if you have authority to manipulate the general ledger accounts, you will not have any restrictions—only obligations.

Some accounts are allowed to display to anyone the line items upon which they are based. Payroll is not usually one of them.

Another example of instructions attaching to a data object representing a general ledger account will be how the line items are to be displayed: their sort order, and perhaps any masks applied to conceal certain values.

### **Daily Journals and Interim Statements**

When it is time for year-end closing, there are SAP programs to help you prepare your system to be closed at the end of the year. But for daily and monthly closings there are no special requirements and no extra entries to make, because the account balances are maintained all the time.

At the end of each day you can see a report of the exact closing balances for the day. These will be based on the line items and the total debits and credits entered.

For periods of a day or more, it is easy to ask for reports of data that have been posted over the period, sorted by date or by any of the fields that appear in the relevant SAP documents that were created for the transactions.

The practice of calling daily or short-period journals can be helpful. You can validate data entry soon after it occurs, and so you can control it.

These journals can help you decide how to close posting periods and account for accruals. You may wish to define two accounting periods that are open for this purpose.

### **Year-End Closing**

Monthly and interim closing entail no technical requirements. Year-end closing, however, has to be anticipated by running a series of SAP programs.

The operation of these year-end programs is automatic to a large extent.

Two main purposes are served by these year-end programs: They reorganize SAP Documents into more convenient groupings, and they reconcile summary records with the individual documents upon which they are based.

**Year-End Closing Tasks.** The year-end closing sequence has to include the following steps:

- Close posting periods.
- Revalue all line items and general ledger account balances to adjust for foreign currencies.
- Sort open and closed Receivables by their due dates.
- Sort open and closed Payables by their due dates.
- Identify and adjust vendor accounts with debit.
- Identify and adjust customer accounts with credit balances.
- Post reevaluations.
- Post adjustments.
- Post accruals.
- Print the balance sheet with the profit and loss statement.

**Automatic Closing.** Automatic closing programs compile a series of reports that will support you by preparing what you will need to close the year.

These supporting reports include:

- Reconciliations of documents with monthly debits and credits
- Posting totals
- Accumulated balance trail
- Balances carried forward from the balance sheet of the previous year

## General Ledger Online Reports

The main reports in the General Ledger are available online with a range of sorting and presentation options to help in year-end closing and final reporting:

- Account Statements
- Document Journal
- Balance Sheet with Profit and Loss Statement
- Balance Sheet Adjustments
- Reconciliation of Documents with Monthly Debits and Credits

- Posting Totals
- Customer Open Items
- Overdue Receivables
- Customer Open Items by General Ledger Indicator Code
- Line Item Journal
- General Ledger
- Accumulated Balance Audit Trial
- Vendor Open Items
- Accounts Payable in Local Currency
- Open Checks
- Chart of Accounts
- Bill of Exchange Register

#### **Financial Statement Report Formats**

The Balance Sheet is always printed with the Profit and Loss Statement; together they satisfy the legal requirement for a company to publish an annual financial statement.

The essential components of the company financial statement are:

- Fixed Assets
- Current Assets
- Equity
- Debt
- Profit and Loss Statement

These essential requirements relate to the basic elements of the Chart of Accounts from which the Financial Statement is constructed.

A complex company is required by law to present a financial statement for each of its components separately and a consolidated statement for the group or company as a whole.

There may be a different chart of accounts for each company in a group. SAP FI-GL General Ledger allows all these variations of organizational structure to be accommodated when preparing the Financial Statement.

The process of designing or customizing the format of the Balance Sheet and the Profit and Loss Statement entails specifying the following details for each account:

- Levels of account detail
- Headings and subheadings

- Text
- Subtotaling and totaling

Separate formats can be designed according to the target readership of the financial documents:

- Stockholders and tax authorities
- Group requirements
- Profit centers

Balances on all accounts are always current. Therefore a profit and loss statement can be prepared at any time, as can a balance sheet.

Extra facilities have been provided as extensions to the functions that allow financial statements to be drafted in a wide range of formats to suit all types of company organization. These facilities have been integrated and placed under the control of a sophisticated user interface.

The EC-EIS Enterprise Controlling-Executive Information System is a SAP tool that is under continual development and improvement, so as to make available to the SAP R/3 user a comprehensive, integrated, online reporting system that offers all the functions that can be exercised on the accounting system.

## FI-GLX Extended General Ledger

For historical and legal reasons, the general ledger has been the primary means by which an auditor or an investor might see how well or badly a company has been managed. The results of this management are extracted to form the balance sheet, showing the end-of-year value of the company's assets, and the trading report or profit and loss statement, revealing how the assets have been set to work for profit or have diminished through losses.

The general ledger is thus the basis for External Accounting, but it will not show all the useful information that has been collected in the course of the trading year, such as who bought what.

It is to the procedures of Internal Accounting that the manager has to submit in order to see more closely how resources might be applied to better effect. Perhaps it would have been very informative if the financial summaries contained breakdowns of activities by geographical business areas, and by type of business, and by product, and so on.

These other ways of collating business information for the benefit of exercising better control of a company have been provided with standard business functions and collected as the CO-Controlling module.

The FI-Financial module primarily serves the requirements of External Accounting. The CO-Controlling module serves Internal Accounting. They both serve the same company

by sharing a common chart of accounts that includes accounts that are not necessary to meet the legal requirements of the Financial Statement—those requirements that are met by the general ledger, from which the balance sheet and the profit and loss statement are derived.

These extra accounts are there to improve the usefulness of the financial system in the matter of controlling the company.

The FI-GL General Ledger accounts plus these extra accounts and account subtotals comprise the FI-GLX Extended General Ledger.

The General Ledger is extended by being integrated with the common chart of accounts in order to take advantage of the facilities offered by the CO-Controlling modules.

Although the Controlling system is specialized for internal accounting procedures, its effect is to maximize the favorable values and minimize the unfavorable values that are summarized in the formal legal documents of External Accounting, namely, the balance sheet and the profit and loss statement. After all, the purpose of the company is to realize profit from its activities and its use of the capital invested in it. The CO-Controlling module represents a comprehensive application of the SAP system to all the elements of a company's business.

#### **GLX Stand-Alone Extended General Ledger**

The Extended General Ledger is a SAP product that can stand-alone and accept data from external systems using software from other suppliers. It can also be installed to integrate with the SAP R/3 system and interact with components of the FI-Financial module and the CO-Controlling module. Either directly, or via the CO-Controlling module, the Extended General Ledger module can link up with any of the SAP R/3 components.

The bridge between other applications and the Extended General Ledger will comprise one or more ledgers. Not all of the transaction data from other applications will find a corresponding account in the Extended General Ledger. The system ensures that updates from another application correspond with at least one ledger. A standard program is supplied with the Extended General Ledger to check that this reconciliation is in fact taking place.

You can reconcile the Extended General Ledger with the transaction data at any time.

#### **Planning in the FI-GLX Extended General Ledger**

The plan comprises three operations and a reporting stage which can occur at any time and be repeated as often as required.

**Specifying Planning Objects.** The first step is to setting out the planning cost objects or levels at which planning is to take place, such as:

- Business area
- Cost centers

- General ledger accounts
- Months or other posting periods

**Assigning Values.** Entering target values and budgets to be assigned to the planning cost objects can be done manually or with assistance from automatic distribution functions.

**Collating Data.** Collecting transaction data and collating them to match planning levels and objects is the most intensive operation in terms of information flow.

**Reporting.** The standard SAP R/3 flexible reporting functions will show you, for any combinations of planning cost objects that you require, how actual values stood up against plans and targets.

Any or all of these procedures may be automated by setting parameters under control of the Extended General Ledger component.

### Functionalities Enabled by the Extended General Ledger

The following actions may be carried out through the Extended General Ledger program:

- Specify General Ledger account subtotals to collect data on chosen periods or another focus of interest.
- Name the account subtotals.
- Specify the criteria for posting entries to each subtotal.
- Record and update account subtotals from the transaction information entered in SAP Documents.
- Accept data from other SAP applications.
- Accept data from systems that do not use SAP software.
- Enter financial plans in the form of planned values for each relevant account and account subtotal of the Extended General Ledger.
- Report on the planned and actual account totals and subtotals for the period or other focus of interest.
- Design reports based on flexible fiscal years.
- Provide parallel reports in up to three currencies.

### Specifying Inflow of Data to the Extended General Ledger

Data reaching the Extended General Ledger system will have arisen mainly by transactions in other systems, other SAP applications or systems provided by other suppliers.

SAP provides a comprehensive suite of standard interfaces.

The flow can take place immediately after a transaction is posted, at regular intervals or via batch transfers. Validation can take place to ensure that the incoming data comply

with the conditions imposed by the Extended General Ledger; and substitution of transaction data can take place so that what is retained is amenable to further processing by the client systems using the facilities provided by the Extended General Ledger module.

Checking for consistency has to occur. For example, master data in the Extended General Ledger must have elements to name and specify all the data objects that will be needed and that will be used to store data incoming from the associated applications. Account identification, cost center, product identification, and any other attribute of interest will have to find a place in the Extended General Ledger from which it can be retrieved and identified, even though, in the case of nonSAP systems, it may no longer be easily traced in the system which first created it.

One solution is to have the Extended General Ledger acquire master data from the transferring system. This imposes the requirement that transactions in the transferring system shall include all the information of interest as either optional or required entries. Obviously, information that has not been collected by the transferring system cannot subsequently be accessed from the Extended General Ledger.

A set of master data shared by all applications will ensure consistency of data across all systems using the Extended General Ledger.

From other SAP R/3 applications the preliminaries to data transfer include establishing the following specifications:

- Which transactions will update the Extended General Ledger. Sources might include financial accounting, material management, or job order accounting.
- Which particular ledger is to be updated, and how
- Whether each ledger is to be updated immediately or at regular intervals

SAP R/3 provides guidance and prompting to enable you to set up the validation rules in each case, based on rules and combinations of fields that you can define. The system will then validate transaction data, subtotals, or totals in the ledgers specified.

It is usual to have other SAP applications automatically transfer the data for the Extended General Ledger. A direct data entry function is also provided to allow the entry of notes or consolidation entries, for instance. As is normal practice, these entries create SAP Documents. These SAP Documents can be flagged to show they are records of direct entries to the Extended General Ledger and, if necessary, they may be displayed separately.

### **Assessment in the Extended General Ledger**

In this context assessment refers to the process of gathering cost information from a number of sources. Consider freight charges across all warehouses for all products in a particular group, or on a particular list of products. Assessment is the process of seeking out the details and calculating the total of these charges.

This task is in the province of the Extended General Ledger. Needless to say, it will not succeed if the master data of the Extended General Ledger makes no mention of freight charges, nor any data field that could be used to make a proper substitution—delivery charges, for example.

### Distribution in the Extended General Ledger

Distribution is sharing. For example, the total of freight charges across the group may be distributed by sharing it as some kind of overhead charge imposed by the accounting system. Who should share this burden may be hotly debated, but in the end the Extended General Ledger will have to be told to divide this cost between various accounts.

There are two types of distribution:

- Single-dimension
- More than one dimension or level of detail

Single-dimension distribution takes place when a value is credited to the sender and debited to a single receiving account. For example, a cost center can be created in order to allow certain costs to be reported under the name of that center. Administration Costs might be the name of a cost center. Freight Costs might be another.

Distribution can also be directed at more than one receiving entity. The set of recipients might include all production departments. The costs can be distributed across specific products in a product group, for example.

Whether the distribution is to a single receiver, such as a cost center, or to a set of receivers, there are three methods of computing how much is attributed to each:

- **Fixed amount method**—You decide how much to charge each individual recipient. A fixed amount is debited to each, and the sender is credited with the total.
- **Fixed share method**—You decide what percentage share of the amount to be distributed shall be charged to each recipient. Each recipient is debited with the fixed share, and the sender is credited with the total of these shares, which need not equal one hundred percent of the assessed charge. The sender may retain a share.
- **Dynamic method**—The amount to be distributed is automatically calculated by the system on the basis of the subtotals already recorded in the Extended General Ledger.

### The Set Concept

The logical concept of a set is used in the Extended General Ledger for reporting, planning and ledger processing. A set refers to a data structure and its relationships with other data structures.

A set of numbers may be defined, where the numbers are the identification codes of bank accounts, for example.

A list of cost centers may constitute a set.

The actual members of a set may not be known until the set definition is called into use. "The top three operating divisions for gaining new customers in the current month" is a set definition of this kind.

The definition of a set may include relationships between specific firms or companies in a group, not necessarily at the same level.

A set may comprise any collection of data objects that meet the logical criteria forming the definition for membership of that set.

Specific business functions may call on a set definition which has been stored for use later. Assessment and distribution often take place under the control of sets.

### **Planned Amounts in the Extended General Ledger**

The basic concept is to set target values for account totals or subtotals for one or more periods. Actual values totaled from the transaction data are then compared with these planned targets.

The method is to enter a planned total, and then have it allocated to periods by various standard functions. Flexible planning and controlling facilities are provided through special functions and tools in the Extended General Ledger.

In practice, the planning usually requires several iterations in which suggested budgets and target values are distributed in various ways until an agreed distribution is effected.

The starting point for a plan is a set of plan parameters:

- Basic data and targets to be entered
- Planned currency for transactions, and the local and group currencies
- Planned types of main and additional quantities
- Standard period allocation keys
- Input units (hundreds, thousands, millions)
- Planned number of decimal places
- Plan version identification
- Data objects to be used

The plan parameters are dependent on the authorization profiles of the users. Not all users are allowed to alter certain parameters.

You can specify for display at any time sets of plan parameters that will be used as the basis for planning and for suggesting more appropriate amounts to be set as targets.

### **Planning Perspectives**

Centralized planning entails planning cost elements, for example, for all cost centers. Decentralized planning would plan for each cost center individually.

The Extended General Ledger allows both perspectives, and you can switch between perspectives online.

The technique of setting up plan parameters allows the planning process to begin with a complete plan that can be used without altering anything. On the other hand, any of the parameter values can be changed, if the user is so authorized.

The distribution functions can be changed, as can the sets of account totals and subtotals upon which they act. Individual amounts may be overwritten.

Each version of a plan may be stored for later comparison.

There are many standard ways of distributing planned amounts. Annual or quarterly input values are usually distributed to planning periods by using one or more distribution keys.

A distribution key is a tag or code which may be used simply as a label, or it may refer to a complex data object that serves as a distribution formula. There is a standard distribution key for distributing an amount equally to every working day in the current month, for example. SAP R/3 offers a wide variety of standard distribution keys, and the user may define unique keys that are available for use with other planning periods or other versions of the plan.

There are distribution keys for use with various planning objects such as sales, personnel expenses, and so on. There are standard keys for product groups and for product types such as "semi-finished products." Such keys can be used to plan for production cost centers so that, in this example, the value of semi-finished products will appear in the Extended General Ledger reports under that heading and will also attract a designated share of the cost of warehousing or other assessments.

This system of distribution keys can be used with the suite of distribution functions and the logical concept of sets to arrange for a flexible and focused planning system that can be adjusted to suit changing business conditions.

### Reporting Dimensions

The reporting system of the Extended General Ledger is particularly flexible. You can use it to report by any field that is already defined for accumulating subtotals.

Installations of SAP R/3 differ according to the needs of the customer, but there may be account subtotals for planned data and actual data, for product groups and business areas, for individual products and cost centers. There are many permutations that could make business sense for a particular user. Even the choice of time period may be an important matter for individual purposes. SAP R/3 can work with up to 365 time periods a year.

There are standard reports for the main tasks:

- Reconciling and controlling account subtotals
- Providing an audit trail for internal and external auditors

There is a menu-driven report writer to design and produce your own reports.

**Report Design.** The design of a report takes place with the aid of a menu-driven system that will apply predefined system standards.

You can accept the details suggested by the system by copying from another report and changing some of the details individually on-screen. You can specify the content and layout in advance by changing the parameters of an existing customized report, or modify a standard report within the permitted domains.

The following factors may be specified or adjusted to design a customized report:

- Report layout
- Sources of data
- Fields to appear in each row
- Level of detail—how data are to be subtotaled and totaled
- Which amounts will appear in the columns (actual, plan, day, month, quarter, total year)
- Which data are to be selected
- Whether and which ratios are to be calculated and their formulas
- Text to appear in the report

**Report Output Media.** Reports can be produced online or in batches. They can be stored for later analysis or printing, possibly by other users.

The range of output routes available for reporting includes the following:

- Online screen listing with user control of format and content
- Printing in accord with ad hoc designs to replicate screen reports
- Printing to standard report formats
- Printing to customized report formats and selected destination printers
- Printing to sequential files in the system for subsequent processing or printing
- Printing to local PC files available to selected network users
- Sending graphic reports to screen or printers with SAP Business Graphics

**Facilities of the Online Reporting System.** The SAP system of using a table of parameters to specify report design allows you to make the following changes online:

- Change the level of detailing.
- Change the subtotaling.

- Change the content of the columns.
- Output all or parts of the report to file or to printer.

Display controls enable you to change what you see:

- Switch to another report with another perspective.
- Select a row in the report and see the whole of the SAP Document upon which it is based.
- Select an area of the report—a group of row items and some of the columns—and call on SAP Business Graphics to present the data in one of a range of graphical styles that you can subsequently adjust and annotate before storing it or consigning it to one or more of the output routes.

The reporting system of the Extended General Ledger gives you the ability to extract pertinent data and process them so you can present them in ways which will best serve the cause of effective decision-making.

## FI-AR Accounts Receivable

Accounts Receivable is a sub-ledger of the FI-GL General Ledger and completely integrated with it at the following levels:

- Master Data
- Transaction Data
- Reporting System

The General Ledger and its sub-ledgers share the common chart of accounts with all applications, and also share all the details of master records. Reporting can draw from the General Ledger and the Accounts Receivable sub-ledger.

The purpose of the Accounts Receivable sub-ledger is to keep track of customers and the transactions that involve them. Its job is to collect money: To process cash receipts and dun customers who are late in paying. It shares the same accounting needs as the SD-Sales and Distribution module.

Transaction data are stored centrally in the document database, and the corresponding line items and details are stored in the sub-ledgers as appropriate. The system automatically updates a subtotal of a balance sheet account for every business transaction, and reconciles the account subtotals and the line items to ensure that the financial information is always correct and always current.

Account balances by debits and credits for up to sixteen posting periods are maintained by the system.

Every transaction creates a SAP Document, and the data are immediately posted to the General Ledger. Hence every business transaction recorded in this way automatically updates the balance sheet or the profit and loss statement.

This is the defining characteristic of an up-to-date, networked, accounting and controlling system.

**Master Records**

The sales organization need not have the same organizational structure as the legal structure of the company. One sales department may handle products from two or more associated companies. The system of master records makes provision for this.

Master data are organized into three parts: general data, data applicable only for specific company codes, and sales data.

General data are the information of a general kind needed by all or some departments about each customer:

- Name, address, telephone, fax, modem number
- Customer registration number
- Line of business, business group
- Bank account data

For each separate company using the sales organization there may be different entries against each company code to reflect their different methods of doing business with the customer:

- Standard payment terms
- Data for dunning overdue accounts
- Data for direct debit
- Data for correspondence such as the account number and name and salutation or title of the clerk responsible for purchasing

You may also have to specify a particular General Ledger reconciliation account for each company contributing products to the sales organization.

**Processing Master Data Records**

Access to customer master data records has to be controlled by limiting the staff who are allowed to modify certain data fields. The method is to use the system of authorizations to restrict the use of certain functions which can affect the critical fields of the customer master records.

These restrictions can then be applied to accounting data, sales data, or both.

When a new or prospective customer is identified, a new master record is created and assigned to an account group.

The account group determines whether you may assign account numbers within specified ranges, or whether this will be done automatically by the system.

You will not be allowed to assign the same account number more than once; but you can have both customers and vendors within the same range of numbers.

The account group also controls which fields will be active in this master record. The fields offered by the account group may be picked and assigned to one of three categories:

- Fields into which the user must make a valid entry
- Fields the user can either leave blank or make an entry into
- Fields that will be suppressed so they will not appear on the screen at all. A whole screen of fields may be suppressed if they are not needed for a particular master record.

The FI-AR Accounts Receivable system will make it easy to create master records by offering various options:

- You can copy a master record from a reference record that has been established for the purpose. You have to make at least one alteration to it before you post it to become a new master record.
- You may copy the master record of an existing customer and edit the unwanted details to make it into a new master record.
- You may create the new customer master record by entering all the necessary details.

Once you have entered and stored a customer master record, you can call it back again and change almost any of the fields. There will be a choice of whether to go through all the fields or work on only one set of fields, for instance, the payment details.

Master records can be selectively displayed so that you need see only those fields that are of interest to you according to the task you have at hand.

### **One-Time Accounts**

If you think a customer is probably not going to become a regular purchaser, you can set up a one-time account by selecting a special function. This will create a master record that contains only the essential control data, such as the number of the reconciliation account to which this sale will be posted. You can supply the address and the bank account data when you enter an invoice. This information will then arrive in the one-time account master record, where the dunning and payment programs can find it when they need it.

### **Head Office—Branch Accounts**

Your customer may be a branch with its own account, but the head office may foot the bill. In this case you can enter the head office account number in the master record for the branch customer. When you enter a transaction to the branch account, the system will post the transaction to the head office account, leaving a cleared entry on the branch account to show who received the goods or service.

The master will include data about the branch and a reference to another master to give details of the head office. By this means, dunning letters can be sent to the head office, the branch or both.

**Payments from an Alternative Payer**

Your customer may not have to deal with his own payments. You can record in his master data the account number of the alternative payer, and the system will then process direct debits, return transfers and other customer payment business through the banks for the other payer.

If you do post customer invoices to an affiliate, you have to record in the master data of the branch customer a group-wide company account number that will be used during consolidation to eliminate the invoices that would otherwise appear twice in the company accounts. The system will be able to look at the transaction documents bearing this group-wide company account number and identify any entries that are replicated because the payment was made by an affiliate who was not the original customer.

**Customer Transactions in Accounts Receivable**

As soon as the master data have been stored for a customer, a customer transaction can occur. If the master is for a one-time account, the data will be sparse.

If you have installed and configured SAP SD-Sales and Distribution with the SAP FI-Financial system, invoices entered in the SD system will be automatically posted to General Ledger accounts in FI.

If you have another invoicing system, the route to the FI-GL General Ledger accounts is through a SAP open interface, which will transfer and post invoice data to General Ledger accounts automatically.

If you have to enter manually an invoice that has not been posted automatically, SAP R/3 will provide all possible help. You can enter and post a check received and match the payment to specific open items in the customer account, all in one operation.

The successful posting of a transaction does not occur until the necessary data are recorded as a SAP Document and are complete and error-free. You can set aside a transaction document before it is ready for posting, in which case the system will validate any information you have already entered and report to you any discrepancies.

The SAP Document has to end up with a document header showing posting date, document date, document reference number, and currency key. The body of the document will contain one or more line items which will show the amount and identify the product and the terms of payment. The system will generate certain line items, such as tax entries, cash discount, and exchange rate differences, as applicable.

You can set up helping routines and use standard data entry functions such as:

- Default values that you may edit at the time of entry
- Recalling for copying and editing a previous screen

- Retaining data for individual users for several transactions
- Adapting a copy of a data-entry screen so that it is better suited to a set of transactions that you are expecting
- Searching for an account number by using matchcodes to narrow the search

A SAP Document that records a previous transaction can be copied to act as sample or model to be edited. This sample can be a regular document that has been set aside, perhaps as an incomplete transaction document. The posting date and new values may have to be changed before posting.

### **Recurring Entries**

If you are expecting to make a series of entries where the amounts are always the same, you can set up a recurring entry. Monthly service fees would be an example.

A recurring entry is a set of data that will not be used until the due dates. Until then, the entries will not update account balances.

You will have to specify the first and last dates and the frequency or time interval. The system will automatically post the required transaction on each of the due dates.

### **Special Transactions in the FI-AR Accounts Receivable Sub-Ledger**

The standard general-purpose data-entry function can be called from FI-AR Accounts Receivable in order to make special entries such as credit memos and adjustments. Down payments, bills of exchange, and security deposits are examples of special General Ledger transactions. Separate account balances are maintained for them.

### **Currencies**

Each company code has a local currency for reporting. The system records amounts in this local currency and also in a currency that has been specified as the document currency and that will be used on all documents in addition to the local currency.

You can enter documents in any currency.

You have two options for converting currencies:

- Enter an exchange rate when you enter the transaction document.
- The system translates between document and local currencies by referring to a table of daily exchange rates.

The system can be customized in various ways, which include the following:

- A specific user is obliged to enter amounts in a particular currency, which can be the local currency or the system document currency.
- A specific user can be permitted to enter amounts in either local or document currency.

Whatever the customizing arrangements, the system will display amounts in both local and document currencies. It will round off minor differences, using rules established for this purposes. These differences can occur when several line items are converted and then added in both currencies.

Customer monthly debits and credits are kept by the system only in local currency. The reconciliation account for the Accounts Receivable sub-ledger is kept in local currency and in all the other currencies that have been posted.

### **Cash Receipts**

When a customer is paying in the traditional manner, it is usual to find references to invoices or other documents with the check or other form of payment. You may find a document number written on the check, on a payment list, or in a payment advice note.

You have to enter four essential items of data:

- Account number for the bank
- Amount paid
- Bank fees
- Document numbers of the invoices being paid

The system has to total the open items for this customer and compare this total with the amount being paid, making allowance for any cash discount due for early payment or other reason. If the total due equals the total paid, the system posts the payment and marks all the line items as cleared.

The action of marking a line item as cleared includes recording for each line the clearing date and the identification number of the SAP Document that is the stored evidence of the transaction—in this case, the payment document.

The audit trail may need to trace any amount to the point where it first appeared in the system.

### **Searching for Open Items**

If the customer has not told you which invoices are being paid by writing their numbers on the check or by including an advice note, you will have to find out by using the system.

For example, you can call for a search for open items for this customer. There may be too many to decide which are being settled by this payment, so you can narrow the search by giving exact values or ranges of values for almost any of the header fields and line item fields that could appear on a transaction document.

It is recommended that you use no more than a handful of search fields. The most useful fields for narrowing a search for open items for a customer are the following:

- Document Reference Number
- Posting Date

- Invoice Amount

- Posting Key

For any of your searching criteria you can accept a range of values: any document number between two given numbers; any posting date over a specified interval; any invoice amount greater than or less than a given amount; any posting key out of a short list that you specify.

The system's first response to a search command is to display a summary screen showing the items it has found.

The summary will total the amounts. If this equals your customer's payment, your search is over. If not, you must refine the search.

You might select a few items from the summary screen, and look at their details in order to find some better entries for a more focused search.

The summary screen layout may be more useful to you if you change its display format by moving or replacing some of the columns until you are looking at only the details that interest you.

At any time you can switch the display between showing the details of a line item, and showing the entire document. This will include the entry offsetting this customer line item, if there is one.

If your search for open items is successful, you will arrive at a list of invoices that add up to the same amount as is being offered as payment by the customer. Allowances for cash discounts will have been calculated by the system, and you will be able to this from the display. There may also be differences arising because of the conversions between currencies.

When your system is being customized, you can specify the limits within which the system will post minor payment differences automatically. You can also establish special rules for each user, so that any differences larger than a certain amount have to be referred to a user with authorization to deal with them.

When the selected open items balance the payment, you can post the document.

### **Partial Payments**

If the open items do not balance the payment after cash discounts have been allowed, there are three options:

- You can post a payment on account.
- You can clear an open item and post a residual item.
- You can enter a partial payment with a reference to the open item that remains open.

If you cannot find any amounts at all to match with the payment, the only option is to post the payment on account.

If you cannot completely match the payment to the open items, the best option again is to post the payment on account.

If you know the open item concerned, and the payment is only partial, you can clear the full amount of the open item; but open a residual item to cover the difference still unpaid. Alternatively, you can enter the payment with a note to refer to the open item of which it is but a partial settlement.

If there are many possible open items, the system can be given the task of picking open items without defining any search criteria. The system will try various combinations of open items in the attempt to match the amount paid. It will suggest a set of items that together add up to an amount as close as possible to the amount paid.

### **Bank Fees**

If a bank charge is associated with a cash receipt, you can enter it at the same time. The system will automatically generate and display a line item for the bank fee.

### **Currency Exchange Differences**

A line item may be expressed in a currency other than the local or document currency. You can enter payments to clear such foreign currency line items using either local or document currency.

The payment expressed in the document currency will have been converted from the local currency at an exchange rate adopted by the system according to the rules laid down for assigning the daily exchange rate. If this rate has changed from the rate prevailing when the invoice was written, the payment amount may not match the open item amount. In such cases the system will automatically calculate and post an exchange difference entry to a separate account established for this purpose.

### **Down Payment Entries**

A payment which is the first of a series of partial payments can be identified as a down payment and will be recorded as such. The item will remain open, and the amount will be posted to an account established for the purpose of accumulating such payments until the full payment has been received. Only then will the item be cleared, and the holding account will be cleared by the same amount.

### **Vendor Open Items**

Because the FI-GL General Ledger accounts are fully integrated, vendor open items may be cleared at the same time as customer payments.

### **Open Items for Different Customers**

The integrated FI-AR Accounts Receivable component will accept each item as an independent task, because each item will have access to the complete set of data objects needed to process it.

Therefore, open items may be found for several customers and cleared by the appropriate payments in the same session.

### **Open Items with Different Company Codes**

Open items bearing different company codes can be cleared at the same time. The system will record a clearing document in each company code.

### **Automatic Clearing in Accounts Receivable**

If your customer has allowed you to collect by direct debit, the FI-AR component will offer you a payment program, which will collect all invoices when due.

Reimbursing customers with checks or by bank transfers follows the FI-AP Accounts Payable procedures for automatic payment.

If the FI-CM Cash Management component has been installed, you will be able to clear automatically. Your bank statement can be provided by file transfer, and the system will automatically post the entries to the FI-GL General Ledger and also clear the matching open items in the customer accounts. Only if the data from the transfer are incomplete will you have to intervene.

### **Payment Procedures for Particular Countries**

There are variations in the legal payment procedures for different countries. These have been encapsulated in the standard business procedures of the FI-AR Accounts Receivable component.

National payment procedures may be specified for your implementation during the customizing process.

### **Dunning Accounts Receivable**

Each customer's master data include a field to indicate what is to be done about overdue invoices. This dunning code identifies an established dunning procedure.

A dunning procedure is independent of company codes. It records the grace period, the dunning intervals and the number of dunning levels.

The SAPscript word processing program is available to you to design and change the format of dunning letters. You will have been provided with some model letters at each dunning level during customization. You can change and edit the text of the letter and also the company logo, position of the address window, and footers. Open items referred to in the letter may be given a special format and content for this purpose.

A dunning proposal is a set of suggestions assembled by the system, which you can accept as it stands or alter in various ways. The system will start creating a dunning proposal by using due dates and some method of selecting which accounts are to be dunned. You may have defined these previously.

You then process the dunning proposal online. You can target the dunning letters at particular clerks; or you may decide to assign particular dunning letters to the dunning levels, and then designate a level to each of the individual open items. The dunning level

of the whole account will be changed automatically to the highest dunning level of any open item. You can release specific open items and accounts to be referenced in the dunning letters. The system records all changes to open items that are to be dunned.

**Customizing Dunning Letters.** The same letter forms can be used throughout the group, or you can use different forms for each company code. Certain text may appear only for particular company codes. You can decide for each company code whether an individual dunning letter is to be prepared for each dunning level. If this is to be the case, only the items with that dunning level will appear on the dunning letter.

Individual accounts can have their own dunning letters. Customer items can be assigned to different dunning areas, each of which is given a separate dunning letter.

If the SD-Sales and Distribution system has been installed and configured, the dunning areas can be made to correspond to the areas of the sales organization, the distribution channel, or the division.

Refunds overdue from a vendor can be dunned; and you can have the dunning program subtract vendor items from customer items where they concern the same company, if the master records specify that this is permitted.

**Selecting the Route for Dunning Letters.** The dunning program can direct dunning letters to the EDI-Electronic Document Interchange system on the basis of individual customer or vendor accounts, or in accord with a group or dunning area policy.

You can also use the office system to send the letters by telex, messenger or postal delivery.

**Reports on Dunning.** The system always prepares a standard processing log. It can also offer the following reports pertaining to dunning:

- List of blocked items
- List of blocked accounts
- Lists of items with special dunning keys
- Dunning statistics

### **Special General Ledger Transactions**

Transactions that are posted to a customer's account will automatically update the FI-AR General Ledger Accounts Receivable, which is a reconciliation account, if they are invoices, credit memos, or payments.

Some transactions posted to the customer account may update FI-GL General Ledger accounts other than FI-AR Accounts Receivable.

These accounts are a type of Special General Ledger Account. They are reconciliation accounts recording business that is neither a sale to a customer nor a purchase from a vendor.

Special General Ledger Transactions include:

- Down Payments
- Bills of Exchange
- Security deposits
- Guarantees

**Down Payments.** A down payment is a payment for a product or service not yet supplied or performed. They have to be reported in the balance sheet separately from other Receivables or Payables.

Down payments made are reported as assets: down payments received are reported as liabilities.

A down payment request can be recorded as a note to the files which will be displayed with other open items for each customer. As a note, it will not update account balances. However, like any other open item, you can dun the request for a down payment with the dunning program, and collect the down payment by direct debit with the payment program.

You can enter and post a customer down payment gross; the tax is included in the down payment and offset in a tax clearing account. Or you can post the down payment net. The balance sheet will report it correctly either way.

When you post the final invoice, you can display all the down payments and apply them to the customer invoice. They may match the invoice in full or in part, but you cannot clear the invoice until you receive payment from the customer.

**Bills of Exchange Receivable.** A bill of exchange is a document on which is written a promise to pay a certain amount on a certain date in exchange for a specific business transaction that has taken place. A Bill of Exchange Receivable is a promise that payment can be collected from a customer on the expiration date record on the bill. It is a form of IOU ("I owe you.") with a date set for payment.

When a customer submits a bill of exchange, you can use the search facilities to find open items to match it if there is any doubt regarding the invoice it belongs to.

A Bill of Exchange Receivable is an open item until the bill itself has been deposited at the bank and discounted there against your account. Alternatively, your customer could pay cash to the amount of a bill of exchange. Either method of concluding the payment would permit you to close the open invoice item.

Because the bill of exchange receivable is a promise and not a payment, it is posted to a special General Ledger account set up for this purpose and named the Bills of Exchange Receivables account.

If the customer offers you a cash or check payment before the bill of exchange receivable has expired, you can reverse the deposit in the Bills of Exchange Receivable account and post the cash against the open item in the normal way.

**Bills of Exchange Discount Ledger.** Discounting is the process of depositing bills of exchange that are not yet due. The system can prepare a deposit slip for bills of exchange.

Discounting also refers to the process of depositing a post-dated check and deducting interest on the amount (the discount) until the due date.

Commission or collection fees can be charged on both bills of exchange and checks.

The system can prepare the discount ledger. This ledger is a journal in which all bills of exchange are entered. The following data fields are mandatory:

- Due date
- Amount
- Name and address of the drawer
- Name and address of the previous holder
- Place of payment
- Name and address of the drawee
- Discount

You can specify default values for each company code for the following:

- Discount percentage
- Collection fees
- Bill of exchange tax

These charges have to be posted to separate accounts in the General Ledger. The system can prepare a bill for the customer that details these charges.

Bills of exchange deposits can be recorded and annotated as follows:

- Discounted before the due date
- Collected on the due date
- Factored—an exporter gets cash immediately from a bank or other financial institution which takes responsibility for collecting the receivable amounts or the amounts due on the bills of exchange

### **Security Deposit**

A security deposit is a payment made in advance against the possibility of poor performance by one of the parties to a transaction, for example, the payment by the buyer or the performance of the seller.

Security deposits are reported as noted items in the financial statements.

**Guarantee**

A guarantee is a contract entered into by a third party to pay up to a specified limit if one of the parties to a transaction fails to deliver the contracted materials or service, on the one hand, or fails to pay the amount due, on the other.

Guarantees are reported as noted items in the financial statements.

**Reporting in the Accounts Receivable Component**

The online reporting facilities of the Accounts Receivable program can be supplemented by printed outputs in single or batch modes. These reports can be sent to file or to a printer.

There are three main classes of report:

- Master record reports
- Customer account statements and open item reports
- Balance audit trail reports

Customers can be selected by various criteria, singly or in the form of logical expressions that will isolate customers on the basis of one or more attributes of their master records combined with attributes computed from their accounts—for example, customers with a post-code beginning 462 who have not ordered in the previous six months.

The content of a report is under your control. You can mix master data and account data, subject to authorization.

If the items are still in the system, you can call for reports of customer open items which sort the items by ranges of due dates or by values according to the report specification that you build or copy from a previous design.

**Audit Trail Reporting**

A legally valid financial accounting system has to have a method of demonstrating all the transactions that contributed to each of the balances on the balance sheet. It has to show the balance at the beginning of the accounting period and all the debits and credits that were applied to the account to reach the balance at the close of the period.

Every computer system has limits to the amount of storage space that it can make available for any particular purpose. The SAP approach to the management of storage space is to archive all the line items in a balance audit trail separately from the document data that recorded the transactions.

When a balance audit trail is required, usually at the end of the accounting period, the line item archive can be scanned without also having to read all the document data.

The balance audit trail report contains a list of customer line items and a control total for each customer account. Reconciliation account totals will also be shown, so the accounts can be matched with accounts in other parts of your accounting system.

The customer line items for accounts that are not managed on an open item basis can be sorted in chronological order to assist in tracking them.

When open item accounting is in practice, the balance audit trail will sort the cleared (paid) line items to the beginning of each account, arranged in clearing date order and then by clearing document number. This helps you trace how and when an item was cleared. The uncleared open items will be at the end of each account listing.

## FI-AP Accounts Payable

Accounts Payable is a sub-ledger of the General Ledger and completely integrated with it at the following levels:

- Master Data
- Transaction Data
- Reporting System

The purpose of the Accounts Payable sub-ledger is to keep track of the vendors of goods, materials and services. Its job is to pay for them. It is an integral part of the purchasing system.

Master data entered or modified in one application will be available to all the others. Transaction data will be accessible to all. Reporting can draw from the General Ledger and the Accounts Payable sub-ledger.

Transaction data are stored centrally in the document database, and the corresponding line items and details are stored in the sub-ledgers as appropriate. The system automatically updates a subtotal of a balance sheet account for every business transaction, and reconciles the account subtotals and the line items to ensure that the financial information is always correct and current.

Every transaction creates a SAP Document, and the data are immediately posted to the General Ledger. Hence every business transaction recorded in this way automatically updates the balance sheet or the profit and loss statement.

This is the defining characteristic of an up-to-date networked accounting and controlling system.

### The Business Functions of Accounts Payable

Accounts Payable includes a program that records orders, deliveries and invoices for each vendor. Operating transactions automatically update accounts in the FI-General Ledger system. When you post a vendor transaction, the system will immediately update the Accounts Payable account.

Accounts Payable is directly integrated with Cash Management, which supports cash planning and dunning.

An automatic payment program can be called from Accounts Payable.

SAP Purchasing is a group of components from MM-Materials Management that can be installed and configured to integrate with Accounts Payable. The Purchasing functions are discussed in the Chapter 22, "Understanding the MM-Materials Management Module."

Reporting on matters concerned with FI-AP Accounts Payable will follow the SAP standard business functions to yield the following reports, for example:

- List of due dates for accounts payable
- Currency lists
- Hit list

Correspondence concerning Accounts Payable can be set to provide automatic letters and messages for such purposes as:

- Balance confirmation
- Information
- Interest calculation

### **Compliance with GAAP**

The methods used by SAP FI-AP Accounts Payable to adhere to GAAP (the Generally Accepted Accounting Principles) are the methods used throughout the SAP system.

Vendor information is stored in vendor master data records which are the only source of this information, and which are kept up-to-date by all users and applications that have reason to interact with them. The master data are entered once, and stays in one place only. Everyone knows where to find it and can discover when it was last updated.

Transactions concerning vendors automatically create SAP Documents that can be used to keep track of the transactions and the actions that arise from them. These SAP Documents can be used to compile a legal audit trail for each balance amount in the balance sheet. They can also be used to record other information that will be used by controlling systems with interests in vendor transactions.

SAP Documents have to comply with GAAP in the matter of capturing the information essential to the proper and legal analysis and control of business. These documents, automatically created during vendor transactions under the Accounts Payable system, can be displayed and altered, in a controlled manner, using the SAP standard business functions for manipulating SAP Documents.

The vendor accounts and others involved with the Accounts Payable system are updated in accord with GAAP recommendations, and the proper record must be created whenever any changes are made to the account balances or the SAP Documents that record such activities.

**Vendor Master Records**

In accordance with the SAP principle of redundancy-free data storage, the standard practice is to use master records for the control of basic data that are seldom changed. At the master record design stage, you have to ensure that a vendor master data object has a data field for every item of information needed to record and post business transactions with vendors.

If the information you require could have been supplied by the system, you should not have to enter it by hand every time you attempt to carry out a vendor transaction.

Information in a master record is not necessarily available to anyone who is interested in it. Certain data objects may be closed to a user who does not have the authorization to access them. The vendor's bank balance would be an example of data that are not available for scrutiny by just anyone.

The SAP MM-Materials Management, Purchasing components have to have been installed and configured in order to make use of information directed at a purchasing department.

If the Purchasing components have been installed, both the purchasing department and the accounting department will use the vendor master record from time to time. There have to be data fields to suit them both, as follows:

- General data concerning the vendor that everyone will need (address, telephone number, telex and modem codes, and so on);
- Data about the vendor that might be of interest to any of the various company codes representing the different legal entities into which the purchasing company may be divided. Accounting data would be an example;
- Data about the vendor that might be important to any of the purchasing organizations that might buy from this vendor. These may not correspond to the divisions differentiated by the company codes.

The company code divides the company into legal divisions for accounting purposes. Master data for each company code will include:

- Payment terms
- Customer account number under that company code
- Reconciliation account number
- Payment methods
- How the vendor line items are to be sorted on displays under each company code

**Creating and Maintaining Vendor Master Records**

When a new or prospective vendor is identified, a new master record is created. It must be assigned to an account group.

The account group determines whether you can assign account numbers within specified ranges, or whether this will be done automatically by the system.

You will not be allowed to assign the same account number more than once; but you can have both customers and vendors within the same range of numbers.

The account group also controls which fields will be active in this master record. The fields offered by the account group can be picked and assigned to one of three categories:

- Fields into which the user must make a valid entry
- Fields the user can either leave blank or make an entry into
- Fields that will be suppressed so they will not appear on the screen at all. A whole screen of fields may be suppressed if they are not needed for a particular master record.

The FI-AP Accounts Payable system will make it easy to create vendor master records by offering various options:

- You can copy a master record from a reference record that has been established for the purpose. You have to make at least one alteration to it before you post it to become a new vendor master record.
- You can copy the master record of an existing vendor and edit the unwanted details to make it into a new master record.
- You can create the new vendor master record by entering all the necessary details.

Once you have entered and stored a vendor master record, you can call it back again and change almost any of the fields. There will be a choice of whether to go through all the fields or work on only one set of fields; for instance, the product or service details.

Master vendor records can be selectively displayed so that you need see only those fields that are of interest to you according to the task you have at hand.

### One-Time Accounts

If you think a vendor is probably not going to become a regular supplier, you can set up a one-time account by selecting a special function. This will create a master record that contains only the essential control data, such as the number of the reconciliation account to which this purchase will be posted. You can supply the address and the bank account data when you enter an invoice received. This information will then arrive in the one-time account master record, where the dunning and payment programs can find it when they need it.

### Head Office—Branch Accounts

Your supplier may be a branch with its own account, but the head office may wish to receive your payment. In this case, you can enter the head office account number in the master record for the branch vendor. When you enter a transaction to the branch account, the system will post the transaction to the head office account, leaving a cleared entry on the branch account to show who supplied the goods or service.

The master will include data about the branch and a reference to another master to give details of the head office. By this means, dunning letters may be sent to the head office, the branch or both for overdue refunds, for example.

**Vendor Payments to an Alternative Recipient**

Your supplier may not have to deal with his payments due. You can record in his master data the account number of the alternative recipient. The system will then process return transfers and other vendor payment business through the banks to the alternative recipient.

If you do post vendor invoices to an affiliate, you have to record in the master data of the branch vendor a group-wide company account number that will be used during consolidation to eliminate the invoices that would otherwise appear twice in the company accounts. The system will be able to look at the transaction documents bearing this group-wide company account number and identify any entries that are replicated because the payment was made to an affiliate who was not the original vendor.

**Transactions in Accounts Payable**

When you post a transaction to a vendor account, the reconciliation account for Accounts Payable is updated immediately in the General Ledger.

The system updates a separate account for each type of vendor transaction:

- Purchases
- Down payments
- Bills of exchange payable
- Guarantees

Orders to and invoices from vendors also update financial planning and cash management data.

**Vendor Invoices**

The SAP FI-Financial Accounting system is integrated with the MM-Materials Management system. An invoice with an order and delivery data can be entered and validated in MM-Materials Management. Validated invoices will be posted automatically to the General Ledger accounts in the FI-Financial Accounting system, if the two systems are suitably configured.

**Electronic Data Exchange**

Vendor invoices can be received by Electronic Data Exchange (EDI). Data entry starts automatically, and the system converts it from the EDI format to the online entry format for line items.

You will be asked to correct and complete any erroneous or incomplete transactions. These will have been automatically saved for you during the EDI.

**Manual Invoice Entry**

If you have to enter manually an invoice that has not been posted automatically, then SAP R/3 will provide all possible help.

The successful posting of a transaction does not occur until the necessary data are recorded as a SAP Document and are complete and error-free. You can set aside a transaction document before it is ready for posting, in which case the system will validate any information you have already entered and report to you any discrepancies.

The SAP Document has to end up with a document header showing posting date, document date, document reference number and currency key. The body of the document will contain one or more line items showing the amount and identifying the product and terms of payment. The system will generate certain line items such as tax entries, cash discount and exchange rate differences as applicable.

You can set up helping routines and use standard data entry functions such as:

- Default values that you can edit at the time of entry
- Recalling for copying and editing a previous screen
- Retaining data for individual users for several transactions
- Adapting a copy of a data-entry screen so that it is better suited to a set of transactions that you are expecting
- Searching for an account number by using matchcodes to narrow the search

A SAP Document that records a previous transaction can be copied to act as sample or model to be edited. This sample can be a regular document that has been set aside, perhaps as an incomplete transaction document. The posting date and new values may have to be changed before posting.

**Recurring Entries**

If you are expecting to make a series of entries where the amounts are always the same, you can set up a recurring entry. Monthly service charges under contract would be an example.

A recurring entry is a set of data that will not be used until the due dates. Until then, the entries will not update account balances.

You will have to specify the first and last dates and the frequency or time interval. The system will automatically post the required transaction on each of the due dates.

**Special Transactions in the Accounts Payable Sub-Ledger**

The standard general-purpose data-entry function can be called from Accounts Payable in order to make special general ledger entries such as credit memos and adjustments. Down payments, bills of exchange and security deposits are examples of special general ledger transactions. Separate account balances are maintained for them.

**Entering Net Vendor Invoices.** A net vendor invoice records the liability to the vendor after the cash discount has been discounted.

When you process a net vendor invoice, you have to enter the gross amount. The system will calculate the net amount on a line-by-line basis.

When this type of invoice is posted, the General Ledger entries in the Accounts Payable sub-ledger will include the offsetting amounts net of the cash discount. The amount of the cash discount will be automatically posted to a discount clearing account. There it will remain until you pay the invoice, when it will be released.

The purchase of a fixed asset can be recorded as a net vendor invoice. By this means, the amount representing the value of the fixed asset will be net of the cash discount, and can be depreciated in the normal way. The discount clearing account will carry the amount of the cash discount, but it does not have to be cleared later, because it will have been released when payment is made for the fixed asset.

**Requests for Down Payments.** If you enter a request to the payment program to generate automatically a down payment to a vendor, the system will make the payment and store the request without updating any account balances.

You will have to support the request with all the necessary payment data and the due date for payment to be completed. You can call for a display of all requests for down payment. You have the option to display down payments gross (including tax) or net (excluding tax). The net amount will be reported in the balance sheet, and the tax will appear in the tax account.

When the payment program has carried out all the down payments and you have received the final invoice from the vendor, you can enter it. The system will display all the down payments made on this invoice, and you can apply them to offset the invoice in whole or in part. The payment program will then pay any amount outstanding to the vendor.

### **Automatic Payment Functions**

Manual entering of payments is necessary, for example, if a vendor is to collect from you by direct debits. But the most effective time-saver in Accounts Payable is the automatic payment program.

The payment program proceeds in two stages:

- Generating and presenting for editing a payment proposal
- Executing the approved payment proposal

You can also execute a payment without considering a payment proposal.

**Generating a Payment Proposal.** The purpose of a payment proposal is to maximize cash discount within the constraints set by certain data in the vendor master records and by the way the payment program has been set up.

Displaying vendor open items will show you who is yet unpaid: you must decide who to choose for payment.

There are various ways to select who to pay on—the basis of due dates, or amounts in order of magnitude and so on.

The system will check the due dates of vendor open items, and propose a method of payment for each depending on the master data and the requirement to maximize cash discount.

The system will also choose one of your banks to provide the funds for each payment.

The system can generate a form for a check or automatic payment medium such as diskette or an online electronic transfer. You will have to assign a medium of this kind for each payment, either individually or on the basis of the default values suggested by the system on the basis of data in the vendor master records. You may have directly specified the choice of medium in advance of a batch of payment proposals.

**Editing a Payment Proposal.** You may be allowed several options regarding the payment proposal. For example, you may have the authorization allowing you to:

- Change the proposed method of payment for an open item.
- Change the proposed bank.
- Block an open item to stop it being paid.
- Add another open item to the payment proposal.
- Change the cash discount level of an open item to be paid.

**Executing the Edited Payment Proposal.** Execution of a valid payment proposal is largely automatic.

The payment program will generate SAP payment documents and post payments to the appropriate General Ledger accounts.

The vendor items in the payment proposal will be marked as cleared and given a reference number which will link them to the SAP payment document.

For each country and payment method combination, there is a specific program to print the checks or payment forms in the language and style for that country, and, if a diskette or other electronic payment notification channel is used, in the format for that medium.

The system will compile a log of each payment run and all payment methods applied, so that you can see the effects and exercise control.

### **Maximizing Cash Discount**

Each vendor open item carries a base amount which is the payment due before applying cash discounts. Each vendor master record contains information about the payment terms which that vendor has agreed with the purchasing company. In the purchasing group there may be different payment terms negotiated with each business entity defined by the company codes.

The payment terms for each company code purchasing from a vendor will each include at least one cash discount term, expressed as a percentage discount, and a cash discount date related to the date of the invoice. For example, the following are cash discount payment terms:

3% if paid within 14 days of the date of the invoice

2.5% if paid on or before the 15th of the month following the date of the invoice

For each open item, you can enter one or two payment terms and a date for net payment. The system can calculate the due discount date by referring to the payment terms and the invoice date. You may wish to enter a date for net payment within a discount period on a date that suits your requirements.

You may find national differences in the practice of settling accounts. In France, for instance, it is customary to pay an invoice with a bill of exchange immediately, so that the due dates of the bill of exchange and the invoice are the same.

The SAP payment program can be set to pay, by bill of exchange, all invoices due within a specific time period. There are many different payment methods available in the system.

The payment program can also be used to make payments by check, by bank transfer, by postal check and by other methods which are specific to particular countries or trading areas.

Multinational accounting is supported by the SAP INT-International Development module:

IN-APA	Asian and Pacific Area
IN-EUR	Europe
IN-NAM	North America
IN-AFM	Africa and Middle East
IN-SAM	South America

### **Payment Methods**

There are no limits to the number of different payment methods you can use for each country. Many of the forms are supplied via a SAP script which is then used to control the printing in the language of the destination country.

You can edit the forms that are supplied so that they precisely suit your payment format.

You can ask the system to select the payment method from a list of up to ten methods that have been nominated in the vendor master record. The automatic selection of payment method can be governed by such factors as:

- Amount to be paid
- Number of open items paid

- Currency of the receiver
- Location of the vendor
- Amount available in the bank account

Open items can be grouped for payment and individual items can be marked to be paid separately. You can nominate a specific open item to be paid in a particular way.

Your system may have been set up to choose one of the vendor's banks on the basis of the suitability of the bank to pay, for example, by bills of exchange.

The choice may rest on the ability of your bank to make a direct transfer to the vendor's bank. Banks are given group codes to indicate who can transfer to whom.

The payment system can be asked to choose one of your banks from which to make a payment. You can rank-order your banks, and have the system work down the list looking for sufficient cash together with the appropriate means of paying. You may have the system choose one of your banks because it has a branch near the vendor. You can also override the automatic selection by commanding it through an entry in the open line item, or by changing the vendor master data.

**Alternative Payment Recipient.** If payment has to go to a recipient other than the vendor, you can arrange it in various ways:

All payments in all company codes can be redirected by entering the new account number in the general data of the vendor master record.

All payments in a specific company code can be redirected by entering the new account number in the company code section of the vendor master record.

Payments for specific open items can be redirected by marking each open item by a code, but only if this is expressly permitted by an entry in the vendor master record specifying the alternative account number.

### Intercompany Payments

One vendor may have supplied several company codes in the same group. The payment system can make one payment and then settle the intercompany accounts by calculating and posting Receivables and Payables between company codes.

The transaction needs you to define one of the company codes and enter it as a normal paying company. The system will assign the document a unique intercompany identification number which will be used to ensure that the other members of the company code group will pay their shares.

### Clearing Sales Contra Purchases

If a vendor is also a customer, you can clear vendor and customer open items against each other via a Contra account. The vendor and customer master records must be able identify each other by holding the respective account numbers in the company code areas. And this sort of dealing must be explicitly permitted by the appropriate master data items.

**Credit and Debit Memos**

A transaction that reduces amounts receivable from a customer—for example, if the customer returns damaged goods—is a credit memo.

A debit memo is a transaction that reduces amounts payable to a vendor because, for example, you send damaged goods back to your vendor.

When you post credit memos, the payment program will immediately process them. If you post a debit memo to a vendor who is to reimburse the amount, then you can apply a multilevel dunning program.

A credit memo can be offset with specific invoices. The payment program will subtract the credit memo amount from the amount due for the vendor open items.

**Reverse Documents**

Should you mistakenly post a transaction to the wrong vendor, you can reverse this transaction and the associated SAP Document. The system will automatically generate a reversing entry for each item wrongly posted.

## **FI-FC Financial Controlling**

Under the heading of Financial Controlling it is convenient to place Cash Management, Financial Planning, Public Accounting, and Funds Management.

There are SAP standard business functions to support each of these areas, and they can be installed and implemented in various combinations.

**FI-CM Cash Management**

The purpose of Cash Management is to plan, control, and monitor the liquidity of the business and contribute to its profitability if possible.

The key accounting distinction to be made is between:

- Cash accounts that record actual available liquid assets
- Clearing accounts that represent payments in transit

The operational concept is to:

- Plan all transactions that have payment advices.
- Control cash.
- Invest cash.

The method entails utilizing the SAP fully automatic payment routines to:

- Optimize short-term interest revenue.
- Optimize money market transactions.

The computer context is a closely integrated system comprising SAP Cash Management, the payment program and FI-AP Accounts Payable.

**FI-CM Cash Management Procedure.** The main steps needed to manage cash efficiently are as follows:

- Store information in the form of payment advices until you receive the payments.
- Prepare to clear open items using the information held as payment advices.
- Process partial payments, either by open items or by account.
- Receive bank statements by file transfer if available.
- Clear open items by referring to bank statements or payment advice notes.
- Update expected cash receipts.
- Use the payment advices to plan cash flow in the short term—up to five days, for example.

**Managing Cash Accounts and Clearing Accounts.** Cash accounts record actual available liquidity; clearing accounts represent payments in transit.

For each cash or clearing account, you can specify individually how it is to be managed. The SAP standard business functions ensure that all the items in these accounts will be consistent with the balance sheet at all times.

You have five options for managing an account:

- Account to be managed on an open item basis
- Account to be kept by value dates
- Account to be kept with various currencies in parallel
- Account to be posted automatically by the payment program
- Account to be cleared automatically by using an electronic banking function

**Cash Management Objects.** The SAP system operates on objects which are either program objects designed to carry out a business process, or data objects providing information when it is needed by the programmed business processes.

Cash management and short-term cash position forecasting depend on transaction information being made available to the various processes that will prepare data objects such as a daily cash report or plans to control the allocation of cash.

FI-CM Cash Management must be assigned transaction information from the following sources:

FI-GL	General Ledger
FI-AR	Accounts Receivable
FI-AP	Accounts Payable

If there is a schedule of funds to be made available, FI-CM Cash Management must be notified in order to use this information in the forecasting.

If any of the ledgers has recurring entries, then the Cash Management function should know about it.

Many of these relationships between the parts of the SAP system will already be in place by virtue of the integrated design of the various modules. However, the precise details may have to be configured and customized to make the best use of them in an individual implementation, depending on which components are installed and the interfaces to outside systems that are to be active.

**Transactions for Processing Payments.** The payment program will make available a wide range of options for payment of individual accounts and groupings of sets of accounts. The possibilities include the following functions:

- Enter bank statements quickly.
- Optionally clear open items automatically subject to specified controls, such as the availability of cash.
- Record payment advices and list them for display.
- Delete payment advices.
- Provide preliminary information about payment orders, checks received, bank statements, and discounted bills of exchange.
- Prepare check deposit slips using default posting instructions.
- Manage checks outstanding.
- Control checks deposited.
- Manage bills of exchange receivable and payable.
- Calculate interest automatically.

Throughout all these transactions, the integrity of the FI-GL General Ledger is maintained by the automatic functions of FI-CM Cash Management, FI-AR Accounts Receivable, and FI-AP Accounts Payable.

### **Electronic Banking Facilities**

The purpose of electronic banking is to reduce the time needed for entering data and to support the aim of timely cash management.

The methods use data transfer by portable storage media such as tape or by direct communication line transfer of files. These files can contain general data or transaction data in the form of bank statements or transaction documents in the SAP Document format or in formats provided by other systems.

The effects of rapid file transfer include the following contributions to the goal of more secure, quicker and more efficient processing and clearing of payments:

- Bank statements can be posted automatically.
- Bank statements can be transferred and clearing accounts processed automatically.
- Data can be transferred to FI-AR Accounts Receivable and cash receipts can be processed automatically.
- Bank charges can be posted automatically.
- Exchange rate differences can be posted automatically and foreign currency accounts managed more effectively.

### **Automatic Bank Account Clearing**

The result of Automatic Bank Account Clearing is an improvement in your control of cash, because you can process payment advices and clear bank statements on a daily basis. The effects will be to optimize liquidity reserves and interest income.

You will retain the option of intervening in the automatic processes and making manual corrections. The FI-CM Cash Management position display, for example, can be arranged to separate specific accounts or groups of accounts; and it can split the display to differentiate checks, bank transfers, payment advices and so on. Amounts and dates can be used to rank-order or divide into sets the items to be displayed.

Intercompany transactions and the separation into multiple levels of accounts will be facilitated.

You will have control over the processing of different payment methods and the minimum balance to be maintained in each bank account.

The system can be primed to create all the necessary correspondence automatically.

### **Medium-Term Cash Management and Forecasting**

The purpose of a cash management and financial controlling system is to maintain liquidity in order to fulfill payment obligations.

Short-term management consists of looking at the current liquidity position and what the situation might be in a few days, typically one working week. Medium-term cash management and forecasting has a horizon that extends to a year.

One product of medium-term financial planning is the annual cash plan. This plan must show how liquidity is to be secured over the period by exercising financial control.

The annual plan can be set out at any level of detail and for any arrangement of the organizational structure that the data will support.

### **Financial Planning Annual Cash Flow Plan**

With modern accounting systems, the financial planning period can be of any duration, since the information to be reported will be assembled online when the design of the report is used to generate the presentation of the information.

SAP FI-Financial Accounting supports planning in a comprehensive way:

- The fiscal year can be flexible and can comprise any number of periods.
- The multilevel dependencies between totals and subtotals, departments and sub-departments, and so on, are automatically taken into account when assessing and distributing planning data.
- Data transfer from and to other systems occurs through clearly defined data interfaces, which can serve the aims of financial planning in addition to their other traffic.

The information sources of most interest to the financial planner will be as follows:

- Accounts receivable and payable
- Planned cash expenditures and receipts
- Open orders from customers
- Purchase orders to vendors

The financial planning report will have to address the following issues for each period of the plan for each of the groups within the company that are to be part of the plan:

- Overall liquidity
- Committed funds
- Types of risk

### **Financial Controlling**

The control process comes into prominence when values set out in the financial plan are compared with the actual values achieved by the business. A quick reaction demands a short planning and accounting period, so that actual and planned or budgeted amounts can be compared in time to make a correction. The SAP FI-Financial Controlling module can provide for cycles of monitoring and control that range upwards from one day.

### **Decentralized Funds Management**

Public accounting is a form of financial controlling which is focused on a budget that is made available to cover expenses over the fiscal year or a shorter accounting period. Recent changes to the methods of financial controlling have made the concept of public accounting equivalent to funds accounting.

There are two tasks for which the SAP FI-Financial Accounting system provides comprehensive support:

- Preparing a budget
- Monitoring the budget by tracking the achievement of targets in each of the divisions of the budget

Preparing a budget will entail estimating or assigning target values for the following:

- Cash requirements for operations
- Cash requirements for capital investment projects
- Planned cash receipts

You can assign responsibility for providing, managing, and accounting for funds for each of these items separately, and then combine them in a total budget. Under this total, you can then prepare individual plans which can make a division into administrative and capital budgets.

A budget can be stored with a version number and the process repeated using some or all of the parameters as a model from which a new version is created.

If the proposed applications of funds exceed the funds available, you can identify the funding required to balance the budget.

**Target Data.** When a budget is translated into planned target amounts for each of the account subtotals that make up the structure of the budget, each of these targets represents the best estimate of the costs or revenues that will or should be realized.

As the period passes, fresh targets can well arise as a result of operating costs, investments and cash receipts which were not anticipated exactly in the plan. Targets may have to alter if the budget is not to be exceeded or underspent. And the data for these adjustments may arise from any of the following causes:

- Funds released and allocated to operating areas additional to the original budget
- Amendments to the budget either in total or in allocation to subdivisions
- Internal transfers
- Commitment authorizations which can be anticipated to exceed the budget
- Unexpended balances
- Anticipated expenditures

**Checking that Funds Are Available.** The funds committed are revealed by the purchase orders. The system checks that they do not exceed the funds available.

The cash available is checked, and the vendor invoices may have to be reviewed by persons responsible for the budget.

**Payment from Funds.** When you post an invoice, the system will update the "actual" data. Cash payment orders will be printed by the system to be signed and passed to the controller. The system can be set up to maintain a cash journal that records all cash transactions by date.

### Liquidity

Reports from the system will allow you to plan liquidity, because you can analyze payment dates and methods for both commitments and invoices.

Reports online will enable you to compare targets, expenses and receipts in accordance with the budget system. Down payments, invoice amounts, and final payments can be gathered into supplementary reports. An individual line item can be scrutinized; and the history of a commitment can be inspected in the form of the related transaction documents.

### **Funds Controlling**

Public accounting and funds controlling activities tend to emphasize monitoring receipts and expenditures: the sources of funds and their applications. Public sector accounting is centered on monitoring payments.

The main aim is to have actual expenses equal the budget.

In organizations that seek a return on investment in financial terms, the orientation is on budgeting for expenses. The cash flow statement is prepared in order to safeguard liquidity, to monitor financing and to analyze investments.

**Aspects of Funds Controlling.** The budget uses a plan to allocate funds to each function and organization unit over a period or succession of periods.

The source of funds is an organizational unit, such as Area, Division, Department, or Individual.

Each source can manage the application of part of the budget to activities that are intended to add value to the information or work items passing through the company. The funds can be applied to:

- Investments, such as stocks of materials, energy or partially completed work
- Output-related expenses, such as raw materials, supplies, or maintenance
- Serviceability costs, such as depreciation, repairs, or capital investments that affect the value of the plant

The progress of the funds through the budget period is monitored by using the ongoing business transactions. Separate records are made of the details of receipts and expenditure, using the budget structure to allocate them to fund sources (fund-holders) so that reports can be written showing how the funds were used in relation to the budgeted targets.

Because the structure of the budget need not coincide with the commercial or production structure of the company, the funds controlling system is able to provide a sophisticated monitoring and control mechanism which can be aligned to whatever decision-making activities will best serve the company.

### **Liquidity Analyses (Available)**

Cash is money that is available. It will usually be in currency or as a credit balance in a bank. It is available to make payments immediately, in contrast to investments and fixed assets, which are not available to pay debts until they are converted to liquid assets.

Liquidity (available) represents the estimated ability of a customer or vendor to settle outstanding debts promptly. Computing it entails two analytical tasks to build up credit and liquidity information about customers:

- Analyzing customer accounts, their credit limits, and payment history up to their current account balance, their dunning program
- Analyzing open items, both Receivables and Payables

### **Credit Limit Control Areas**

A credit control area is a set of one or more company codes and a currency for credit controlling that is to apply to all company codes in that area. This currency need not be the same as the currency of any of the company codes in the credit control area.

You can set a total amount as the credit limit for a group and a limit for each company in a credit control area. There may be several credit control areas under one group.

Different customers may be assigned a credit limit account which they share. Any order or invoice posted to any of these joint holders of a credit limit account will cause the system to check whether the joint credit account limit has been exceeded. For example, different branches that are treated as separate customers may share a credit limit account held by the head office.

You can decide which types of transaction will affect a credit limit account balance. Bills of exchange receivable, for example, are often posted to the credit limit account.

If your installation includes the SAP SD-Sales and Distribution application, there will be an automatic check on the credit limit when you enter an order.

Online customer credit control is essential if you record payments and offset paid items promptly. You can review the credit situation and the liquidity (available) of any customer at any time in terms of the following elements:

- Customer credit limit and current account balance
- Payments due
- Dunning program and dunning level in force
- Payment history

### **Payment History**

Under your direction, the system can automatically record a payment history for any or all customers for each month, going back sixteen months, using the following factors:

- Number of payment transactions
- Payment amounts
- Average days in arrears for each of the sixteen months

For the most recent period, the data are sorted by net payment and payment under each specific cash discount arrangement.

Merely as a simulation or what-if exercise, you can ask to see how the payment history would change if this customer paid immediately all the items open on a particular date that you specify. By this means you can simulate the payment history report, including the current open and overdue items.

The system also contributes to the payment history of a customer by recording totals of authorized and unauthorized deductions. The average discount rate is calculated, as is the interest amount based on the items paid after the due dates, including items still unpaid on the date you chose for making the calculation. A fictitious or nominal interest rate is used for these calculations which you can set so as to give you a fair picture of how much interest has been lost to your company because of the late payments of this customer.

You can total the amounts outstanding on open items and also on items paid in arrears. These will be sorted by number of days in arrears of the due dates for net payment or days in excess of the time limits for payments to attract cash discount.

**Tracking Open Items.** The financial control system relies on tracking uncleared items. You can identify one or more customers or vendors, and sort their open items in whatever way is most informative for you.

Similarly, you can say how you want the columns of the report and what periods you are interested in. You can have the system choose open items that fall due within any range of dates.

When you have found an individual account that needs your attention, you can display all the open items for that account and use the flexible line item search facilities to focus on just those lines that you require.

## FI-FA Financial Assets Management

Financial Assets Management is the process of valuing and controlling financial assets and liabilities with a view to securing the liquidity of the company and managing it. The main financial assets of a company will include:

- Securities
- Time deposits
- Loans granted, for example, from the company to employees

Liabilities are loans to the company.

The FI-FA Financial Assets Management component is integrated with FI-Financial Accounting and Cash Management and closely linked to the SAP FI-FEM Foreign Exchange Management System so that you can hedge your business risks by investments in foreign currency. There is also an option to update FI-CM Cash Management and FI-Financial Accounting according to the results of foreign exchange contracts.

To manage effectively the full range of financial assets, it is necessary to pay proper attention to the following tasks:

- Record keeping
- Liquidity planning
- Financial asset analysis

The SAP system provides the programs to achieve good results in each of these. The FI-CM Cash Management system provides the means to effect liquidity planning, whereas FI-AR Accounts Receivable is specialized in managing customer open items that are overdue; all SAP systems automatically generate the transaction documents from which are drawn all the items of information used in subsequent accounting and analysis for planning and control.

The FI-FA Financial Assets Management system can be used by companies in all types of commerce and industry. There are additional applications for industries, like insurance, for example, that have special relationships between financial assets at different levels and between different classes of business as well as complex interrelationships with other financial institutions.

#### **Business Associate Master Data**

A business associate is a company or institution which, in some way, is sharing the financial risks of your business by acting in one or more of the following roles:

- Borrower that owes you money
- Lender that expects money from you
- Banks that may hold some of your money like a borrower
- Banks that may have allowed you an overdraft or loan of some kind and are in the role of lender
- Issuers of financial instruments

The SAP system provides master data records on which you can hold centrally the details of your associations with each of your associates. You can record electronic notes, to whatever length you need, about telephone conversations and any other interchange that is not readily discerned from the operational business documents and transaction records stored automatically by the system. These records can extend back any number of years.

The following fields are standard in the business associate master records:

- Company name, address, and type of business
- Contact people by name, title, position, and department
- Validity checks set up for this business associate
- Links to other SAP and outside systems that concern this business associate

- Total current balance or exposure
- Financial ratios for the reviewing of credit-worthiness

### Asset Types

SAP FI-FA Financial Assets Management will expect you to divide your financial assets into asset types, which you will use to differentiate how you conduct transactions. Here are some examples of standard asset types that are recognized by the system:

- Loans
- Securities
- Time Deposits in the money market

The system is customized to suit the range of financial assets likely to be held by each company.

**Types of Investments.** Each type of asset will include a range of investment types, each of which can be provided with a customized transaction procedure that is adapted from the standard procedures supplied with the system. Bonds which are fixed income securities, variable income securities, zero-coupon bonds, and equities are examples of investment types which have standard procedures. The different types of investment are differentiated in this way because they can affect the liquidity and profitability of the company in different ways. Financial asset transactions can be tracked by calling for reports which are sorted by status, such as offer, reservation, agreement; or by type of business transaction, such as purchase of securities or prolongation of time deposits.

**Loan Administration.** The asset type “loans” is further differentiated by type of investment to make for more effective processing. The list of loan types will include the following:

- Loans receivable
- Loans payable
- Installment loans
- Annuity loans

Loans can benefit from the flexible business functions of the SAP system because their administration is conducted by the FI-FA Financial Assets Management component which uses the basic system together with any other applications that are installed and configured to interact with it, such as FI-CM Cash Management. The main business functions and data objects that take part in the administration of loans are as follows:

- Basic contract
- Discount management
- Interest plan and the amortization of principal

- Flexible value dates
- Automatic postings
- Cash management forecast
- Reporting
- Word processing and automatic correspondence

### **Planning Interest and the Amortization of Principal**

Standard conditions of interest and amortization are made available by the system. You can call on them to be applied to a particular loan or group of loans for which you have established the amounts and the payment regime.

This loan plan can be printed automatically as a letter.

The plan of interest and amortization of principal will set out the following amounts and other features in a legal format acceptable in the country to which it will apply:

- Fixed or variable interest rate
- Prepayment or additional payment
- Term of loan
- Calculation of effective date of interest based on the payments according to the loan pricing regulations, or other procedures in cases of international securities trading
- Calculation of annuities or principal amounts
- Commission due for origination of the transaction
- Currency arrangements

When a plan of interest and amortization of principal has been approved and the details are established in the SAP system, there are several possibilities. The loan administrator can set up commands for automatic execution, or initiate online any of the following activities which can add value to the loan investment:

- Accrue interest to particular periods or other accounting subheading.
- Post interest automatically.
- Plan amounts by posting them to the appropriate control accounts in the Extended General Ledger.
- Revalue loans in one or more foreign currencies.
- Report balances using a flexible formatting system.
- Update the cash flow plan for interest and amortization of principal.
- Print account statements.

If you have installed and configured the Cash Management system, your forecast of liquidity can include and display all the planned flows of payments of interest, repayments of principal, and payments on expenditures.

When a change of your liquidity occurs, such as when a balloon payment or a payment of interest is received, the system will update the cash flow plan, and the Cash Management data when you post the transaction.

### **Securities Administration**

Securities are bought by a purchase order and sold, fully or in part, by a sales order. These orders always refer to the securities master data records for the details, so that data integrity can be maintained.

The master data records for securities can be updated from external data via a SAP standard interface. They can also be created and updated online or in batches.

The master record of a security will contain information of the following kinds:

- Name of the issuer and a description of its business
- Conditions attaching to this security, such as interest rate and arrangements for the amortization of principal
- Classification of this security in terms of the types and groupings use by your company
- Technical characteristics of this security, for example, whether it is tax-free

The interest rate can be variable and linked to a key rate which will be specified during Customizing.

In your company, the asset type “securities” can be divided into the following investment types:

- Bonds that are fixed income securities
- Variable income or floating-rate securities
- Zero-coupon bonds
- Equities

You can be authorized to add investment types to this list of Security Assets.

**Securities Purchase Orders.** From the securities master record, enter the relevant order data and the amount. Any currency can be selected to denominate securities; the fees, interest, and repayment of principal can also be expressed in any currency.

The system automatically calculates any partial-period interest and fees incurred in the form of commission, foreign exchange, or other charges.

When you purchase a security, the system will take up the plan for interest and amortization of principal, and make the data available to Cash Management, where it will be part of liquidity planning.

You can immediately view calculations of the effective yield and rate of return. The SAP system supports calculations by any of the common methods:

- AIBD
- Braess/Fangmeyer
- Moosmüller

**Securities Sales Orders.** From the securities master record, enter the relevant order data and the amount. Securities can be denominated in any currency. The fees, interest, and repayment of principal can also be expressed in any currency.

The system automatically calculates any partial-period interest and fees incurred in the form of commission, foreign exchange, or other charges. Immediately, the gain or loss is computed.

When you sell a security denominated in a foreign currency, the system can calculate the gain or loss separately from the gain or loss resulting from the currency exchange. The system will post the currency exchange gains or losses to a profit and loss account designated specifically for that purpose.

You have the option to select individual valuation instead of total valuation. If you choose this option, you must match exactly sales to purchases. Gains and losses will then be reported on the transactions individually.

### Valuations

A separate price table is maintained for valuing securities. This table contains the so-called “book value” of each security. It can be updated from external sources.

There are two moments for valuing securities—before you print a balance sheet, and when you sell.

If you value your securities before you sell, the balance sheet will not take into account the unrealized profits and losses. You must define the valuation rules for each balance sheet account in the general ledger. You can have the valuation rules applied to each security, controlling this by parameters which you set. Or you can ask for the valuation of an individual security or for your entire portfolio. Capitalized fees are maintained as a separate item and can be released against subsequent trading.

### Managing Money Market Transactions

Transactions on the money market are usually either time deposits or demand deposits. FI-FA Financial Assets Management distinguishes between these two types. The system is directly integrated with FI-CM Cash Management.

You can establish different procedures for each type of money market transaction. The status of a transaction and the approval procedures will control what happens at each stage.

You can determine which staff are restricted to transactions in a particular currency and the fixed maximum amount they can post.

Confirmation letters will be printed automatically upon recording transactions.

The flow of a money market transaction entails the following processes:

- The bank publishes money market data that are transferred to your system and join the basic data you hold on your business associates and customers.
- When a transaction is initiated, the basic data pertinent to the business associate and the money market product are accessed, and the decision on the amount to be bought or sold is recorded on the transaction document.
- The transaction document is passed through the control procedure for approval.
- When it is released from control, there is an exchange with the bank to confirm the details of the transaction.
- The sale or purchase is then fulfilled by an exchange of documents.
- Posting the transaction generates internal documentation which can be revised internally.

#### **Standing Instructions Regarding Time Deposits and Demand Deposits**

The SAP FI-FA Financial Assets Management system supports the common methods of paying interest. The financial data to complete the transaction are provided to the Cash Management system when the cash is available.

If you wish to prolong the period of a time deposit, the system offers a function to record the prolongation with all the data, including the amount invested and the terms.

Arrangements to make regular automatic accruals of the interest are straightforward. It is standard practice to set up regular foreign currency valuations of investments in the money market and use the hedging system to cover business risks in foreign currency.

The value of demand deposits can be tracked by setting up a current account, one for each deposit if necessary, into which you have the system enter the new interest rates daily. Sales or purchase orders for these demand deposits are posted to this account, and the system prints confirmation letters automatically.

#### **Controlling Transactions in Financial Assets Management**

Transactions in FI-FA Financial Assets Management are identified by the nature of the business transaction and by the status or milestone reached in its progress.

For example, a transaction can have been selected from a list because it concerns the purchase of securities. Another transaction might be a matter of prolonging a time deposit.

The status of a financial asset transaction can be expressed in different ways for different types of asset. A typical arrangement is to define status as one of a set of codes that signify some or all of the following logical and business milestones:

- New investment
- Inquiry
- Offer
- Reservation
- Agreement, conclusion of negotiations leading to a contract, and scheduling arrangement
- Partial payment
- Full payment
- Planned interest and amortization of capital
- Contract prolonged
- Contract ended

Each new form of investment may entail designing or adapting a sequence of data entry screens. You may need to change some of the parameters that control what appears on the screens and how the entries are to be processed.

The SAP system offers a suite of business programs that support an investment transaction from beginning to end. The processing routines are grouped as follows:

- Initiation, which includes inquiry and offer procedures, with internal controls as required
- Concluding establishment of the contract by reaching agreement with the associate and scheduling payments under internal control
- Payment control
- Planning interest and amortization of principal
- Ending a contract or prolonging it

#### **Internal Control and the Separation of Duties**

You have the option to define your own methods of internal control over financial asset transactions. You can specify that an investment is reviewed by a minimum of two or even three persons, each of whom must carry, in his or her personal master data file, the authorization necessary to perform the role that has been designated for this type of investment approval.

Limits for each employee who might use the system and each currency will be important components of the automatic control procedures applied by the system.

And you will probably want to prevent processing of an investment transaction from one status to another until the details have been scrutinized and the transaction marked for release to the next status and hence to the subsequent activities.

### **Interaction with the Cash Management System**

When you are setting up a new transaction in FI-FA Financial Assets Management, you can record the planned data in the FI-CM Cash Management system. For example, if you are granting a loan to an employee, you can have the amounts planned and the anticipated dates automatically transferred to the FI-Financial Accounting system and posted to the FI-GLX Extended General Ledger. In the case of granting a loan, for instance, the stages of the entire transaction could be posted automatically:

- Disbursement
- Minimum deposit
- Amortization of principal
- Interest income

### **Automatic Correspondence**

The standard business functions of the SAP system will be available to generate correspondence on behalf of the FI-FA Financial Assets Management system in such matters as the following:

- Cover letters
- Balance confirmations
- Account statements
- Interest payment plans

You can also automatically conduct correspondence by fax or telex. You may wish to use SAPscript to customize your correspondence with individual business associates or groups of addressees.

The functionality of SAPmail will be on call to keep track of key dates and to monitor your investments.

## **FI-LC Consolidation**

This SAP component is also referred to as FI-LC Legal Consolidation.

Legal consolidation is the process of combining the financial statements of two or more individual companies to produce a consolidated financial statement that complies with legal requirements.

The legal consolidated financial statement can also be supplemented and used for internal information purposes.

Consolidated financial statements are often required promptly, yet they often have to be assembled from incompatible data communication protocols in a software environment which is, to say the least, heterogeneous. Extra details can be required, and there can be a need to validate the data.

The purpose of the SAP FI-LC Consolidation module is to optimize and automate the consolidation process. The following additional functionality is offered by the module:

- Integration with the accounting software used by individual companies
- Automatic and reliable transfer of data from the individual financial statements
- Integration of internal and external group reporting
- Multinational accounting functions
- Standards for processing representations of organizational structures

The method of FI-LC Consolidation is first to prepare the financial data in each of the individual companies, and then to effect computer integration.

### The Tasks of Consolidating

Preparation entails the following operations:

- Matching the individual company chart of accounts to the group chart of accounts
- Eliminating intercompany Payables and Receivables, revenue and expenses, which arise because individual companies in a group enjoy a variety of sender-recipient relationships
- Recording acquisition years for historical currency conversion
- Consolidation of investments

Computer integration is relatively straightforward if every individual company has installed and configured only SAP applications. In this case they will share a common environment of standard documents and data objects controlled by SAP standard business process software.

If one or more of the individual companies uses a software system which can communicate with one of the interfaces supported by SAP, there are programs to facilitate the transfer of financial data.

If one or more of the individual companies has been in the habit of using only paper forms and ledgers for accounting, there obviously has to be a stage of data input to at least a personal computer with a means to convert the data to a medium suitable for transfer to the SAP FI-LC Consolidation system. The alternative of last resort is probably a conventional mailing of the data to the head office of the host company, where a SAP R/3 workstation can be used to reenter the data.

**Standardizing Entries**

If the accounting practices of an individual company do not accord completely with the basis chosen for presenting the consolidated financial statements, it is possible to account for the differences in amounts by making a standardizing entry which is posted to a head office account designated for this purpose. These entries are stored in a separate file.

**Currency Translation in Consolidation**

There are three basic methods used in the consolidation of group accounts:

- Reporting date method
- Modified reporting date method
- Temporal method

Groups of items in the balance sheet and profit and loss statement are converted at one of three exchange rates:

- Reporting date rate
- Average rate
- Historical rate

FI-LC Consolidation can translate any items at any rates and use any of the methods for any of the individual companies. There are several problems for which this program provides solutions:

- Exchange differences between the date of the transaction and the date of the currency conversion
- Rounding differences
- The assets history sheet will be using rates current on the reporting date.
- If a transaction difference is posted, the previous translation differences will have to be reversed.

**Eliminating Intercompany Payables and Receivables**

FI-Financial Accounting will eliminate intercompany balances by open item only if each trading partner has been marked in the vendor master record. You must also ensure that the reporting procedures inform the consolidating department of the numbers of these trading partners, at least on the items which relate to intercompany Payables and Receivables, revenues and expenses.

The law requires that all intercompany balances be eliminated before presenting the balance sheet and profit and loss statement. All possible pairs of individual companies must be investigated for evidence that they have been trading with each other.

In practice, significant differences between the way individual companies keep their records can make complete elimination impractical. The most frequent causes of discrepancies in elimination are as follows:

- Currency translation differences
- Differences in the timing of entries for goods in transit between individual companies
- Specific reserves set aside for doubtful accounts
- Liabilities that are not acknowledged in the records

The cause that is most difficult to handle is currency translation; the others can usually be resolved by applying corporate policies in a thoroughgoing manner.

If the individual companies have installed and configured SAP accounting applications, there will have been automatic dual currency accounting, in which every transaction is documented at the time in both the local currency and the currency designated for all transactions in the group. The FI-LC component will allow you to trace any currency translation differences between the local currency at the prevailing rate of exchange and the transaction currency. An exchange rate difference correction can then be posted in the balance sheet account designated for this purpose and thus brought into the consolidated financial statement.

### Consolidation of Investments

When you are using FI-LC Consolidation, you can say which consolidation methods are to be used for subgroups of individual companies.

For example, step consolidation first consolidates each accounting unit within every subgroup separately. Subgroups at the same level of the organization are then consolidated with each other, and so on until the final consolidation yields the financial information for the group as a whole—the top level, as it were.

Simultaneous consolidation treats all accounting units as equals under the head office, and performs the whole consolidation in one step.

You can say what should happen if different methods yield differing results. Or you can use these methods and options in parallel.

The system will carry out simultaneous consolidation using each of the methods chosen, applied to calculated equity shares which represent the values of the individual holdings. This is known as the matrix method.

### Investment Consolidation Procedures

FI-LC will take account of any minority interests in investments and any hidden reserves as it performs any of the following procedures, in most instances automatically:

- First consolidation
- Subsequent consolidation

- Step acquisition and indirect changes in ownership
- Increase and decrease in capital
- Write-down of investment
- Complete divestiture or partial disposal
- Transfer of investment to a new owner

The balance sheet and the profit and loss accounts are corrected in parallel by the system. Goodwill and hidden reserves are amortized. Auxiliary records are updated.

Every elimination entry is explained clearly, concisely or in detail, at your command.

The system meets the legal requirements for an asset history sheet and the special situation of equity consolidations.

#### **What-If Versions and Forecast Simulations of Consolidation**

The system allows you to copy the consolidation data to a new version of the consolidated financial statement. You can then edit certain control tables for the new version, so that a different method of consolidation is used. For example, you may wish to see what would happen if valuation were done differently, or if exchange rate differences were handled in another way.

You can also create a simulation of the consolidation process by using forecast data in place of actual financial statements data. All the same manipulations can be carried out on plan data as on actual.

#### **Annual Reporting Requirements of Complex Companies**

The SAP FI-LC Consolidation component is the application of choice for analyzing and reporting for large and complex groups. The following types of reports will usually be required, at least annually, but often on an ad hoc basis at any time:

- Asset history sheet, reserves and special items
- Summaries of Payables and Receivables
- Detailed information on selected items
- Group or parent company comparisons
- Sales by region or product line

SAP standard product FI-LC Consolidation includes predefined report specifications that will serve most of these reporting needs.

**Special Report Design.** Small-volume reports can be generated to view online, to print or to store using the standard display control and item selection functions of the R/3 Basis component. This flexible type of interactive reporting is a specific SAP technique.

Extensive consolidation reports and audit trails can be sent to a printer or a transfer medium. For example, pre-consolidated financial statement data for a subgroup can be sent

by online electronic means or transferred to tape or diskette for passing to the next higher level in the group.

In addition, consolidated financial statement information can be directed to word processing and spreadsheet facilities, where it can be attached to letters and prepared for presentation.

**Interactive Reporting.** The process of interactive reporting starts with a display of data that has arrived on your screen as part of a warning or advisory message from some other part of the system, or because you specifically asked for it by calling for a search based on a range of parameters that you entered to narrow the possibilities. You might ask for items over a certain amount, for instance.

When you see a data object on the screen that interests you, it is possible to find out more if you place the cursor on it and use one of the function keys to show you what you want to know. You might want to perform a what-if analysis using a value or other parameter of your choice in place of the actual value used to compute the item on your screen.

The following types of query can be readily initiated:

- Details of specific items, going to ever-finer detail as you repeat your query action
- Comparisons
- Investments in companies
- Transaction types
- Standardizing and consolidating entries
- Graphical presentations of selected data

If your system is integrated with other SAP application modules, you can gain access to the data recorded by them. For example, you will be able to inspect account balances and documents in the SAP FI-Financial Accounting system if your FI-LC Consolidation component is integrated with it. If your installation uses the SAP AM-Fixed Assets Management system, you will be able to see, and use in reports, the information in the acquisition and retirement records.

Your finished report can be readily drafted to show whatever combination of detail and summary information best serves your purpose.

**Ratio Analysis.** One of the important benefits of having an up-to-date accounting system with a flexible reporting facility on a powerful computer is the speed with which complex business calculations can be provided with the information necessary to ensure that they are valid.

A frequently used outcome of business calculation is the ratio: a comparison between two numerical values obtained by dividing one by the other.

A ratio that compares one production period with another can be a useful indicator to guide internal management. The financial position of the company can be compared with that of a rival by means of one or more ratios. Ratios between individual company performance and consolidated financial statement amounts can be used to explain or amplify the annual report.

The FI-LC facilities allow you to define the same mathematical procedure for all these ratio calculations, but the actual variables and data will depend on the purpose and the version number of the ratio calculation that you specify when you call for the result.

Suppose you define your ratio calculation in two stages:

- Specify where the information is to come from.
- Specify how it is to take part in the calculation.

Suppose, for example you are interested in calculating the equity ratio, which you have agreed to define as the ratio of equity to total assets. The information could be gathered from three sources, but only one will give you exactly what you want:

- $\text{Equity}(1) = \text{Paid-in Capital} + \text{Reserves} + \text{Retained Earnings}$
- $\text{Equity}(2) = \text{Paid-in Capital} + \text{Required Adjustments} + \text{Pension Reserves}$
- $\text{Equity}(3) = \text{Total Assets} - \text{Total Liabilities}$
- Equity(1) is in the language of a business report.
- Equity(2) will appear by law on the balance sheet.
- Equity(3) is expressed in the terms used in cost accounting.

Your definition of the ratio you want corresponds to Equity(3). This is what the system will use to calculate the ratio for whatever time periods or organizational units you are interested in.

If you select an element on your display, the system will show you how it computed this element; it will display the individual values that took part in the calculation on a split screen.

And you can call for a 3D display of the information you have isolated for your calculations.

### **Periodic Financial Statements**

Unlike the annual consolidated financial statement, interim periodic financial statements can be selective in the information they report.

You can flag each individual company to indicate its reporting category, and you can adopt the suggestions of the system based on ratio thresholds:

- Individual company information required
- Data will be derived from prior periods (as plan data)
- This company will be omitted from the periodic report

Consolidation intervals have to be defined for each subgroup of companies:

- Yearly
- Half-yearly
- Quarterly
- Monthly

Different companies tend to post entries to accounts at different times of the accounting period. The system eliminates intercompany Payables and Receivables, which balances the unavoidable timing differences.

Intercompany profits and losses can be eliminated by using information from the previous year's financial statements.

The system automatically posts depreciation accrued during the periods of the periodic consolidated financial statement.

### Options for Consolidation

In the format for any account balance, external or internal, there are two fields which can be used to eliminate intercompany balances. You can extend this format and use it to eliminate transactions between companies and business areas with sender-recipient relationships. It can also be used for detailed internal group reporting.

Because the SAP system uses central data administration, simple validation will ensure that external and internal reports use the same data.

## From Here...

- The FI-GL General Ledger and the FI-GLX Extended General Ledger systems must be at the center of any management system. There are many spokes radiating out from this hub: and the most important of these is CO-Controlling, because it oversees the collection of operating data and the planning of value flows in the company. See Chapter 13, "Understanding the CO-Controlling Module."
- If you are ready to plan the implementation of a SAP integrated business system, then the various Cross Application modules should receive your attention. Chapter 28, "R/3 Business Workflow Management," and Chapter 27, "ABAP/4 Program Development with the R/3 Workbench," are recommended.

- If the detailed planning of a project, in whatever sphere, is uppermost in your mind, then Chapter 16, "Understanding the PS-Project System Module," must be viewed with close attention.
- To see how the SAP methodology would work out in a particular industry, you should look at either Chapter 18, "Understanding the PP-PI Production Planning for Process Industries Modules," or Chapter 22, "Understanding the MM-Materials Management Module."
- No doubt you have appreciated the importance of the human factors in business. Chapter 21, "Understanding the HR-Human Resources Module," should be given close attention by all.

## Chapter 13

# Understanding the CO-Controlling Module

The SAP R/3 system includes the CO-Controlling system as an integral part. The concept of business controlling includes the planning of values such as costs and revenues which will appear in the financial documents. The performance of the company has to be monitored and reported in relation to these planned values. Advice and information to management should be the outcomes.

The implementation of the CO-Controlling system will entail specifying the details of which quantities and values are to be subject to planning and therefore to the subsequent monitoring and reporting functions.

## CO-Components

The following components comprise the SAP CO-Controlling module, which is an integrated system for overhead cost controlling:

CO-CCA	Cost Center Accounting
CO-ABC	Activity-Based Cost Accounting
CO-OPA	Order and Project Accounting
CO-PA	Profitability Analysis
CO-PCA	Profit Center Accounting

The FI-GLX Extended General Ledger uses accounts that are based on a range of subledgers that allow overhead cost analyses from different points of view. For example, accounts may focus on cost centers, product costs or activities. These facilities are provided by using the SAP CO-Controlling system as an internal accounting system.

The implementation of a controlling function in an organization is carried out in a SAP R/3 system in the following phases:

Defining the structure of the organization in terms of units that can be controlled

This section will show you how to:

- Make use of the integrated systems for costing, production and materials management and human resources to support planning, costing and control
- Use the CO-CCA Cost Center Accounting component to set up the most important parts of your company as cost centers which will keep track of their own costs and revenues for business planning and control

Setting up information flows that can monitor the performance of the controllable units

Running the controlling system through cycles of the controlling tasks, which are repeated at a frequency suited to the type of business process

The R/3 system integrates all these phases by offering standard business programs that are fully integrated with each other. If you install the system in your company, the SAP Customizing procedures will prompt you into selecting the functions that match your requirements. You will also be invited to provide such details as the specific terms and names of work units to that the system as implemented will be an accurate representation of your company.

The structure of a business organization can be seen from different points of view. One company will see itself as a group of complete and self-sufficient units reporting to head office; another will think of the main functional areas, such as procurement, production, sales and marketing.

In order to make use of a fully-integrated system and exploit the value-adding functionalities available in a modern, computer-based installation, it is necessary to define an organization in terms of a detailed structure of cost centers with specified relationships between them.

The SAP R/3 system with the CO-Controlling component gives you the functionality you need to capture the structure of your company in the form of a comprehensive cost center plan that clearly defines the responsibility structure of your company. When you have such a structure, the system will use it to run all the controlling functions.

This structure has to be rich enough in features to capture any type of organization and express it in a form that can be used by the computer system to carry out automatically as many of the necessary operations as possible. And where automatic operation is not possible or not required, the system should be able to provide as much support and guidance as possible and make the work as efficient and effective as circumstances allow.

## Business Planning and Control

In accord with the basic divide-and-measure approach to business control, it is useful to differentiate the operational controlling systems from the functional controlling systems.

The operational controlling systems are provided with SAP R/3 components to support the four operational tasks:

Capital investment controlling, which transfers activities to be capitalized and used to calculate depreciation and operating profits

Financial controlling, which monitors and plans scheduled payments from projects and orders

Funds controlling, which sees to the procurement, use, and creation of funds in all areas

Cost and profit controlling, which monitors the costs of all company activities

### **The SAP Approach to Alternative Cost Accounting Methods**

The SAP R/3 standard business functions provide all the functionality needed to support most modern cost accounting systems.

The main differences between costing concepts arise in connection with the scope of the costs they include and the structure of these costs with respect to the organization structure. There are variations in the use of standard versus actual costs, and in the allocation of costs directly to the products or services, in contrast to allocating them to overhead. Methods may also differ in the relationships between cost center activities, such as in the use of primary costs, cost components and secondary cost breakdown.

The following cost accounting methods can be accommodated in the SAP R/3 system:

- Actual costing
- Static and flexible normal costing
- Static and flexible standard costing
- Variable direct costing
- Activities and services costing
- Functional costing

You may wish to take a step-by-step approach to the implementation of cost control by, for example, using actual costing and collecting the primary expenses in the cost centers by allocation and perhaps later, automatically by direct posting.

### **Progressive Implementation of Cost and Profit Controlling**

The modular structure of SAP R/3 applications is designed to allow you to move progressively according to the developments and requirements of your company. The application modules are discussed in a sequence which is in accord with this concept of progressive implementation.

Cost element accounting is a standard approach which is integral to the R/3 system. Functions are predefined to create and maintain cost element master data and calculate imputed cost elements. The R/3 system can mediate the importing and incorporation of posting data from external systems. There is full reporting on cost elements. Individual business transactions are structured, recorded, assigned and reported using the FI-GL General Ledger profit and loss account structure.

CO-CCA Cost Center Accounting has to plan, monitor, control and settle all business activities and responsibilities. It has functions to create and maintain cost center master

data and to accept or modify definitions of statistical ratios. Cost center postings and transfers have their specialized functions, as have distribution, assessment and allocation between cost centers. Primary cost elements can be used in the planning functions for cost centers. The user can define the screen and printed report layout formats from the cost center reporting system. Planning functional dependencies and the detailed planning of cost centers are supported by the CO-CCA Cost Center Accounting component.

CO-ABC Activity Based Cost Accounting is used to cost the internal flow of activities with functions to plan, evaluate and allocate.

CO-OPA Order and Project Accounting is specialized in the tasks of planning, monitoring and settling the activities, services and processes that take place as the result of internal orders and projects.

CO-PA Profitability Analysis is required in order to report on complex sales organizations and complex product hierarchies. In SAP R/3, results analysis is conducted using the cost-of-sales approach or by period accounting.

### **The Controlling Area Concept**

The starting point and method of navigating through the details of a controlling system are a structure made up of units and links. This structure is stored in the SAP R/3 system, and can be inspected in various ways, including a graphical representation. The structure may be the same topological network as the management structure, each level of managers being responsible to more senior managers on the level above. Traditional organizations in business tend to have a pyramid structure rising to the owner on the pinnacle. Government and military organizations are notorious for having very tall pyramids. Modern, small companies in the high-tech domain are notorious for having very flat structures, very few layers of management and a boss who is ready to speak to anyone at almost any time.

The logical justification for any type of structure is based on the demands placed on it by external circumstances and by the need for the owner to exert some control over it.

The controlling area of the owner is perhaps the managing director or the chief executive officer. This person has a controlling area of the whole company. The department heads have controlling areas defined by the territory of their departments; or perhaps their controlling areas are better specified by the activities for which they are responsible.

The SAP R/3 module CO-Controlling holds master data on the controlling areas that you have decided to establish for your company. These may correspond exactly with the departments that exist already, but if you are looking for a method of adding value to information and material as they pass through your company, it would be prudent at least to consider other ways of setting up controlling areas.

What you will be looking for are profit centers that can be controlled on the basis of the measured profit they contribute to the company. One or more of these profit centers will

constitute an area of responsibility that will be a proper subject for the application of controlling area discipline.

The conceptual tools of area controlling include the following:

**Cost center**—this is defined as a place in which costs are incurred. It may be a unit within a company, distinguished by area of responsibility, location, or accounting method.

**Order**—an order is an instrument for planning and controlling costs. In a business environment it will be a document. In the SAP environment it will be a SAP Document, which has a standard set of constituent parts and is subjected to strict internal control by the computer system so that it can take part in the legal requirements of an audit trail.

**Project**—the defining characteristic of a project is the fact that it has to achieve a certain result in a specified time without exceeding the budget allocated to it. There are many types of project: capital-spending, research and development, engineer-to-order manufacturing, investment program, data processing and customer project, for example.

**Cost object**—whatever work is undertaken, whether planning, controlling, informing and so on, there are features that can be used to focus the computation of costs. The cost object need not be a real object, and it needn't really engage in any activity that would consume resources or generate revenue. The cost object is a convenient conceptual destination that can appear in the accounts with accrued costs or revenues.

**Market or business segment structure**—the control of a business may be improved if information is collected about part of it; for example, the sale of certain products, in a specified market area, over a range of accounting periods. Another example of a segment would be the value of the raw materials in each of the possible locations where the capacity for additional production could take place.

In logical terms, a controlling area is defined as a set of accounting units within an organization that all use the same cost accounting configuration. Normally the controlling area is coextensive with the company code, which usually stands for an individual company in a corporate structure. For cross-company cost accounting, one controlling area may be assigned to cover the areas of responsibility of more than one company code.

These conceptual tools have been efficiently programmed into the SAP standard business processes in the most useful of forms, the generic form, which you can customize to fit your particular circumstance. For example, you can record in the master data how you want to define the business segments and how you want to select which cost objects to monitor. And you can say how orders and projects will be assigned to cost centers.

The CO-Controlling module will accept your requirements and deliver a flexible controlling system that fits your company.

## Connecting Financial Accounting with Controlling

At the heart of every accounting system must be the general ledger, and the SAP system is no exception. The FI-Financial Accounting module serves the FI-GL General Ledger.

The common chart of accounts contains all the accounts available to a company. Every company, and therefore every unit identified by a company code, must be assigned to the common chart of accounts.

The concept of the controlling area is integral to the internal controlling functions. Each controlling area is assigned to the common chart of accounts. This ensures that every transaction in each area is posted to an account in the common chart of accounts, and will, therefore, be reconciled and thus take part in the financial accounting that provides the balance sheet and profit and loss accounts required by law.

The CO-Controlling system uses the FI-GL General Ledger accounts directly. In particular, it uses the FI-GL General Ledger profit and loss accounts as primary cost and revenue elements.

With certain exceptions, the CO-Controlling system needs no separate reconciliation with the FI-GL General Ledger and its subledger accounting systems. The exceptions arise if you use the special feature of CO-Controlling which manages imputed costs or accruals. CO-Controlling allows you to create imputed costs at a level of detail other than that used in financial accounting; you can record costs which have no equivalent, or have an equivalent with a different value, in the accounts of financial accounting. These intentional differences can be reconciled and cleared by using the CO-Controlling functions provided for this purpose.

Secondary cost elements are maintained by CO-Controlling in addition to the primary accounts of the FI-GL General Ledger. This constitutes a two-level system of accounts: each level records accounting data using a different degree of detail.

However, the extra details maintained by CO-Controlling in the secondary cost elements are integrated with the FI-GL General Ledger accounts by means of the controlling areas, which are represented in the common chart of accounts. In accordance with GAAP (Generally Accepted Accounting Principles), it is possible to trace any transaction posted on the general ledger down through the controlling area and thence to the cost center, which will be holding all the details of the cost elements which were used to compute it.

The value flow in the subledgers of the FI-GL General Ledger is always reconciled via special reconciliation accounts. You can always analyze data into summaries using these accounts, which will give you such reports as monthly debits and credits, account balances and so on, and you can inspect individual business transactions. With this kind of functionality, you can substantiate any of the values shown in your trial balance.

If you have installed and configured a SAP application such as CO-Controlling, you will have an additional and parallel way of looking at the value flows in your organization.

But because the system is fully integrated, you will know that the values and value flows revealed by the external accounting documents, the balance sheet and the profit and loss statement are fully reconciled with the value flows that are uncovered by your parallel internal accounting system, implemented using the standard business functions of the SAP CO-Controlling module.

You will have a fresh way of looking at how the values change by doing business.

### **The Value-Adding Process and the Role of Cost Objects**

In simple terms, a cost object is something that incurs costs: two of them cost twice as much; ten of them cost ten times as much.

A particular cost object can be declared to be in a market segment by entering it in the master record of that segment.

This cost object could also be identified in the processes of inventory accounting.

A cost center will be charged overhead, because that is where the costs originated. Overhead posted to that cost center will then be transferred to the cost objects that are the responsibility of that cost center. The proportion of the overhead allocated will be according to the quantities of cost objects, or by some other rule. In this way the cost object has to bear a share of the overhead.

Revenues and sales deductions are reported in the relevant market segments and profit centers.

You can use period accounting at profit center level, incorporating changes to the inventory in the period. You can also use cost-of-sales accounting at the market segment level.

The cost object method enables an accurate system of accounting that will help you control the value-adding business processes of your company.

### **Integrated Planning and Decision Support**

One of the important decisions to be made is often the product mix. You want to make sure that you optimize the contribution of each product line to the profit margin. Your methods will include tentative variations in the planned production costs, which the system will develop through the work flows of your organization to arrive at the planned values in each of the areas of interest. You can display any combination of planned values for any cost object or set of objects, right up to the planned figures for the entire company.

This is integrated planning, and it depends on the following functions which are programmed in the CO-Controlling system:

- Planned assessment, distribution and accruals of imputed costs

- Planned allocation of internal activities

- Planned assessment of costs on orders and projects

These functions cannot succeed unless you have provided the data or told the system how to find them. The system will support you in this preparation by guiding you through these essential tasks and performing the necessary calculations automatically wherever possible:

- Planning of cost centers

- Planning of internal orders and projects

- Determining standard costs of products for stock production and for unit costing of customer orders

- Planning contribution margins and profits in sales management

Again, the system needs information to help you in the development of your plans, and CO-Controlling will provide the programs to support the following preliminaries:

- Creating the activity plan using the activities for each work center and cost center

- Integrating detailed planned sales quantities for the individual reference objects, including assigned costs and revenue

- Developing automatic standard cost estimates based on bills of materials and routings

### **Reporting in CO-Controlling**

The SAP EIS Executive Information System and the reporting facilities of CO-Controlling are fully integrated. Within the SAP R/3 computer system, the reporting facilities are highly flexible. Reports are easy to define for ad hoc purposes and to maintain as needs change. The content and format are virtually unlimited, and can be differentiated by user groups.

Reports can be stored, recalled and processed by the SAP graphics presentation component.

Online navigation facilities make it easy for you to switch between report formats without losing the focus of your inquiry. For example, you can select an item on a list and use the function keys to call up a more detailed report on the item selected.

Reports designed in the CO-Controlling module are applicable to all its components.

Standard predefined reports are available for the following purposes:

- Comparing actual values with the planned entries

- Comparing the performance of different cost objects, such as cost centers, orders and projects

- Assembling balance lists and balances of activities

- Inspecting individual line items

You can select a cost center and call up all the settlement objects linked to it. You can also trace the costs on each object back to the individual business transactions which caused them.

## Integration of CO-Controlling with R/3 Applications

All the information in all the R/3 applications which have been installed and configured is available directly. Any of the information outputs of the system, from the annual sales and production plan to the individual planning steps and down to the planning and processing details of individual orders, may be called upon by the CO-Controlling system.

For example, standard business functions are available for the following tasks:

- Using bills of material and routings to prepare cost estimates for products and orders
- Updating a costing as production progresses by transferring times and material valuations automatically as they become available
- Evaluating quantities used of supplies and raw materials
- Evaluating semi-finished and finished products in stock
- Using cost-of-sales accounting to provide an ongoing analysis of profitability based on invoiced sales quantities

The success of a controlling function depends on the integration of planned and actual data at all stages and levels of the production process.

## Integration with HR-Human Resources Management

Cost centers can be given time factors for each of their activities by applying the methods of activity-based cost accounting. The SAP HR-Human Resources Management system can transfer the planned personnel costs to the FI-Financial Accounting and CO-Controlling modules. The actual, confirmed, monthly personnel costs are updated simultaneously in both FI-Financial Accounting and the cost accounting components in CO-Controlling.

The personnel data used for salaries and wage payments are the same as the data used to allocate personnel costs to orders and projects: HR-Human Resources provides both.

## Cost Element Accounting Principles

A cost element is a classification code. It is a mandatory data field on transactions which involve costs arising in a company code. It is used to label and differentiate the following types of cost:

Direct cost elements for goods and services procured externally

Indirect (internal activity) cost elements

There may be several cost element types, based on a classification of cost elements by uses or origin, for example:

Material cost element

Settlement cost elements for orders

Cost elements for internal cost allocations

A cost element is also used to maintain a collection of information, in particular, the transaction documents that bear the code of the cost element and that have been selected, for example, for a specific accounting period.

Direct cost elements are maintained in the FI-GL General Ledger master records. Indirect cost elements have no counterpart in the financial accounts, and are maintained exclusively in cost accounting.

The cost element concept ensures that each business transaction posted under a particular cost element in the CO-Controlling system is properly assigned to the relevant cost centers, orders, projects, cost objects and so on.

Each material issue in MM-Materials Management, each invoice recorded in SD-Sales and Distribution, each external invoice in SD-IV Invoice Verification; each of these flows via the FI-GL General Ledger account to the appropriate cost or profit object.

The expense accounts of the FI-GL General Ledger chart of accounts are automatically adopted by the CO-Controlling system as primary cost elements. Additional primary cost elements have to be added to the financial chart of accounts to accommodate accruals and imputed costs. The aim is to ensure that all the costs incurred in a particular accounting period and documented in the CO-Controlling system are properly reconciled with the general ledger. The method of establishing a default coding block cost element is also used to support this aim.

Secondary cost elements are created and managed only in CO-Controlling. They represent value flows such as:

Internal cost allocation

Surcharge allocation

Settlement transactions

### **Cost Element Parameters**

The CO-Controlling system carries an extensive set of standard cost elements which you can adopt and edit for your own installation. There is a matchcode search facility to locate the one you want on the basis of a specific name or label that you have assigned. The matchcode search may also include values such as order number ranges and dates

that you define so as to narrow the field of your search. You can block out those you are unlikely to need.

The standard cost elements will begin with certain parameters established, for example:

- Default coding block element assignment to the balance sheet accounts
- Whether quantities are recorded
- How costs are displayed in reports

The system will log any changes you make to the cost element masters.

A cost element group is a technical term for a set of cost elements used in conjunction with select records and to define lines and columns in reports. They can be used for planning purposes. There are no constraints on how you combine and arrange cost elements into cost element groups. You can display the cost element groups in the form of a tree diagram.

### Accruals

The accounting period most useful when controlling a business is seldom the same period used for financial accounting. To effect a reconciliation, it is necessary to use accruals which assign imputed costs to the financial accounting periods and under an account heading that indicates their cause. There are three methods:

This is the percentage method. If the cost elements are known, you can build up a database from which to calculate the imputed costs for each financial period by allocating a percentage to each period. And you can do this for both planned data and actual costs, by period and by cause.

This is the plan/actual method. If no relevant historical values or quantities are available to enter into your base cost elements, you can make a plan or estimate of them across the relevant time periods and by cause. Then you can have the system post the planned values as imputed costs and later make an adjustment when the actual cost data become available.

This is the target/actual method. If you expect your costs to be directly related to the operating output, then you can use the techniques of activity-based cost accounting to arrive at target values, which the system will post as imputed costs to the relevant financial accounting periods and causes. Again, you must have the system make an adjustment when the actual values can be obtained.

There are other ways of accounting for imputed costs that entail simultaneous posting of accrued costs to both FI-Financial Accounting and CO-Controlling. Alternatively, you can establish imputed cost objects, which can be reconciliation cost centers or reconciliation orders.

### Price Variances

The CO-Controlling system can calculate the influence of price fluctuations for each posting transaction. The difference will be displayed as a variance in the SAP Document recording the transaction.

The SAP MM-Materials Management application can provide the difference between the standard price of a material and the moving average price.

Differences can also be computed between the actual cost to the cost center, and the value posted to it from FI-Financial Accounting as a percentage share of the actual value distributed across a number of cost centers.

### **Reporting in Cost Element Accounting**

The flexible SAP R/3 reporting system allows you to analyze cost elements from any point of view:

By individual cost elements, cost element groups or subgroups

By other cost objects, such as cost centers, orders and projects

## **CO-CCA Cost Center Accounting**

A cost center is a place in which costs are incurred because at least one activity originates there. It need not correspond to a real place in the geographical sense: it may be a functional unit that makes business sense. If one person does two different types of work, you might find it helpful to place one type in one cost center and the rest in another. The cost center is a unit within a company distinguished by area of responsibility, location or special accounting method, and by activity-related aspects.

All cost centers have to belong to a controlling area. If there is more than one FI-Financial Accounting company in the area, then you also have to say which cost center belongs to which company by assigning a company code to the master record for each cost center.

Each cost center has a defined validity period, and all changes to the master record will be related to this validity period. You decide when cost center changes are to take effect.

The cost center master record will indicate by parameters which functions can be active:

Will the cost center master record accept planning data?

Is posting allowed to this cost center?

Will the cost center maintain open items?

Can quantities be entered on the cost center master record?

What blocking logic applies?

What is the type of this cost center?

What is the cost center currency? This defaults to the area currency, but can be changed.

The cost center concept allows transaction data to be validated against cost center masters as soon as they are established, even if CO-CCA Cost Center Accounting is still being implemented.

Cost centers may be grouped in alternative configurations which may be changed at any time. The transaction data itself is always assigned to the relevant cost center. Alternative cost center groups may correspond to organizational or functional distinctions related to decision-making, departmental or controlling requirements.

### Actual Costing

When primary costs are entered, you specify a cost center as the destination in the cost accounting system. SAP R/3 will automatically create a SAP Document to record the transaction and post it to the appropriate subledger of the FI-GL General Ledger. At the same time, CO-Controlling will cause a second copy to be made for itself. Thus CO-Controlling can be self-contained, yet the audit trail is still intact.

The following SAP applications are fully integrated with CO-CCA Cost Center Accounting, and may act as feeder systems sending actual cost data to it:

- FI - Financial Accounting
- FI-AM Asset Management
- MM - Materials Management
- PP - Production Planning
- HR - Human Resources Management
- SD - Sales and Distribution

The data from these feeder systems can be used in calculating statistical ratios for the purpose of internal cost allocation and ratio analysis. The data can be formed into groups and used in the same way as cost elements and cost centers.

External data from non-SAP systems may be automatically transferred through SAP standard interfaces, and there is a flexible and supportive interface for the manual input of data. Every transaction is recorded in the standard form of a CO document which is additional to the standard SAP Document created by every transaction.

Costs are transferred between cost centers, but the original cost element data remain unchanged. CO-CCA Cost Center Accounting sponsors two types of distribution of costs:

- Periodic transfer of primary cost totals from FI-Financial Accounting to a temporary clearing cost center in CO-Controlling

- Distribution of primary and secondary costs within CO-Controlling

## Cost Distribution within CO-CCA Cost Center Accounting

The distribution method of CO-CCA Cost Center Accounting is totally flexible and under your control.

The sender is a cost center that has access to rules for distributing the cost elements to the receivers, which are also cost centers. You have control over the allocation structures,

so distribution is made to suit the needs of your company. The identity of the sender is preserved in all distribution postings, and the system keeps a log of all the relevant data.

You can simulate distribution to test out the effects of the rules before you post the values. The variety of available distribution rules is illustrated by the following examples:

Fixed specific amounts, or values calculated at the time and based on shared portions or percentages

Actual data or planned data

Allocation across a pattern of cost centers which is determined at the time by the system

Generally, it is advisable to group sender and receiver cost centers in the same controlling area so as to give them identical distribution rules, because you can then combine distribution rules. For example, you could allocate, say, 70 percent of a cost arising from sales evenly to the cost centers for individual sales representatives and split 20 percent between the central sales organizations in proportion to the number of sales representatives working to them. This example illustrates that you do not have to distribute all the costs: the sender cost center still has 10 percent.

The effects of a distribution can be seen immediately by calling for a standard online report available through the special functions keys. And you can repeat the distribution procedures at any time.

### **Assessment**

The processing logic is similar for assessment and distribution. The cost center sending cost data is credited with the total of the accounts that have been assigned to it, and the receiver cost center is debited using special cost elements that signify that the transaction is part of an assessment procedure.

By looking at the appropriate secondary cost elements, you can analyze the results of the assessment.

### **Surcharge Calculation**

A cost allocation method that is additional to assessment and that is available in CO-Controlling is to use the surcharge calculation function. This calculates a supplement, usually as percentage, which is used to apply overhead in absorption costing, for example, as when a service receiver is charged for overhead incurred by the service provider on an individual business transaction basis.

You can call on CO-CCA Cost Center Accounting to calculate a surcharge at a percentage rate based on one or more cost elements. The system will simultaneously credit and debit the relevant cost centers with the calculated surcharge, which will be posted under a predefined surcharge cost element.

### **Cost Center Planning Procedures**

The purpose of cost center planning is to anticipate the volume of costs for a particular period at each of the cost centers you have identified in your company. You can plan for

one fiscal year ahead, or for several. You can have the year divided into parts, up to 365 in number, or you can use a rolling system of planning.

Within your overall period of choice, the fiscal year perhaps, the system will reallocate any planned values according to your selection from the predefined distribution keys, to which you may add your own.

One of the things you have to decide is the planning level. The planning level defines the cost center where you set out your plan. If the plan is to be applied across the entire enterprise, then the planning level will be the SAP Client which will subsume all subordinate companies. If the plan is for a single subsidiary, then the level will be Company Code and this code will appear on all master records associated with this plan.

The plan will specify details such as:

- Quantity-based activities
- Value-based primary and secondary cost elements
- Statistical ratios

When you have settled on the planning level, the system will provide you with detailed planning support in the form of standard texts for documenting the plan and formulas for calculating all the standard statistical ratios. The SAP product costing system will be able to supply information to your plan in the form of quantity and value details of particular cost elements.

Although you can change and correct the cost center plan at any time by repeating individual sections of the overall planning sequence, you can also block your plan, version by version, to prevent any changes. You can also use the standard R/3 authorization functions to control changes to your plan.

It may be the case that your cost center plan contains a planned value for a particular cost element that should really be subjected to more detailed attention. The system allows you to define individual items to separate what you regard as the important factors that should be subjected to detailed planning. The following influencing factors illustrate the concept:

A material may be subject to wide fluctuations in cost due to an unstable market. Your plan could specify the code number of this material, and the SAP MM-Materials Management application would keep your plan up to date by posting the current price of this material to your plan.

Some cost centers in your plan may be sensitive to employee-related wages and salaries. You could have this influencing factor evaluated using price tables and cost rates, by employee group or by individual employee, if necessary.

Some cost centers may be sensitive to the costs associated with individual activities and external services. You might well highlight these as influencing factors to be actively and automatically taken into your plan.

There may be risks or overheads that ought to attract surcharges at some cost centers. These can be factored into your plan.

SAP standard business functions are also available to support the concept of having cost centers working to a cost center budget.

## CO-ABC Activity-Based Cost Accounting

In cost accounting terms, an activity is a process that can be counted and which attracts costs. In business terms, a production process is achieved by a network of activities. If you want to find out the cost of a process, you have to know the activities and the quantities of work done by each.

The purpose of the CO-ABC Activity-Based Cost Accounting component of the SAP R/3 CO-Controlling module is to help you plan, monitor and settle activity types in the accounts of cost centers.

Activity types serve as allocation bases and are used as cost drivers to determine and send incurred costs to receivers.

The CO-ABC Activity-Based Cost Accounting system allows you to develop fully integrated activity costing in a controlled, step-by-step fashion. There is an inevitable logical sequence:

1. Define the activity types that are of interest to your company because they add value, attract costs or both.
2. Specify how each activity type will be measured and the units to be used.
3. Create a plan using your activity types and their quantities.
4. Extend the plan to include the costs that are dependent on activities and the rates to be applied.
5. Allocate, or set up rules to allocate, activity costs for both planned and actual data.
6. Predistribute the fixed costs and attach a value to each of the activity types that are not amenable to measurement.
7. Determine the variances over the period and allocate them to activities or cost centers.

### Activity Types and Allocation Bases

The measurement of productivity has to start with a measurement, or at least a quantitative assessment of activity. In a production cost center, there will be measurements of time required, number, weight or volume of each product, units finished and semi-finished. The service cost centers will have records of jobs, hours worked by each skilled trade, energy and materials used.

Sales and administrative tasks are also becoming subject to measurement of a nominal kind, where something that can be counted, such as the number of calls made, is used as

an index of activity: each call entails an amount of work that can be assessed and evaluated, at least in average terms. Data on an activity will typically, depending on the type, include information on the planned activity quantity, the capacity and the output quantity. Activities may be assigned to activity groups, so you can carry out some operations on all the members of the group simultaneously. This might be useful as you change your controlling task from planning to allocation, to determination of cost rates, and so on. There is no limit in CO-Controlling to the number and scope of the activity groups you use.

The master record of an activity group will contain parameters that you can use to define how the group is handled. There are parameters to define settlement cost elements to be used in the direct allocation of planned and actual values. You can flag particular activities as statistical, which will ensure that the system adopts a standard procedure for calculations according to the needs of the moment, including assessment, distribution and computing ratios for use in reporting.

### **Activity Planning and the Flow of Activities**

For each cost center, you have to arrive at a planned value for each activity. And you must reconcile this amount of activity with the amount of activity planned in the Logistics system. The system will assist you with this.

The CO-ABC Activity-Based Cost Accounting module differentiates three types of planning:

- Planning statistical ratios
- Planning activity quantities
- Planning primary and secondary cost elements

A statistical ratio in planning can be simply a number for each posting period, or it can be a cumulative number computed for each period on the basis of data. If the cost center produces activities that are quantified, the planned or actual quantity of output can be the basis for planning the primary and secondary cost elements, because the output quantity of the cost center can be converted to values.

Given the input of primary and secondary costs to a cost center and the output in terms of evaluated quantities of activities, you can have the system compute the efficiency of the cost center in each of its activities.

The same method is used to plan the activities to be produced and consumed in the flow of internal activities.

You then have the basis for planning secondary costs.

### **Simulation and the Reconciliation of Activities**

The logistics plan and the controlling plan may be inconsistent. Bottlenecks and idle production capacity may be foreseen.

Interactive activity analysis allows you to look at several activities at once to see which will have spare capacity and which are destined to be subjected to demands that are beyond their capacity. You may be able to effect a displacement of work or resources, or replace one activity by another. The system will immediately simulate the cost effects of your tentative change of plan, which you can confirm when you are satisfied, or store as a separate version of the plan.

Starting at any cost center, you can command a display of the activity types received from or sent to an adjacent cost center level. This allows you to trace the functional dependencies between individual activity types.

### **Activity-Based Cost Planning**

Each activity type and each cost center can be given as many cost elements as necessary. You can enter the planned cost elements as values, or as values to be computed at the time on the basis of quantities and the rates prevailing. The cost element can be given a planned overall value or a planned quantity.

Both procedures can be carried out as full or marginal costs and can direct a split into fixed and variable components. The system provides formulas, formal specifications, texts and report characteristics.

The CO-Controlling system distributes the planned values for the variable primary cost elements for the year. You can see the effects on costs of any fluctuations in planned activity levels. You can call for the fixed costs to be distributed using standard rules or your own rules.

The internal exchange of activities also causes secondary costs to be incurred. These are computed by taking the amounts of the allocated activity quantities and valuing them at the appropriate standard rates defined in the sender cost centers. The receivers of internal activity costs will include:

- Cost centers
- Orders for cost centers which are overhead cost orders
- Production orders for semi-finished and finished products
- Capital spending orders for fixed assets
- Sales orders or sales cost objects

Having planned values for internal orders, you may wish to allocate the planned costs to the receiver cost centers. The original producing cost centers will retain the information.

### **Political Prices**

Standard prices and standard rates at which cost centers activities should be charged are among the important results to come out of any planning exercise. The total cost is divided by the total quantity in each case.

You may be in a business that prefers not to use the actual or historical standard price computed as an average based on total cost and total quantity.

You may have to set rates which are determined by political factors rather than by computation.

You have to enter political rates manually. You can then use them to evaluate planned and actual quantities. The system thus retains an accurate representation of internal activity cost flows and cost allocations, even if the rates are not the strictly determined product of formal business planning.

### **Indirect Allocation of Costs to Non-Measurable Activities**

The system has indirect cost allocation functions that you can use to allocate costs accurately to the objects which caused them. You may be able to apply standard methods if you can derive an index of activity that can serve as a quantity to which you can apply a rate. But the indirect allocation functions are available for when the most reasonable method is to assess costs and allocate them to their causes.

### **Cost Center Variances**

Variance analysis is a method of monitoring business activity.

A variance is defined as the computed difference between actual costs and planned costs, using the following formula:

$$\text{Actual Cost} = \text{Planned Cost} +/\text{-Variance}$$

Variances can be calculated at any level:

Cost center

Cost element

Activity type

There are four variance factors that explain why actual costs can differ from planned costs:

Price variance, caused by differences between the actual and the planned prices of the goods and services used

Usage variance, arising from uneconomical working practices in the production process

Volume variance, which occurs when the planned volume is not reached or if it is exceeded, giving rise to the fixed costs being under- or over-absorbed by the actual volume of product

Cost center over- or under-absorption of fixed costs as a result of using different standard rates in the plan from those applied in the posting of actual activities, the so-called political rates. The same effects may occur if the cost center plans have not been reconciled.

The total of these variances for all cost elements and activity types within a cost center provides the overall variance for that cost center.

For each combination of cost element and activity type on each cost center, the CO-ABC Activity-Based Cost Accounting system maintains a value structure for controlling. Each of these values is split into fixed part and variable part:

- Planned costs
- Target costs
- Variance types
- Actual costs
- Planned/actual usage

You can have the variances calculated and included as part of the cost components. The formulas follow:

- Actual Cost = Planned Cost +/- Cost Variance
- Actual Price = Planned Price +/- Price Variance
- Target Costs = Actual Volume  $\times$  Planned Rates
- Usage Variance = Actual Costs - Target Costs - Price Variance
- Volume Variance = Target Costs - Actual Activity  $\times$  Planned Price
- Over-/Under-absorption = Target Costs - Allocated Costs - Volume Variance

### Charging Variances

The CO-Controlling system evaluates each activity by applying the planned rate to the activity quantity. If you have the historical variances, or your system can get them for you, there is the possibility of using them in a fresh version of your plan. Similarly, if you have some way of anticipating future variances, or if you want to conduct a what-if simulation exercise, then again, you can create a fresh plan version.

You may want to use anticipated variances in the cost allocation process. In order to represent accurately the value flow in your company, it is essential to allocate cost center variances periodically. You can specify whether to use historical, standard or anticipated variances for the subsequent charging process, and in this way, transfer all variances directly to your profitability analysis system.

An alternative approach is to pass on usage variances to the receivers but keep as a charge on the producing cost center the variances resulting from too little output. They will go to the profitability analysis system from there.

You can charge variances periodically to the following types of receiver:

- Individual cost centers
- Internal orders or projects
- Production orders, and thence to the finished and semi-finished product inventory

### Cost objects in profitability analysis

#### Fixed assets

If you arrange for actual variances to be charged to cost objects in CO-PA Profitability Analysis, you will be on the way toward the creation of the detailed cost structures that are necessary to a system of contribution margin accounting.

Variances are posted under the CO-ABC Activity-Based Cost Accounting system using the rules and procedures of direct cost allocation. The system specifies the allocation cost element by its identification code and by whether the value is fixed or variable on either sender or receiver object. It also ensures that identical variance types are in use.

The effect of all these procedures is to accurately allocate all actual costs to the precise area of the company where they were caused. This serves both the legal requirement of external accounting, and the need for comprehensive internal reporting as a basis for controlling the company.

### Alternative Activity Rates in Parallel

The method described above can be regarded as an imputed allocation approach: cost centers accrue costs because of the activities they undertake and the overheads they enjoy.

The CO-Controlling system will also operate a system of parallel activity rates that can provide a family of alternative evaluations relevant to various accounting purposes.

At the cost element level, you can put together a portfolio of costs to be included in an alternative activity rate for each cost element. If these rates are used when calculating internal activity flows, you will be able to produce cost estimates conforming to all legal and tax regulations for which your portfolio is correct.

These calculations lead to the derivation of the balance sheet and profitability analysis. You can compare costs of sales and total costs of production, both estimated and as they appear in the external financial documents—the balance sheet and profit and loss statement.

### Activities and Services Costing

By looking more and more closely at the way they produce their goods and services, companies have been able to make extensive improvements. The need is for a system of structured overhead costing.

The first thing to do is to identify and define the cost drivers—the allocation bases that influence how activity costs are allocated to the cost centers that generate them.

The cost driver is a subprocess that can be measured for individual cost center activities; for example:

- Number of purchase order items successfully processed

- Number of quotation items

Delivery items in sales

Dunning operations and payment differences handled

Subprocesses are grouped together into primary processes that can be addressed by the product costing system to determine the costs of administrative and service activities.

You will discover what each subprocess costs. You are on the way to an activity-based profitability analysis.

### **Planning and Simulating the Subprocesses**

The basic disciplines of activity-based accounting have to be applied to ensure that the activities at a cost center are integrated with the accounting and controlling systems. However, there is a further level of detail to be considered if activities are to be analyzed into their constituent subprocesses.

A business process can be represented by a chain of activities and products or a network of such chains. In the SAP R/3 system, this chain or network is managed by a process sequence structure, which may be of any complexity.

The process sequence structure can be used to simulate the flow of material through a sequence of activities that create perhaps a series of semi-finished products and that terminate with the finished product.

The SAP PP-Production Planning module is specialized in this work.

For the purpose of analyzing overhead activities and services, the CO-ABC Activity-Based Cost Accounting module provides full supporting functions.

The system of costing based on a process sequence structure requires that all the processes and subprocesses be quantified in terms of quantity and value flow, so that analysis and reporting can occur to a level of detail that will yield a balance of activities to document the ways in which the activity level of the parent cost center exerts influence on the costs of the primary processes and their subprocesses. How do support costs alter when business gets better or worse?

### **Using Process Cost Rates**

The purpose of applying the methods of activity-based costing to the detailed processes and subprocesses of a production company is to compute process cost rates. How much does it cost to put one invoice item through the office? How much to move one pallet from production to warehouse?

If you have process cost rates at this level of detail, you can take a standard costing based on a bill of materials and routings, for example, and cost each of the processes entailed. Or you can have the SAP system do it for you.

If you have these process cost rates for all the subprocesses in each activity type, you can transfer the process costs from CO-CCA Cost Center Accounting directly to CO-PA Profitability Analysis.

Because you have the process costs associated with each activity embraced by CO-CCA Cost Center Accounting, you can have these process costs included in the value flow patterns that are identified by both Product Costing and Period Costing.

### **CO-OPA Order and Project Accounting**

The purpose of the CO-OPA Order and Project Accounting module is to analyze and settle the costs arising from internal orders and projects.

The purpose of internal orders is to monitor costs to assist in decision making and to manage the allocation and settlement of activity costs to target objects, including FI-GL General Ledger accounts. Projects may also be used for these purposes. Complex projects are more properly the province of the SAP R/3 PS-Project System, which is discussed elsewhere in this volume.

Internal orders are usually defined for a particular task, event or internal change measure that has to be planned, monitored and settled in great detail. These orders are distinguished by their origin and by the time allocated for their completion. They vary in their settlement arrangements and in how they appear in the reporting functions.

SAP R/3 classifies internal orders as follows:

- Production-related orders used in Logistics
- Sales orders used in SD-Sales and Distribution
- Internal orders used in CO-Controlling

Although the internal orders of the Logistics modules and the SD-Sales and Distribution component serve mainly to monitor resources used and sales achieved, they also document estimated costs, actual costs, and revenues. In the PP-Production Planning and Control modules, the order has the job of annexing information on the latest estimate of costs until the actual costs replace them when the order is complete.

Sales orders that document costs and revenues are accessed by the CO-PA Profitability Analysis system. They also carry the information needed by CO-Controlling and PP-Production Planning and Control, for example. The orders for processing and settling internal costs usually support the integration of different business systems with the ways the particular company likes to do business and settle the costs.

Internal orders in CO-Controlling are differentiated by the following characteristics:

- Whether logistical, controlling, or settlement in main function
- Content of the order, such as product or project
- Whether an individual order or a standing order
- The significance of the values on the order, such as plan costs, actual costs or variances
- Settlement receiver for the order, such as fixed asset account, cost center, cost object, project, stock, business segment, sales order, or FI-GL General Ledger account