Chapter 1 provides an introduction to the book as a whole, from the goals of the book to its structure and content. Chapter 2 discusses the organizational structures of SAP ERP, gives an overview of Production Planning and the three main production types, and briefly summarizes the use of Product Costing (CO-PC) and the SAP calendar, as they relate to Production Planning.
1 Introduction

A company that is in the business of manufacturing a product and selling it to customers goes through the rigor of production planning and then production execution. SAP ERP Production Planning (referred to as PP throughout the book) plays a critical role in the logistics functions of the company to accomplish just this. This component enables the company to benefit from historical data to prepare a forecast that can then be used in sales and production planning. From an initial sales plan or sales orders from customers, to the highly integrated and complex chain of interdependent activities in logistics in the SAP ERP system, the PP component reflects its strength, both in planning and execution. It seamlessly integrates with sales, procurement, quality, maintenance, projects, human capital, finance, and controlling functions of the company. It also integrates with SAP Manufacturing Execution (SAP ME), as well as with SAP Manufacturing Integration and Intelligence (SAP MII).

1.1 Goals of This Book

The first goal of this book is to provide you with the step-by-step approach to configure and implement three different production types in PP: discrete, process, and repetitive manufacturing.

The book lays the initial foundation in the form of configuration and then explains how the configuration impacts actual business processes. The configuration to business process approach is maintained throughout the book.

The next goal is to provide comprehensive coverage to the PP workflow tools available. Further, there are significant “hidden” or lesser-used functionalities in PP that you can integrate even when (and long after) your SAP ERP system implementation is complete. These tools are covered to bring greater optimization to your business processes and greater return on your investment in the SAP ERP system.
The book offers several real-life examples and other modeling hints and tips to help you decide which option best meets the business needs of the company. Screenshots are used extensively and are duly supported by in-depth coverage of concepts and terminologies. SAP ERP 6.0 EHP 8 is used in the screenshots. The menu paths or transaction codes are given to perform each step. Where possible, a deliberate attempt is made to use the SAP’s Internet Demonstration and Evaluation System (IDES), so you can configure and implement a solution in a training client. Where specific or unique data is used, all necessary prerequisites and hints are given to enable you to set up the data or meet the prerequisites before attempting to run a business process. While this book can only cover so much of a topic, we highly encourage you to explore and try out a large number of options, icons, menu paths, and other pointers to continue the process of self-learning and eventually become an expert in PP.

In this book, we also cover several cross-component functionalities that enable you to leverage their strengths not only in PP but also in other logistics components that are implemented in your company. For example, you can use the classification system, digital signature, Early Warning System (EWS), flexible planning standard analysis, information systems, and reporting in many other logistics components. In other words, this book goes beyond the PP component to help in optimizing business processes in other logistics components.

### 1.2 Target Audience

This book is intended for all readers who use PP in the SAP ERP system, such as the component’s team leader, project team members in an SAP ERP system implementation, integration managers, production planners, or production controllers working in operational positions in the company. Because this book covers three different production types—discrete, process, and repetitive manufacturing—it tends to benefit those readers who are either transitioning or intending to transition from companies using different production types. Additionally, if the company is embarking on production and capacity expansion, then this book can help by facilitating the creation of the new enterprise structure needed in the SAP ERP system to support the expansion. Finally, this book can be an invaluable reference to SAP ERP system consultants and even business process owners who are considering the transition to a consulting career and need a comprehensive understanding of the required concepts and fundamentals.

### 1.3 Structure and Content

This book takes a deep-dive approach to deliver in-depth and comprehensive coverage of discrete, process, and repetitive manufacturing in SAP ERP. It begins by covering the enterprise structure that you need to set up in the PP component, which also reflects the interdependencies of the enterprise structures of other components. The configuration basics that you need to know for each production type are covered next. Similarities and differences in various production types are highlighted to enable you to comprehensively differentiate one from the other. The configuration of each production type is then put to actual use, in which we show the impact of the configuration on the business processes. You must understand a business process in a comprehensive way before modeling and configuring it in the SAP ERP system.

The book then transitions to cover the PP workflow tools available. You’ll also learn how to optimize your production processes by using several latent features that are often not as frequently used to bring about business processes improvements. This book moves toward conclusion by covering the reporting capabilities, including the flexibility to create self-defined queries. Finally, the book concludes by broadly covering the integration of PP with some of the other SAP ERP components.

In summary, the following structure is used:

In Part I of this book, starting in Chapter 2, we cover the broad outline of the entire book and why you should implement a specific functionality or how it will benefit your business processes. We’ll discuss the enterprise structure that you’ll need to set up in PP, which at the same time also depends on the enterprise structures of other components. The enterprise structure forms the backbone of the SAP ERP system, in which all the important business processes of the company are mapped. Eventually, reporting also takes important elements from the enterprise structure.

In Part II of this book, we move forward with covering the configuration basics that you need to set up for each production type. However, the primary focus of the three chapters in this part is on the configuration basics only, whereas the actual and practical use of configuration basics are covered with the business
processes in Part III. **Chapter 3** covers the configuration basics of discrete manufacturing. **Chapter 4** attends to the configuration basics of process manufacturing, and **Chapter 5** covers the configuration details for repetitive manufacturing.

Part III of this book discusses the PP workflow by each production type, and we make logical connections to the business processes of each production type for which we undertook the configuration in the relevant chapters of Part II. **Chapter 6** provides an in-depth coverage of the business processes of PP in discrete manufacturing. **Chapter 7** brings out the similarities and differences between discrete and process manufacturing, but remains primarily focused on the process industry-specific functionality known as Process Management. Process Management then matures to a user-friendly functionality known as Execution Steps (XSteps). XSteps can also be used in discrete manufacturing. In the same chapter, we also cover how to use the process manufacturing cockpit. The focus of **Chapter 8** is on the important business processes of repetitive manufacturing, in which, once again, we make consistent and logical links to the configuration chapter.

Part IV of this book covers the PP workflow tools. **Chapter 9** focuses on sales and operations planning (S&OP), in which we cover product group, flexible planning, and standard analysis in flexible planning. Forecasting as an invaluable planning tool is also covered in this chapter. **Chapter 10** is on SAP Demand Management, in which we cover planning strategies and production methods such as make-to-order (MTO) and make-to-stock (MTS). Material requirements planning (MRP) is covered in **Chapter 11**, in which we discuss the planning calendar and also MRP areas. In **Chapter 12**, you’ll see how you can use MRP to successfully execute Long-Term Planning (LTP) to simulate what-if planning scenarios.

Part V is all about optimizing PP. **Chapter 13** covers special procurement types, such as subcontracting, phantom assembly, procurement or production at another plant, withdrawal from another plant, consignment, and pipeline materials. In **Chapter 14**, we show you how to manage the capacity requirements planning (CRP) in your SAP ERP system, including its evaluation and leveling. **Chapter 15** covers the versatile and dynamic functionality of the classification system, which is cross-modular and finds several applications not just in PP, but also in other logistics components. The co-products and by-products that the actual production process generates find comprehensive coverage in **Chapter 16**. Next, in **Chapter 17**, we show you the benefits of implementing the digital signature functionality in your business processes to eliminate or reduce the manual signature and approval process. Digital signature is also cross-modular.

The last part, Part VI, is all about monitoring and evaluating PP. In **Chapter 18**, you’ll learn how to quickly set up alerts in your SAP ERP system with the Early Warning System (EWS) to closely monitor important deviations to your business processes and make quick decisions and actions. You can also set up EWS in other logistics functions, if needed. In **Chapter 19**, you’ll learn the features, functionalities, menu paths, navigation tools, and many options available to run a large number of standard reports available in SAP ERP. The concepts you’ll develop here will enable you to expand your knowledge horizon to explore standard reports available in other logistics components. In this chapter, we also cover how you can quickly create your own reports by using the SAP Query tools. Finally, in **Chapter 20**, we give you some “flavors” to the complex and highly interconnected world of PP integration with other logistics functions. Here, we provide five examples in which PP integrates with SAP ERP Materials Management (MM), SAP ERP Quality Management (QM), SAP ERP Project Systems (PS), and SAP ERP Plant Maintenance (PM). We also provide a roadmap you can use to ensure effective planning and comprehensive monitoring of cross-components integration during your SAP ERP system implementation project.

In the appendix, you’ll find a comparison table of the production types (discrete, process, and repetitive), and a glossary of some of the more important terms used in PP.

While this book is certainly a significant expansion to the areas and functionalities that the PP offers, note that we don’t cover the following in detail:

- Variant configuration
- Distribution resource planning
- Kanban

**Note**

Kanban is now covered in the E-Bite titled *Configuring Kanban in SAP ERP MM and PP*, which is available at www.sap-press.com/4013.

Let’s now move on to Chapter 2, where we’ll discuss the internal organizational structure of SAP ERP from a PP perspective.
Chapter 2
SAP ERP Production Planning is a direct and in-depth reflection and mapping of the business processes that a company either currently follows as a part of industrial operations or will transition to when the implementation of the SAP ERP system is complete. We’ll start your journey with a discussion of the organizational structure of all the core components.

2 Organizational Structures in SAP ERP

In this chapter, we’ll help you get an overall understanding of how business functions and the SAP ERP system interact and work together. After you understand the basics, we’ll slowly move into some specific details on how Production Planning (PP) works in the SAP ERP system. We’ll then overview the three main types of manufacturing, which are a large focus of this book.

From a PP perspective, the important organizational units are company code, plant, and storage location. In the following sections, we’ll review the structure as it applies to PP. We’ll discuss the importance of the organizational units and explain how they work together to accomplish the organizational, legal, and reporting requirements of the company. We’ll also explain the SAP calendar, which is an essential part of maintaining your entire system schedule.

2.1 Breaking Down the Structure into Units

During an SAP ERP system implementation, one of the first and highly intensive activities undertaken is the finalization of the organizational structure. This involves having inter-modular and intra-modular discussions and deliberations to ensure that SAP ERP can cover the legal aspect of the company’s organizational structure, as well as attend to component-specific reporting needs. In other words, the business process owners, business analysts, and SAP ERP system consultants review the existing organizational structure of the company and then simultaneously begin mapping it in the SAP ERP system.
A practical approach to adopt while finalizing the organizational structure in the SAP ERP system is to ensure that the organizational structure isn’t so generic that it loses its significance and prevents the business process owner from extracting the required information from the system, nor is it so minute or detailed that it becomes cumbersome to collate and consolidate the information. You should also keep a forward-thinking view of your organizational structure. If you foresee that you’ll need certain organizational elements in your SAP ERP system in the future, for example, it’s better to have them available in the system than to add them at a later point.

The organizational structure in the SAP ERP system is equally applicable to all manufacturing types—discrete, process, or repetitive. Take a look at Figure 2.1, which shows the client as the highest level of the organizational structure in the SAP ERP system. The profitability analysis of the company is performed at the controlling area level, and the cost center and profit center accountings are performed at that level as well.

A company can consist of several legal entities, each including separate, individual financial statements that must be prepared at the end of the financial year. This is reflected as a separate company code for each legal entity.

The *valuation area* represents the level at which the company values its material stock consistently. It’s part of the logistics area of the SAP ERP system. A one-to-one relationship exists between the valuation area and the plant. For example, a material at one plant may have a different standard price than at another plant.

The diagram shown in Figure 2.2 represents the organizational unit of PP, wherein the company code attains the highest level. Within each company code, there can be one or multiple plants. Within each plant, there can be one or multiple physical and virtual storage locations.

A client represents the highest element of the SAP ERP system’s organizational structure. Often, the client represents a company or a group of companies, within which there are several independent company units. An SAP ERP system can contain several clients in logical units. The additional organizational elements and the master and transaction data are created and managed within a client.
From the SAP ERP system’s landscape perspective, you normally have three clients (systems): development (DEV), quality assurance (QAS), and production (PRD). The actual configuration of the SAP system takes place in the DEV system, which is then transported to the QAS system for testing and training. The final configuration eventually moves to PRD, which is the final and live system on which the business process owners of the company make real-time live entries.

### 2.1.2 Company Code

The company code is the level below the client in the SAP ERP system, and it reflects the level at which the company legally reports income statements and balance sheets. It’s an organizational element (unit) of SAP ERP Financials (FI). You can have a separate company code for each line of business—for example, textile and chemicals—as long as the two are legally separate entities. Similarly, separate company codes can exist if the company has operations in foreign countries.

To create a company code or to make changes to the existing one, follow the configuration (Transaction SPRO) menu path, **Enterprise Structure** • **Definition** • **Financial Accounting** • **Edit**, **Copy**, **Delete**, **Check Company Code** • **Edit Company Code** (see Figure 2.3).

![Change View “Company Code”: Details](image)

**Figure 2.3** Company Code

**Note**

In this book, whenever we refer to Transaction SPRO, it implies that the next step you need to take is to click on **REFERENCE IMG** or press 

**Note**

Your FI team decides and works on the creation of company codes in the system.

### 2.1.3 Plant

A plant is an organizational unit within the logistics component. You can classify a plant from the point of view of production, procurement, maintenance, warehouse, and planning. For example, the plant can be a manufacturing site, a head office, or a distribution center within a company. It organizes the tasks for the production logistics, and it can be a physical production site or the logical grouping of several sites in which materials are produced or goods and services are provided. Different production locations are mapped with the plant in the SAP ERP system. At the plant level, you can perform the following tasks:

- Managing inventory
- Evaluating and performing physical inventory of stocks
- Managing demand
- Planning production
- Executing and controlling production
- Performing material requirements planning (MRP)

In the organizational structure of the SAP ERP system, you can assign only one company code to a plant. However, you can assign multiple plants to the same company code.

To create a new plant or to make changes to the existing plant, follow the configuration (Transaction SPRO) menu path, **Enterprise Structure** • **Definition** • **Logistics – General** • **Define**, **Copy**, **Delete**, **Check Plant** (no transaction code available).

**Note**

Your SAP ERP Materials Management (MM) team decides and works on the creation of plants in the system.

Figure 2.4 shows the change transaction screen of plant 3000, with the provision to enter the complete address and other details. It’s important to use the FACTORY
Organizational Structures in SAP ERP

2.40

calendar field to assign a factory calendar to a plant so that the system can plan out all the working and nonworking days of the plant.

Figure 2.4 Plant

Note
We cover the creation of the factory calendar in Section 2.4.3.

After the creation of the plant, the next step is to assign the plant to the company code. A plant can only be assigned to one company code, and you can assign multiple plants to the same company code. It’s mandatory to assign a plant to a company code.

To make a plant–company code assignment, follow the configuration menu path, ENTERPRISE STRUCTURE • ASSIGNMENT • LOGISTICS – GENERAL • ASSIGN PLANT TO COMPANY CODE, or use Transaction OX18 (see Figure 2.5). Choose the NEW ENTRIES icon to create a new plant–company code assignment.

Figure 2.5 Assignment of Plant to Company Code

Note
Your MM team creates the plant–company code assignment in the system.

2.1.4 Storage Location

A storage location is the physical or virtual storage site for the materials. Examples of physical storage locations include raw materials store, components store, returned goods store, finished goods store, and so on, whereas the virtual storage location can be self-defined and may be a scrap yard or a production shop floor in which semifinished goods are temporarily stored.

You can even treat storage tanks or silos for storing bulk chemicals, oils, or grains as storage locations in the system. However, the limitation is that a storage location in the SAP ERP system doesn’t have the provision to define the maximum storage capacity of an individual tank or silo. This provision is available in SAP ERP Warehouse Management (WM).

You can create as many storage locations as needed within a plant, but you can assign a storage location to one plant only.

To create a new storage location or to make changes to the existing storage location, follow the configuration (Transaction SPRO) menu path, ENTERPRISE STRUCTURE • DEFINITION • MATERIALS MANAGEMENT • MAINTAIN STORAGE LOCATION, or use Transaction OX09. Figure 2.6 shows the PLANT popup screen, in which you enter the plant value as “3000”. You add both the storage location code with a DESCRIPTION and the complete address.
2.1.5 Material Requirements Planning Controllers

An MRP controller can be an individual role or group of roles, performing the same task. For example, if three people in a company manage the packaging materials procurement, then it makes sense to define one MRP controller for this. The MRP controller is primarily responsible for attending to the requirements of materials. When defining the MRP controller, focus must remain on making sure it’s defined based on responsibility, role, or area of working, instead of individuals. For example, you may have one MRP controller who is responsible for raw materials only, while another one may be for packaging material. You may have an MRP controller who is only responsible for managing consumables. The MRP controller is assigned in the MRP 1 view of the material master. When you select the relevant MRP type in the material master by indicating that planning will be done on the material, the system prompts you to enter the MRP controller. Again, the MRP controller should be based on position or responsibility rather than on the person. Later, when you run several reports, you’ll be able to use the MRP controller as a selection criterion, among others.

To configure the MRP controller in SAP ERP, follow the configuration (Transaction SPRO) menu path, Production • Material Requirements Planning • Master Data • Define MRP Controllers.

2.1.6 Capacity Planners

A capacity planner or capacity planner group is responsible for evaluating the current work center’s or resource’s capacity and, if needed, also performing the capacity leveling. When you create a new work center, you also have to assign the person responsible in a specific field. The capacity planner can also handle the role of person responsible for the work center. For example, it may make sense to combine all of the packing units of similar products as one capacity planner if the same person is responsible for it. If a company produces 10 different sizes of tomato ketchup—from a packet to a gallon size—and the same capacity planner is responsible for ensuring that various machines’ capacities for each packing size are available, then you can simply agree to have one capacity planner in the SAP ERP system, together with its code.

The capacity planners are assigned in the capacity header data of the work center (resource). Then, in all the capacity evaluation and leveling reports, the capacity planner is available as the selection criterion for the planner to choose from and enables the system to display only relevant information.
To create a capacity planner, follow the configuration (Transaction SPRO) menu path, Production • Capacity Planning • Master Data • Capacity Data • Set Up Capacity Planner.

### 2.1.7 Production Schedulers

A production scheduler is responsible for ensuring that production execution and operation takes place per the production plan. The production scheduler immediately attends or takes immediate remedial action, where necessary. To define a production scheduler, follow the configuration (Transaction SPRO) menu path, Production • Shop Floor Control • Define Production Scheduler, or use Transaction OPJ9 (see Figure 2.7). You assign production schedulers in the Work Scheduling View of the material master.

**Figure 2.7** Production Scheduler with Production Profile Assignment

Now that you have an understanding of how the SAP ERP system works, we’ll add another ingredient into the mix: PP.

### 2.2 Production Planning in SAP ERP

Production planning is the core of any manufacturing process. SAP ERP helps you set up and streamline your specific process to maximize efficiency in the workplace when working with different types of manufacturing.

Actually, you’ll find that the SAP ERP system is made up of several different components, in addition to PP (see Figure 2.8). We’ll go into the different integration of PP with the different components you see here in Chapter 20.

In general, the entire process of production planning and control starts when you forecast the demand of a product and prepare a sales plan. The sales plan is synchronized with a production plan to take the project realities into account, such as capacity constraints. Various simulated models are considered, and the finalized production plan becomes the basis of MRP. Materials planning helps the production and the procurement planners know when to procure and produce a material for its eventual availability and dispatch to the customer. The production execution accounts for and records each production detail, including generation of scrap, co-products, or by-products, if any. Quality checks in the production processes ensure minimal customer returns or other rejections. The produced product is sold to a customer, and the production plan continues to be a monitoring barometer against the sales plan.

Of course, this information is great for providing a bird’s-eye view of the production planning process. We’ll help you understand how the individual objects you have to work with in the SAP system help streamline and manage your business processes in the following sections.

PP includes the following types and tools:

- **Master data**
  This includes the material master, work centers, resources, production lines, routings, master recipe, rate routing, bill of materials (BOM), and production version.

- **Sales and operations planning (S&OP)**
  You can use standard S&OP or flexible planning to forecast sales and production plans to meet customers’ requirements for products.
Organizational Structures in SAP ERP

2.2 Production Planning in SAP ERP

In the following sections, we’ll cover the features and characteristics of various production types as well as important business processes in production planning and control.

2.2.1 Characteristics of Production Types

A production type characterizes the frequency, complexity, or stability with which a product is produced in the production process. When implementing an SAP ERP system, one of the very first decisions a company makes is which production type to implement to reflect the complexity (or simplicity) of the production process. For example, if the production process is relatively simple with a linear production line involving one operation and one work center, then it makes sense to implement the REM production type to enable the company to benefit from lean manufacturing. Similarly, the process manufacturing production type is more suited to scenarios in which the product is generally in liquid form and flows or where the manufacturing process is generally continuous. The discrete manufacturing production type is used where the production process is order based, involves special procurement types, or when products are stored in interim storage locations between the production processes. Kanban is a demand-driven production type in which the demand triggers the replenishment and initiates the supply process. This production type enables minimal involvement of the Inventory Management function.

We discuss each of the main production types in the following sections. While this book will primarily cover discrete, process, and repetitive production types, this sections also briefly covers engine-to-order (ETO) and Kanban to provide a comprehensive look at production types.

Discrete Manufacturing

The discrete manufacturing production type, which is also known as shop floor production, describes the production of a product on the basis of production orders. Discrete manufacturing is implemented where the products change frequently, the demand pattern is irregular, and production is workshop oriented in character. A range of master data is required for discrete manufacturing; the most important are the material, BOM, work center, and routing.

Production Planning

This includes material forecasting, SAP Demand Management, Long-Term Planning (LTP), and Master Production Scheduling (MPS).

Material requirements planning (MRP)

This attends to standard and unique customers’ requirements via various planning and production methods.

Discrete manufacturing or shop floor control (SFC)

Production orders processing, goods issuances and receipts, and confirmations are used for complex manufacturing processes in which there may be a need for intermediate or interim storage.

Process manufacturing or Production Planning for Process Industries (PP-PI)

Process orders processing, Process Management, material quantity calculation, goods issuances and receipts, and confirmations are used for production processes of liquid-based or flow-based materials.

Repetitive manufacturing (REM)

This adopts the lean manufacturing principle in which generally the production process is not only simple but also consistent over a considerable period of time.

Capacity requirements planning (CRP)

This consists of capacity evaluation and capacity leveling. Capacity evaluation reflects the load and overload at work centers/resources, whereas capacity leveling helps the planner optimize the production processes.

Product Costing (CO-PC)

This completely integrates with PP and is responsible for ensuring all production-related costs are accounted for, including overheads, variances, and work in process (WIP).

Kanban

This production type replenishes stocks based on a pull system by using Kanban cards. Kanban works well for both in-house produced materials and outside procured materials.

Distribution resource planning (DRP)

This enables planning the demand of products at distribution centers.

Reporting

A large number of information systems and standard and flexible analysis reporting options are available in PP.
Example

In steel rerolling mills, the entire production process passes through five different production steps. However, customers can place orders based on a different level of the processed good. Hence, the company has to produce and also store a semifinished good at each production step to meet its customer’s demand.

The production process in discrete manufacturing starts when a production order is created and processed. A production order can either be created manually or by converting a planned order that the system generated after running MRP. A production order is a request to the production department to produce the product at a specific time and in a specific quantity. It specifies the work centers and material components that are required for production. The creation of a production order automatically creates reservations for the required material components. Purchase requisitions are created for externally procured material components and services, and capacity requirements are created for the work centers at which each operation of the order will be executed. The discrete process is shown in Figure 2.9.

![Discrete Manufacturing Process Flow](image)

Note

Chapter 3 covers the configuration basics of discrete manufacturing, and Chapter 6 details the business processes of discrete manufacturing.

Process Manufacturing

Process manufacturing is the batch-oriented and recipe-oriented production of products or co-products in the process industry. Manufacturing can be in the form of continuous production, discontinuous production, or regulated production. In continuous production, the product is continuously produced, raw material is continuously supplied to the production line, and the plant and machinery are in continuous operation. An example of this is fertilizer manufacturing, where the production process is continuous, starting with production of ammonia from natural gas (methane) and continuing until the final urea/fertilizer is produced. The process may find an interim storage in the form of bulk urea being stored in the warehouse before the bagging process starts.

In discontinuous production, the products aren’t produced in a continuous process. Instead, the material components are provided and weighed out as required for each step of the production process. Its greater application is found in industries such as food processing.

Regulated production is used if the product quality requirements are very stringent and specific industry standards must be met. This type of production is generally followed in pharmaceutical or cosmetics manufacturing.
orders can be created only with approved recipes. If changes need to be made to master recipes, these are subject to master data change administration procedures.

The central master data elements in process manufacturing are the material, the BOM, the resource, and the master recipe.

The business process in process manufacturing starts when a process order is created and processed in accordance with a master recipe. A process order is a request to the production department to produce a product at a specific time and in a specific quantity. It specifies the resource and material components that are required for production.

A process order can be created either manually or when a planned order that was created in the PP process is converted. The creation of a process order automatically creates reservations for the required material components. The system automatically creates purchase requisitions for externally procured material components and services, and capacity requirements are created for the resources at which the order will be executed. Process orders are released on the release date, provided the required materials and capacity are available. At the time of release, you can run an automatic batch-determination process for components that are subject to a Batch Management requirement. The relevant documents in the process order can be printed to prepare for the execution of the process order. The process manufacturing flow is shown in Figure 2.10.

The capacity situation is evaluated, and any required capacity leveling can be carried out in any phase of the process order processing, although this is usually ensured before the actual production commences.

> **Note**

Refer to Chapter 14 in which we show you how to use capacity requirement planning (CRP) for evaluation and leveling.

The actual production can now begin, with or without the use of Process Management. If you implement Process Management to execute a process order, this serves as the interface between the SAP ERP system and process control. The flexible structure of this interface makes it possible to connect automated, semi-automated, and manually controlled plant and equipment to the production process.

Process Management makes extensive use of the classification system, which is cross-component.

![Process Manufacturing Process Flow](image)

**Figure 2.10** Process Manufacturing Process Flow

**Note**

Chapter 15 shows you how to implement the classification system and then integrate it in Process Management. You can also integrate classification in other logistics components to bring better organization to your master data management.

After the process order or the relevant phases of the process order is released for production, control recipes are generated from the process instructions in the process order. The control recipes contain all the information required for the process control function to execute a process order. Next, the control recipes for the process control system are either automatically or manually sent to the relevant process operator in the form of process instruction sheets. In the process instruction sheet, the process operator can refer to operation’s instructions, refer to the online instruction manual using the Document Management System (DMS), input process parameters, or write shift highlights.
When the process operator has entered all process parameters and is ready to mark the process instruction sheet as complete, the system can prompt the process operator to digitally sign the process instruction sheet to set it to completion status.

**Note**

In Chapter 17, we show you how to implement digital signature and then integrate it in Process Management.

The process data that results from the execution of the process order are sent back to the SAP ERP system, are transferred to external function modules for further processing, or both. This data is transferred from the process control function to the various recipients by means of the process-coordination interface with the help of process messages. A material consumption message, for example, causes a goods issue to be posted for a component. Similarly a material-produced message triggers a goods receipt posting in the system.

If process order execution takes place without process coordination, the material components required to produce the finished product are withdrawn with reference to the process order, and the goods issue is posted in the Inventory Management subcomponent of MM. The required finished product is then produced in accordance with the process order. The quantities created and the products produced are confirmed to the process order, the finished product is put into storage, and the goods receipt is posted. In the final step, the product costing team ensures the order settlement.

**Note**

Chapter 4 and Chapter 7 cover the configuration basics and business processes of process manufacturing, respectively.

Repetitive Manufacturing

*Repetitive manufacturing (REM)* is the interval-based and quantity-based creation and processing of production plans. With REM, a certain quantity of a stable product is produced over a certain period of time. The product moves through a work center, which may be a group of machines, in a continual flow, and intermediate products aren’t put into intermediate storage (e.g., motherboard assembly in computer manufacturing).

The data entry efforts involved in production control with REM is significantly reduced when compared with single-lot and order-based production control. REM can be used for the make-to-stock (MTS) production method. In this case, production has no direct connection to a sales order. The requirements are created in the SAP Demand Management process, and the sales orders are supplied from stocks. Sales order-based production (i.e., the make-to-order [MTO] production method) is also possible in REM. In this case, production is directly related to a sales order or can even be directly triggered from a sales order. The most important master data in REM are material, BOM, production line, rate routing, and production version. The REM process flow is shown in Figure 2.11.

![Figure 2.11 Repetitive Manufacturing Process Flow](image-url)
activities will be posted to the cost collector for material confirmations, whether a decoupled confirmation will be used, whether a backflush will be carried out for the entry of actual data, and which transaction types will be used.

The BOM for the material specifies the quantities of components required for production. In REM, not every goods issue is recorded at the same time as the physical withdrawal of the material from stock. Usually, component usage/goods issuance (backflush) is automatically posted only when the finished product is received in the warehouse. To backflush a component, a storage location is specified in every BOM item, and the backflush is carried out from this storage location.

Work centers in REM are known as production lines because the product moves through the machines in a continuous flow, and the machines are usually spatially arranged in a line. These can be simple production lines, which often consist of just one work center, or complex production lines, which consist of several work centers. The individual processing stations are set up as individual production lines and are grouped into a line hierarchy. A production line determines the available capacity of the processing station and is assigned to a single cost center.

In REM, standard routing is known as rate routing. A rate routing contains the operations or the processes required to produce the material. Because the same product is produced over a long period in REM, very simple routing is used, often consisting of just one operation/process. This kind of process specifies the production rate, which, in turn, specifies the quantity per time unit that is produced on the line (e.g., 50 units per hour).

Because there are different BOMs and routings for a material depending on the production process, a production version is used to specify which BOM and which routing will be used to produce the material. The production version also specifies the lot size for which the production version is valid. It’s important to set the REM ALLOWED checkbox in the production version. There has to be at least one production version of a material in REM. The costs incurred in REM are posted to a product cost collector (PCC). In the process of entering actual data, the material costs and production costs are added to the PCC. The PCC is created for a material within a plant in a specific production version.

In REM, the planned orders for a material that result from the production and procurement planning process are managed in a planning table. In these tables, the planner can schedule the production quantities on the assembly lines. In REM, the term run schedule quantity is used instead of planned orders (as used in discrete or process manufacturing) to denote the quantity that you plan to produce. The components are supplied anonymously to the production line by using the pull list. The components required on a production line for a specific period are calculated in the pull list. The missing quantities that the system detects are replaced by means of direct stock transfers, for example, from the main storage location to the production storage location. This is known as replenishment.

The production of the product usually takes place in a continuous flow along the production line. Entry of actual data is carried out at regular intervals for each finished production quantity. Component use (backflush) and production activities are automatically posted when the finished product is received in the warehouse. For longer production lead times, the actual data is recorded with a reporting point within the production line to enable the system to post consumption data more promptly.

**Engineer-to-Order**

The engineer-to-order (ETO) production type attends to the complexities and challenges when a sales order-based MTO production method is unable to fulfill the requirements. In the MTO production method, the system is unable to make a distinction between the predecessor-successor relationships in the production process; for example, a material’s production can’t initiate (successor) until the production of the previous product (predecessor) is ensured. In ETO, the system uses work breakdown structure (WBS) and networks for scheduling and coordinating the production processes and also managing Cost Accounting. All produced goods are specific to the project, and the system maintains project-based inventory.
Kanban

Kanban involves a requirements-oriented production control procedure and uses material flow control that avoids time-intensive requirements planning. With Kanban, a material is produced or procured only when it’s actually required. A specific quantity of the components required to produce a material are stored on-site and in containers. When a container is empty, this component is replenished according to a predefined replenishment strategy (in-house production, external procurement, or stock transfer). In the interval between the request for replenishment and the delivery of the refilled container, the other available containers simply do the work of the empty one.

The replenishment process is largely automatic in the Kanban procedure, thereby greatly reducing the amount of manual posting work required. The material isn’t pushed through the production process as specified by an overall plan; rather, it’s requested by one production level (consumer) from the previous production level (source) as and when needed. It adopts the “pull” strategy in the production process.

In Kanban processing, production supply areas (PSAs) divide the plant. The components required for production are stored in these PSAs, and various work centers take what they need from them. A Kanban control cycle is defined to specify how a material should be obtained within a PSA. The control cycle defines a replenishment strategy for the material that specifies, for example, whether the required material is to be produced in-house or procured externally. The control cycle also specifies the number of containers in circulation between the consumer and source, as well as the quantity per container.

Replenishment strategies specify how a material component should be replenished and which of the following replenishment elements should be created for this purpose:

- In-house production
- Manual Kanban
- Replenishment with run schedule quantity
- Replenishment with production order
- Replenishment by purchase order
- External procurement

The replenishment process with Kanban entails that a material is produced at a machine. The components required to produce it are available onsite in containers and are ready for withdrawal. If one of these containers is empty, the source that is responsible for its replenishment has to be informed. If Kanban processing without the SAP ERP system support is being used, the consumer sends a card to the work center (source). The card contains the information about which material is required, in what quantity, and where it should be delivered to.

The SAP ERP system also supports other kinds of Kanban procedures besides the more-prevalent procedure just mentioned. The Kanban process also works well...
with stock transfer replenishment (plant-to-plant and store-to-store stock transfer).

2.2.2 Processes in Production Planning and Control

We discuss the main processes in PP in the following sections.

Sales and Operations Planning

The S&OP process is used to determine the quantities for production. Sales planning, which is also known as demand planning, covers future requirements without considering stocks and available capacities. The historical sales figures serve as a basis for sales planning. Operations planning uses the results of the sales planning process to plan the production quantities and takes initial stocks and capacities into account.

Note

Chapter 9 covers S&OP.

SAP Demand Management aligns sales planning with the customer requirements in accordance with the planning strategy and thus calculates the independent requirements for production. The planning methods that SAP Demand Management looks for are MTS, MTO, planning with final assembly, and several others.

Note

Chapter 10 covers SAP Demand Management.

Material Requirements Planning

MRP is one of the most important functions of PP. The system performs net quantity calculation for component requirements while taking scrap and lot sizes into account. MRP calculates requirement coverage elements for all MRP levels such as plant, material, product group, and MRP areas, and it takes into account the lead times, lot sizes, and scrap quantities. MRP also enables capacity planning.

Note

Chapter 11 covers MRP.

Long-Term Planning (LTP) is a simulation tool for MRP that examines how a change in planned independent requirements (PIRs) will affect capacity utilization, stocks, and external procurement. LTP is also suitable for short-term simulations.

Note

Chapter 12 covers LTP.

Capacity Requirements Planning

For detailed production planning while taking available capacities into account, capacity requirements planning (CRP) schedules the worklist in detail, which usually consists of the processes for created or released production orders. CRP delivers a production sequence that is feasible from the capacity viewpoint. CRP consists of capacity evaluation and capacity leveling.

Note

Chapter 14 covers CRP.

Production Control

The central controlling and recording element—the production process—is the production order in discrete manufacturing, the process order in process manufacturing, and the run schedule quantity in REM. While the previous processes dealt with production planning, production execution is concerned with how the actual production as specified in the production order is recorded and controlled, from material withdrawal to order confirmation to storage and invoicing.

2.3 Product Costing

Product Costing (CO-PC) is a subcomponent of SAP ERP Controlling (CO) and comprehensively integrates with PP. In fact, PP is unable to function completely until the Product Costing subcomponent is in place. Product Costing helps to ensure that the total cost of goods manufactured (COGM) and cost of goods sold (COGS) are completely accounted for. To calculate the COGM, you need to have
first-hand information of the cost of all the raw materials and components used. Further, you also need to know the activity rates for each work center (resource). The material and activities costs are also known as direct costs and are individually assigned to the order without any allocation. Overhead cost is determined by overhead charges. Examples of overhead costs are the electricity consumed in the production process and the salaries of employees involved in the production of goods.

There is also a method of assigning a costing sheet to an order type, which for example, may contain details such as 2% of raw material cost will equal the electricity cost of producing a material. Before the actual business processes, such as order creation, in PP begins, the product costing team runs a material cost estimate in the SAP ERP system. When running the material’s standard cost estimate, the system refers to the complete master data information of PP such as BOM, routing, work center, and production version. It draws information from CO, such as activity types and activity rates. The material cost estimate is first saved and then released. Then, when you create an order, the system performs planned cost calculations within the order. When you perform production execution activities such as goods issuance, confirmation, goods receipt, and recording of co-products or by-products, the system continuously updates the actual cost and presents a comparison of planned costs with actual costs.

### Note
Chapter 16 shows you how to manage co-products and by-products in the production processes.

The WIP, the overhead, the variances, and finally the settlement are some of the functions managed by the product costing team. When an individual order is settled, the system updates the material price based on the price control. If the price control in the material master (finished or semifinished good) is standard price, the system reflects all differences and variances to the price difference account. If the price control in the material master is a moving average, the system updates the material price. Order-based settlement in discrete and process manufacturing is a mandatory requirement.

The process differs slightly in REM, in which either the material’s standard cost estimate is used or a PCC is created with infinite validity. A PCC is preliminary costing, and all the product costs are summed up in the PCC for a material before the actual settlement takes place. In REM, the settlement process isn’t order-based but period-based.

### 2.4  SAP Calendar

For all of the planning and scheduling to effectively take place, it’s imperative that a calendar exists in the system. This calendar is then assigned to the plant. You have to first define all of the national holidays, followed by combining all of the individual holidays in the holiday calendar. This holiday calendar then gets assigned to the factory calendar.

The SAP calendar creation function includes three individual steps:

- Defining holidays
- Creating a holiday calendar
- Defining a factory calendar and assigning a holiday calendar to it

To create a new calendar, follow the configuration (Transaction SPRO) menu path, SAP NetWeaver • General Settings • Maintain Calendar, or use Transaction SCAL (see Figure 2.12). Here you have the options you need to maintain the requisite details, such as Public holidays, Holiday calendar, and Factory calendar, in the same sequence.

![SAP Calendar Main Menu](image)
In the following sections, we’ll go into more detail about the different calendar steps.

### 2.4.1 Public Holidays
Select the **Public Holidays** radio button shown previously in Figure 2.12, and then choose the **Change** icon. Select the **New Holiday** icon, so you can then select whether it’s a fixed date or a floating public holiday. A floating public holiday depends on factors such as moon sighting to decide the holiday. In Figure 2.13, selecting **Floating Public Holiday** leads to the **Floating Public Holidays** dialog box, in which you can choose the holiday to be any specific date, day, or even with religious denominations, such as Buddhist, Christian, Islamic, or Jewish calendars.

![Figure 2.13 Public Holidays](image)

**Figure 2.13 Public Holidays**

### 2.4.2 Holiday Calendar
After defining and saving a public holiday, you’ll again come back to the screen shown in Figure 2.12, where you select the **Holiday calendar** radio button, which consists of a list of all of the holidays defined so far. Choose the **New Entry** icon, which leads to the screen shown in Figure 2.14. After you provide the identification code and a short text for the holiday calendar in this screen, you define the validity of the holiday calendar. Next, select the **Assign Holiday** button, which leads to the pop-up in which you can select all of the relevant public holidays by choosing the relevant checkboxes, pressing [Enter] to confirm, and finally saving the holiday calendar. This takes you back to the original SAP Calendar screen shown earlier in Figure 2.12.

![Image of SAP Calendar](image)

**Figure 2.14 Public Holiday Calendar**

### 2.4.3 Factory Calendar
Finally, in the screen shown earlier in Figure 2.12, select the **Factory calendar** radio button, which leads to the screen shown in Figure 2.15, where you can enter the validity date of the factory calendar, assign a **Holiday Calendar ID**, and define **Workdays**. You can also define **Special Rules** to denote any holiday (off day) as a workday.

![Image of Factory Calendar](image)

**Figure 2.15 Factory Calendar**
With the necessary configuration of the factory calendar in place, you can proceed to assign the same in the plant (refer to Figure 2.4 in Section 2.1.3).

Table 2.1 provides a summarized view of configurations specific to PP, which will eventually form the basis of selection criteria in reporting (or the evaluation tools). Based on the various roles configured in this chapter, for example, capacity planner, MRP controller, or production scheduler, this table provides a broader description of which role makes use of which evaluation tools. For example, the MRP controller generally uses Transaction MD06 (MRP List/Collective Display Evaluation Tool); hence, the option to enter the MRP controller on the initial selection screen is available. Similarly, capacity evaluation tools (Transactions CM01, CM02, etc.) are of more interest to capacity planners than, for example, to MRP controllers. Further, all these evaluation tools make use of the factory calendar defined earlier in this chapter.

Keep this table in mind as you read through the rest of the book.

<table>
<thead>
<tr>
<th>Function</th>
<th>Transaction</th>
<th>MRP Controller</th>
<th>Capacity Planner</th>
<th>Production Scheduler</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP Demand Management</td>
<td>MD73</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRP List/Collective Display</td>
<td>MD06</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock/Requirements List/Collective Display</td>
<td>MD07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Term Planning (Requirements)</td>
<td>MS65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Processing of Production/Process Orders</td>
<td>COHV COMAC</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production Order Information System</td>
<td>COOIS</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process Order Information System</td>
<td>COOISPI</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing Parts Information System</td>
<td>CO24</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity Evaluation</td>
<td>CM01 CM02 CM04 CM05 CM07</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Capacity Leveling</td>
<td>CM21 CM22</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Production Resources and Tools</td>
<td>CF10 CF13</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 2.1 MRP Controllers, Capacity Planners, and Production Schedulers Available as Selection Criteria
2.5 Summary

This chapter explained the importance of mapping most, if not all, of the important actual business processes of the company in SAP ERP during its implementation. We also highlighted the importance of the enterprise structure of not just PP, but of the entire organization, along with their interdependencies. The reference table acts as an invaluable guide in helping understand the importance of several PP-specific configuration elements, such as MRP controllers, production schedulers, and capacity planners.

The next chapter begins Part II and covers the configuration basics of PP for discrete manufacturing.
Contents at a Glance

PART I Production Planning Core Concepts
1 Introduction ................................................................. 29
2 Organizational Structures in SAP ERP ............................ 35

PART II Configuration Specifics for Manufacturing Types
3 Configuration Basics of Discrete Manufacturing .................. 69
4 Configuration Basics of Process Manufacturing ................... 129
5 Configuration Basics of Repetitive Manufacturing ............... 179

PART III Production Planning Workflow by Production Type
6 Production Planning for Discrete Manufacturing ................. 201
7 Production Planning for Process Industries ....................... 311
8 Production Planning for Repetitive Manufacturing ............. 373

PART IV Production Planning Workflow Tools
9 Sales and Operations Planning ...................................... 443
10 SAP Demand Management ......................................... 521
11 Material Requirements Planning ................................. 545
12 Long-Term Planning ................................................. 633

PART V Optimizing Production Planning
13 Special Procurement Types ........................................... 663
14 Capacity Requirements Planning ................................... 693
15 Classification ............................................................ 739
16 Co-Products and By-Products in Production Processes ....... 755
17 Digital Signature ........................................................ 775

PART VI Monitoring and Evaluation
18 Early Warning System ............................................... 795
19 Reporting in SAP ....................................................... 815
20 Integration of Production Planning with Logistics Functions ...... 857
Dear Reader,

In manufacturing, there’s a maxim: “You can have it cheap, fast, or good. Pick two.” In the publishing industry, where micro-level editing is seemingly endless, we usually say, “It’s either published or perfect. Pick one.”

For an editor, then, there is a unique pleasure in working on a second edition. It offers a chance to right past editorial wrongs (the missing comma on page 438 or the typo on page 822 that sneaked into the first edition). We can take the opportunity to re-examine a best-seller that has already reached bookshelves around the world—and find new ways to both reinvigorate its content and aim for that elusive perfection.

In my mission to create the perfect book, I could have asked for no better partner than expert and author Jawad Akhtar. His tireless effort, his attention to detail, and his commitment to a new edition of his first-ever book were second to none. While perfection may never truly be possible, I do believe we have come quite close!

As always, your comments and suggestions are the most useful tools to help us make our books the best they can be. Let us know what you thought about this second edition of Production Planning and Control with SAP ERP! Please feel free to contact me and share any praise or criticism you may have.

Thank you for purchasing a book from SAP PRESS!

Meagan White
Editor, SAP PRESS

Rheinwerk Publishing
Boston, MA
meaganw@rheinwerk-publishing.com
www.sap-press.com

Contents

Acknowledgments ............................................................................................ 25

PART I Production Planning Core Concepts

1 Introduction ........................................................................................................ 29
  1.1 Goals of This Book ................................................................................... 29
  1.2 Target Audience ..................................................................................... 30
  1.3 Structure and Content ............................................................................ 31

2 Organizational Structures in SAP ERP .......................................................... 35
  2.1 Breaking Down the Structure into Units .................................................. 35
    2.1.1 Client ........................................................................................... 37
    2.1.2 Company Code ........................................................................... 38
    2.1.3 Plant ............................................................................................. 39
    2.1.4 Storage Location .......................................................................... 41
    2.1.5 Material Requirements Planning Controllers .............................. 42
    2.1.6 Capacity Planners ........................................................................ 43
    2.1.7 Production Schedulers .................................................................. 44
  2.2 Production Planning in SAP ERP ......................................................... 44
    2.2.1 Characteristics of Production Types ............................................. 47
    2.2.2 Processes in Production Planning and Control ............................... 58
  2.3 Product Costing ....................................................................................... 59
  2.4 SAP Calendar ........................................................................................... 61
    2.4.1 Public Holidays ............................................................................ 62
    2.4.2 Holiday Calendar .......................................................................... 62
    2.4.3 Factory Calendar ........................................................................... 63
  2.5 Summary .................................................................................................... 66

PART II Configuration Specifics for Manufacturing Types

3 Configuration Basics of Discrete Manufacturing ........................................ 69
  3.1 Material Master ....................................................................................... 70
  3.2 Bill of Materials ..................................................................................... 72
    3.2.1 Define Bill of Material Usages ..................................................... 72
PART III  Production Planning Workflow by Production Type

6  Production Planning for Discrete Manufacturing ................................. 201

6.1  Process Overview ...................................................................... 202
6.2  Master Data .......................................................................... 203
  6.2.1  Material Master ............................................................... 204
  6.2.2  Bill of Materials ............................................................. 211
  6.2.3  Work Center ................................................................. 217
  6.2.4  Routing ........................................................................ 226
  6.2.5  Production Version ......................................................... 239
6.3  Production Order Management .................................................... 243
  6.3.1  Header Data .................................................................. 245
  6.3.2  Operations Overview ....................................................... 247
  6.3.3  Standard Trigger Points .................................................. 249
  6.3.4  Components Overview .................................................... 252
  6.3.5  Reread Master Data ......................................................... 253
  6.3.6  Statuses ........................................................................ 254
  6.3.7  Scheduling .................................................................... 255
  6.3.8  Availability Checks ........................................................ 260
6.4  Release Production Order ............................................................. 265
  6.4.1  Automatic Release .......................................................... 266
  6.4.2  Individual Release .......................................................... 266
  6.4.3  Collective Release ........................................................... 266
6.5  Printing ............................................................................... 268
6.6  Material Withdrawal .................................................................. 271
  6.6.1  Goods Issuance against the Production Order ....................... 271
  6.6.2  Picking List .................................................................... 274
  6.6.3  Backflush ..................................................................... 276
6.7  Confirmation ........................................................................... 278
  6.7.1  Confirmation at the Operations Level .................................. 280
  6.7.2  Progress Confirmation ...................................................... 283
  6.7.3  Confirmation for Order ..................................................... 283
  6.7.4  Confirmation Cancellation ................................................ 284
  6.7.5  Display Confirmation ........................................................ 285
6.8  Goods Receipt ......................................................................... 285
  6.8.2  Goods Receipt: Automatic Process .................................... 288
6.9  Postprocessing ......................................................................... 288
  6.9.1  Reprocessing Goods Movements ....................................... 289
  6.9.2  Cost Calculation ............................................................. 291
6.10 Settlement and Completion ........................................................... 292
6.11 Production Order Batch Traceability Using Work in Process Batches ........................................................................... 293
6.11.1 Configuration Settings .................................................................................................................. 294
6.11.2 Master Data Setup ....................................................................................................................... 297
6.11.3 Business Processes for Work in Process Batches ............................................................................. 299
6.11.4 Work in Process Batches Reporting ............................................................................................... 302
6.12 Additional Functions and Information Systems ....................................................................................... 304
6.12.1 From Planned Order: Individual Conversion ................................................................................. 305
6.12.2 From Planned Orders: Collective Conversion .................................................................................. 305
6.12.3 Production Order Creation without Material ................................................................................. 306
6.12.4 Mass Processing ............................................................................................................................. 306
6.12.5 Information Systems ...................................................................................................................... 308
6.13 Summary .............................................................................................................................................. 309

7 Production Planning for Process Industries .............................................................................................. 311
7.1 Process Manufacturing Overview ........................................................................................................... 312
7.2 Master Data in Process Manufacturing ................................................................................................... 314
7.2.1 Material Master .................................................................................................................................. 315
7.2.2 Bill of Materials ................................................................................................................................. 316
7.2.3 Resource ........................................................................................................................................... 316
7.2.4 Production Version ............................................................................................................................. 317
7.2.5 Master Recipe Creation ...................................................................................................................... 318
7.3 Process Management ............................................................................................................................... 327
7.3.1 Functions in Process Management ................................................................................................... 328
7.3.2 Elements in Process Management .................................................................................................... 328
7.3.3 Integrating Process Management with External Systems ................................................................. 329
7.3.4 Process Management and Manufacturing Integration and Intelligence .............................................. 329
7.3.5 Process Instructions ............................................................................................................................ 330
7.3.6 Process Instruction Sheet .................................................................................................................. 331
7.4 Process Order Execution ......................................................................................................................... 341
7.5 Process Management in Action ............................................................................................................... 343
7.5.1 Creating and Releasing a Process Order ............................................................................................ 343
7.5.2 Generating a Control Recipe ............................................................................................................... 344
7.5.3 Downloading and Sending a Control Recipe ...................................................................................... 345
7.5.4 Maintaining Process Instruction Sheets ............................................................................................. 347
7.5.5 Completing a Process Instruction Sheet .............................................................................................. 349
7.5.6 Sending Process Messages .................................................................................................................. 350
7.5.7 Generating a New Control Recipe ........................................................................................................ 353

8 Production Planning for Repetitive Manufacturing ................................................................................ 373
8.1 Overview .................................................................................................................................................. 374
8.1.1 Roles of Repetitive Manufacturing in Planning and Production ...................................................... 374
8.1.2 Repetitive Manufacturing Process Flow ........................................................................................... 375
8.2 Repetitive Manufacturing Master Data ................................................................................................... 377
8.2.1 Material Master .................................................................................................................................. 379
8.2.2 Bill of Materials .................................................................................................................................. 381
8.2.3 Work Center (Production Line) ........................................................................................................ 381
8.2.4 Routing ............................................................................................................................................ 390
8.2.5 Production Version ............................................................................................................................. 396
8.3 Material Requirements Planning in Repetitive Manufacturing .............................................................. 400
8.3.1 Planned Independent Requirements ................................................................................................. 401
8.3.2 Run Material Requirements Planning ............................................................................................... 402
8.3.3 Planning Results ................................................................................................................................. 403
8.3.4 Evaluate Planning Results (Material Level) ....................................................................................... 403
8.4 Collective Availability Check ................................................................................................................ 404
8.5 Operational Method Sheet ...................................................................................................................... 405
8.6 Planning Table in Repetitive Manufacturing ......................................................................................... 406
8.6.1 Parameters Selection for the Planning Table ....................................................................................... 406
8.6.2 Creating a Repetitive Manufacturing Planned Order in the Planning Table ....................................... 409
8.6.3 Capacity Planning ............................................................................................................................... 412
8.6.4 Functions in the Planning Table ........................................................................................................ 413
8.6.5 Range of Coverage ............................................................................................................................ 414
8.7 Material Staging ...................................................................................................................................... 414
8.7.1 Material Staging: Current Situation ................................................................................................. 415
PART IV Production Planning Workflow Tools

9 Sales and Operations Planning ............................................................... 443

9.1 Standard Sales and Operations Planning ............................................. 444
  9.1.1 Overview ............................................................................... 444
  9.1.2 Information Structures ............................................................ 450
  9.1.3 Planning Methods ................................................................. 453
  9.1.5 Distribute Key Figures ............................................................ 462
  9.1.6 Working with Macros .............................................................. 466
9.2 Flexible Planning ............................................................................ 467
  9.2.1 Creating a Self-Defined Info Structure .................................... 468
  9.2.2 Planning Hierarchy ................................................................. 474

9.3 Maintaining Version Management .................................................... 492
  9.3.1 Copy a Version ...................................................................... 493
  9.3.2 Delete a Version ..................................................................... 494
  9.3.3 Scheduling a Copy Version or Scheduling a Delete Version .......... 494

9.4 Forecasting ..................................................................................... 495
  9.4.1 Forecasting View in Material Master ....................................... 496
  9.4.2 Forecast Profile ..................................................................... 497
  9.4.3 Forecast Strategy .................................................................... 499
  9.4.4 Using the Forecast Profile ...................................................... 502

9.5 Rough-Cut Planning Profile ............................................................. 502
  9.5.1 Create a Profile ..................................................................... 503
  9.5.2 Pegged Requirements ............................................................. 506

9.6 Events ............................................................................................ 507
  9.6.1 Create Events ...................................................................... 508
  9.6.2 Assignment of Events ............................................................ 509
  9.6.3 Events in Planning ................................................................. 510

9.7 Mass Processing in Sales and Operations Planning ......................... 513
  9.7.1 Planning Activity .................................................................... 513
  9.7.2 Setting Up a Mass Processing Job .......................................... 514
  9.7.3 Scheduling the Mass Processing Job ....................................... 517

9.8 Standard Analysis in Flexible Planning ............................................. 517
  9.9 Summary ..................................................................................... 520

10 SAP Demand Management ................................................................. 521

10.1 Planning Strategy ............................................................................ 522
  10.1.1 Planning with Final Assembly ............................................... 522
  10.1.2 Make-to-Order/Stock Production .......................................... 524
  10.1.3 Requirements Class and Requirements Type ............................. 526
  10.1.4 Strategy Groups ................................................................... 528
  10.1.5 Maintain Requirements Class for Planned Independent Requirements .................................................. 530

10.2 Planned Independent Requirements ................................................ 531
  10.3 Customer Independent Requirements .......................................... 536
10.3.1 Creating Customer Independent Requirements ................. 536
10.3.2 Planning for Independent Requirements ......................... 538
10.3.3 Stock/Requirements List for Independent Requirements .... 539
10.3.4 Total Independent Requirements: Evaluation ................... 539
10.3.5 Total Independent Requirements: Reorganization .......... 540
10.3.6 Planned Independent Requirements: Reduction ............... 542
10.4 Summary .......................................................... 544

11 Material Requirements Planning ........................................... 545

11.1 Process Overview .................................................... 546
11.1.1 Prerequisites ....................................................... 549
11.1.2 Influencing Factors in Material Requirements Planning ... 551
11.1.3 Lot Sizes ......................................................... 551
11.1.4 Configuring Material Requirements Planning Lot Size ... 557
11.1.5 Rounding ........................................................ 559
11.1.6 Static Rounding Profile .......................................... 560
11.2 Scrap ........................................................................ 561
11.2.1 Assembly Scrap .................................................. 562
11.2.2 Component Scrap ............................................... 563
11.2.3 Operations and Component Scraps in Bill of Materials ... 563
11.2.4 Scrap in Routing .................................................. 564
11.3 Safety Stock .......................................................... 564
11.3.1 Safety Stock Availability ....................................... 565
11.3.2 Master Data Selection .......................................... 566
11.4 Material Requirements Planning Procedures .................... 567
11.4.1 Material Requirements Planning Types ....................... 567
11.4.2 Configuring Material Requirements Planning Types ..... 571
11.5 Consumption-Based Planning ....................................... 572
11.5.1 Type VB: Manual Reorder Point Planning .................. 574
11.5.2 Type VM: Automatic Reorder Point Planning ............. 576
11.5.3 Type V1/V2: Manual or Automatic Reorder Point Planning with External Requirements .......... 576
11.6 Forecast-Based Consumption Planning ............................. 577
11.6.1 Basics of Forecasting ........................................... 578
11.6.2 Type VV: Forecast-Based Planning .......................... 579
11.6.3 Type R1: Time-Phased Planning .............................. 581
11.7 Types of Planning Runs ............................................. 581
11.7.1 Single-Item, Single-Level ....................................... 582
11.7.2 Single-Item, Multi-Level ......................................... 582
11.7.3 Total Planning Online ............................................. 583
11.7.4 Total Planning Background ..................................... 584
11.7.5 Single-Item Planning, Sales Order ......................... 584
11.7.6 Single-Item Planning, Project .................................. 584
11.8 Scheduling .......................................................... 585
11.8.1 Scheduling In-House Production ............................... 585
11.8.2 Basic Date Determination ...................................... 586
11.8.3 Planned Order Dates ............................................ 587
11.8.4 Scheduling External Procurement ............................. 588
11.8.5 Forward and Backward Scheduling ......................... 590
11.9 Procurement Proposals .............................................. 591
11.9.1 Planned Orders .................................................... 592
11.9.2 Planned Order Profile .......................................... 596
11.9.3 Purchase Requisitions ......................................... 597
11.10 Executing Material Requirements Planning .................... 597
11.10.1 Planning File Entry and the Selection of Materials for Planning .................................................. 597
11.10.2 Net Requirements Calculation Logic ....................... 600
11.10.3 Planning Control Parameters in Materials Requirements Planning .................................................. 601
11.11 Configuration Settings for Material Requirements Planning .. 605
11.11.1 Material Requirements Planning Activation ................. 605
11.11.2 Scope of Planning Configuration ............................... 605
11.11.3 Plant Parameters Configuration ............................... 606
11.11.4 Material Requirements Planning Group Configuration 607
11.12 Material Requirements Planning Run Analysis ................ 610
11.12.1 Stock Overview .................................................. 610
11.12.2 Stock/Requirements List ....................................... 612
11.13 Planning Calendar ................................................... 621
11.14 Material Requirements Planning Areas .......................... 623
11.14.1 Configuring Material Requirements Planning Areas .... 624
11.14.2 Set Up a Material Requirements Planning Area in the Material Master ........................................ 626
11.14.3 Running Material Requirements Planning at the Material Requirements Planning Areas Level 630
11.14.4 Planning Results for Material Requirements Planning Areas .................................................. 630
11.15 Summary .......................................................... 631
12 Long-Term Planning ................................................................. 633

12.1 Long-Term Planning Master Data and Planning Data .......... 634
12.1.1 Master Data: Bill of Materials ........................................... 635
12.1.2 Planning Data: Planning Quantity ................................... 637
12.1.3 Planning Data: Version Number of Planned Independent Requirements ........................................... 638
12.1.4 Create a Planning Scenario .............................................. 639
12.1.5 Create the Planning Scenario ......................................... 640
12.1.6 Enter Planned Independent Requirements for the Simulative Version ........................................... 641
12.1.7 Run Long-Term Planning (Simulative Material Requirements Planning) ........................................... 642
12.1.8 Evaluate the Long-Term Planning Stock/Requirements List .................................................... 644
12.2 Long-Term Planning: Business Process ......................... 639
12.2.1 Create the Planning Scenario ......................................... 640
12.2.2 Enter Planned Independent Requirements for the Simulative Version ........................................... 641
12.2.3 Run Long-Term Planning (Simulative Material Requirements Planning) ........................................... 642
12.2.4 Evaluate the Long-Term Planning Stock/Requirements List .................................................... 644
12.3 Further Options in Long-Term Planning ......................... 647
12.3.1 Manually Create a Simulative Planned Order .............. 647
12.3.2 Firm the Simulative Planned Order Using a Firming Date .................................................... 649
12.3.3 Calculate Average Plant Stock .................................... 650
12.3.4 Copy Long-Term Planning Results to Operative Planning .................................................... 651
12.4 Evaluate Information Systems for Long-Term Planning .... 654
12.4.1 Setting Up a Purchasing Information System for Long-Term Planning .................................................... 655
12.4.2 Evaluating with the Purchasing Information System for Long-Term Planning .................................................... 656
12.4.3 Setting Up an Inventory Controlling Information System for Long-Term Planning .................................................... 657
12.4.4 Evaluating the Inventory Controlling Information System for Long-Term Planning .................................................... 658
12.4.5 Capacity Planning ..................................................... 659
12.5 Summary ................................................................. 659

PART V Optimizing Production Planning

13 Special Procurement Types ..................................................... 663

13.1 Overview ............................................................................. 664
13.2 Phantom Assembly ......................................................... 666
13.3 Direct Production .......................................................... 667
13.4 Direct Procurement ......................................................... 672
13.5 Stock Transfer (Interplant Transfer) ................................... 676
13.6 Withdrawal from Alternate Plant ...................................... 679
13.7 Production in Alternate Plant ............................................ 681
13.8 Subcontracting ............................................................ 683
13.9 Consignment ................................................................. 688
13.10 Pipeline Material .......................................................... 691
13.11 Summary ................................................................. 691

14 Capacity Requirements Planning ......................................... 693

14.1 Process Overview .......................................................... 694
14.2 Capacity Requirements and Capacity Evaluation ............ 696
14.2.1 Capacity Requirements .................................................. 696
14.2.2 Standard Evaluation of Capacity Utilization ................. 697
14.2.3 Variable Evaluation of Capacity Utilization ...................... 700
14.2.4 Cumulating the Capacity Requirements ......................... 705
14.2.5 Checking Capacity Availability ................................... 705
14.3 Finite Scheduling .......................................................... 711
14.4 Dispatching ................................................................. 713
14.4.1 Process Steps ........................................................... 714
14.4.2 Profiles for Dispatching ............................................... 716
14.4.3 Dispatching Sequence .................................................. 723
14.4.4 Sequence-Dependent Setup ......................................... 725
14.4.5 Midpoint Scheduling .................................................... 728
14.4.6 Mass Processing ......................................................... 729
14.5 Capacity Planning Table .................................................. 730
14.5.1 Dispatch Operations .................................................... 733
14.5.2 Deallocate ................................................................. 735
14.5.3 Options in the Graphical Planning Table ....................... 735
14.6 Summary ................................................................. 737
15 Classification ................................................................. 739
15.1 Classification System ...................................................... 740
15.1.1 Characteristics .............................................................. 741
15.1.2 Create a Class and Assign Characteristics ...................... 744
15.2 Assigning the Material Class to the Material Master .......... 746
15.3 Finding Objects in Classes ................................................. 749
15.4 Assigning an Equipment Class to Equipment ..................... 751
15.5 Summary ........................................................................... 754

16 Co-Products and By-Products in Production Processes .......... 755
16.1 Check in Material Master ................................................... 757
16.1.1 Co-Product .................................................................. 757
16.1.2 By-Product .................................................................. 760
16.2 Bill of Materials ................................................................. 760
16.2.1 Co-Product .................................................................. 760
16.2.2 By-Product .................................................................. 761
16.3 Process Order ................................................................. 762
16.3.1 Co-Product .................................................................. 762
16.3.2 By-Product .................................................................. 763
16.4 Goods Issue ................................................................. 764
16.4.1 Co-Product .................................................................. 764
16.4.2 By-Product .................................................................. 765
16.5 Confirmation ................................................................. 766
16.5.1 Co-Product .................................................................. 766
16.5.2 By-Product .................................................................. 767
16.6 Goods Receipt ................................................................. 768
16.6.1 Co-Product .................................................................. 768
16.6.2 By-Product .................................................................. 769
16.7 Documented Goods Movement ......................................... 770
16.7.1 Co-Product .................................................................. 771
16.7.2 By-Product .................................................................. 771
16.8 Cost Analysis ................................................................. 771
16.8.1 Co-Product .................................................................. 771
16.8.2 By-Product .................................................................. 773
16.9 Summary ........................................................................... 773

17 Digital Signature .............................................................. 775
17.1 Configuration Steps to Set Up a Digital Signature .............. 776
17.1.1 Define Authorization Groups ......................................... 776
17.1.2 Define Individual Signatures ......................................... 777
17.1.3 Define a Signature Strategy ............................................. 778
17.1.4 Assign a Signature Strategy to a Document ...................... 781
17.2 Digital Signature in Action ................................................. 783
17.3 Digital Signature Logs ..................................................... 788
17.4 Application of Digital Signature in SAP ERP Components .... 789
17.4.1 Production Planning for Process Industries ...................... 789
17.4.2 Quality Management ..................................................... 790
17.4.3 Plant Maintenance ......................................................... 790
17.4.4 Document Management System .................................... 790
17.4.5 Engineering Change Management ................................. 790
17.5 Summary ........................................................................... 791

PART VI Monitoring and Evaluation

18 Early Warning System ..................................................... 795
18.1 Overview ........................................................................... 795
18.2 Exceptions ................................................................. 797
18.2.1 Set Up Exceptions ......................................................... 798
18.2.2 Define Requirements ..................................................... 799
18.2.3 Follow-Up Processing .................................................... 802
18.2.4 Group Exceptions ........................................................ 803
18.3 Set Up Periodic Analysis .................................................. 804
18.4 Schedule an Early Warning System .................................. 806
18.5 Early Warning System in Action ....................................... 808
18.6 Exception Analysis ........................................................ 811
18.7 Summary ........................................................................... 814

19 Reporting in SAP .............................................................. 815
19.1 The Basics of Reporting .................................................. 816
19.2 Order Information System ............................................... 818
19.2.1 Selection Screen at the Header Level ............................... 819
19.2.2 Selection at the Operations and Components Levels
with Options ................................................................. 821
19.2.3 Selection Screen for Dates ........................................... 822
19.2.4 Multiple Selection ....................................................... 823
19.2.5 Maintain Selection ......................................................... 824
19.2.6 Maintain Variant .......................................................... 824
19.2.7 Order Header in the Process .......................................... 825
19.2.8 Filter Settings ............................................................. 827
19.2.9 Graphs ........................................................................ 828
19.2.10 Download ................................................................. 830
19.2.11 Copy Selective Data to Microsoft Excel ......................... 830
19.2.12 Print ....................................................................... 830
19.2.13 Automatic Goods Movement ...................................... 831
19.2.14 Capacities ............................................................... 832
19.2.15 Production Resource/Tool .......................................... 832
19.2.16 Items ........................................................................ 832
19.2.17 Document Links ........................................................ 833
19.2.18 Execution Steps ........................................................ 833
19.3 Missing Parts Information System .................................... 833
19.4 Standard Analysis Reports .............................................. 834
19.4.1 Discrete Manufacturing/Production Order ...................... 834
19.4.2 Process Manufacturing/Process Order ......................... 835
19.4.3 Repetitive Manufacturing ............................................ 835
19.4.4 Standard Analysis: Work Center .................................. 836
19.4.5 Standard Analysis: Operations .................................... 836
19.4.6 Standard Analysis: Material ........................................ 838
19.4.7 Key Figures ............................................................... 839
19.4.8 Other Info Structures .................................................. 839
19.4.9 Standard Analysis: Goods Receipt in Repetitive
Manufacturing ................................................................. 840
19.4.10 Standard Analysis: Product Cost ................................. 842
19.5 Data Browser .............................................................. 843
19.6 QuickViewer ............................................................... 848
19.7 SAP Query .................................................................... 852
19.7.1 Maintain InfoSets ....................................................... 853
19.7.2 Create User Groups .................................................... 853
19.7.3 Create Queries .......................................................... 854
19.8 Assign a Transaction Code to a Query ............................... 855
19.9 Summary ................................................................. 856

20 Integration of Production Planning with Logistics
Functions ........................................................................ 857
20.1 Integration Prerequisites .................................................. 858
20.2 Integration Aspects of Production Planning with
Quality Management .................................................... 860
20.2.1 Configuration Steps .................................................... 861
20.2.2 Quality Management Master Data ................................. 863
20.2.3 End-to-End Production Process Flow with
Quality Management Integration .................................... 871
20.3 Integration of Production Planning with Materials Management .... 875
20.3.1 Managing Master Data ................................................. 876
20.3.2 Production Planning Master Data ................................. 879
20.3.3 End-to-End Process Flow ............................................ 880
20.3.4 Display Automatically Generated Vendor Delivery
Schedule Lines in the Scheduling Agreement ....................... 881
20.4 Integration of Production Planning with Sales and Distribution
(Make-to-Order Production) ............................................. 882
20.4.1 Managing Master Data ............................................... 882
20.4.2 Sales Order Creation ................................................... 883
20.4.3 Material Requirements Planning Run on Sales Order
Line Item ........................................................................ 884
20.4.4 Conversion of a Planned Order to a Process Order .......... 884
20.5 Integration of Production Planning with Sales and Distribution
(Assembly Processing) ...................................................... 886
20.6 Integration of Production Planning with Project System
(Engineer-to-Order Production) ........................................ 888
20.6.1 Managing Master Data ............................................... 889
20.6.2 Assigning a Material to the Project ............................... 890
20.6.3 Material Requirements Planning Run on Material for
Project-Based Production ............................................... 891
20.6.4 Conversion of a Planned Order to a Production Order .... 892
20.7 Integration of Production Planning with Plant Maintenance .......... 894
20.8 Integration of Production Planning with SAP Manufacturing
Execution ............................................................... 894
20.9 Integration of Production Planning with SAP Manufacturing
Integration and Intelligence ............................................... 895
20.10 Summary .............................................................. 896
Index

A

ABC analysis, 830
Activities posting, 184
Activity backflush, 423
Activity type, 230, 905
Actual costs, 905
Additional data, 742
Aggregation, 463, 826
Alternative BOM, 905
Alternative sequence, 237
Aspiration structure, 759
Approval, 135
Assemble-to-order (ATO), 207, 887
Assembly backflush, 423
Assembly processing, 886
Assembly scrap, 562
Attributes, 806
Authorization group, 776
Authorization object
C_SIGN_BGR, 776
Automatic calculation of proportional factors, 464
Automatic goods movement, 182, 289, 831
Automatic goods receipt, 99, 288
Automatic reorder point planning, 576
Automatic stock determination, 186
Availability check, 102, 260
Average plant stock, 650
Backflush, 54, 276, 371, 764
separate, 185, 429
Background job, 127, 169
Backward consumption, 523
Backward scheduling, 109
Basic data, 218
Basic date determination, 586
Basic date scheduling, 109, 604
Basic load, 697
Basic mode, 848
Batch, 108
Batch determination, 186
Batch input program, 740
Batch Management (BM), 311, 315, 744
BOM, 72, 211, 253, 316, 400, 663, 756, 906
define usage, 72
explosion type, 77
header, 73
item category in, 75
item overview, 213
MRP product structure, 599
phantom assembly, 666
process industries, 316
selection, 77
set by-product, 761
single-level, 920
standard, 920
status, 74, 212
usage, 637
variant, 922
with history requirement, 75
Branch operation field, 236
By-product, 755
confirmation, 767
cost analysis, 773
create process order, 763
documented goods movement, 771
goods receipt, 769
Calculate proportional factors, 456
Call function, 335
Cancellation of confirmation, 284
Capacities tab, 220, 385
Capacity, 832
analysis, 502
comprehensive details, 386
header, 221
Capacity availability check, 260, 264, 694, 705
assign overall profile, 708
interactive, 707
Capacity availability check (Cont.)
perform finite scheduling, 711
Capacity evaluation, 503, 694
different methods, 697
Capacity leveling, profile, 716
Capacity planner, 43, 633
Capacity planner group, 43, 222, 387
Capacity planning, 412, 659
mass processing, 729
production scheduling profile, 100
sequence-dependent setup times, 727
Capacity requirement, 696
cumulating, 705
distribute, 704
insufficient, 711
sort, 724
Capacity requirements planning → CRP
Capacity utilization factor, 387
different methods, 399
perform finite scheduling, 711
Capacity utilization, 223
Capacity utilization factor, 387
Change number, 75
Characteristic, 740, 741
define proportional factor, 474
group, 741
restrict to class type, 744
value, 799
view key figures, 829
Characteristic values combination (CVC), 446
Characteristics group, 142
Checking control, 106
Checking group, 104
Checking rule, 104
Class, 740
goodstoequipment, 751
goodstojob, 751
find object in, 749
type, 745
Classification, 739
Classification system, 740, 744
Client, 37
Collective availability check, 264, 404
Collective confirmation, 435
Collective order, 669, 671
Company code, 36, 38
Component
backflush, 188, 423
scrap, 563
Components allocation, 394
Components assignment, 233
Components data, 244
Confirmation, 115, 196, 278, 371, 423, 766
at operation level, 280
cancellation, 284
collective, 435
configuration, 117
cost calculation, 291
time optimization, 121
for order, 283
mass processing, 306
process, 116
progress, 283
reset reporting point, 434
time of, 123
type, 281
variance, 124
Confirmation and backflush, 371
Consignment, 688
Consistency check, 242, 400
Consistent planning, 454, 470
Consumption mode, 523
Consumption-based planning, 572
Control, 246
key, 220, 383
for order, 87
profile, 721
Control instruction, 363
Control recipe, 51, 164, 819
create background job, 170
define destination type, 327
destination, 139, 164, 165, 166, 174
destination in XSteps, 357
generalizing new, 353
generation, 344
maintaining, 347
sending, 345
Controlling area, 36
Controlling-Profitability Analysis (CO-PA), 447
Co-product, 755, 760
confirmation, 766
cost analysis, 771
cost variance, 764
cost of goods, 764
distance to order, 762
document, 771
document goods movement, 771
goods issue, 764
Co-product (Cont.)
goods receipt, 768
Copy data, 491
cost analysis, 771
cost calculation, 291
cost object controlling, 436
cost of goods manufactured (COGM), 59
costing, 225, 389
activities, 436
cost sheet, 60
creation of project, 890
CRP, 46, 59, 78, 342, 412, 693, 694
cumulative modeling, 508
customer independent requirement, 536
Customer independent requirement, 536
Customer information, 100
different methods, 100
disaggregation, 100
 DUI, 100
dynamic function call, 100
dynamic lot size creation, 146
dynamic order list, 146
dynamic processing, 146
Dynamic lot size creation, 556

Event (Cont.)
planning, 510
EWS, 795
schedule, 806
Exception, 797
analysis, 811
create, 797
group, 797, 803

G
General data in rough-cut planning
profile, 504
Generation of operations, 101
Goods issue, 764
backflushing, 768
coproduct, 764
Goods movement, 770
Goods received, 246, 285, 371, 758, 768, 874
automatic process, 288
manual process, 286
Graph, 828
Graphical capacity planning table, 730
Graphical planning table
options, 735
Graphical representation, 828
Groff lot-sizing procedure, 556
Grouping, 222

H
History requirement, 75

I
Independent requirements
evaluation, 539
planning for, 538
reorganization, 540
stock/requirements list for, 538
Individual signature, 777
Info structure, 448, 450, 839
create self-defined, 468
test in SAP database tables, 492
multiple planning types, 477
Information system, 308, 816, 819
available lists, 821
InfoSet, 848
assign to group, 853
create query, 854
create/maintain, 853

L
Layout key, 723
Layout mode, 848
Lead time scheduling, 109, 585, 604
capacity requirement, 697
Least-unit cost procedure, 556
Level-by-level planning, 454, 470
LIS, 196, 373, 634, 654, 911
List field, 850
Local field, 852
Location group, 85
Lock, 242
Logical database, 848

Logistics Information System → LIS
Logistics, access standard analytics, 815
Lot size, 551
configuring, 557
periods, 553
with splitting, 553
Lot sizing
optimizing procedures, 554
part-period, 555
Low-level code, 599
LTP, 444
BOM, 465
calculate average plant stock, 650
copy results to operative planning, 651
evaluate information systems, 654
evaluate stock/requirements list, 644
Inventory Controlling Information System, 657
manually create a simulative planned order, 647
planning data, 634
run, 642
set up purchasing information system, 655

Macro, 466
self-defined, 480
self-defined, validate, 487
Maintain selection, 824
Maintain Variant screen, 805
Make-to-order (MTO), 180, 207, 882
Make-to-stock (MFS), 180, 207
Mandatory reporting point, 182
Manual reorder point planning, 574
Mass processing, 306, 513, 729
scheduling the job, 517
setting up, 514
Master data, 45, 378
delete/not archive, 238
management, 882, 889
process industries, 130
process manufacturing, 314
REM, 377
selection, 566
Master data (Cont.)
use Engineering Workbench, 238
Master Inspection Characteristic (MIC), 867
Master ... planning, 581
V1/V2 (manual or automatic reorder point planning), 576
VB (manual reorder point planning), 574

Index

Material

Material assignment, 234, 395
availability check, 260, 261
base quantity, 212
class, 746
component assignment
activate backflush, 277
consumption, 835
create BOM, 211
create/maintain views, 209
plan, 444
Material BOM, 72, 73, 912
declare as co-product, 760
Material cost estimate, 60
Material master, 70, 204, 206, 378, 747, 757
activate backflush, 276
class, 745
discrete, 204
forecasting view, 496
integrate classification system, 740
plant-independent/dependent views, 205
special procurement type key, 663
Material cost estimate, 60
Material master, 70, 204, 206, 378, 747, 757
activate backflush, 276
class, 745
discrete, 204
forecasting view, 496
integrate classification system, 740
plant-independent/dependent views, 205
special procurement type key, 663
Material quantity calculation, 320
enter formula, 321
Material requirements planning → MRP
Material staging, 195, 371, 414
current situation, 415
material document of, 419
trigger replenishment, 417
Material stock, 735
Material type, 70, 205
allowed in BOM header, 73
set up attributes, 71
Material withdrawal, 271
picking list, 274
Materials list, 130
Midpoint scheduling, 714, 728
Milestone, 279
Missing parts information system, 262, 833
Move time matrix, 85
Movement type, 189, 687
Moving average price, 292
MRP, 46, 58, 342, 402, 448, 545, 567, 633, 912
activate, 605
area, 623
area, setup in material master, 626
backward scheduling, 256
calculate planning, 108
configuration settings, 605
configure area, 624
consumption-based planning, 547, 577
countercontroller, 42
create group, 607
creation of list, 603
element, 614
exception message, 617
group, 529, 608, 609
individual conversion of planned order, 305
lot size, 551
material requirements planning, 547
planning control parameters, 601
planning file list, 597
planning results for MRP area, 630
planning run, 581
plant parameters, 606
repetitive manufacturing, 400
run, 214
run analysis, 610
run at MRP area level, 630
run for REM, 402
scope of planning, 605
scrap, 562
simulate, 642
technical steps, 597
MRP run on material for production, 891
MRP run on sales order line item, 884
MRP type, 567
configuring, 571
PD, 568
R1 time-phased planning, 581
V1/V2 (manual or automatic reorder point planning, 576
V8 (manual reorder point planning), 574

MRP type (Cont.)
VM (automatic reorder point planning), 576
VV (forecast-based planning), 579
with the planning time fence and firming logic, 568
Multiple selection, 823

N
Net change planning in the planning horizon (NETPL), 598
Net requirements calculation logic, 600
Net requirements planning, 600
Number range, 92

O
Object
find in class, 749
highlight that belong together, 732
ODA, 329
Online error correction, 188
OPC, 329
Opening date, 113
Operation quantity, 318
Operational method sheet (OMS), 197, 205, 276
Operations, 325, 393
and phases, 325
Option profile, 704
Order category, 90, 703
Order confirmation parameter, 117
Order date, 587
Order information system, 818
document link, 832
execution steps, 833
items, 832
production resource/tool, 832
Order number, 409
Order progress report, 614
Order type, 89
consider stock/batch, 108
maintain, 90
Order type-dependent parameter, 134

P
Parameter
define, 82
Part-period balancing, 555
Pegged order, 914
Pegged requirements, 506
Percentage modeling, 508
Period Indicator, 579
Periodic analysis, 804
Periodic lot-sizing procedures, 553
Petrochemical industry, 755
Phantom assembly, 666
Phase, 325
assign control recipe destination, 325
Picking list, 274
Pipeline material, 691
PIR, 401, 461, 531
copy to operative planning, 651
MRP type PD, 568
reduction, 542
requirement class, 530
simulative version, 641
Planned independent requirement → PIR
Planned order, 592
collective conversion, 305
creation, interactive planning, 592
individual conversion, 305
manual creation of, 594
profile, 596
scheduling in REM, 192
Planning activity, 513
firming type, 570
horizon, 532
log, 715
method, 449, 451, 453, 470
mode, 603, 249
results, 644
scenario
create, 639
strategy, 522, 529
time fence, 569, 571
work center, 228
Planning calendar, 621
create, 622
Planning data
planning quantity, 637
version number of PIRs, 618
Planning hierarchy, 449, 464, 468, 474
prerequisites, 475
Planning indicator (PD), 530
Planning run
single-item planning, project, 584
single-item planning, sales order, 584
single-item, multi-level, 582
single-item, single-level, 582
total planning background, 584
total planning online, 583
types of, 581
Planning table, 54, 1
Planning run
create REM planned order, 409
functions, 413
parameters selection for, 406
Planning type, 449, 454, 476
event, 510
raw attributes in, 482
Plant, 39
assign to company code, 40
production in alternate, 681
withdraw material from alternate, 679
Plant Maintenance, 790
Plant parameters, 607
Pool of orders/operations, 698
Post activities option, 184
Posting Actual Activities screen, 428
Postprocessing, 288
of components, 429
Print, 830
control, 126
operational method sheet, 405
Printing, 268
Process control, 185
Process control system (PCS), 327
Process flow sequence, 376
Process industries
production cycle, 575
Process Industries subcomponent, 311
Process instruction, 330
calculation, 155
category, 139, 150, 151, 168, 173
create own category, 160
dynamic function call, 157
in XSteps, 358
inspection results requests, 157
maintenance, 132
option, 131
process data request, 152
process message subscription, 154
sequence definitions, 159
sheet, 164
switch to XSteps, 355
universal, 159
Process Instruction Assistant, 159
Process instruction characteristic, 139, 173, 741
create self-defined, 161
Process instruction sheet, 140, 331
calculations, 334
digital signature, 340
DMS, 339
instructions and notes, 338
long text input, 337
table entry, 336
using XSteps, 366
Process instruction type, 150
process parameter, 151
Process integration, 128
Process Management, 50, 138, 142, 172, 311,
312, 327, 434
activate, 140
elements for data flow, 328
functions, 328
integrate with external systems, 329
Process manufacturing, 49, 818, 816
cockpit, 130, 174, 367
configuration basics, 129
material master, 315
process flow, 51
production version, 317
resource, 316
standard analysis, 835
Process message, 143, 145, 148, 350
category, 140, 145
class characteristics, 140
create background job, 171
create characteristic, 144
destination, 144
evaluation, 368
monitoring, 350
Process message categories, 173
Process message characteristics, 173
Process order, 50, 324, 762, 819
creation and release, 343
execution, 312, 341
Process order information system, 818
Process planning, 312
Processing key, 603
Procurement elements
interactive conversion of, 615
Procurement proposal, 591, 658
rounding, 559
Product cost collector (PCC), 54, 377
Product Cost Controlling (CO-PC), 46, 59, 184
Product costs, 835
Product group, 444
creation, 455
plan, 456
Production continuous, 49
discontinuous, 49
line, 54, 381
line category, 217
list, 419
regulated, 49
Production control, 59
Production function, master recipe, 318
Production order, 48, 272, 671, 819
activate backflush, 276
automatic release, 266
check capacity availability, 705
Production order (Cont.)
collective release, 266
completion, 262
components overview, 252
create for EWS, 808
dates, 256
elements, 243
goods issuance against, 271
goods receipt, 285
header data, 245
individual release, 266
mass availability check, 262
operations overview, 247
print, 268
release, 265
scheduling, 255
scheduling parameter, 110
scheduling type, 110
settlement, 292
status, 254
Production order creation, 89
without material, 306
Production order information system, 254, 818
Production order management, 243
Production Planning
discrete manufacturing, 201
integration with LO functions, 857
Process Industries, 311
repetitive manufacturing, 373
tables in SAP ERP, 945
Production Planning for Process Industries,
775, 789
Production plant, 682
Production scheduler, 44
Production scheduling profile, 99, 135, 136
confirm capacity requirement, 708
create new, 99
Production storage location, 216
Production type, 47, 917
Production version, 54, 204, 239, 317, 396
Profile
control, 721
evaluation, 722
graphic, 705
list, 705
option, 704
Index

Profile (Cont.)
capacity leveling, 716
selection, 703, 720
strategy, 712, 718
time, 722
Profiles for dispatching, 716
Progress confirmation, 279, 283
Proportional factors calculation, 464
PRT, 197, 237, 832
check, 260
Pull list, 195, 415
Purchase requisition, 48, 597
key, 603
Purchasing information record, 683, 689

Q
QM master data, 863
Qualitative characteristic, 741
Quantitative characteristic, 741
Quantity contract, 876
Quantity staged field, 418
Quantity-dependent in-house production time, 587
Quantity-independent in-house production time, 586
Query
assign transaction code, 855
create, 848, 854
Query InfoSet, 848
Quick Menu, 826
QuickViewer, 848

R
Range of coverage, 414
Rate routing, 54, 390
Recipe ERP’s supply, 616
Recipe, 918
Recipe quantity, 318
Record quality results, 157
Reduction, 259
in planned order quantities, 187
level, 114
Reduction (Cont.)
of lead-time scheduling, 109
period, 187
Reference routing, 391
Relationship, 325
Relative Dates at Header Level section, 822
Release date, 113
Relevant to finite scheduling, 223
REM, 46, 52, 179, 373, 918
activities confirmation, 425
actual activity scrap, 434
actual component Scrap, 434
analysis of goods receipt, 840
analyze planning results, 403
assembly confirmation, 424
capacity planning, 412
component confirmation, 425
configuration, 179
confirmation, 421
create planned order in planning table, 409
material master, 379
MRP, 400
naming profile, 190
planned order, 410
planning table, 193, 406
process control, 185
process flow, 375
production line, 381
production type, 180
profile, 180, 196, 380
reporting, 437
scheduling, 388
standard analysis, 835
summary of profile settings, 190
REM actual assembly
confirmation, 426
scrap, 433
Remote function call (RFC), 144
Reorder point planning, 573, 574, 918
manual/automatic, 576
Repetitive manufacturing → REM
Replenishment, 55
Replenishment elements, 417
Replenishment strategy, 56
Report
quick menu, 826
standard analysis, 834
Reporting, 371, 815
Reporting point, 55, 182
confirmation, 184
mandatory, 182
statistics, 437
Reprocessing, 289
Requirements
category, 531
define, 799
type for customer requirement, 527
type for independent requirements, 527
Requirements class, 526
Requirements type, 526
Reread master data, 253
Reset reporting point (RP) confirmation, 434
Row selection, 194
RP backtrack, 426
Run schedule header, 187
Run schedule quantity (RSQ), 55, 375
Sales Information System (SIS), 447
Sales order creation, 883
Sales plan, 45
SAP Business Workflow, 775, 789
SAP calendar, 61
factory calendar, 63
holiday calendar, 62
public holidays, 62
SAP Demand Management, 58, 444, 521
Planned independent requirement (PIR), 461
receive key figures, 488
transfer planning figures to. 460
transfer results validation, 489
SAP ERP, 44
landscape, 38
roles of MRP, 546
SAP ERP Financials (FI), 38
SAP ERP Materials Management (MM), 39, 209, 756, 796, 875
SAP ERP Quality Management (QM), 311, 377, 739, 790, 860
SAP ERP Sales and Distribution (SD), 202, 886
SAP ERP Warehouse Management (WM), 41
SAP Manufacturing Execution (SAP ME), 29
SAP Manufacturing Integration and Intelligence (SAP MII), 29, 329, 895
SAP Query, 852
SAP shop floor information system, 811
Scenario planning, 443
Scheduling, 108, 224, 585
agreement, 881
copy, 494
external procurement, 588
finite, 257
forward and backward, 590
forward/backward, 712
in-house production, 585
log, 716
margin key, 112, 259
margin key (GMR), 586
planned order, 192
production order, 255
type, 110, 604
Scope of check, 104
Scope of generation, 167
Scrap, 136, 430, 561, 920
actual activity, 434
Scrap (Cont.)
actual assembly, 433
actual component, 434
assembly, 562
component, 563
in BOM, 563
in routing, 564
variance, 124
Selection
dates, 822
profile, 703, 710, 720
Selection field, 850
Self-defined info structure, 468
Self-defined process instruction category, 160
Separated backflush, 429
Sequence
routing, 235
Sequence-dependent setup, 725
Sequences
overview, 237
parallel, 235
settlement, 371
Setup group category, 726
Setup matrix, 726
Setup time, 727
optimization, 728
Shift note type, 219, 383
Shift report
type, 219, 383
Shifts and intervals, 224
Shop floor control (SFC), 46, 201, 216
Shop floor control component, 818
Shop Floor Information System, 97
Shop floor information system, 834
Shop floor papers, 49
print, 126, 268
Signature method, 778
Signature sequence, 779
Signature strategy, 778, 779
to SAP DMS document type, 781
Simulative planned order, 647
firm, 649
Simulative planning, 633
Single-item planning, project, 584
Single-item planning, sales order, 584
Single-item, multi-level, 582
Single-item, single-level, 582
SOPDIS, 454
SOPKAPA, 454
SOPKAFAM, 454
Source list, 876
Special procurement, 216
Special procurement type, 663
key, 664
Special procurement type key, 670, 680
Splitting, 232, 258
Standard analysis, 815
goods receipt, 840
info structure, 839
material, 838
operations, 838
product cost, 842
report, 834
user-defined, 517
work center, 836
Standard capacity evaluation, 698
Standard overview, 698
Standard trigger point, 249
Standard value key (SVK), 78, 81, 383
create, 82
field, 219
Standard values tab, 327
Static lot-sizing procedure, 552
Statistics Currency characteristic, 475
Status network, 783
Stock
and batch determination, 108
include transfer/blocked, 601
overview report, 650
posting, 189, 861, 875
statistics, 620
transfer, 195, 676
Stock/requirements list, 612, 921
evaluation, 616
header details of, 615
Storage costs for optimum lot size, 554
Storage location, 37, 41
Strategy group, 522, 528
Strategy profile, 718
change, 735
Subcontracting, 233, 683
purchase order, 684
Subcontracting order, 687
Sub-total option, 826
T
Tabular capacity planning table, 736
Takt, 921
Takt-based flow manufacturing, 373
Target stock level, 512
Task list, 400, 503
assignment to material types, 132
delete, 238
status, 133
type to material type assignment, 861
Text item, 76
Threshold value analysis, 801
time event, 279
time profile, 722
time series, 842
time tickets/event, 280
time-based disaggregation, 464
allow, 473
time-based scaling, 732
time-phased materials planning, 573, 577, 581
Total, 826
planning background, 584
planning online, 583
Transaction
CL3ON, 750
CO24, 263
CO82, 92
CO05, 254
CS20, 217
CT04, 164
CUNI, 77
CY39, 723
dsal, 788
MB1B, 687
MD02, 402, 674
MD03, 419
MD61, 401
MI0G, 687
MM03, 750
OPH, 670
OPUS/OPU3, 260
SPRO, 74, 121, 133, 180, 789
Transaction data, 762
Transport time matrix, 86
trend analysis, 801
Trigger point, 125, 922
standard, 249
Trigger workflow, 250
U
Underdelivery, 118
Update group, 518
Usage, 218, 382, 869
decision, 861
User exit CYP0001, 724
User group
create, 853
User Parameters button, 532
V
Valuation area, 37
Value contract, 876
Variable evaluation, 700
define with profiles, 701
Variable size item formula, 76
Variable-size item, 76
Variance, 124
reasons for, 428
Variant, 824
attributes, 517
maintain, 516
Variant Configuration, 748
Version
copy, 493
delete, 494
management, 492
View, 205
operations, 230
W
What-if model, 443
Withdrawal from alternate plant, 679
Wizard, 159
Work breakdown structure (WBS), 819
Work center, 78, 204, 381
activate backflush, 277
capacity evaluation, 699
<table>
<thead>
<tr>
<th>Work center (Cont.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>category, 78, 382</td>
</tr>
<tr>
<td>control key, 87</td>
</tr>
<tr>
<td>create, 217</td>
</tr>
<tr>
<td>cumulate capacities, 705</td>
</tr>
<tr>
<td>field selection, 79</td>
</tr>
<tr>
<td>formula, 84</td>
</tr>
<tr>
<td>standard analysis, 836</td>
</tr>
<tr>
<td>SVK, 82</td>
</tr>
<tr>
<td>Work in progress (WIP), 60, 182, 377</td>
</tr>
<tr>
<td>Work scheduling view, 137</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSteps, 354, 833</td>
</tr>
<tr>
<td>calculation, 360</td>
</tr>
<tr>
<td>control recipe destination, 357</td>
</tr>
<tr>
<td>general information, 355</td>
</tr>
<tr>
<td>option, 131</td>
</tr>
<tr>
<td>output characteristics and values, 362</td>
</tr>
<tr>
<td>parameter value, 359</td>
</tr>
<tr>
<td>parameters, 356</td>
</tr>
<tr>
<td>process messages in, 365</td>
</tr>
<tr>
<td>scope of generation in, 364</td>
</tr>
<tr>
<td>signature, 365</td>
</tr>
<tr>
<td>standard repository, 354</td>
</tr>
<tr>
<td>tables, 363</td>
</tr>
<tr>
<td>valuation, 357</td>
</tr>
</tbody>
</table>
Jawad Akhtar is the SAP leader for business sales and delivery at IBM Pakistan. He earned a chemical engineering degree from the Missouri University of Science and Technology (USA) in 1996. He has more than 18 years of professional experience and has completed several large-scale SAP implementations and rollout lifecycles. He has led large teams in his roles as an SAP integration manager and SAP project manager, and has also been actively involved in business development and solution architect roles.