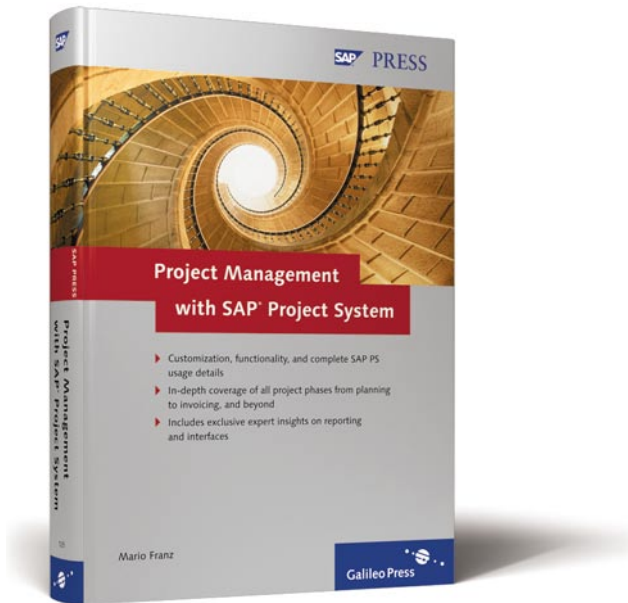


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Project Management with SAP® Project System




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This chapter describes the objectives of this book and provides an overview of the contents of the individual chapters.

1 Introduction

Due to the requirement to implement projects successfully within increasingly shorter periods and under continuously rising costs, project management methods and tools are becoming more important in the industry, as well as in the public sector. The various projects range from smaller cost and investment projects to development or plant maintenance projects to large-scale projects in plant engineering, construction, and mechanical engineering.

There is an abundance of project management software on the market that project managers can use for support in planning and implementing their projects. Many companies also use programs they have developed by themselves for individual aspects of project planning and implementation; however, only a few project management tools can map the entire lifecycle of a project completely and uniformly. A lack of integration options also frequently results in project data such as cost information or time data, for example, thereby having to be entered several times. All current project-relevant data and documents for project management are therefore only simultaneously available with most project management tools under certain conditions.

To avoid these problems, companies that already use an SAP ERP system,¹ such as an R/3, Enterprise, or ECC system,² are now increasingly using SAP Project System to manage their projects and therefore benefit from the close integration of SAP Project System with Accounting, Materials Management, Sales, Production, Human Resources, and so on. Since the early stages of SAP Project System as a Real-time Cost Accounting Project (RCAP) in the R/2 system, the

1 ERP = Enterprise Resource Planning

2 ECC = ERP Core Component

range of functions of SAP Project System, and also the integration options available, has continued to grow. The experiences and requirements of companies from the different branches have been incorporated in this case into the development of SAP Project System.

Since SAP Project System offers functions for managing practically all types of projects (and often even in different ways, depending on requirements), most companies that use SAP Project System only use a small portion of the available functions. Frequently, companies initially only use a few of the SAP Project System tools (for example, to control their project costs) and then gradually use other options in SAP Project System.

**Objective
of this book**

The objective of this book is to explain the main functions and integration scenarios of SAP Project System. We will discuss business processes that can be mapped using SAP Project System, and also highlight the required settings that must be made for this purpose in the projects and, in particular, in Customizing of SAP Project System. References to customer enhancements (user exits) and Business Add-Ins (BAIs) or to notes addressing modifications indicate additional customizing options of SAP Project System. Although this book is written with Release SAP ECC 6.0 in mind, most of the functions are also already available in earlier Releases. Therefore, this book can also be used by readers who, for example, use Release SAP R/3 4.6 or an Enterprise release. Functions that have been added as of the Enterprise Release will be specifically mentioned in the text.

The range of SAP Project System functions can be used across different project types and industries. This book therefore describes the functions of SAP Project System in the most general sense possible, without restricting itself to specific uses of SAP Project System or to individual project types. Nevertheless, you will note that often only explicit examples and specific screenshots can truly clarify functions and contexts. In these cases, the book uses an IDES scenario³ of an engineer-to-order production of elevators. Readers who can use IDES data can therefore reproduce the specified examples in their own SAP systems.

³ IDES = Internet Demo and Evaluation System

Based on its objectives, this book is intended for readers, who require detailed knowledge of the different settings options of SAP Project System to help them implement this system, such as consultants or persons responsible for SAP Project System implementation, or for those who want to broaden or refresh their knowledge, such as project managers, Competence Center employees, or key users of a company. However, this book is also for readers, who are interested in getting an overview of the functions and concepts of SAP Project System, such as decision-makers in a company who are responsible for deciding to implement an SAP Project System, for instance.

Target audience

As a general prerequisite for using this book, the reader must have basic business knowledge and be familiar with project management methods. Due to its integration with various other SAP components, a basic knowledge of these SAP components is also required to understand many of the functions and processes of SAP Project System. SAP Project System does not contain any organizational units of its own, for example, but instead uses organizational units of Financial and Managerial Accounting, Production, Purchasing, Sales and Distribution, and so on. A detailed explanation of all of these organizational units or the integrated components would exceed the scope of this book. Therefore, readers with only a modicum of SAP knowledge should, if required, use the SAP Glossary and SAP Library that are available for free on the Internet under *help.sap.com*.

The structure of this book reflects the individual phases of managing a project using SAP Project System. **Chapter 2, *Structures and Master Data***, therefore first describes how you can map your projects in the SAP system using suitable structures. These structures and their master data form the basis for all other planning and execution steps. With the structuring, you already set the course for the other planning and execution functions using profiles and control indicators. To obtain an initial overview of the planning and execution functions of SAP Project System from subsequent chapters, readers who want to use this book as an initial introduction to project management with SAP Project System should therefore skip the details about these profiles and indicators discussed in Chapter 2 when they first read the book.

Structure of the book

Chapter 3, *Planning Functions*, deals with the various functions of SAP Project System available for planning the logistical and relevant

accounting aspects of your projects. For many projects, in particular, cost or investment projects, budgeting takes place in the approval phase of projects. **Chapter 4, *Budget***, describes the functions of SAP Project System available for budgeting. **Chapter 5, *Project Execution Processes***, discusses typical processes that can be mapped in the SAP system as part of the execution phase of projects following approval, and the resulting quantity and value flows. The wide range of integrations of SAP Project System with other SAP components is addressed in this chapter. Additional procedures such as calculating overhead costs or project settlement, for example, are carried out periodically. **Chapter 6, *Period-End Closing***, covers the periodic procedures available in SAP Project System for the planned and actual data of your projects.

A key aspect of project management is the analysis of all project-related data. The reporting functions of SAP Project System that support you in every phase of your project management process are introduced in **Chapter 7, *Reporting***. Finally, **Chapter 8, *Integration Scenarios with Other Project Management Tools***, discusses the possible integration of SAP Project System with Microsoft Project (Client), cProjects, and SAP xApp Resource and Portfolio Management (xRPM).

The most important database tables of SAP Project System and a list of Business Application Programming Interfaces (BAPIs) available for developing your own interfaces are listed in the **Appendices A and B**. **Appendix C** contains tables listing the transaction codes and menu paths of the most important transactions and Customizing activities mentioned in the text.

Special Symbols

To make it easier for you to use this book, we have included special symbols to indicate information that might be particularly important to you.

- [!]** **Attention:** This icon warns you of a possible problem. Pay particular attention when tackling this task.
- [>]** **Note:** This icon indicates a note. We use this icon to emphasize important information that can facilitate your work.

In SAP Project System, structuring projects is the basis for all subsequent project management steps. Therefore, selecting the right structures and an efficient structuring process are critical when managing your projects.

2 Structures and Master Data

A prerequisite of project management using SAP Project System is the mapping of projects in the SAP system via appropriate structures. These structures form the basis for planning, entering, and analyzing all data that is relevant to a project. For this purpose, SAP Project System provides two structures: *Work breakdown structures* and *networks*. These two structures differ in the way in which they enable you to structure projects and in the functions provided for them in the SAP system. For example, if you need a hierarchical budget management function for a project, you would want to use a work breakdown structure. If, in addition, you also want to do capacity requirements planning for the same project, you would have to use one or several networks as well.

We begin this chapter with a description of the basic differences between work breakdown structures and networks. Then, we will discuss the essential master data of the two structures, as well as milestones, documentation options, and Customizing activities that are necessary in a structuring process. Statuses play a major role in controlling projects. We will show you the functions that statuses are responsible for in SAP Project System and how you can define your own statuses. We will also introduce you to the transactions and tools you can use for structuring purposes and for processing master data, and versions of SAP Project System that you can use to document the progress of a project and for "what-if" scenario analyses. Lastly, we'll describe the different steps and necessary prerequisites for archiving and deleting project structures.

2.1 Basic Principles

Depending on your specific requirements, you may be able to map a project only via a work breakdown structure, or only by using one or several networks, or a combination of a work breakdown structure and networks.

Figure 2.1 illustrates the different structuring options. The symbols used for the different structure objects in the figure correspond to the symbols used in the SAP system to represent those objects. The following sections describe the basic differences between the different structuring methods.

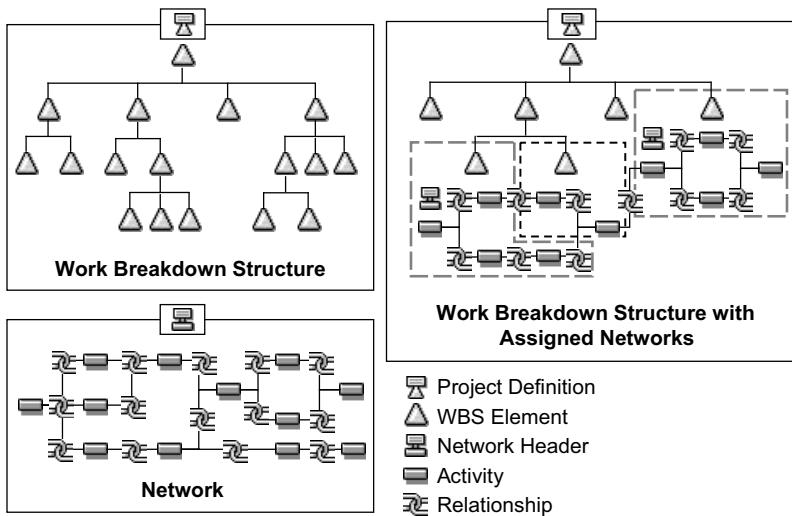


Figure 2.1 Usage Options of Work Breakdown Structures and Networks to Structure Projects

Work breakdown structure

Work breakdown structures enable you to map the structure of a project in the SAP system. This is done via *work breakdown structure elements (WBS elements)* that are located at different levels and structure the project hierarchically (see Figure 2.2). An advantage of a hierarchical structure is that within the structure, data can be inherited or distributed in top-down direction and it can be aggregated or summarized in bottom-up direction.

The actual process of structuring a project using WBS elements can occur at individual levels, for example, based on phases, functions, or organizational aspects. There is no universal recommendation

with regard to how you should structure a project using a work breakdown structure. The selection of appropriate structures depends instead on many different aspects and should be carefully thought out before a project starts. Section 2.2 has some general tips on how you can structure projects using a work breakdown structure.

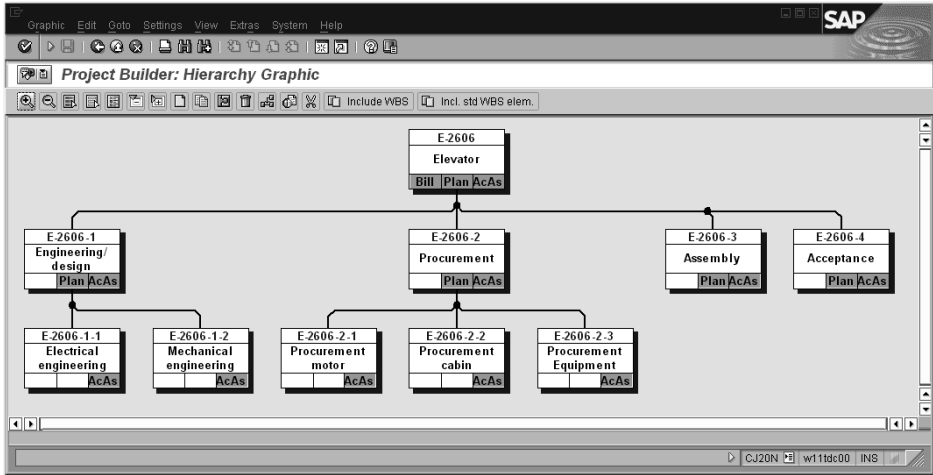


Figure 2.2 Hierarchical Structure of a Work Breakdown Structure (Hierarchy Graphic)

The following list provides an overview of important functions of work breakdown structures in the SAP system:

- ▶ Planning and entering dates
- ▶ Cost planning and account assignment of documents
- ▶ Planning and invoicing revenues
- ▶ Planning and monitoring payment flows
- ▶ Hierarchical budget management
- ▶ Material stock management
- ▶ Various period-end closing activities
- ▶ Monitoring a project's progress
- ▶ Aggregated data analysis

Because of their functional scope, work breakdown structures that are not assigned any networks are typically used to map projects whose focus lies on controlling aspects and therefore require fewer

logistical functions. These kinds of projects usually involve overhead cost or investment projects.¹

Network You can use one or several networks to map the flow of a project or of parts of a project in the SAP system. For this purpose, a network maps individual aspects of a project as *activities* that are linked to each other via *relationships* (see Figure 2.3).

The relationship between two activities defines the logical sequence of the activities (predecessor-successor relationship) as well as their time-based interdependencies. You can also map project flows across different networks by linking activities of different networks to each other. An essential advantage of the network technique is that SAP systems can automatically determine planned dates for each activity and the entire network on the basis of the duration of individual activities and their chronological sequence. In addition, the system can also determine floats and time-critical activities.

The following list provides an overview of important functions of networks in the SAP system:

- ▶ Scheduling
- ▶ Resource planning
- ▶ Confirmation of work
- ▶ External procurement of services
- ▶ Material requirements planning, procurement, and delivery
- ▶ Network costing
- ▶ Various period-end closing activities
- ▶ Monitoring a project's progress

Because of their functionality, networks are predominantly used to map projects in which logistical functions such as automatic time scheduling, resource planning, or the procurement of materials are required. You can use networks independently of or in conjunction with a work breakdown structure.

¹ Work breakdown structures are also frequently used for smaller projects instead of internal orders in the SAP system, because a WBS enables you to carry out hierarchical project controlling activities. For example, you can distribute a budget to individual parts of a project within a work breakdown structure. This is not possible if you use internal orders.

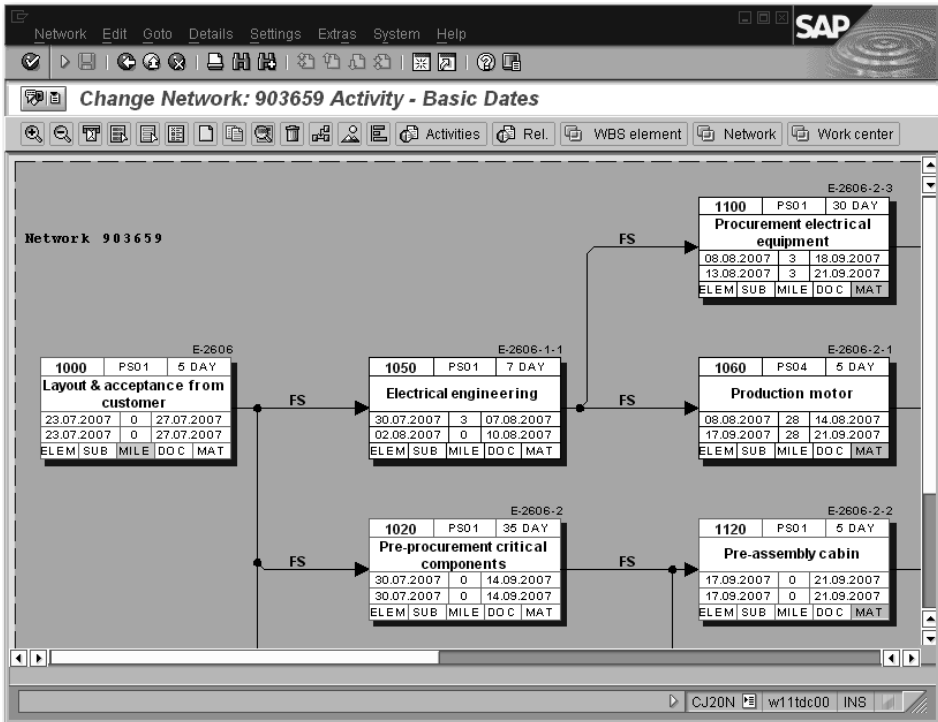


Figure 2.3 Flow Structure of a Network (Network Graphic)

To be able to utilize the functions and benefits of work breakdown structures and networks at the same time, you can assign network activities to WBS elements. A WBS element can be assigned several activities (even different networks, if required); however, an activity can only be assigned to a maximum of one WBS element. Once you have assigned activities to WBS elements, you can exchange data between the work breakdown structure and the activities. For example, activities can inherit statuses from the WBS elements they are assigned to. Conversely, you can total up project activity dates to the WBS elements, or check funds allotted to activities against the budget of the WBS elements. In reporting, you can obtain an aggregated analysis of the data of assigned activities at the level of WBS elements.

Work breakdown structures and networks

In general, the structures available in SAP Project System are divided into *operative structures* (work breakdown structure and network), *standard structures* (standard work breakdown structure and standard network), and *versions* (project version and simulation version).

Operative structures, standard structures, and versions

While you can use the operative structures for planning and carrying out your projects, that is, for operational project management, the standard structures merely serve as templates for the creation of operative structures or of parts of those structures. Versions can be used to record the status of a project at a specific point in time or at a certain stage in the system. In addition, you can use versions to test changes that are implemented retroactively before including them in your operative project.

The following sections describe the master data of the different structures, as well as methods to create the structures including the associated Customizing settings.

2.2 Work Breakdown Structure

Size of work breakdown structures

You can subdivide a project into different parts by using the WBS elements of a work breakdown structure. You can further sub-divide those parts until you have reached the required level of detail. The maximum number of levels available is 99. Technically, you can use any number of WBS elements at each level; however, for performance reasons, a work breakdown structure should not contain more than 10,000 WBS elements.²

A work breakdown structure should map all relevant aspects of a project in order to enable comprehensive planning and analysis of a project in the SAP system. The tasks of the different project parts, in particular of the individual WBS elements, should be defined clearly and unambiguously, and they should be time-dependent and feasible. Furthermore, the tasks should contain criteria that enables you to analyze their progress, which is important for analyzing the progress of the entire project.

Methods of structuring

Let's take a brief look at a sample elevator project in order to demonstrate some possible ways of structuring a work breakdown structure at a specific level.

► Phase-based structuring

This type of structuring could involve the following WBS elements: *engineering*, *procurement*, *assembly*. This structuring

² You can find more detailed information on the size of work breakdown structures in Note 206264.

method is particular well suited for time scheduling and a step-by-step execution of project parts.

► **Function-based structuring**

This structuring method could comprise WBS elements for individual assemblies of the elevator, such as *motor*, *elevator shaft*, *elevator cabin*. If you use project stocks (see Section 3.3.2), those elements enable you to keep separate stocks for the different assemblies.

► **Structuring based on organizational aspects**

If this type of structuring is used, individual structures could contain single WBS elements for *Sales and Distribution*, *Purchasing*, and *Production*, or they could be separated by responsible cost centers. With regard to reporting, this type of structuring allows the direct evaluation of cost portions for the different organizational units.

Figure 2.2 illustrates the structure of the elevator project. We used phase-based structuring for level 2, whereas the structuring type we chose for level 3 is based on functional aspects. The example shows that you can choose different structuring logics for different levels. Note, however, that you should not vary the structuring types at a single level within the work breakdown structure.

When structuring your projects, you should pay particular attention to the question “Based on which aspects do you want to analyze the data in reporting?”³ Also, the required level of detail in cost planning and budgeting can provide you with additional information regarding how many hierarchy levels you may need. You should also consider which structuring option might be the most appropriate one if you want to settle the project costs at a later stage, or carry out a results analysis (see Chapter 6, *Period-End Closing*).

2.2.1 Structure and Master Data

A work breakdown structure consists of WBS elements that are located at different levels in order to map the hierarchical structure of a project. Each work breakdown structure is based on a *project def-*

³ In reporting, you can use different project views and the project summarization function so you can include other evaluation hierarchies as well in your analysis (see Chapter 7).

inition that serves as a framework for the project and contains parameters that control the properties of the entire project. Furthermore, the project definition contains default values that are passed on to newly created WBS elements. But, it is the WBS elements that actually contain the cost, revenue, budget, and scheduling data. The project definition is not a separate controlling object in the SAP system.



Each WBS element is uniquely assigned to a project definition. This assignment cannot be changed, that is, you cannot reassign a WBS element that is based on a specific project definition to another project definition.

Project Definition

Identification If you create a project in SAP Project System by using one of the transactions described in Section 2.7, you must first create a project definition (see Figure 2.4).⁴ During the creation process you must specify a unique *identification* for the project definition, which may consist of a maximum of 24 characters. You can also search for an available identification. You can control the structure of the identification via *coding masks* (see Section 2.2.2).

In addition to the identification, you also specify a *short text* as a description for your project. If necessary, you can also enter a descriptive *long text*. Depending on the scheduling settings (see Section 3.1), you must specify a start or end date for your projects; otherwise, the system will propose to use the current date. Of course, you can change those dates later during the date planning process.

When creating the project definition, you must always specify a *project profile*. The project profile contains control data and default values for the project. You can store all additional mandatory fields of the project definition as default values in the project profile so that it is usually sufficient to specify the identification and the project profile when creating the project definition. You cannot change the project profile of a project at a later stage. Project profiles can be cre-

⁴ Some processes require you to first create a WBS element. The project definition is then created automatically when you save the WBS element. Note that once you have saved a WBS element, this element can never exist without an associated project definition.

ated for different project types of an enterprise in the Customizing section of SAP Project System (see Section 2.2.2).

Figure 2.4 Basic Data of a Project Definition

You must assign your project to a **controlling area** at the project definition level. The assignment to a controlling area is mandatory. It can be proposed via the project profile and cannot be changed after you have saved your project for the first time.

Organizational assignments

The assignment of a project to a controlling area via the project definition is unique. For this reason, a work breakdown structure cannot comprise several controlling areas.

[!]

Although the **Company code** and **Project currency** fields are also mandatory, the entries you store in the project definition are merely default values for the WBS elements. Therefore, the assignment to a company code can be changed for each individual WBS element.

Object currency The **Project currency** field has the following purpose. All currency-based data of your projects is managed in three different currencies – the controlling area currency, the transaction currency, that is, the currency of the respective business transactions, and the project or object currency.⁵ You can choose the object currency for each WBS element separately, provided you use only one company code in your controlling area. If you cover several company codes in cost accounting, the object currency is automatically derived from the local currency of each company code and cannot be changed manually.

The assignments to other organizational units within financial accounting (**Business area, Profit Center**) and logistics (**Plant, Location**) that you can enter in the project definition serve as default values for the WBS elements of the project. However, you should note that the **Business area** field is also mandatory if business area balance sheets are maintained.

You can also store a *responsible person* for your project in the project definition as well as an *applicant* (see Section 2.2.2). These entries are automatically adopted as default values when you create a WBS element.

Partner determination procedure

If you want to enter additional personal data or partner information for purely informational purposes, you can enter a *partner determination procedure* in the project definition (see Section 2.2.2). Once you have specified the partner determination procedure, the system displays an additional tab for the project definition (and all assigned WBS elements) in which you can enter additional responsible persons, personnel numbers, SAP users, or even suppliers and customer IDs, depending on the definition of the partner determination procedure. You may even navigate into the details of all those entries. As of the Enterprise Release, the reporting section provides a separate report for analyzing this partner data.⁶

⁵ The controlling area must explicitly allow the update of data in all three currencies. The conversion of currency-based data then occurs automatically when the data is entered and on the basis of the latest exchange rates defined in Customizing.

⁶ A specific modification (see Note 638 781) enables you to use the partner data of SAP users also for an object-based authorization concept for projects.

In addition to the partner determination procedure, you can also define the planning profile, budget profile (see Sections 3.4 and 4.1), and the simulation profile (see Section 2.9.2) in the project definition. All other profiles contained in the **Control data** tab of the project definition are default values for the WBS elements of the project.

Another important setting to be made at the project definition level involves the project stock indicators. Section 3.3.2 has details about this setting. However, you should note that you can no longer modify the settings as to whether you want to allow a valuated project stock once you have saved the project definition.

Project stock

The **Sales pricing** fields are only relevant if you want to carry out sales pricing exclusively on the basis of your project data, that is, without any relation to a customer inquiry (see Section 3.5.4).

You can control the presentation of the project definition fields using a *field selection* (see Section 2.8.1). Additional project definition fields can be implemented by using a customer enhancement.

WBS Elements

Figure 2.5 shows the detail screen of a WBS element. Like the project definition, a WBS element also contains a unique external identification that consists of a maximum of 24 characters and can be controlled through a coding mask.⁷ Internally, the system assigns another unique number to the WBS element, which allows you to modify the external identification at a later stage.⁸ In addition to the unique identification and the short text as a description, you can also specify a *short identification*.

You can use short identifications to save space for displaying the WBS elements in tabular displays or in hierarchical cost planning or budgeting. You can either assign a short identification of your choice

Short identification

⁷ Because the project definition and WBS elements are different objects, a WBS element can have the same identification as the project definition.

⁸ You cannot modify the external identification at a later point in time if you have distributed the work breakdown structure to other systems via Application Link Enabling (ALE), or if the status of a WBS element does not allow for a modification.

manually or use the **Mask ID** field in the project definition screen to derive the short ID of the WBS elements from their IDs.

Organizational assignment

You can integrate a WBS element into your company structure by assigning the element to organizational units in accounting and logistics. Most of the organizational units can be proposed using the project profile or project definition and, if required, you can modify each WBS element separately; however, you should note that those changes must comply with your existing company structure.

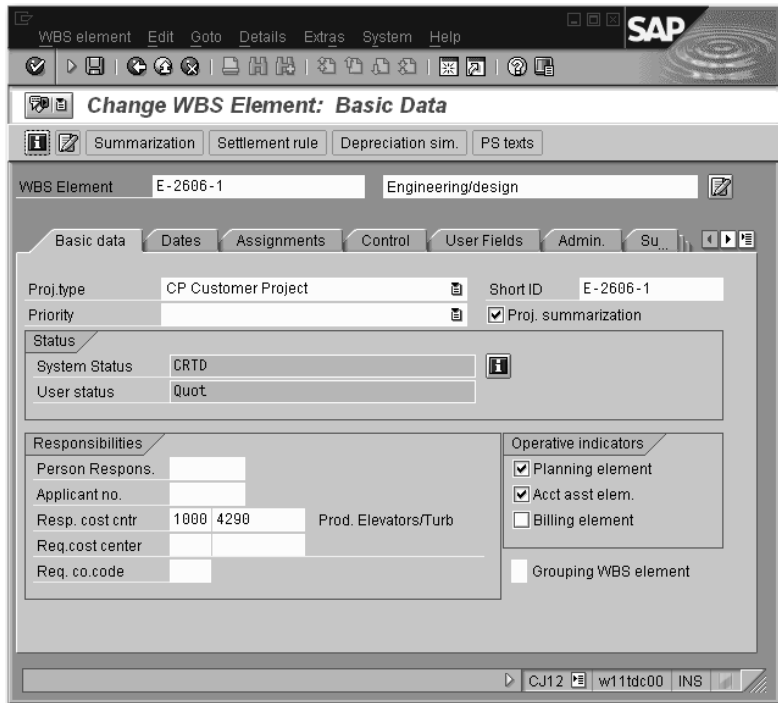


Figure 2.5 Basic Data of a WBS Element



In an international project, you can store different company codes in different WBS elements. However, all these company codes must be assigned to the controlling area you have specified in the project definition.

The company code, object currency, object class, and – if business area accounting is carried out – even the business area are mandatory fields at the level of WBS elements, which can no longer be modified, once the planned or actual values have been entered.

The WBS elements contain numerous control profiles and indicators. While the profiles are discussed in Sections 6.3, 6.4, 6.6, and 6.9, we would like to describe the control indicators at this time.

The basic data of a WBS element contains the three operative indicators: **Planning element**, **Account assignment element**, and **Billing element**. You can use these indicators to define the controlling properties of the WBS element.

Operative indicators

WBS elements for which you want to plan costs manually must be marked as planning elements. If you use the appropriate settings in the planning profile of the project (see Section 3.4), you can even ensure that manual cost planning on a WBS element is only possible if this indicator is set.⁹

Planning elements

The **Account assignment element** indicator determines whether you can assign orders to the WBS element (in particular, activities and networks). It also controls whether you can assign any documents to the WBS element that result in actual or commitment postings to the WBS element. If you don't set this indicator for a WBS element, for example, you cannot assign a purchase requisition or invoice to this WBS element. You can also store this indicator as a default value for all WBS elements in the project profile.

Account assignment elements

If you want to base revenue planning on a WBS element and post actual revenues to the WBS element at a later stage, you must mark the WBS element as a billing element.

Billing elements

You can define any combination of those indicators for a WBS element, irrespective of the element's hierarchy level. Figure 2.2 shows an example of the operative indicators of a project. The example shown there allows for manual cost planning only on WBS elements of levels 1 and 2. However, the display of actual costs can be more detailed because the account assignment of documents can also be carried out for WBS elements at level 3. In addition, the highest-level WBS element is also responsible for planning and implementing revenues.¹⁰

⁹ Creating planned costs by rolling up planned values of subordinate WBS elements or orders is possible, irrespective of the planning element indicator.

¹⁰ Please read also Sections 6.6 and 6.9 with regard to setting the billing element indicator.

Statistical WBS elements

Another indicator that's also used for defining the controlling properties of a WBS element is the **Statistical** flag. If you set this indicator for a WBS element (you can also set it as a default value for all WBS elements in the project profile), the actual costs are only updated statistically for this WBS element under value type **11 (Statistical actual)** instead of value type **4 (Actual)**. This means that when you assign documents to a statistical WBS element, you must specify on the one hand side the WBS element as an account assignment recipient and otherwise also a "real" account assignment object that serves as a recipient of actual costs. If that element is always a specific cost center, you can store this cost center as a default account assignment in the detail screen of the statistical WBS element.

There are different ways to use statistical WBS elements and statistical projects. Some companies use statistical projects for purely hierarchical analyses. In that case, operational controlling is still carried out at the level of cost centers, internal orders, or cost objects, for example.

Statistical budget monitoring

Another typical usage of statistical WBS elements consists of indirect budgeting and availability control (see Section 4.1.5) of objects in the SAP system that otherwise are not assigned any budget. For example, in asset accounting, you cannot assign budgets to assets, which means that you cannot use availability control to control direct capitalizations of the asset, that is, to automatically avoid exceeding specific threshold values. But, you can achieve this by entering a statistical WBS element as an account assignment for investment in the master record of the asset.¹¹ Once the WBS element has been budgeted and the availability control has been activated for the project, each posting to the asset is accompanied by a statistical account assignment on the WBS element. This means that the statistical actual costs are automatically validated against the budget of the WBS element.

¹¹ In addition, the existing costs must be defined as a statistical cost type and contain a field status definition that allows for additional account assignment to a WBS element. Moreover, you must activate WBS elements as account assignment objects in asset accounting.

Note that not all accounting functions are available for statistical WBS elements. For example, you cannot carry out any overhead application based on the statistical actual costs; neither can you perform any settlement of the statistical actual costs. Although statistical WBS elements can be used for calculating interest, the interest itself must be updated in a real account assignment object (see Section 6.5).

[!]

The **Integrated planning** indicator refers to a specific function that enables you to pass planned activity inputs of a project as scheduled activities to cost center accounting. Sections 3.4.3 and 3.4.5 provide more detailed information on integrated planning.

Integrated
planning

You can use the **Project summarization** indicator in the basic data of a WBS element to control how the WBS element should be treated in an analysis (typically cross-project) using custom evaluation hierarchies (see Section 7.4). In the project profile, you can store this indicator as a default value for all WBS elements, only for account assignment elements, or for the billing elements. If you don't use project summarization, the indicator has no other specific function.

Project
summarization

The **Grouping WBS element** indicator marks a WBS element as relevant for the grouping of requirements and stocks of material components that are maintained in individual requirements inventory. The indicator can be set either manually for selected WBS elements, or automatically for the highest-level WBS element, provided that automatic requirements grouping has previously been set in the project definition. Section 3.3.2 contains further details on the possible attributes this indicator can have, as well as on additional prerequisites of requirements grouping.

Grouping
WBS elements

Detail screens are available for each WBS element for date planning and entering actual dates. In addition, a separate detail screen is available for each WBS element to determine the progress of a project. Sections 3.1.1 and 5.7.2 provide further detailed information on those screens.

Many fields of the WBS elements are pure information fields that don't contain any control functionality. For example, in Customizing, you can define attributes for the fields, **Project type**, **Priority**, **Scale**, **Investment reason**, or **Joint Venture**, and store these attributes separately for each WBS element. In addition, the **Equipment** and **Functional Area** fields in the **Assignments** detail screen are

Project type,
priority

also used for purely informational purposes, that is, you can analyze all those fields in Reporting, use them to build groups or for filtering purposes in reports, or employ them as selection criteria when selecting objects to be analyzed.

User fields Usually, each company has its own requirements regarding information fields in WBS elements that are supposed to be analyzed along with master data fields in Reporting. For this purpose, each WBS element contains the **User Fields** detail screen (see Figure 2.6) that provides the following fields:

- ▶ Two fields for 20 alphanumeric characters each
- ▶ Two fields for 10 alphanumeric characters each
- ▶ Two date fields
- ▶ Two numeric fields for measurement units
- ▶ Two numeric fields for currencies
- ▶ Two indicators

The screenshot shows the SAP 'Change WBS Element: Basic Data' dialog box. The 'User Fields' tab is selected. The 'Field key' is '1300000'. The dialog is divided into several sections:

General fields		Numeric fields	
Field 1		Number 1	
Field 2		Number 2	
Field 3		Number 3	
Field 4		Number 4	

Dates		Checkboxes	
Date 1		<input type="checkbox"/> Indicator 1	
Date 2		<input type="checkbox"/> Indicator 2	

Figure 2.6 User Fields of a WBS Element

You can use the **Field Key** (see Section 2.2.2) to control the assignment of names to the fields in the detail screen. The field key, in turn, can be proposed via the project profile. For example, instead of

using the default name, **Field 1**, you can store the name, **Model series**, for the first alphanumeric field in the Customizing section of the field key. Using a customer-specific extension would then enable you to implement a validation of the entries. By default, it is not possible to implement an entry tool for the alphanumeric fields.¹²

When working with user fields, you should note that you can set the field key individually for each WBS element; however, this may lead to confusion in Reporting. For example, if you use two different field keys in your project, one of which contains the name **Model series** for the first alphanumeric field, while the other one contains the name **Color** for the same field, the field values are displayed in the same report column in Reporting, irrespective of the fact that WBS elements with the first field key contain information on model series, whereas the other WBS elements contain color information. For this reason, you should either use a uniform field key within a project, or use the field key as a selection criterion in your evaluations.

[!]

If the number of available user fields does not meet your requirements, you can use a customized extension to define additional fields for WBS elements. Those additional fields are typically displayed in a separate detail screen.

If necessary, you can log changes to master data as *change documents* and evaluate those documents at a later stage. As is the case with the project definition, the **Field selection** option in Customizing allows you to control which fields of the WBS elements you want to hide, display, use for data input, highlight in a specific color, or define as mandatory (see Section 2.8.1).

2.2.2 Structure Customizing of the Work Breakdown Structure

Figure 2.7 shows the different activities in structure Customizing of operative work breakdown structures. Before you can create a WBS, you must create at least one project profile here. Prior to the initial creation of a WBS, you should also consider defining coding masks. Using coding masks is not mandatory, but it has many advantages. If at all possible, you can only create or modify coding masks with many restrictions at a later stage.

¹² Apart from the generic name of the user field, you can also adopt the name of exactly one field key as a column header in reports.

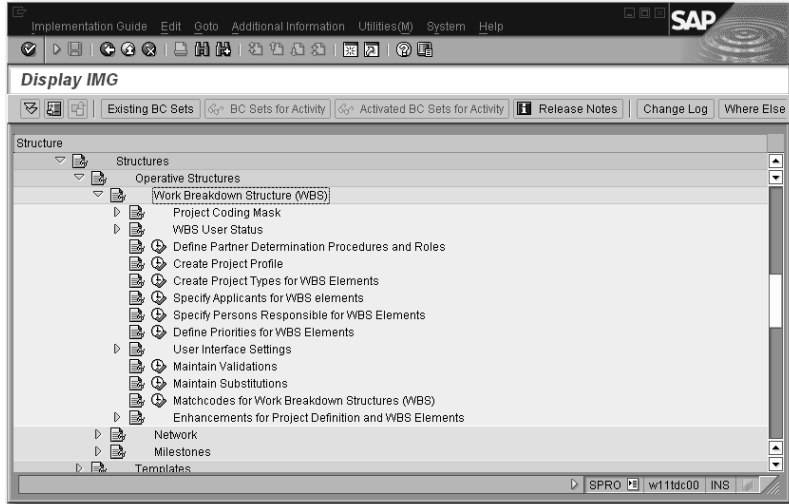


Figure 2.7 Structure Customizing of Work Breakdown Structures

Depending on your specific requirements, you must specify various settings in structure Customizing of operative work breakdown structures, in addition to defining project profiles and coding masks. The following sections briefly describe the individual Customizing activities involved. The Implementation Guide (IMG) of the SAP system contains detailed documentation for each of these Customizing activities.

Project Profile

When creating a project, you must always specify a project profile that has been previously defined for the respective project type in transaction OPSA. The project profile contains values and profiles that can be used as default values for project definitions or WBS elements during the creation phase. Depending on the field selection and status of the object, those values and profiles can be modified, for instance, with regard to the project type, organizational units, and so on. In addition, the project profile contains referenced fields (see Figure 2.8).

Referenced fields Referenced fields define properties of your project without being displayed or editable in the work breakdown structure. At this stage, we only want to briefly touch upon referenced fields.

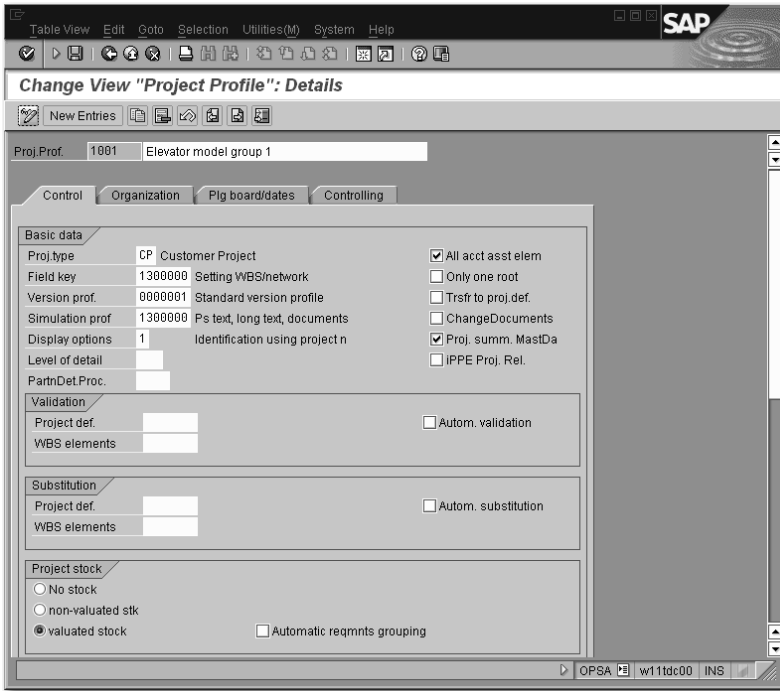


Figure 2.8 Sample Project Profile

The **Only one root** indicator controls whether one or several WBS elements are allowed at level 1 of the work breakdown structure. If you set this indicator and try to save two or more WBS elements at the highest level, the system will output an error message, and you will have to change the hierarchical structure before you can save the project.

The project profile contains two indicators that are relevant for writing change documents. One indicator refers exclusively to changes to master data, while the other indicator is for status changes. Besides activating the respective indicator, you must meet another requirement in order to write change documents, namely, a status must explicitly allow the business operation, **Create change document** (see Section 2.6).

The **Project summarization via Master Data (Proj. sum. MastDa)** indicator is only relevant if you want to use the project summarization function for your analyses (see Section 7.4). This indicator enables you to decide whether you want to carry out the summarization

process based on the master data or based on a classification of the WBS elements. Particularly with regard to system performance, you should summarize on the basis of master data characteristics. In the project profile, you can mark billing elements, account assignment elements, or all WBS elements of the project as relevant for inheriting master data during project summarization.

The **Version profile** is responsible for the automatic creation of project versions on the basis of their statuses (see Section 2.9.1). It is referenced via the project profile.

If you specify **Substitutions** and **Validations** and set the **Automatic** (i.e., **Autom. Validation** or **Autom. Substitution**) indicator, you can make sure that logics for setting and checking field values, which you personally have defined, are processed during the save process (see Sections 2.8.4 and 2.8.5).

The specification of **status profiles** (see Section 2.6) for project definitions and WBS elements is only a default value for the respective objects. However, if a status profile is used to directly set a user status, you can no longer modify the status profile in the object. In that case, the entry of a status profile in the project profile has a referencing character as well. Because the retroactive entry of status profiles in the objects is rather complex and cannot be done via mass changes (see Section 2.8.3), you should store your custom schemas in the project profile right from the start.

You can call a graphical display of WBS element data in hierarchical arrangement via the processing transactions (see Section 2.7), or by using the transactions for cost planning, time scheduling, and budgeting. The graphical presentation of the data is controlled by the **graphics profiles** that you must store for various purposes in the project profile. If required, you can define your own graphics profiles; but, usually, the default profiles will suffice.

If you set the **iPPE Proj. Rel.** indicator, the system displays an additional tab for WBS elements, which allows for integration with Integrated Product and Process Engineering (iPPE), see Section 3.3.1.

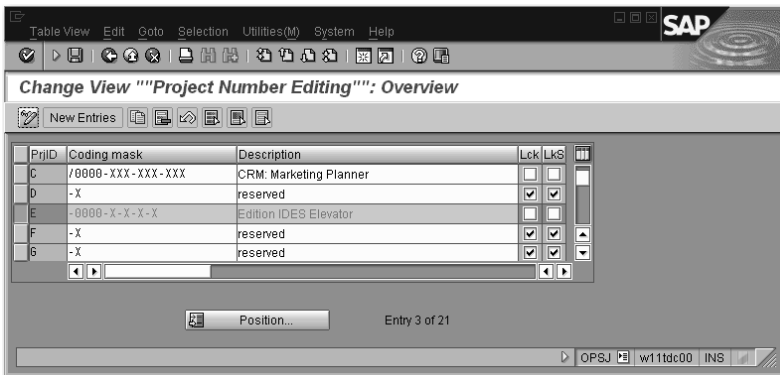
If you enter a **Strategy** in the **Controlling** tab of the project profile, you can automatically generate the settlement rules for WBS elements. Section 6.9 provides a detailed description of how to define strategies and how to derive settlement rules.

Coding Masks

To enable employees in different departments to use project structures easily in their daily work, it is useful to agree on certain conventions regarding the identification of WBS objects, for example, on the basis of the type and usage of projects. For this purpose, you can define coding masks in order to control the external identification of project definitions and WBS elements in Customizing.

You can define coding masks on the basis of *keys* in Customizing activity, **Define Project Coding Mask** (OPSJ). A coding mask contains *sections* for the external identifications. These sections are separated by special characters. A section either consists of numbers that are represented by zero characters in the coding mask, or of alphanumeric characters that are represented by X characters in the mask. You can store a descriptive text for each coding mask in Customizing and use *lock indicators* to control whether the key and the associated mask can be used for operative or standard work breakdown structures.

Defining coding masks



The screenshot shows the SAP Customizing activity 'Define Project Coding Mask' (OPSJ). The window title is 'Change View ""Project Number Editing"": Overview'. The table below lists the defined coding masks:

PrjID	Coding mask	Description	Lck	LKS
C	/0000-XXX-XXX-XXX	CRM: Marketing Planner	<input type="checkbox"/>	<input type="checkbox"/>
D	-X	reserved	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
E	-0000-X-X-X-X	Edition IDES Elevator	<input type="checkbox"/>	<input type="checkbox"/>
F	-X	reserved	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
G	-X	reserved	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

At the bottom of the window, it shows 'Position...' and 'Entry 3 of 21'. The status bar at the bottom right indicates 'OPJSJ | w11tdc00 | INS'.

Figure 2.9 Sample Coding Masks

In the following sections, we will demonstrate the definition of coding masks on the basis of our IDES (Internet Demo and Evaluation System) example. All elevator projects in the IDES Company begin with the letter 'E'. For this reason, the coding mask shown in Figure 2.9 was defined in Customizing for the key 'E' even before the first elevator project was created. Each identification of project definitions and WBS elements that begins with an 'E' is now based on the convention that the 'E' key must be followed by a hyphen as a special

character, which, in turn, is followed by a section containing a maximum of four characters that may only consist of numbers. If a letter is entered in the first section, the system outputs an error message. In the IDES Company, the first section is used for the sequential numbering of projects. The system supports this in that it provides the option to search for the next available number.

If a longer ID must be assigned to WBS elements, the numerical section must be followed by a second hyphen, which is followed by a one-digit section that may contain an alphanumeric character, and so on. When entering the identification, you can usually omit the special characters as the system automatically inserts the special characters in the provided place of the displayed identification once the data has been released.¹³

Because a lock indicator is neither set for operative nor for standard structures in the example, we can create both operative projects and standard work breakdown structures with identifications for the key 'E'.



Note that you can only create a coding mask for a key as long as no object exists for that key.

You should consider using coding masks when you first implement SAP Project System and before you create the first projects. If necessary, you should define masks for keys as early as possible — even if you want to use them at a later stage — and lock those coding masks. You can further detail those masks at a later point in time and release them for usage, that is, remove the lock indicators.



Coding masks that are already used by objects can only be modified to a certain extent. The only two possible options to change coding masks retroactively consist of adding alphanumeric sections and converting a numeric section into an alphanumeric one of identical length.

When you create or change coding masks, the system carries out several checks; however, not all of the steps involved in those checks are carried out when you transport Customizing settings to coding

¹³ However, the external identification is stored without special characters in the database table of the WBS elements. Note 536471 provides further information on coding masks.

masks. For this reason, we recommend that you don't transport coding masks; instead, you should create them manually in the respective systems.

In order to define coding masks in Customizing, you must first enter several settings in Customizing activity **Define Special Characters for Projects** (OPSK). Here you must first define the length of the keys for the coding masks. Note that the maximum length for a key is five (numeric or alphanumeric) characters. For example, if you enter **3** in the respective field, you can only use keys of a maximum of three characters when defining the coding masks. If you want the keys to be exactly three characters long and no shorter, you must also set the **SL** indicator (structure length).

Defining special characters

You can simplify the tabular creation of WBS elements by entering any character in the **ET** field (Entry Tool). Instead of always having to enter the complete ID for a new WBS element, which can be prone to errors when you use long IDs, you can simply enter the entry tool character for the part of the ID that is identical to the object on the higher level. When the data is confirmed with enter, the system replaces the character with the identification of the higher-level object.

Entry tool

In the eight **Special character** fields, you must store the characters you want to use as separators between two sections when defining the coding masks.

By setting the **Edit** indicator, you can ensure that project definitions and WBS elements can only be created with identifications that are controlled by coding masks, which aren't locked. For example, if you haven't defined a coding mask for the key 'Z', you can't create any projects that begin with 'Z' when the **Edit** indicator is set.

If you enter a character of your choice in the **ANo** field (automatic number assignment) when creating a WBS element from the template area, the system will automatically propose an ID for that WBS element (see Section 2.7.1). If the system cannot automatically propose a number, it will assign a temporary number that begins with the character you have previously entered in the **ANo** field.

Project Type, Priority

The definition of project types and priorities merely consists of a key and a description. You can enter project types and priorities in the basic data of WBS elements. They are usually used for purely informational purposes, but you can also use them as selection criteria in Reporting. You can store default values for the project type and priority in the project profile.

Partner Determination Procedure

Defining partner roles

The definition of partner determination procedures consists of three Customizing activities. First you must create the identifications and names for the roles¹⁴ you want to assign to projects at a later stage and link the IDs and names with the partner number types provided.

For example, if you want to store the sold-to party as additional information in sales projects, you must create a **Sold-to party** role and link this role to the **Customer** type. This allows you to specify a customer number for the **Sold-to party** role and to view the data of the corresponding customer master record in the project.

Language-dependent conversion

In the second Customizing activity, you can translate the name of the roles into other languages. Depending on the logon language, the system will then output the corresponding name.

Defining partner determination procedures

The final step consists of summarizing the roles you want to be available for selection in your project into a partner determination procedure. When doing so, you can define for each role whether it must be specified in any case, whether an entry for a role can be modified at a later stage, and whether it should be possible to enter several values for a role. You can store a partner determination procedure as default value in the project profile.

Applicants and Responsible Persons

You can use transactions OPS6 and OPS7 to create possible responsible persons and applicants for project definitions and WBS elements. The definition of applicants and responsible persons consists of an

¹⁴ The term "role" is used in different contexts here. The roles defined here are not related to the roles that are used to assign authorizations, or to the roles that are defined in cProjects projects.

ID that may contain a maximum of eight characters and the name of the corresponding person. You must make these entries manually; you don't need any data from HR for this process.

In addition, you can assign the corresponding SAP users to responsible persons. This type of entry is relevant if you want to notify the user automatically via email in case of budget overruns (see Section 4.1.5).

Field Keys

You can use field keys to control the names of user fields (see Figure 2.6). Data can only be entered into the fields for which you have stored a name in the field key definition. For the two quantity fields of the user fields, you can create a link to parameters in order to be able to use the quantities in formulas at a later stage (see Section 3.2.1). You can enter a default value for the field key in the project profile.

2.2.3 Standard Work Breakdown Structures

A standard work breakdown structure consists of a *standard project definition* and *standard WBS elements* and it can be used as a template for live projects. You can create standard work breakdown structures by using transaction CJ91. You must also have a reference to a project profile. You can also use other standard work breakdown structures or even operative projects as templates.

A standard work breakdown structure may already contain important master data. Standard WBS elements can be assigned milestones (see Section 2.4) or PS texts (see Section 2.5.1); however, you cannot store any planning data, such as date information, planned costs or revenues, and settlement rules in the standard WBS. Moreover, you cannot assign document info records in a standard WBS (see Section 2.5.2).

Master data

Furthermore, you cannot set any statuses for the standard WBS elements; however, you can store the status profiles for the operative project definition and WBS elements in the standard project definition. In addition, there are three different system statuses available at the level of the standard project definition:

- Standard system statuses
- ▶ **Standard Created**
The system issues a warning message if you want to use the standard work breakdown structure as a template in this initial status.
 - ▶ **Standard Released**
You can use the standard work breakdown structure as a template without any restrictions. Note that you cannot undo this status.
 - ▶ **Standard Closed**
You cannot copy the standard work breakdown structure.

Summary

You can use the WBS elements of a work breakdown structure to map a project hierarchically in the SAP system. All WBS elements of a work breakdown structure are uniquely assigned to a project definition. In addition, you can store data for informational purposes, as well as control profiles and indicators in the master data of those project elements. Standard work breakdown structures can be used as templates for actual projects. Before you can create work breakdown structures, you must define a project profile in the Customizing section of SAP Project System. Moreover, it is useful to also define coding masks in Customizing, which enable you to control the identification of the project elements.

2.3 Network

You can use networks to map the flow of different project activities as activities and relationships in the system. In particular, networks enable you to use various logistical integrations with materials management, production, plant maintenance, purchasing, and capacity requirements planning, as well as time scheduling.

- Network sizes
- Networks should not exceed a size of approximately 500 activities, because you usually store only one responsible person per network. This person is referred to as the *MRP controller*. Another reason for keeping the aforementioned size can be found in the lock logic of networks. Whenever a network object is edited or confirmed, for example, the entire network is locked. The bigger your networks and the higher the number of possible confirmations, the greater the risk that the network gets locked for editing.

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