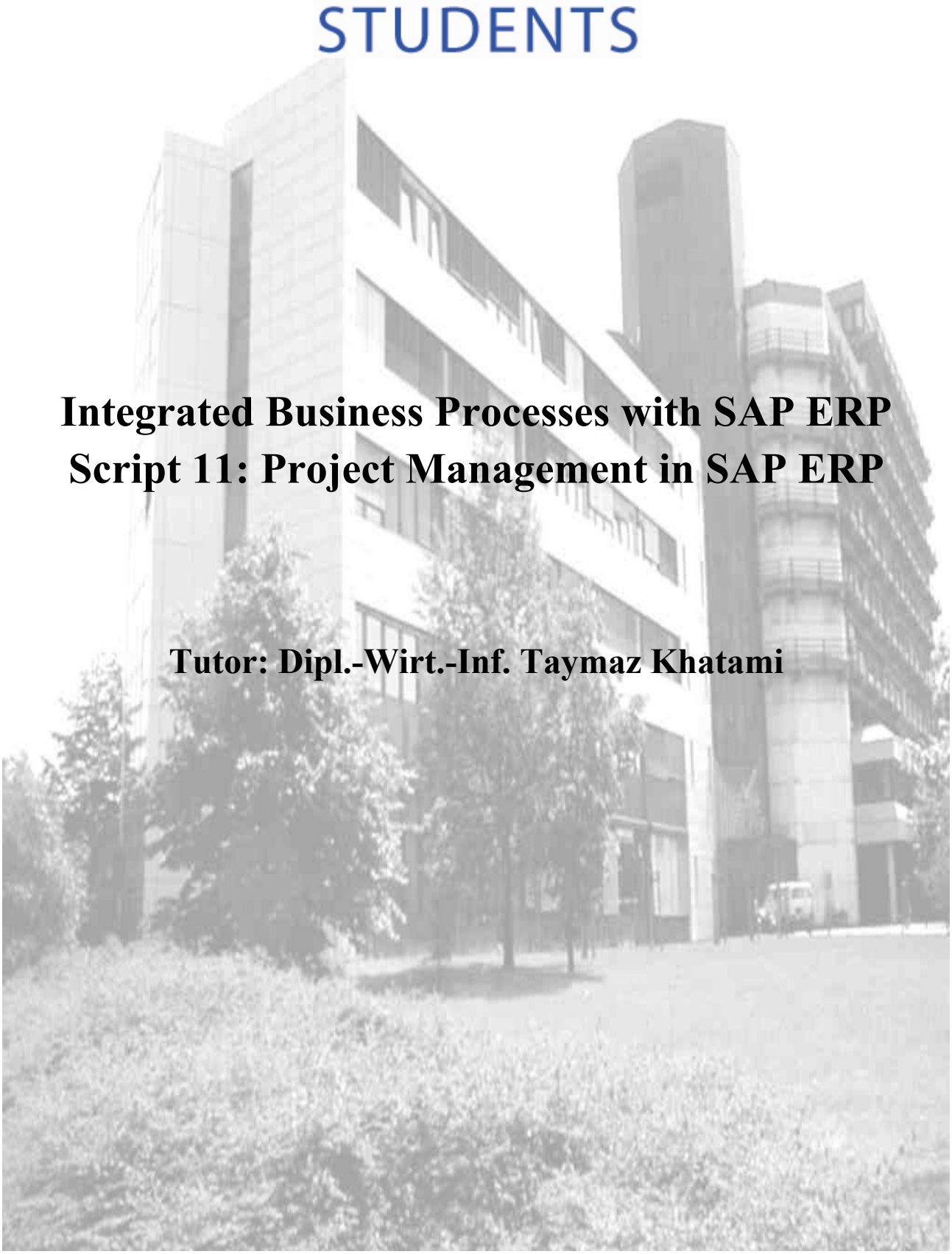
ERP4 STUDENTS



Integrated Business Processes with SAP ERP
Script 11: Project Management in SAP ERP

Tutor: Dipl.-Wirt.-Inf. Taymaz Khatami

Copyright

Table of Contents

Table of Figures

1 Project Management in SAP ERP

This teaching unit aims at giving you an understanding of Project Management in the SAP ERP system.

Educational objectives in this unit:
After this teaching unit, you will be able to:

- Describe the basic data used in a project.
- Describe the basic functions associated with work breakdown structures.
- Explain the purpose of networks and activities.
- Describe the basic functions associated with project planning board.
- Explain the purpose of planning WBS dates and scheduling.
- Define the types of resource planning and their integration implications.
- Describe different types of project cost and revenue planning and their integration implications.
- Explain the differences between planning and budgeting.
- Explain the function of budget availability control.
- Explain the functions involved with posting to projects and their integration implications.
- Describe different methods of posting labor to a project.
- Define the integration between projects and materials management from a purchasing process.
- Describe the functions of project period-end closing and their integration implications.
- Explain the scenarios involved in settling projects from an integration perspective.
- Discuss the reporting and analysis tools used in the Project System

Scenario for the Case Study
A customer, who annually sends a successful team to a three-week bicycle race in France, contacts your company. The customer is tired of his vendors from the chemical and pharmaceutical industries and wants to gain an advantage by using technical resources instead. Therefore, you and some engineers (Frankfurt location) are in charge with developing in a project a new racing bicycle, which is superior to all other competitive products. The project has the code name techno-doping.

In the practical application of this unit, you will firstly maintain the master data required for performing the project. You will create a dummy material master record, an activity type and a personnel master record. Maintaining master data also includes the subsequent step of project definition. Thereby, the project structure is visualized in the system by using project structure plans and Networks.
After creating the master data in the system, you will carry out project planning. This includes scheduling, resource planning and cost planning. After releasing the project, the sales order is entered and the project is carried out. In project processing, you will enter costs and Activities incurring during project Activities and you will assign them to the project structure. Based on this, you will create the customer invoice.

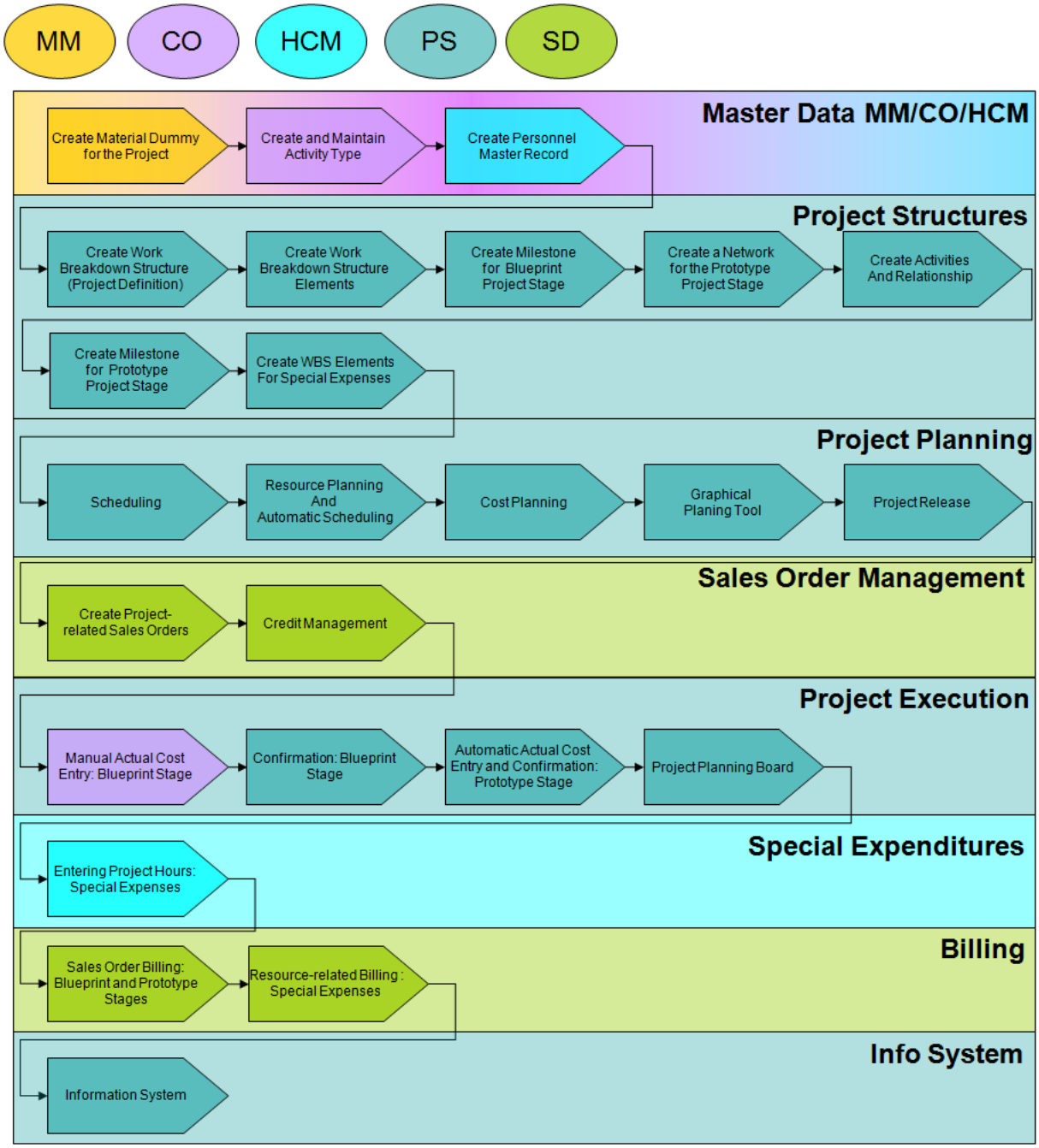
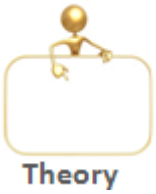


Figure 1: Process Overview: Project Management

2 Basics of Project Management in SAP ERP

This section gives you an overview of SAP Project System (SAP PS) and explains the organizational levels utilized in SAP PS. Furthermore, master data of and project structures in SAP PS are introduced.

2.1 Theory: Overview of Project Management in SAP ERP



Both large scale projects such as building a factory and small-scale projects such as organizing a trade fair require precise planning of the many detailed Activities involved. The project manager has the job of ensuring that the project is executed efficiently, on time and within budget - which he or she achieves by ensuring that the required resources and funds are available as and when needed.

What is a project?
Projects are tasks characterized by special characteristics:

- Usually, projects are complex, unique and include a high risk for the company.
- Precise targets between contractor and sold-to party are negotiated in a project.
- Projects are temporary and they are costs and capacity intensive.
- Several departments are involved in processing a project.
- Projects feature particular quality requirements.
- Usually, projects are of high strategic relevance for a company that is carrying out the project.

Usually, projects are included in the business activities of a company. To be able to control all tasks occurring to realize a project, a project-specific organization is required. The project structure, therefore, should be located centrally to the departments involved (see figure) in the project and should, thus, have (technical) interfaces with all departments (integration of organizational units).

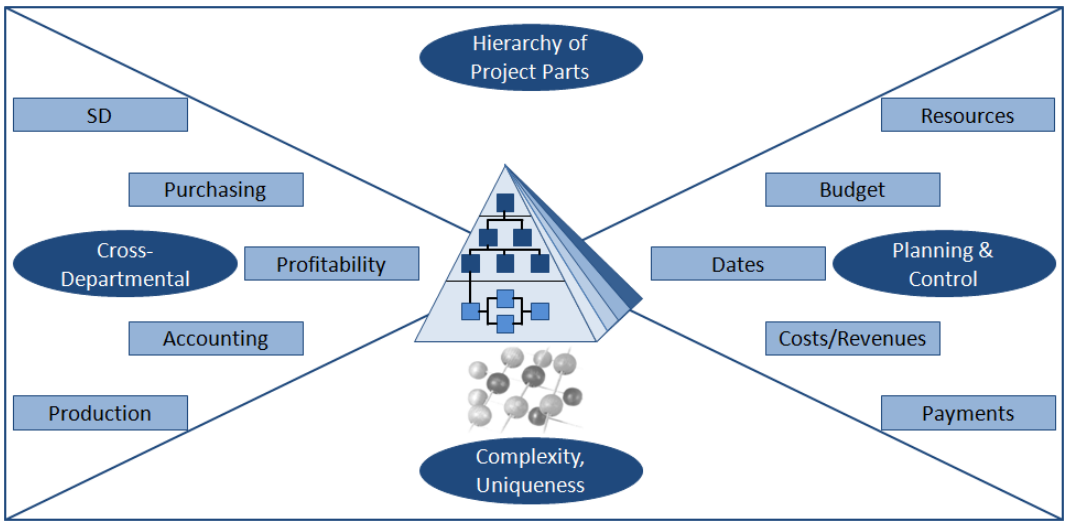


Figure 2: Project Characteristics

2.1.1 Organizational Levels in Project Management

The project system in the SAP ERP system does not feature a separate organizational unit on its own, like you already have witnessed for all the other applications in SAP ERP. Depending on type and configuration of a project, organizational units of different areas are used (SD, purchasing, production, accounting, controlling, HR, etc.). Thereby, you incorporate the project into the existing structure by making assignments to the organizational units in Accounting and Logistics, etc. This also shows the integrative function of a project.
In controlling, a project is assigned to only one controlling area, but each WBS element can be assigned to different company codes.

Figure 3: Organizational Units in the Project System

2.1.2 Master Data in Project Management

Depending on the requirements of a project that is supposed to be performed in the SAP ERP system, projects can be visualized and structured with one **Work Breakdown Structure** (WBS) or with one or multiple **Networks** or with a combination of both.
A **Work Breakdown Structure** represents the organization of a project in the SAP ERP system and is, thus, a model of the project which ***hierarchically*** visualizes the tasks to be carried out in the project. A WBS represents the operative basis for planning costs, revenues and payments as well as for scheduling and budgeting.
Using one or several **Networks,** the ***flow*** of a project or parts of a project can be visualized. Therefore, individual aspects of a project are represented as ***Activities*** that are linked to each other by using ***Relationships***.
Correspondingly, **Activities** represent the flow of a project or the flow of Activities of a project. Activities are the operative basis of planning and controlling dates, costs and resources (personnel, machines, production resources/tools, material).

Activities can be assigned to **WBS Elements.** Thereby, dates and costs of the Activities are totaled up to the WBS Elements and can be evaluated on the aggregated level of the WBS. Activity funds are checked against the budgets of WBS Elements.

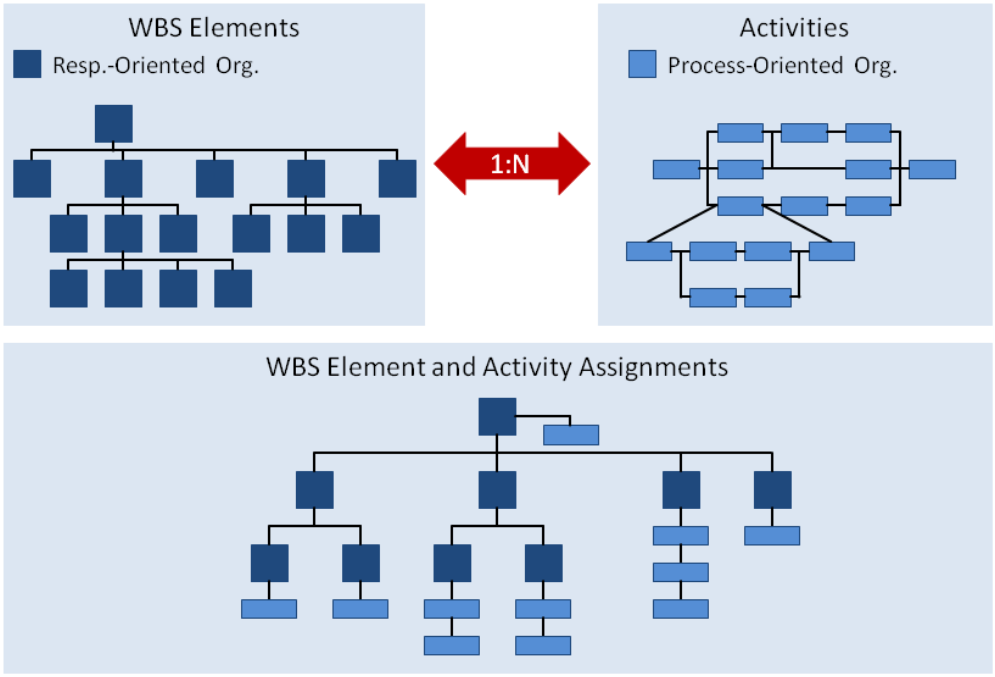


Figure 4: Master Data in Project Management

2.1.3 Phases of a Project

During the execution of a project, different phases are accomplished. Executing complex projects requires a high degree of precise planning and coordination. When planning the project flow, scheduling deadlines, making resources available and providing budgets is required. The project system in SAP ERP supports all phases of project execution and benefits from the integration with other SAP functional areas.

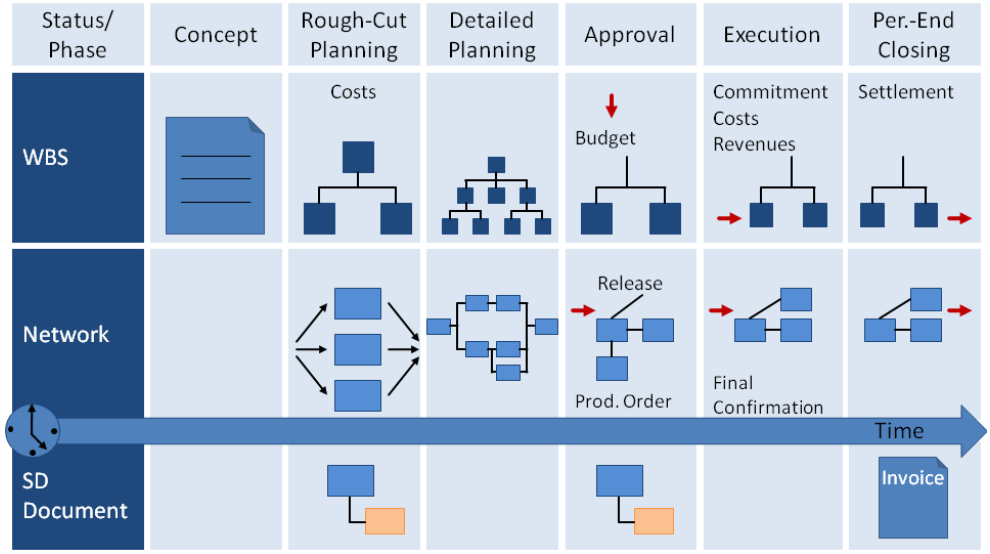
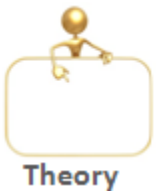


Figure 5: Phases of a Project

2.2 Theory: Project Structures and Master Data



Depending on the requirements of a project that is supposed to be mapped in the SAP ERP system, projects can be visualized and structured with a ***Work Breakdown Structure*** (WBS) or with one or several ***Networks*** or with a combination of both. Work Breakdown Structures without assigned Networks are often used to represent projects that focus on controlling aspects (e.g., cost and investment projects), as opposed to logistical processes. Contrastingly, Networks are used to represent the logistical functions within a project definition. Examples of this are automatic time planning by using scheduling, planning resources or procuring materials.

2.2.1 Work Breakdown Structure

Using a **Work Breakdown Structure** (WBS), you can represent the organization of a project in SAP ERP. ***Work Breakdown Structure Elements*** (WBS Elements) are used to structure a project and to visualize the hierarchical form of a project. The individual project parts can in turn be structured by WBS Elements until the required level of detail for a project is reached. Generally, a project can contain up to 99 structure levels in the SAP ERP system and you can assign any number of WBS Elements to the individual levels. Due to performance reasons, however, a Work Breakdown Structure should contain 10000 WBS Elements at most.

2.2.1.1 Work Breakdown Structure: Functions

The Work Breakdown Structure is the basis for subsequent planning steps in a project. The main focus is on planning, describing, managing and monitoring costs, key dates and the budget. Planning dates, costs and payment dates is often carried out by using Activities that are assigned to WBS Elements. Following, the functions of Work Breakdown Structures in the SAP ERP system are listed:

- Planning and recording dates
- Hierarchical budget management
- Cost planning and assignment of documents
- Planning and billing of revenues
- Planning and monitoring payment flows
- Inventory management for materials
- Diverse period-end tasks
- Monitoring the project progress
- Aggregated evaluation of data

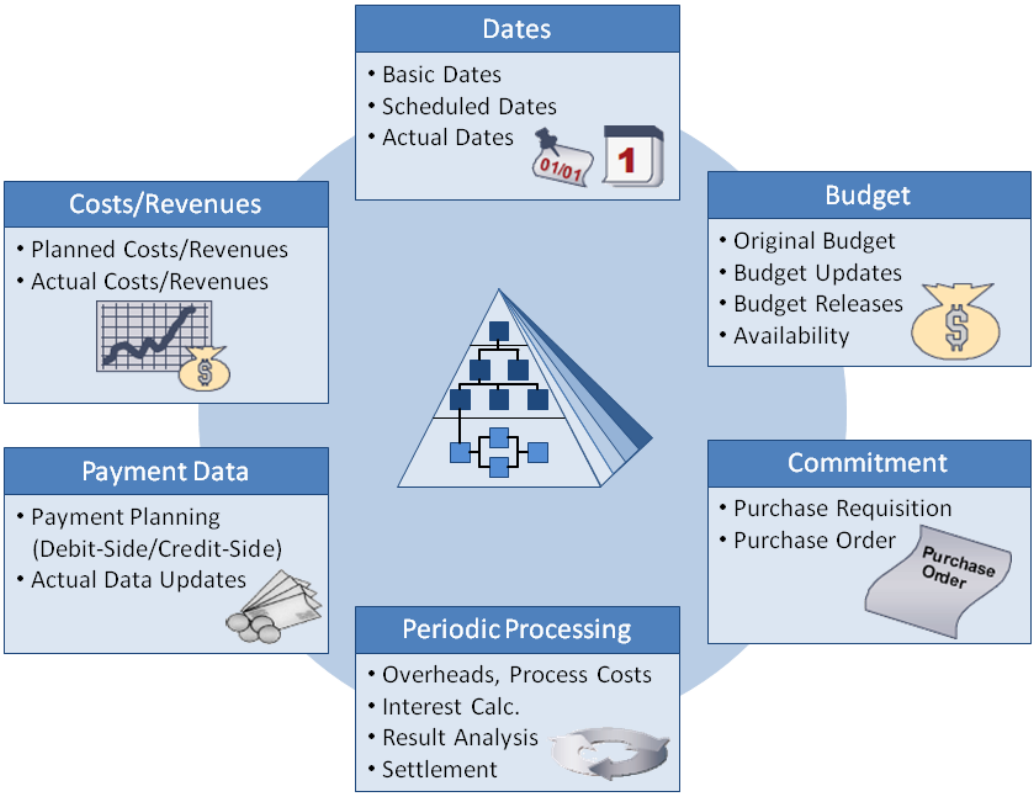


Figure 6: Work Breakdown Structure: Functions

The Work Breakdown Structure should contain all relevant aspects of a project to allow for a complete planning and analysis of the project in the SAP system. The tasks and functions of individual project parts should be distinguished clearly and defined uniquely. There are several ways to structure a Work Breakdown Structure within a hierarchy level. For example, you can structure a level according to phases, functions or organizational characteristics.

Phase-oriented structuring
WBS Elements represent, for example, elements of a construction procurement or an assembly phase. This form of structuring is especially relevant for significant scheduling and gradual processing of projects.

Function-oriented structuring
This form allows, for example, for structuring a shipbuilding project according to functional components and their manufacturing. Thus, you would create WBS Elements for the engine, the cabins, etc. When using project stocks (material stocks), you can manage separate stocks for the individual assemblies.

Structuring according to organizational characteristics
Structures can, for example, contain WBS Elements for SD, purchasing and production or contain a separation according to cost centers. This form of structuring allows for the immediate identification of cost proportions according to different organizational units in reporting.

The following figure shows a schematic image of the project definition for the techno-doping project. Thereby, a phase-oriented structuring was chosen for the project definition.

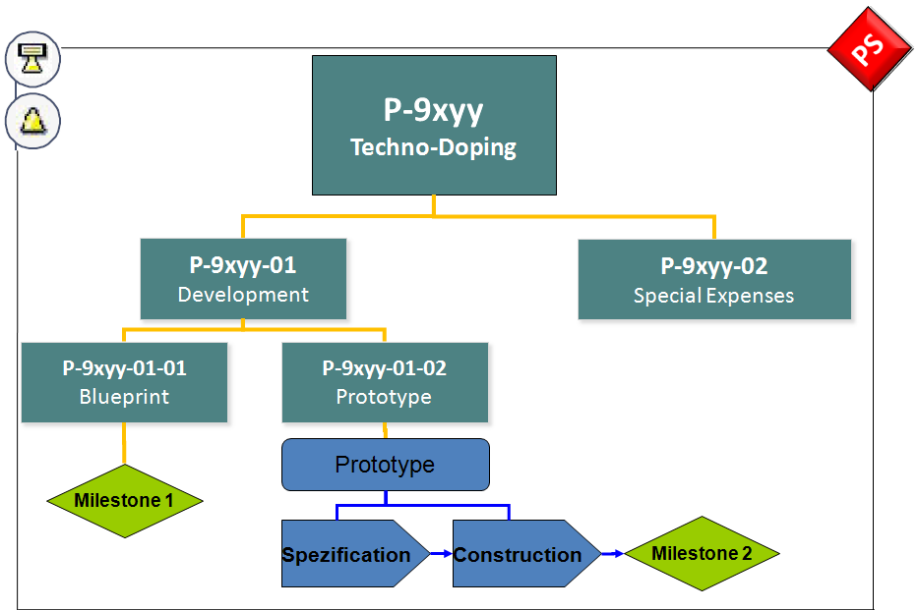


Figure 7: Project Definition Techno-Doping

2.2.1.2 Operative Indicators of WBS Elements

WBS Elements represent the individual parts of a project. Operative indicators are especially important for controlling WBS Elements. You can set the indicators ***Planning Element, Account Assignment Element*** and ***Billing Element*** in the basic data of WBS Elements. Thus, the (controlling) characteristics of a WBS Element are determined. Moreover, operative indicators determine which task a WBS Element carries out during project processing.

Planning Element: WBS Elements for which costs are supposed to be planned manually are characterized as Planning Elements.
Account Assignment Element: This indicator controls whether you can assign orders (also Activities and Networks) to the WBS Element. Moreover, it allows for the assignment of documents or costs at WBS Elements. In case this indicator is not set, no purchase requisitions, orders or invoices can be charged against a WBS Element.
Billing Element: You have to set this indicator if you want to plan revenues and post possible actual revenues for a WBS Element.

Independent of the level in the Work Breakdown Structure, you can set any combination of these three indicators.

Another indicator affecting the controlling characteristics of a WBS Element is the **statistic** indicator. If this indicator is set, actual costs are updated on a WBS Element only using value type 11 (statistic actual) instead of value type 4 (actual). Thus, when assigning to this WBS Element, you always need to enter a "real" assignment object along with the statistic WBS Element as well (e.g., cost center, sales order) as receiver of costs. Statistic assignments are usually used for analyses and reporting.

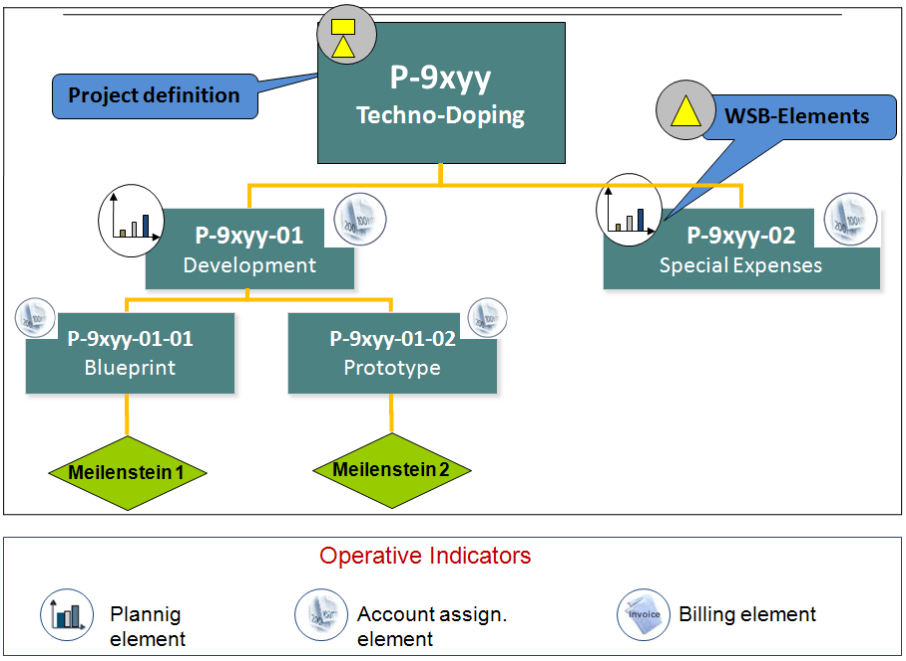


Figure 8: Operative Indicators of the Work Breakdown Structure

2.2.1.3 Hierarchy Chart

The hierarchy chart displays the hierarchical organization of a Work Breakdown Structure in a graphical way. Depending on the graphical profile of a project and the selections under *display WBS Elements,* different data can be displayed for each WBS Element. With a mouse click, you can change the operative indicators of a WBS Element or call up the detail screen for a WBS Element. Moreover, you can create a WBS Element directly from the hierarchy chart and – if permitted – delete as well.

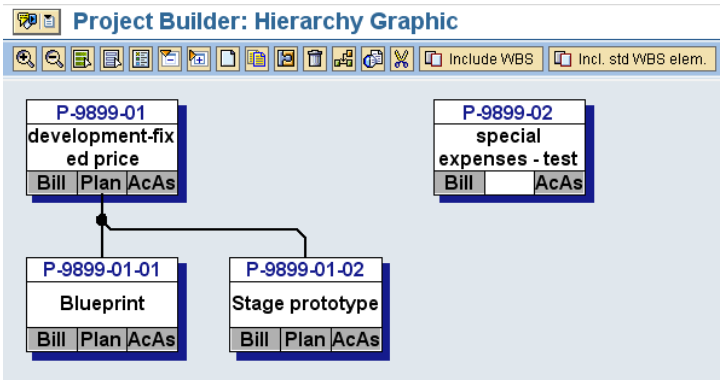


Figure 9: Hierarchy Chart: SAP-System-Screenshot

2.2.2 Network

Networks represent the flow of project activities. Project activities and their sequence and links are represented by using ***Activities*** and ***Relationships*** in the system. Using Networks, you can especially make use of the logistical integration in materials management, production, maintenance, capacity planning and purchasing.

Networks should not exceed a size of 500 Activities, since usually there is only one manager per Network in the system. Moreover, you have to pay attention to the lock logic in the SAP system when conceiving a Network. Each time a Network object is processed, the entire Network is locked.
Usually, but not inevitably (a project can be created without WBS Elements or Work Breakdown Structure and only feature a Network), Activities are created for WBS Elements. That means that Activities are assigned to the corresponding WBS Elements. Using this assignment, planned and actual data of Activities (dates, costs and payment data) are aggregated at the WBS Elements.

2.2.2.1 Networks and Activities: Structure

A Network consists of a ***Network Header*** and ***Activities***. Activities can be linked with each other by using ***Relationships***. You can use ***Activity Elements*** to further detail Activities.

Do not confuse Activities (and Activity Elements) of SAP PS with activities or activity types of SAP CO. Since both are used throughout this whole teaching unit, the SAP PS Activities will always start with a capital letter.

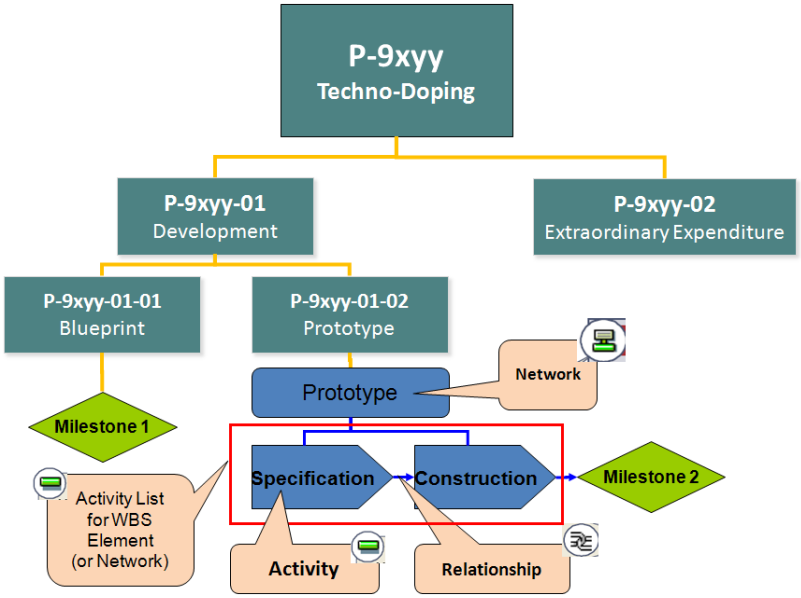


Figure 10: Networks and Activities: Structure

Network Header

The Network Header is a frame for the different objects of a Network. It contains controlling profiles and indicators as well as default values for the different Network objects. The Network Header contains a Network profile, a Network type and the plant in which the project is processed. Using the plant, the system can determine to which company code and controlling area the project belongs.

Activities

The Activities in a project describe the individual tasks and project steps. Activities are linked by using Relationships to determine a causal and timely sequence. Moreover, they are a quantity structure for planning:

- dates (automatically via scheduling)
- costs (automatically via costing)
- resources (internal and external Activities)
- material requirements (via assigned components)

There are four **Activity categories** in Networks:

- ***Internal Processing***: An Internal Processing Activity is used to plan and enter an activity that is provided by capacities (e.g., personnel, machines) of your own company.
- ***External Processing***: An External Processing Activity is used to plan and procure an Activity provided by a company-external resource. Using the specifications of the External Activity, the end date of the External Activity, the material group and the purchasing organization in charge as well as the purchasing group, the system can later generate a purchase requisition.
- ***Service***: Similar to an External Processing Activity, the Service Activity is used to plan and procure external activities via purchasing. While a specific activity is procured in external processing, Service Activities allow for planning and procuring several services as well as entering data concerning activities that are not yet specified exactly.
- ***Costs***: Cost Activities can be used for planning and later assigning costs that do not incur due to internal activities, procurement of external activities via purchasing or material consumption. Examples are travel expenses or other primary costs.

Relationships

Using Relationships, sequences of Activities are defined. When creating a Relationship between two Activities, you determine which one is the antecessor and which one is the successor. Correspondingly, you specify a logical sequence. The following types of Relationships are available in the SAP ERP system:

- ***FS Relationship***: The following Activity starts when the previous one is finished.
- ***SS Relationship***: The next Activity starts simultaneously or after the previous Activity starts.
- ***FF Relationship***: The subsequent Activity ends simultaneously or after the previous Activity ends.
- ***SF Relationship***: The previous Activity starts after the subsequent Activity ends.

Activity Elements

Activity Elements are used to detail Activities. The following Activity Element types exist in SAP PS:

- ***Internal Processing Element***
- ***External Processing Element***
- ***Service Element***
- ***Cost Element***

The individual types feature the same functionality as mentioned for the categories. However, in contrast to the categories, they do not feature Relationships and are, thus, not relevant to scheduling the Network.

2.2.2.2 Networks and Activities: Functions

Using one or several Networks, projects or parts of it can be represented in a flow-oriented way in the SAP system. The Relationships between two Activities define their logical sequence and timely dependencies. Linking Activities of different Networks allows for representing Cross-Network Activities. One important advantage of Networks is that the SAP system automatically determines plan dates for each Activity and the entire Network, as well as buffer times and timely critical Activities based on the duration of the individual Activities and their sequence.

Using Activities of a Network, personnel, capacities, materials, resources/tools and services required for the different tasks of the project can be planned. Thus, important functions of a Network are:

- Scheduling
- Resource planning
- Confirmation of work
- External procurement of Activities
- Material planning, procurement, and delivery
- Network costing
- Several period-end closing tasks
- Monitoring of the project progress

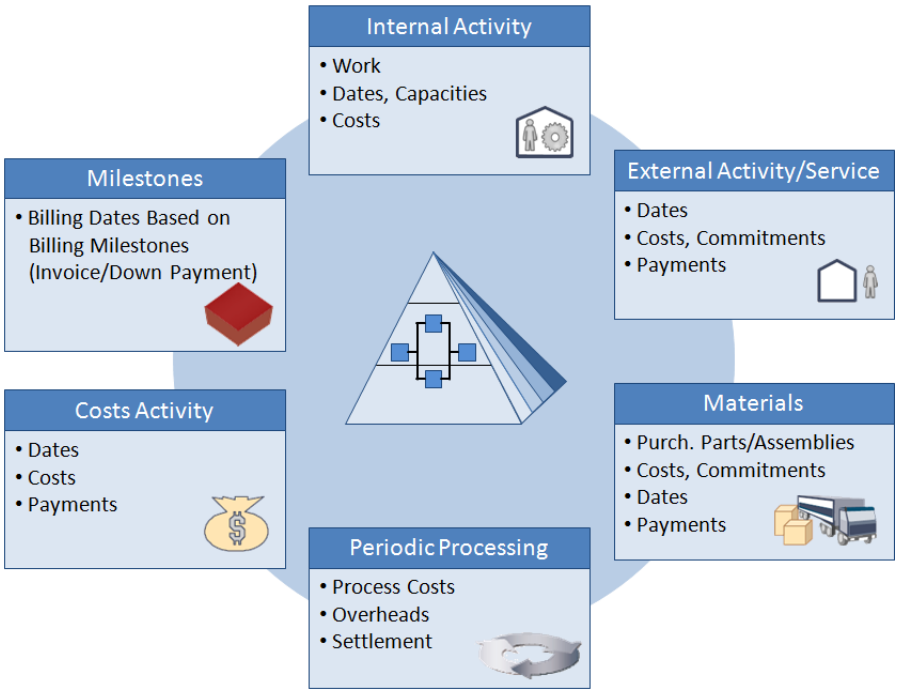


Figure 11: Networks and Activities: Functions

2.2.2.3 Network Structure Graphic

A Network structure graphic represents Activities of one or several Networks graphically. The system organizes the Activities according to their logical sequence. The graphical sequence can be changed (drag & drop) manually. Moreover, Activities can be grouped according to used work centers or WBS Elements to which they are assigned.
All functions to create a Network are available in a Network structure graphic. For example, Activities or Relationships can be created. The Network structure graphic can be called up by using different transactions of the project system, e.g., from the Project Builder, the information system and the Project Planning Board.
Moreover, a cycle analysis can be carried out. This function can only be executed from the Network structure graphic. A cycle is a closed loop of Relationships and Activities (i.e., if you start at a particular Activity and return to this very Activity via the assigned Relationships). In case of a cycle, the Network cannot be scheduled. A cycle analysis is a tool to identify and process a cycle.

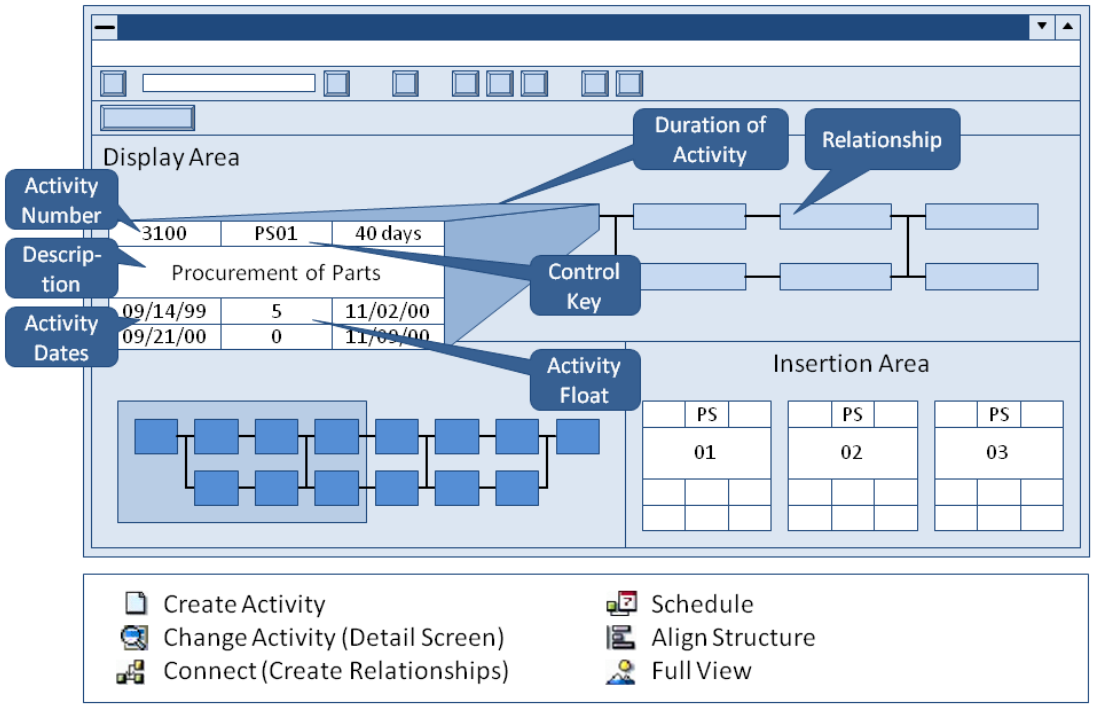


Figure 12: Network Structure Graphic

2.2.3 Other Structures in the SAP Project System

The following structures are important for both using Work Breakdown Structures and Networks in SAP PS.

Milestones

Milestones are used in the project system to represent events of importance, e.g., entering important project steps. Therefore, data regarding the intended use and function, a short and long text and a planned date at which the Milestone is presumably completed, are entered into the Milestone. Reaching a Milestone can be documented by setting the actual date. Milestones

can be assigned to WBS Elements. They feature different possible uses. They can, for example, be used for Milestone Billing in SD or for starting workflow tasks.

PS Texts
PS Texts (Project Structure Texts) are individually defined texts managed in a PS Text Catalog. Texts are differentiated according to several text types. PS Texts can be assigned to one or several WBS Elements or Activities. PS Texts can be entered in SAP ERP SAPscript or in Microsoft Word format. Thereby, data from the SAP ERP database are saved.

Document Management integration
Within the Project System, you can use the SAP ERP Document Management System to assign document info records to WBS Elements and Activities. In the document management system (DMS), original documents in different formats (e.g., Excel, Word, PPT, BMP, TIF, CAD formats) are assigned to a (SAP ERP internal) document info record (cf. teaching unit life-cycle management). You can display document info records and the corresponding originals from the project information system online. The originals can also be displayed via Internet.

2.2.4 Processing Options

Operative project structures can be created manually or by copying (standard) templates in the SAP ERP system. Standard Work Breakdown Structures, standard Networks and some other project structures and simulation versions can serve as copy templates. For creating, changing and displaying operative project structures, there are different options in the SAP system. The important tools for project creation are the **Project Builder** and the **Project Planning Board**. A project can also be created in the Project Builder and then later processed in the Project Planning Board and vice versa. Which tool is used in the end depends on the user's preferences.

2.2.4.1 Project Builder

Using the **Project Builder** (Transaction CJ20N), you can maintain all objects except for assignment of productions resources/tools in the project system. The Project Builder is the central tool for defining projects in the SAP ERP system. The Project Builder screen consists of three areas:

- ***Worklist and template area***: In the work list on the lower left screen of the Project Builder, the last five projects processed by a user are displayed. The template area, which is located on the lower left screen as well, displays individual objects (WBS Elements, Activities, etc.) that can be used to create the structure of a project. By double-clicking or drag & drop, you can insert template objects into the upper left area.
- ***Structure tree***: The structure tree of the Project Builder (upper left area) displays the project definition, WBS Elements, Network headers, Activities, etc. of a project including their identification and description. Thus, the structure tree displays the project that is supposed to be processed currently in its hierarchical organization.

- ***Detailed work area***: The detail screen on the right hand side displays individual entry fields for controlling the project Element that is currently selected from the structure tree. This is also where all entries required for controlling the project are made (e.g., dates, resources, assignments).

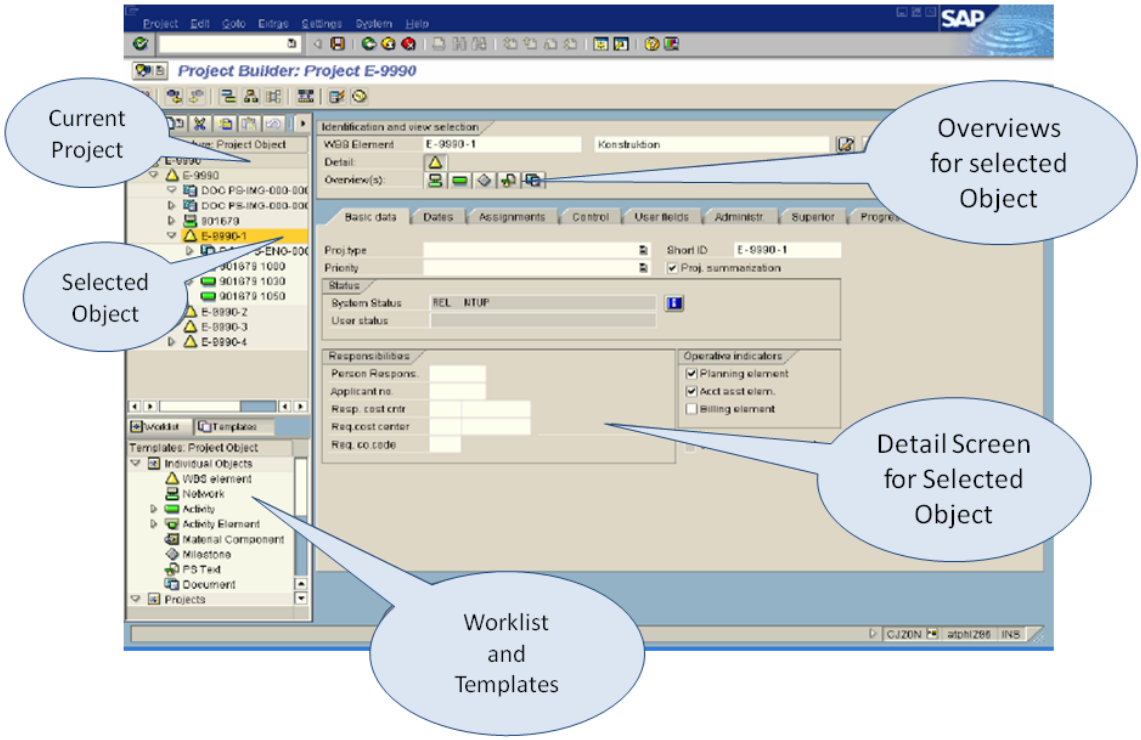


Figure 13: Project Builder (1)

Using the Project Builder, you can create or change objects available from a project definition for defining projects in the SAP system such as the project definition, WBS Elements, Activities, Activity Elements, PS Texts, documents, milestones or material components. Moreover, detailed screens, lists or charts (hierarchy chart, Network chart) (1-4 in the next figure) can be used.
Along with manually creating project structures, you can also use standard project structures (WBS structures or Networks) or standard structures (standard WBS structures, standard Networks) as templates (7). Moreover, you have the option to include WBS structures, standard WBS structures and standard Networks in an already existent project structure (5).
When creating a project, you can copy an operative project or a standard project including all objects of subsequent levels (WBS Elements, Activities, PS texts, documents, milestones, items) (6).

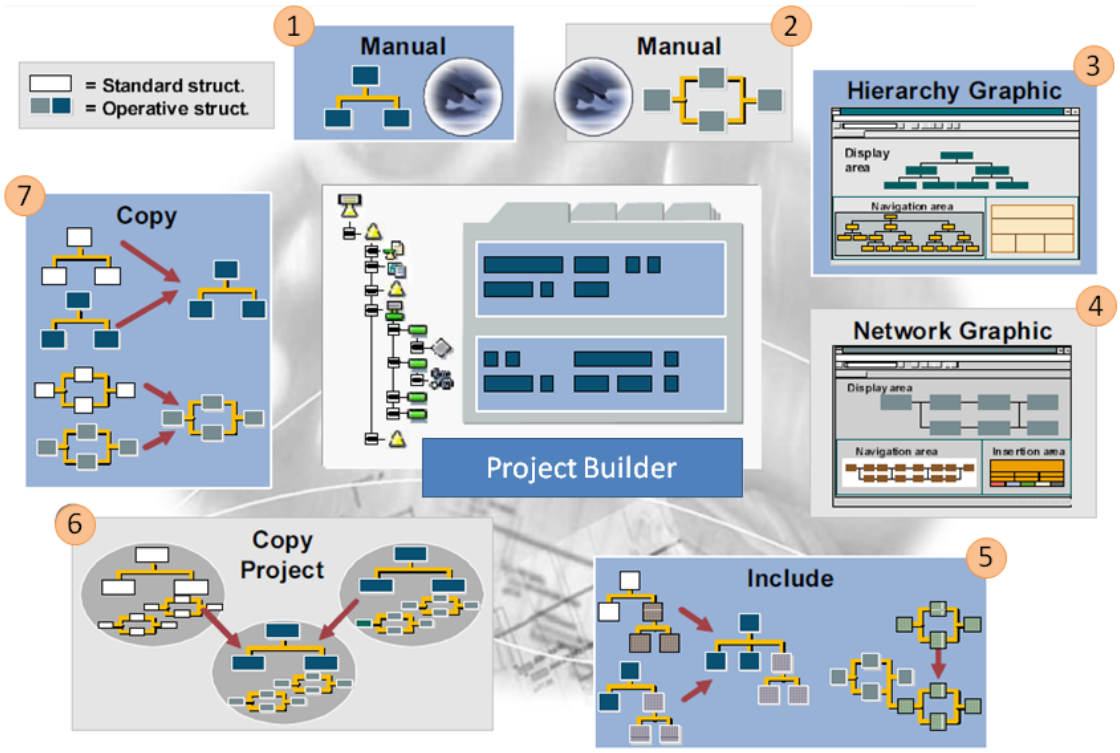


Figure 14: Project Builder (2)

2.2.4.2 Project Planning Board

The **Project Planning Board** is a graphical user interface that can be used to create and process all data for a project in an integrated environment. This includes:

- Project definition, WBS Elements, Activities, Relationships, Milestones, Documents and PS Texts
- Planning dates and resources (internal/external processing)
- Cost planning via Activities

You can simulate projects at various stages and use this information for planning (see next theory chapter) to estimate costs, deadlines and capacities during the quotation phase and to compare various options during the course of the project. You can then use the best option in your operative project.

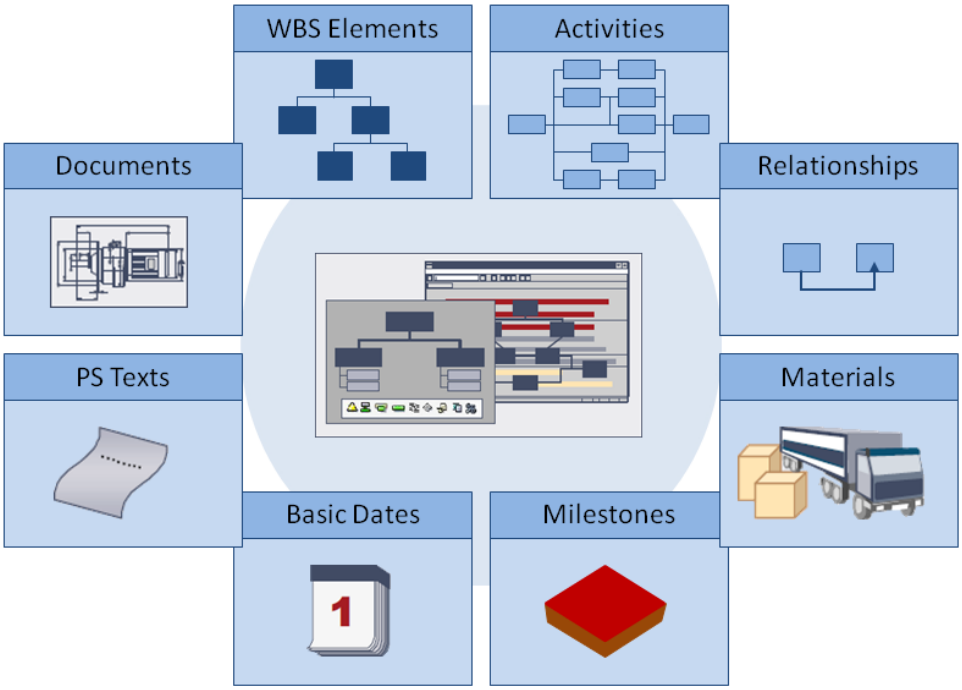


Figure 15: Project Planning Board

The Project Board is based on an interactive SAP Gantt chart. You can access important navigation help as follows:

- By double-clicking the Project Planning Board items, you can branch into detailed screens to change field selections or time settings.
- By clicking the right mouse button, all options for the corresponding cursor position are displayed (important: the options depend on the cursor position!).
- When selecting all objects and choosing *show all dependent objects*, all objects of the Project Planning Board are displayed.

2.3 Practice: Master Data SAP MM/CO/HCM

The SAP ERP Project System is integrated with almost every application of SAP ERP. Thus, to accomplish a project by using SAP PS, you need to maintain several master data from different SAP applications.

Prior to entering your project into the SAP system, maintain all master data from the other functional areas involved. This includes

- a material master record,
- an activity type and its price,
- a sales condition and
- personnel master record.

Figure 16: Process Overview: Maintaining Master Data

Subsequently, enter the project definition into the SAP ERP system.

2.3.1 Create Material Dummy for the Project

To be able to settle the project with the customer, you need to create a material master record for a material dummy. This "material" is sold as a placeholder for a project to the customer. Dummy master records are usually created for non-physical "materials" or products (e.g., services). Create a **dummy material master record** for the project.

Dummy material master record:
This material master record will be used in the sales document as dummy substituting the project to be sold.

Choose

Logistics → Materials Management → Material Master → Material → Create (Special) → Service (MMS1)

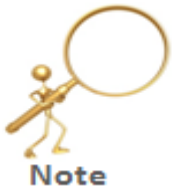
1. Enter the following data:
   - **Material** ***Techno-xxyy***
   - **Industry** ***3 Service Provider***
   - Press *Enter*.
2. The system displays the views to select. Pick the following views:
   - ***Basic data 1***
   - ***Basic data 2***
   - ***Sales: SalesOrg data1***
   - ***Sales: SalesOrg data 2***
   - ***Sales: general/plant data***

- ***MRP 1***
- ***MRP 2***
- ***MRP 3***
- ***MRP 4***

3. Enter the following organizational units:
   - **Plant** ***1300 (Frankfurt)***
   - **Sales organization** ***1000 (Germany Frankfurt)***
   - **Distribution channel** ***10 (End customer sales)***
   - Leave the **storage location field *blank***, since a Service cannot be stored!
   - Confirm your entries with *Enter*.
4. **Basic data 1:**
   - **Long text** ***Techno-doping-xxyy***
   - **Basic unit of measure** ***PC (Piece)***
   - **Division** ***Cross-divisions [00]***
   - **GenItemCatGroup** ***0005 (Milestone - billing)***
5. **Sales: SalesOrg 1:**
   - **Delivering plant** ***1300 (Frankfurt)***
   - **Tax classification** ***1 (Full tax)***
6. **Sales: SalesOrg 2:**
   - ***Matl statistics grp*** ***1 (statistically relevant)***
   - **Gen. Item cat. grp** ***0005 (Milestone - billing)***
   - **Item category group** ***0005 (Milestone - billing)***

*On the left hand side, the **general item category group** is already set to **0005**. We refer to the field on the right hand side: **item category group**. **Both** fields must have the entry 0005.*

7. **Sales general/plant view:**
   - **Availability check** ***KP (No checks)***
8. **MRP 1:**
   - **Purchasing group** ***000 (Chef, H.)***
   - **MRP type** ***ND (NO MRP)***
9. **MRP 2:**
   - **Planned delivery time** ***60 days***.
10. **MRP 3:**
    - **Strategy group** ***21***



With the setting of the Strategy group sales-order-related production/project settlement you can link this material in the sales document with a WBS Element from the PS module later in this case study.

11. Finally select the **Additional Data** tab. Type in the **language** key ***DE*** and the **description** ***Techno-Doping-xxyy***.
12. *Save* the new material.

2.3.2 Controlling Master Data

Next, create the **master data in SAP CO**. You are already familiar with these process steps as well.
You have to hire a test driver for the new bike to be able to evaluate the prototype regarding its technical advantage in comparison to competing products. The hours worked by the test driver are supposed to be entered by using a separate activity.

2.3.2.1 Create an Activity Type for the Test Driver

First, create an activity type for the test driver. Call up the following transaction:

Accounting → Controlling → Cost Center Accounting → Master Data → Activity Type → Individual Processing → Create (KL01)

1. Enter the following data:
   - **Controlling area** ***1000*** **(If prompted)**
   - **Activity type** ***T-xxyy***
   - **Valid from** ***01.01.(!) of this year***
   - **Valid to** ***31.12.9999***
   - Press *Enter*.
2. Enter the following data:
   - **Name** ***Testdriver-xxyy***
   - **Activity unit** ***HR (hours)***
   - **CCTr. categories** **** (all)***
   - **ATyp category** ***1 (manual entry, manual allocation)***
   - **Allocation cost elem** ***616000 (DAA Inspection)***
3. *Save* your entries. The system confirms that the Activity type was added.

2.3.2.2 Plan Hourly Rates for the Activity Type

To valuate the test driver's working hours, an internal hourly rate is supposed to be planned. Cost center **4280** is responsible for this. 100 € costs incur for the test driver per hour. Please bear in mind that these are only internal cost items for controlling. The customer is charged with higher costs, since you want to gain profits with hiring the test driver. You will find more on this issue later in the case study (Dynamic Items Profile).

Call up the following transaction:

Accounting → Controlling → Cost Center Accounting → Planning → Activity Output/Prices → Change (KP26)

1. Enter the following data:
   - **Version** *0 (plan/actual)*
   - **From period** *1*
   - **To period** *12*
   - ***Fiscal year*** *current year*
   - **Cost center** *4280 (quality control)*
   - **Activity type** *T-xxyy (Testdriver-xxyy)*
   - Press .
2. Enter an hourly rate of ***100*** into the **fixed price** column.
3. *Save* your entries.

2.3.2.3 Assign the Activity Type to an Activity Type Group

Subsequently, you will assign the previously created activity type to an **activity type group**. This assignment will be the **foundation of resource-related billing** later in the business process.

Since all participants of this case study assign their activity types to the same Activity type group, there may be brief lock issues as another participant may assign his/her activity type at the same time and, thus, locks data access. This data base lock is necessary to ensure data consistency in the system. In this case, wait briefly and try the subsequently described procedure again!

Choose the following transaction

Accounting → Controlling → Cost Center Accounting → Master Data → Activity Type Group → Change (KLH2)

1. Enter **Activity type group *testdriver*** and confirm with *Enter*.
2. Confirm a possible question regarding a change to the data set with ***Yes***.
3. Assign your activity type **T-xxyy** to the activity type group by clicking the Activity Type symbol (**inset activity type**). In the first column, enter the **activity type *T-xxyy*** and press *Enter*.

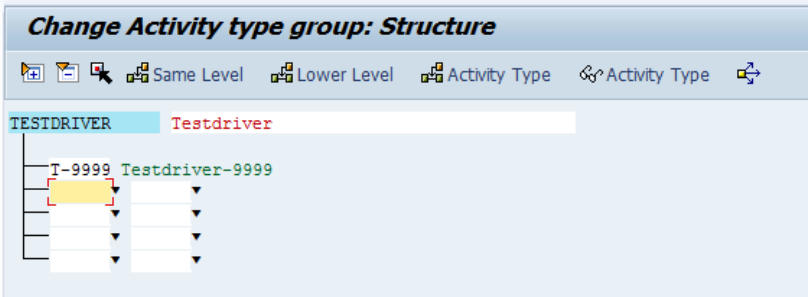


Figure 17: Assign Activity Type to Activity Type Group: SAP-System-Screenshot

4. *Save* your entries ( ) and leave the screen ( ).

*You will learn why this assignment was necessary later in the case study when processing the **resource-related billing** (Dynamic Item Profile).*

2.3.3 Create Personnel Master Record

Next, you have to maintain the personnel master record for the test driver. Therefore, choose the following transaction:

Human Resources → Personnel Management → Administration → HR Master Data → Personnel Actions (PA40)

1. Enter the following data:
   - **Personnel number** ***990xxyy***
   - Start field ***01.01. (!) of the current year***
2. Select **action** ***Time Recording (mini-master)*** by clicking the row so that it is entirely highlighted. Click the symbol.
3. In the next screen, assign the employee to
   - **Personnel area** ***1300 (Frankfurt)***
   - **Employee (EE) group** ***1 (active)***
   - **Employee (EE) subgroup** ***salary staff (DU)***.
   - Save your entries.
4. In the next dialog, complete all mandatory fields (indicated with the symbol) as follows:
   - **Title** ***Mr.***
   - **Last name** ***Test***
   - **First name** ***Tom-xxyy***
   - **Birthday** ***01.01.1980***
   - *Save* your entries.
5. On the **create organizational assignment** screen, enter
   - **Business area (Bus. area)** ***9900 (Corporate/other)***
   - *Save*.
6. On the next screen, do not change any entries but click Continue only (copy assignment).
7. Skip possible warnings with *Enter*.
8. On the **planned work time** screen, enter
   - **Daily working hours** ***8***
   - **Weekly working days** ***5***
9. *Save* the entries.

Your employee is now recorded in the system. Next, you need to extend the personnel master record to allow for using time sheets. Thereby, you enter which activities (previously entered

activity type ***T-xxyy***) are provided by the employee to settle them by using the corresponding prices.

Expand the Personnel Master Record

Choose the following transaction:

Human Resources → Personnel Management → Administration → HR Master Data → Maintain (PA30)

1. Enter your previously created personnel number ***990xxyy*** into the **personnel number** field**.**
2. Enter **Infotype *0315 (Time Sheet default values)*** at the bottom of the screen. Press *Enter*.
3. Click the  symbol (**create**).
4. Enter the following data:
   - **Sender Cost Center** ***4280 (quality control)***
   - **Activity type** ***T-xxyy***
   - **Plant** ***1300 (Frankfurt)***
5. *Save* your entries.

With this, you have created all master data required for processing the case study. To recapitulate, you have created:

- a material master record in the logistics functional area
- an activity type and a corresponding price in controlling
- personnel master for the test driver who is supposed to provide special activity expenditures.

Next, we will focus on the project structure.

2.4 Practice: Project Structures

In contrast to previous master data records, PS master data for structuring projects are maintained by using the **Project Builder,** since it can inherently represent the organizational logic of the project.
In the following section we will carry out **project structuring**.

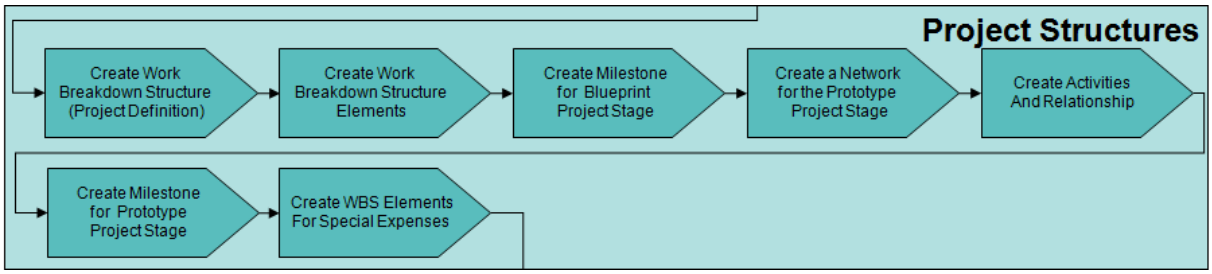


Figure 18: Process Overview: Project Definition

Your project deals with developing a new racing bicycle for your customer. When conceptualizing the project structure, you determine that your project is divided into the **developing and test stages**. The developing stage consists of the project parts **Blueprint** and **prototype**. Both parts are represented as Work Breakdown Structure. In the Blueprint stage, your engineers are going to produce drawings of the new racing bicycle. You plan 2 weeks for that (milestone 1). The project phase prototype includes the production of a bicycle prototype. This stage is structured into the **Activities *specification*** and subsequently, ***construction***. Specification and construction are correspondingly represented in a Network. The duration of phase 2 is derived from the duration of Activities in the Network (milestone 2). Corresponding billing sets are linked with the milestones. When the first milestone is reached, 30% of the customer invoice is recorded. When reaching the second milestone, 70% of the project price is due.
The **test stage** of the project is later billed as special Activity. Therefore, ***resource-related billing*** is used. Thus, the test phase is not settled using a fixed price but according to testing expenses.

Below, you can see the organization of the project described in this case study.

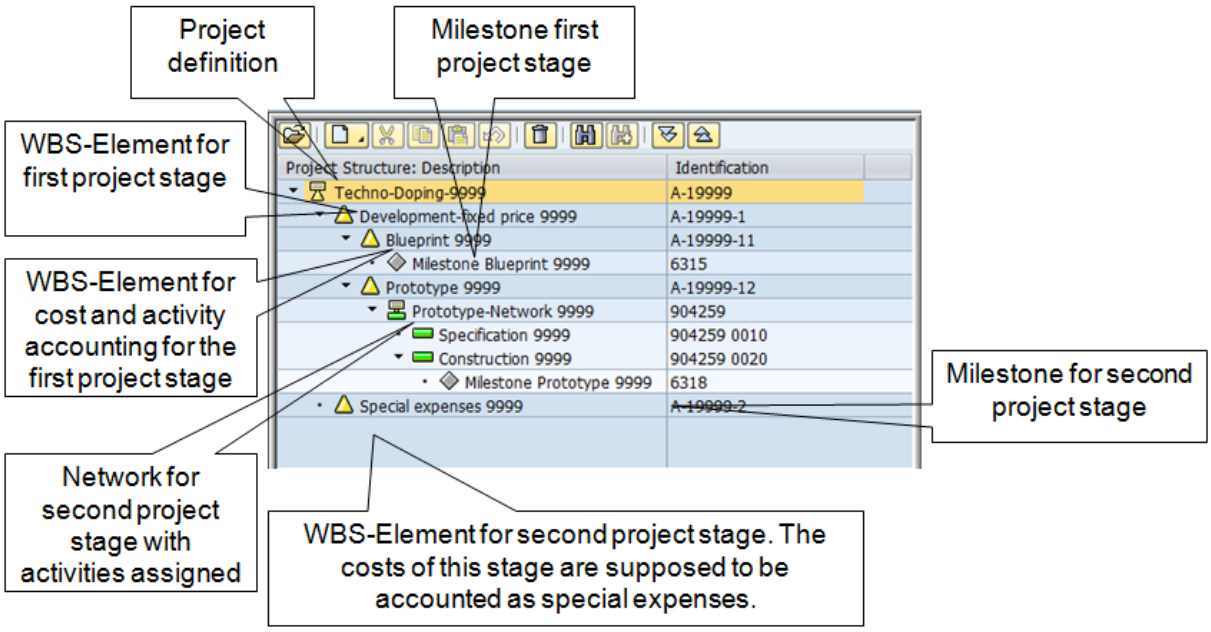


Figure 19: Project Structure: SAP-System-Screenshot

2.4.1 Create Work Breakdown Structure (Project Definition)

The project definition is the basis of the project. This is your first task. Choose the following transaction:

Logistics → Project System → Project → Project Builder (CJ20N)

1. When calling up the transaction for the first time, a screen appears saying "**Welcome to the Project Builder...**". Select ***Skip this in the future*** and press *Enter*. Possibly, the **Project Builder: User-specific options** menu appears. Accept the proposed settings with ***Enter***.
2. You are now in the **Project Builder**. To create a new project, click the  symbol (**create**) and choose **project**.

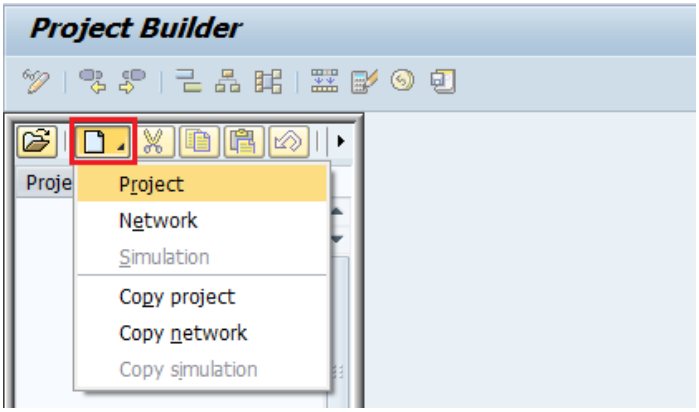


Figure 20: Create new Project: SAP-System-Screenshot

3. In the project header, enter the following data:
   - **Project Def**. ***A-1xxyy***

- **Text** ***Techno-Doping-xxyy***
- **Project Profile** ***US50 Open PS - US***
- Press *Enter*.

4. Go to the **basic data** view on the lower screen. Enter the following data:
   - **Controlling area** ***1000 (CO Europe)***
   - **Company code** ***1000 (IDES AG)***
   - **Business area** ***9900 (Corporate/other)***
   - **Plant** ***1300 (Frankfurt)***
   - **date** section set
   - **Factory calendar** ***01 (Factory calendar Germany standard)***
   - **Start date** ***Current date***
   - **End date** ***Last day of the current month + 3 months***
   - Press *Enter*.

If you receive a notification concerning the date, e.g., the date is not a working day, skip the message with Enter.

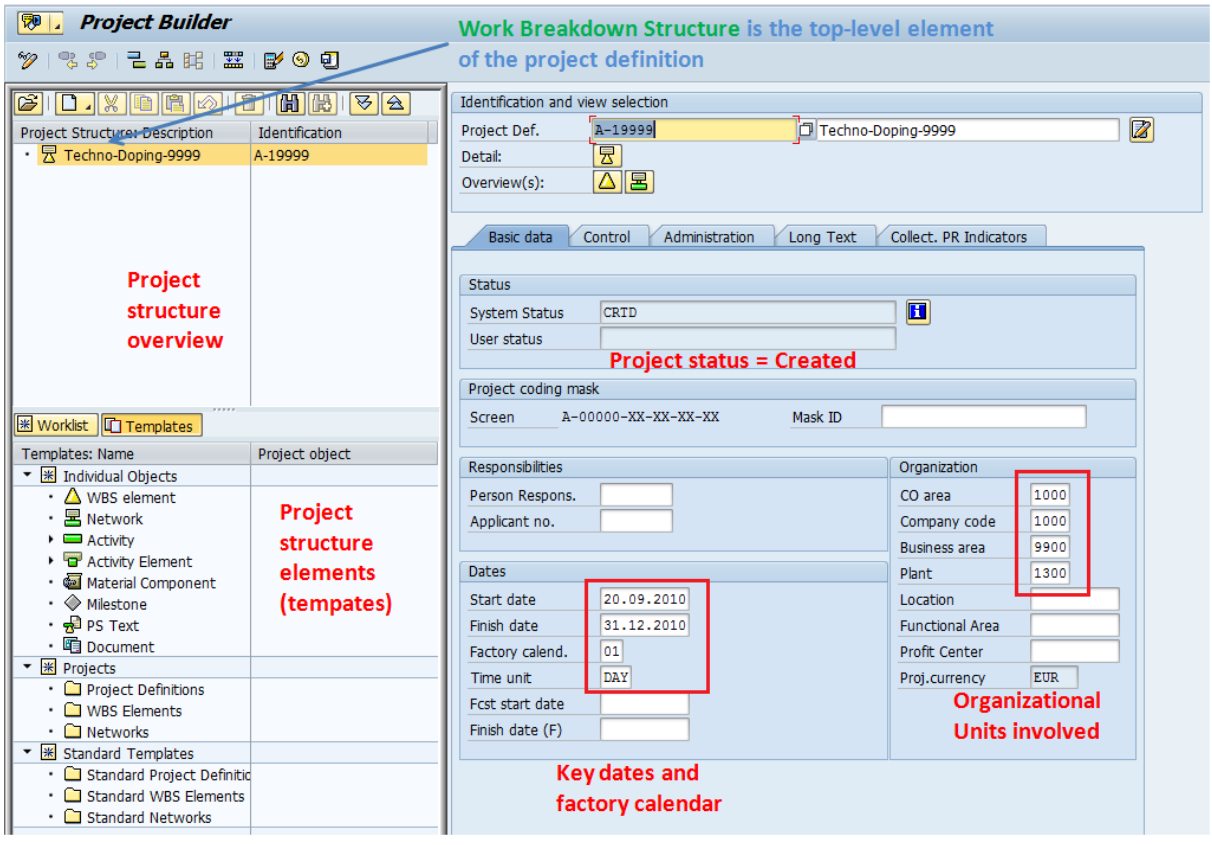


Figure 21: Project Definition: SAP-System-Screenshot

Our project consists of two phases. In the first stage, the research team is supposed to develop technical plans and the prototype (**development**). The second stage focuses on testing the prototype (**test**).

2.4.2 Create Work Breakdown Structure Elements

You use **Work Breakdown Structure Element** to further detail your project definition.

2.4.2.1 Create a WBS Element for the Development Project Stage

Create the first **Work Breakdown Structure Element** (WBS Element). This Element is for the development stage.

1. This WBS Element is created for milestone billing. On the lower left screen (**templates: description**), you can see different templates for setting up project structures in the **individual objects section.**
   Select the ***WBS Element*** (WBS element) with the mouse. Hold on to the mouse button. Move the mouse to the window of the project structure on the upper left screen. Release the mouse button upon the project definition to add the WBS Element to the project.

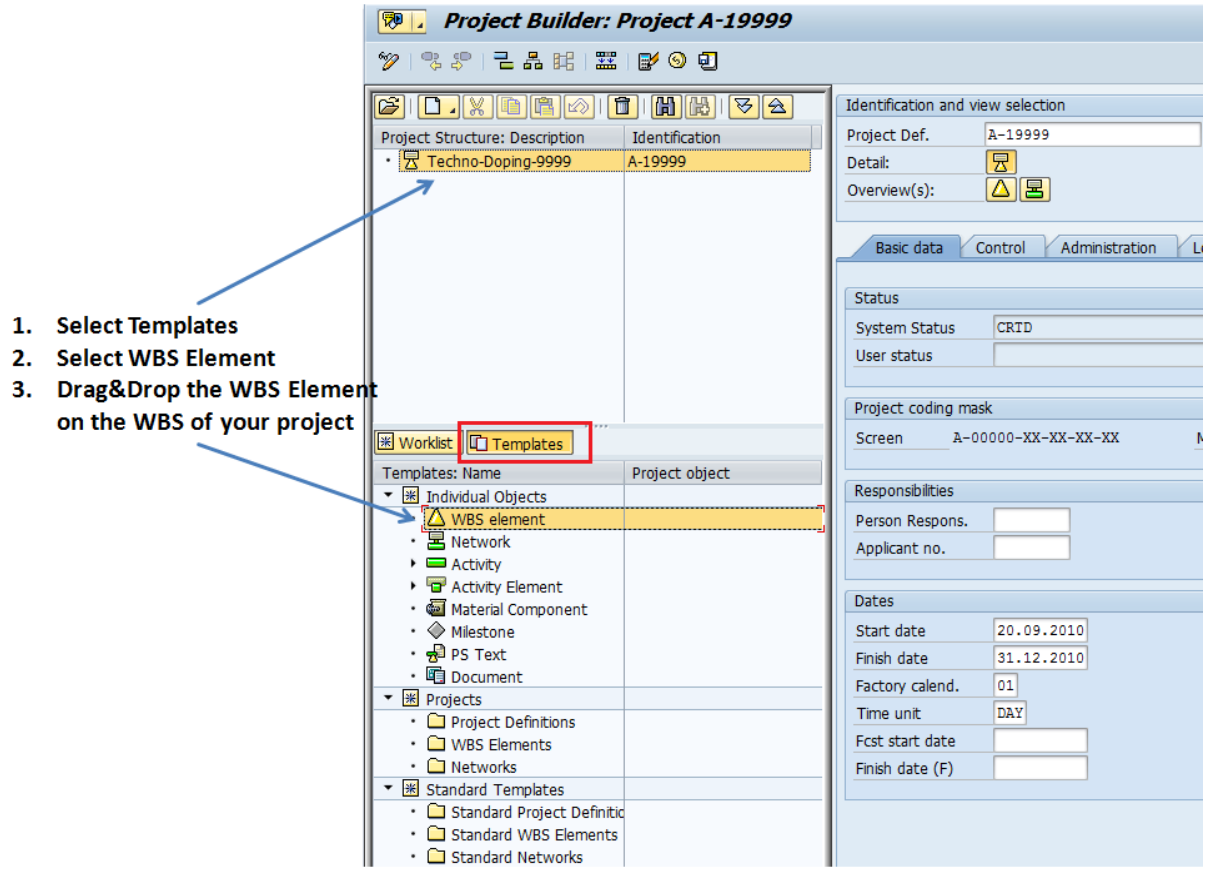
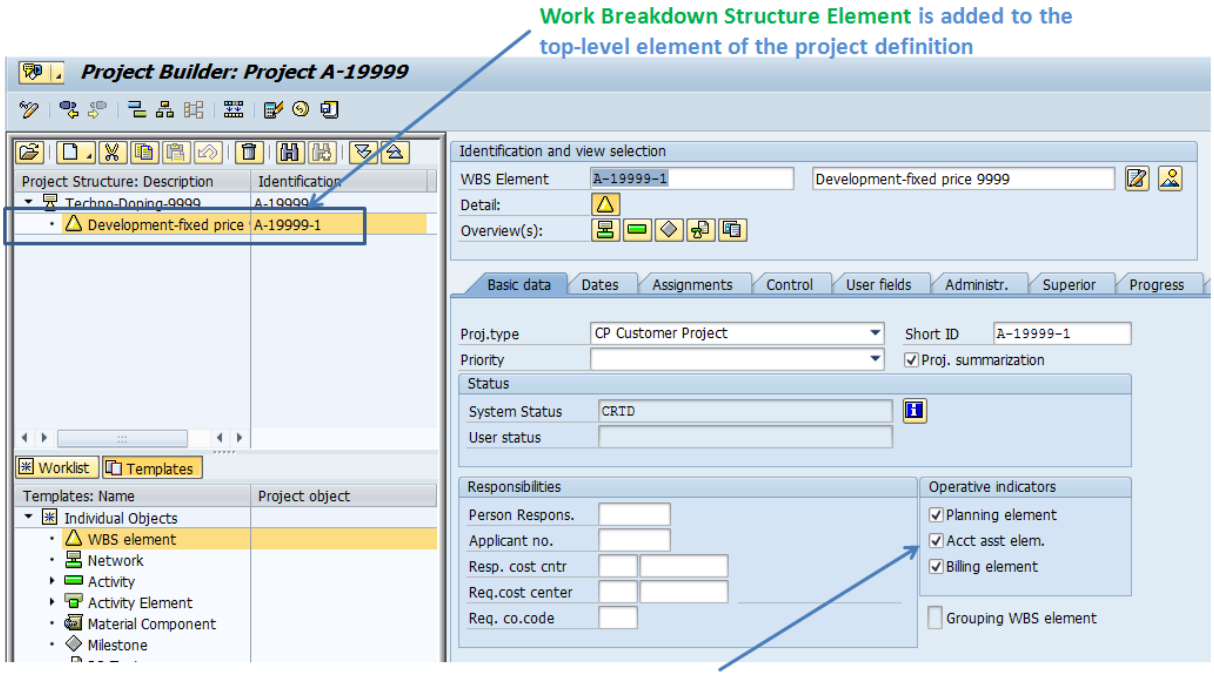


Figure 22: WBS Element Development (1): SAP-System-Screenshot

2. The system enters ***A-1xxyy-1*** as name for the **WBS Element** on the right screen.
3. Enter the text ***Development-fixed price xxyy*** into the field right next to it.
4. In the **basic data** tab, select the additional options
   - ***Billing Element***
   - ***Acct asst elem*** *(Account Assignment Element)*
   - ***Planning Element***

- Press *Enter* and the system will display the new Element in the project structure on the upper left screen.



These indicators determine, if you can use this WBS Element for

1. **Planning costs manually**
2. **Assigning orders, documents, or costs**
3. **Planning revenues and post possible actual revenues**

Figure 23: WBS Element Development (2): SAP-System-Screenshot

2.4.2.2 Create a WBS Element for the Blueprint Project Stage

The project part (development-fixed prices) consists of two project stages. You have to create a WBS Element for each stage. Commence with the Element for the **project stage Blueprint**.

1. Again, drag a **WBS Element** from the template window and attach it to the Element ***Development-fixed price xxyy (A-1xxyy-1)*** that you have just created.
2. The system assigns the entry ***A-1xxyy-11*** as **project definition.**
3. Right next to this, enter the text ***Blueprint-xxyy*** and confirm with *Enter*.
4. The Element is included in the project structure on the left hand side.
5. In the **basic data** tab, select the additional options
   - ***Billing Element***
   - ***Acct asst elem*** *(Account Assignment Element)*
   - ***Planning Element***
   - Press *Enter* and the system will display the new Element in the project structure on the upper left screen.
5. Confirm with *Enter*.

2.4.2.3 Create a WBS Element for the Prototype Project Stage

Create another WBS Element for the **project stage prototype**.

1. Once again, drag a **WBS Element** from the template window and attach it to the Element ***Development-fixed price xxyy (A-1xxyy-1)*** that you have just created.
2. The system assigns the entry ***A-1xxyy-12*** as **project definition.**
3. Right next to this, enter the text ***Prototype xxyy*** and confirm with *Enter*.
4. The Element is again included in the project structure on the left hand side.
6. In the **basic data** tab, select the additional options
   - ***Billing Element***
   - ***Acct asst elem*** *(Account Assignment Element)*
   - ***Planning Element***
   - Press *Enter* and the system will display the new Element in the project structure on the upper left screen.
5. The following figure displays how your project structure should look like this far.

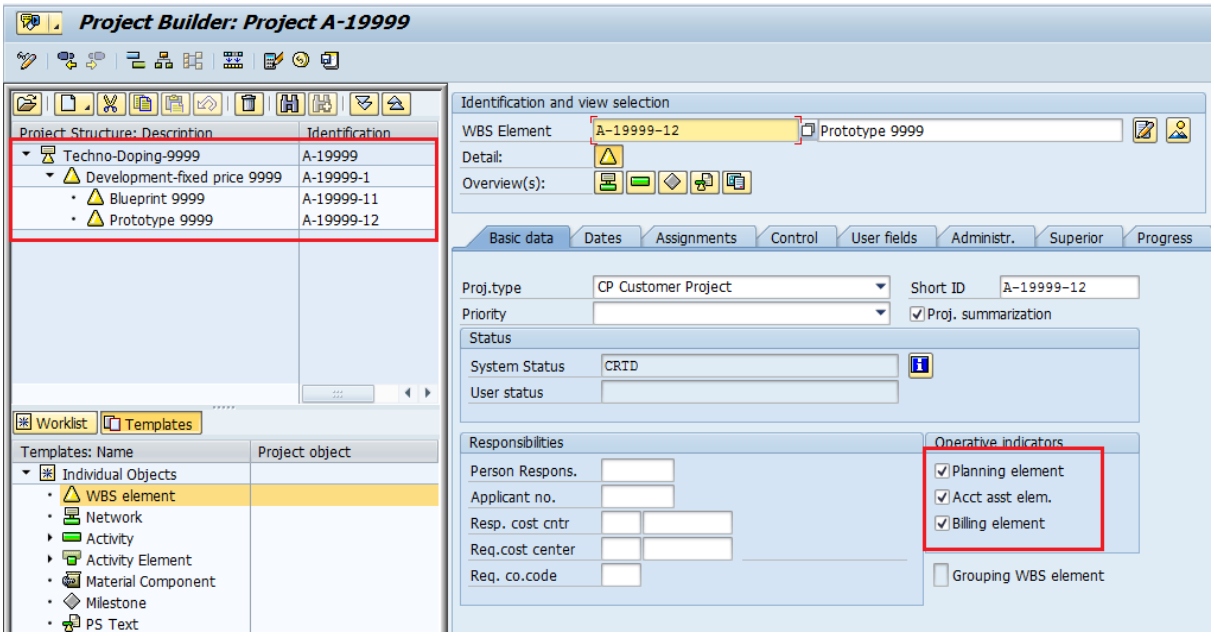


Figure 24: Add Lower-Level WBS Elements: SAP-System-Screenshot

2.4.3 Create a Milestone for the Blueprint Project Stage

You have to create a milestone for the Blueprint project stage.

1. Take the **milestone** from the template window and drag it over the just created **WBS Element *A-1xxyy-11 Blueprint***.
2. Enter the text ***Milestone Blueprint xxyy.***
3. On the lower screen, enter ***00003*** into the **usage** field.
4. Set the ***sales doc. date*** flag
5. Choose a percentage of value to be invoiced (**InvoicePercentg) of *30%***.
6. Confirm with ***Enter***. The system automatically assigns a **milestone number** for unique identification.

Write down the Milestone ID on your datasheet.

Milestone Blueprint: _____

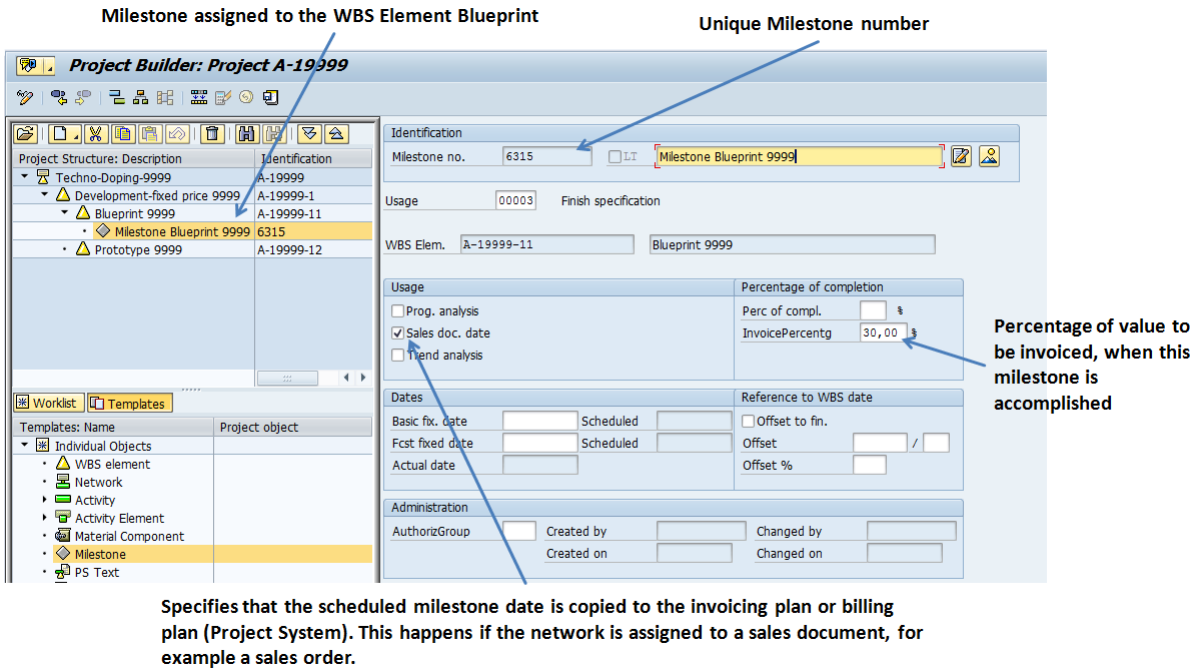


Figure 25: Assign Milestone: SAP-System-Screenshot

2.4.4 Create a Network for the Prototype Project Stage

The prototype stage contains two related Activities. Firstly, create the Network.

1. On the lower left screen (**templates: name**), you can see the standard Networks under **individual objects**. Using the mouse, select the ***Network*** icon (

). Hold on to the mouse button. Move the object to the upper left window containing the project structure. Release the mouse button above the WBS Element for the project stage **prototype** to add the Network to this project stage.
2. Right behind the Network field, enter the long text ***Prototype-Network xxyy***.
3. In the **Control** tab, enter ***PS02*** into the **Network type** field and confirm with *Enter*.
4. The Network is added to the project structure on the left upper screen.
5. In the **Scheduling** tab maintain
   - **Start date** ***the current date + 14 days***
   - **End date** ***delete any entry***
   - **Scheduling type** ***1 forwards***
   - **Schedule automat** ***deselect***
   - **Capacity requirement** ***deselect***
   - **Exact break times** ***deselect***
   - Confirm with *Enter*.

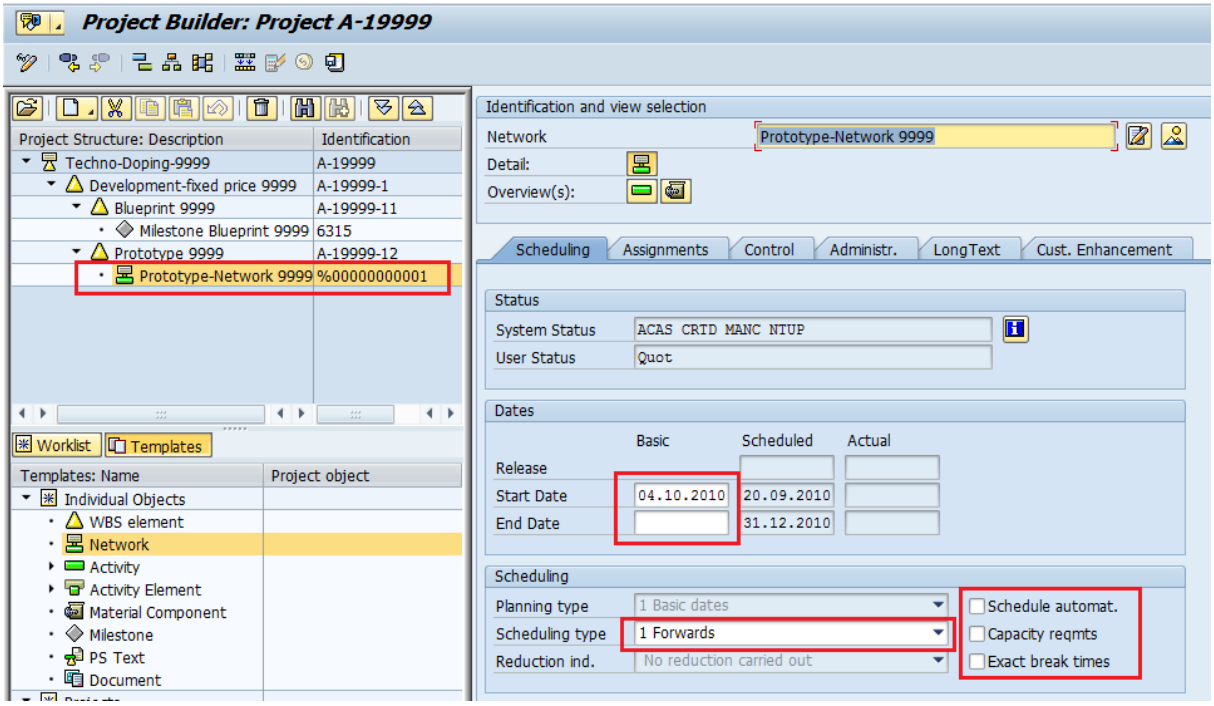


Figure 26: Create Network: SAP-System-Screenshot

2.4.5 Create Activities and Relationship

The prototype stage contains two related Activities. Now create two Activities within the Network and link them with each other by using a relationship. Thereby, the Specification is supposed to be finished first, before the Construction begins.

2.4.5.1 Create an Activity for Specification

Now, create the Activity for the specification.

1. Select the ***Internal Processing*** icon (Internal processing) with the mouse below the Activity icon. Hold on to the mouse button. Move the mouse to the upper left window containing the project structure. Release the mouse button above the Network ***Prototype-Network xxyy*** to add the Activity to this Network.
2. As description, enter the text ***Specification xxyy***.
3. Confirm with *Enter*.

2.4.5.2 Create an Activity for Construction

Next, create the construction Activity.

1. Select the ***Internal Processing*** icon (Internal processing) with the mouse below the Activity icon. Hold on to the mouse button. Move the mouse to the upper left window containing the project structure. Release the mouse button above the Network ***Prototype-Network xxyy*** to add the Activity to this Network.
2. As description, enter the long text ***Construction xxyy***.
3. Confirm with *Enter*.

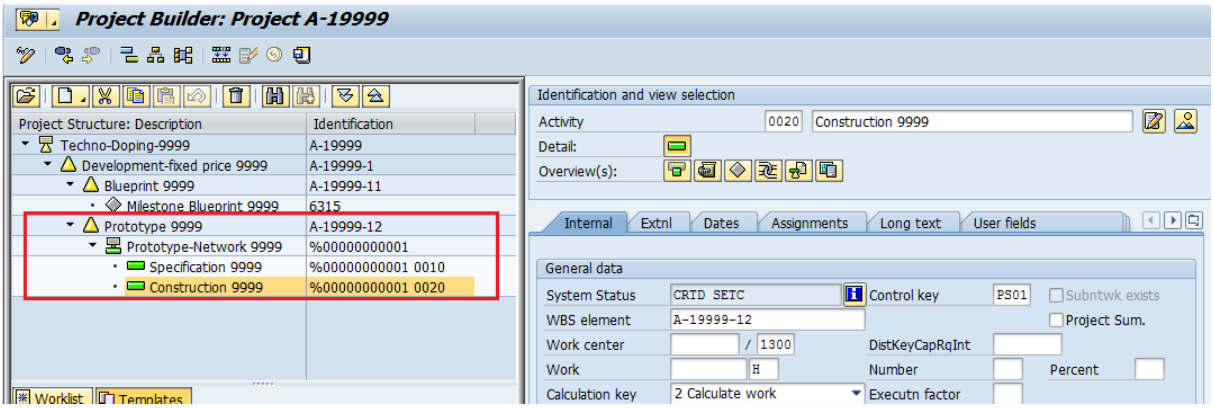


Figure 27: Create Activities: SAP-System-Screenshot

2.4.5.3 Create a Relationship between the Activities

Now, create a Relationship between the two Activities.

1. Double-click on the Activity ***Construction*** in the left upper frame.
2. Choose the button.
3. In the **Relationships** area, click into the first field of the ***Act.*** column. Choose the F4 help and double click the only proposal ***0010 (Specification)***.
4. In the column Type (Ty.), make sure the entry FS is selected.
5. Confirm with *Enter*.
6. Hereby, the Activity ***Specification*** is determined as predecessor of the ***Construction Activity.***

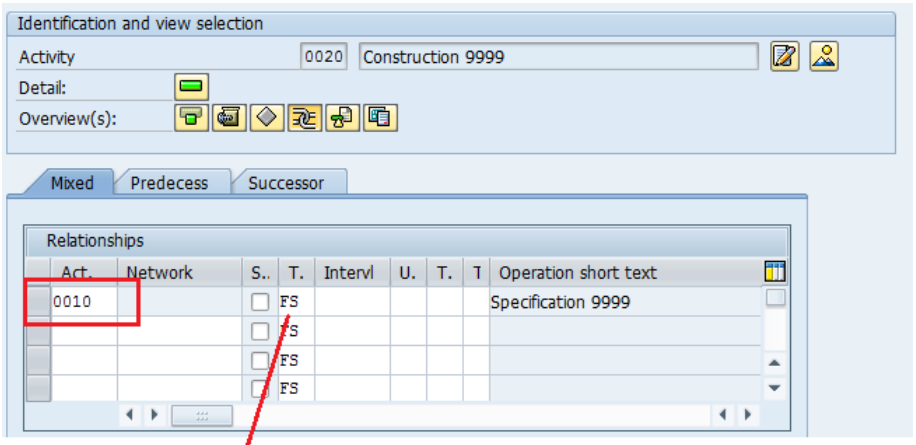


Figure 28: Create Relationship: SAP-System-Screenshot

2.4.6 Create a Milestone for the Prototype Project Stage

You have to create a milestone for the Prototype project stage as well.

1. Take the **milestone** from the template window and drag it over the just created **Activity *Construction***.
2. Enter the **long text *Milestone Prototype xxyy***.

3. On the lower screen, enter ***00006*** into the **usage** field.
4. Select ***sales document date*** and ***milestone functions*** flags and choose an **InvoicePercentg of *70%***. Confirm with *Enter*.

Write down the Milestone ID on your datasheet.

Milestone Prototype: _____

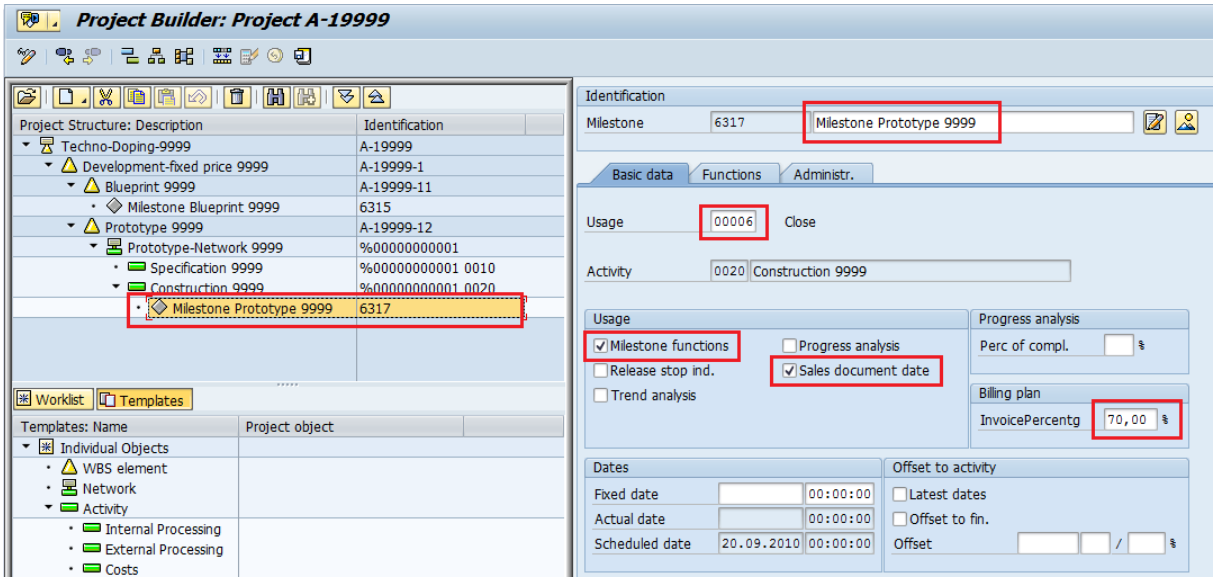


Figure 29: Create Milestone Prototype: SAP-System-Screenshot

2.4.7 Create a WBS Element for Special Expenses

For the occurring **special expenses,** i.e., additional activities that need to be provided for the customer, you need to create another WBS Element to allow for billing later.

1. Drag a **WBS Element** from the template window and attach it to the firstly created structure ***Techno-Doping-xxyy (A-1xxyy).***
2. The system assigns the entry ***A-1xxyy-2*** as **WBS Element ID**.
3. Right next to this, enter the text ***Special expenses xxyy***.
4. On the **Basic** tab, select the options
   - ***Billing Element***
   - ***Acct. asst. elem.***
   - Confirm with *Enter*.

For comparison:
The following figure displays how your project should look like now.

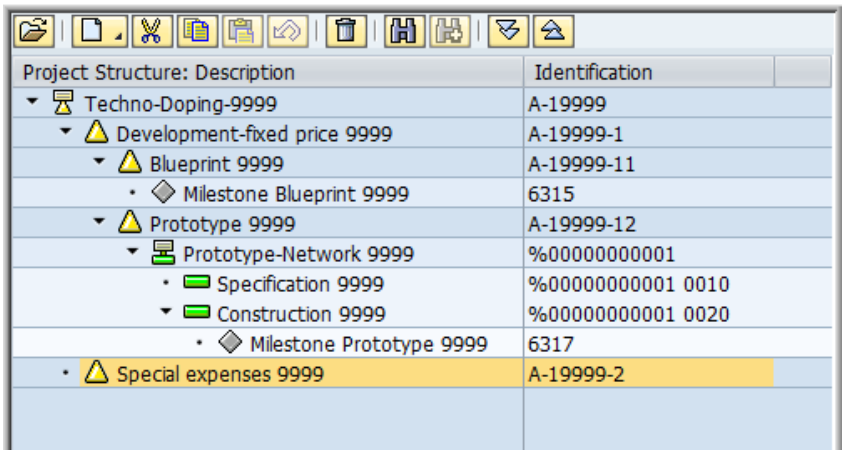


Figure 30: Project Definition in the Project Builder: SAP-System-Screenshot

5. *Save* your project and leave the Project Builder.

Thus, representing the project structure is completed. We will now focus on project planning.

2.5 Elucidation

Since the theory parts of this whole teaching unit are explained in great detail, the elucidations will focus more on summarizing the outcomes and give you a good overview of the subjects, rather than explaining even more details. Thereby, the most important aspects are presented. This should serve as learning aid.

What have we learned so far?
You got acquainted with the organizational structures of projects in SAP ERP Project System (SAP PS) and the major master data used in SAP PS.

2.5.1 Overview of Project Management in SAP ERP

Project characteristics:

- complex, unique and include a high risk for the company
- precise targets between contractor and customer
- limited in time
- costs and capacity intensive
- several departments are involved
- quality requirements must be met
- high strategic relevance

2.5.1.1 Organizational Levels in Project Management

Each project starts with the definition and classification of the structures required for processing and the incorporation of these into the existing enterprise structure.
The Project System has no organizational structures of its own; you incorporate it into the existing structure by making assignments to the organizational units in Accounting and Logistics. It is this which enables the Project System to present data clearly and in many different ways. Depending on type and configuration of a project, organizational units of different areas are used (SD, purchasing, production, accounting, controlling, HR, etc.). The following figure displays the organizational levels that might be relevant for each structure element of SAP PS. You see that a project is an integrating organizational structure within SAP ERP and utilizes diverse organizational levels from all applications.

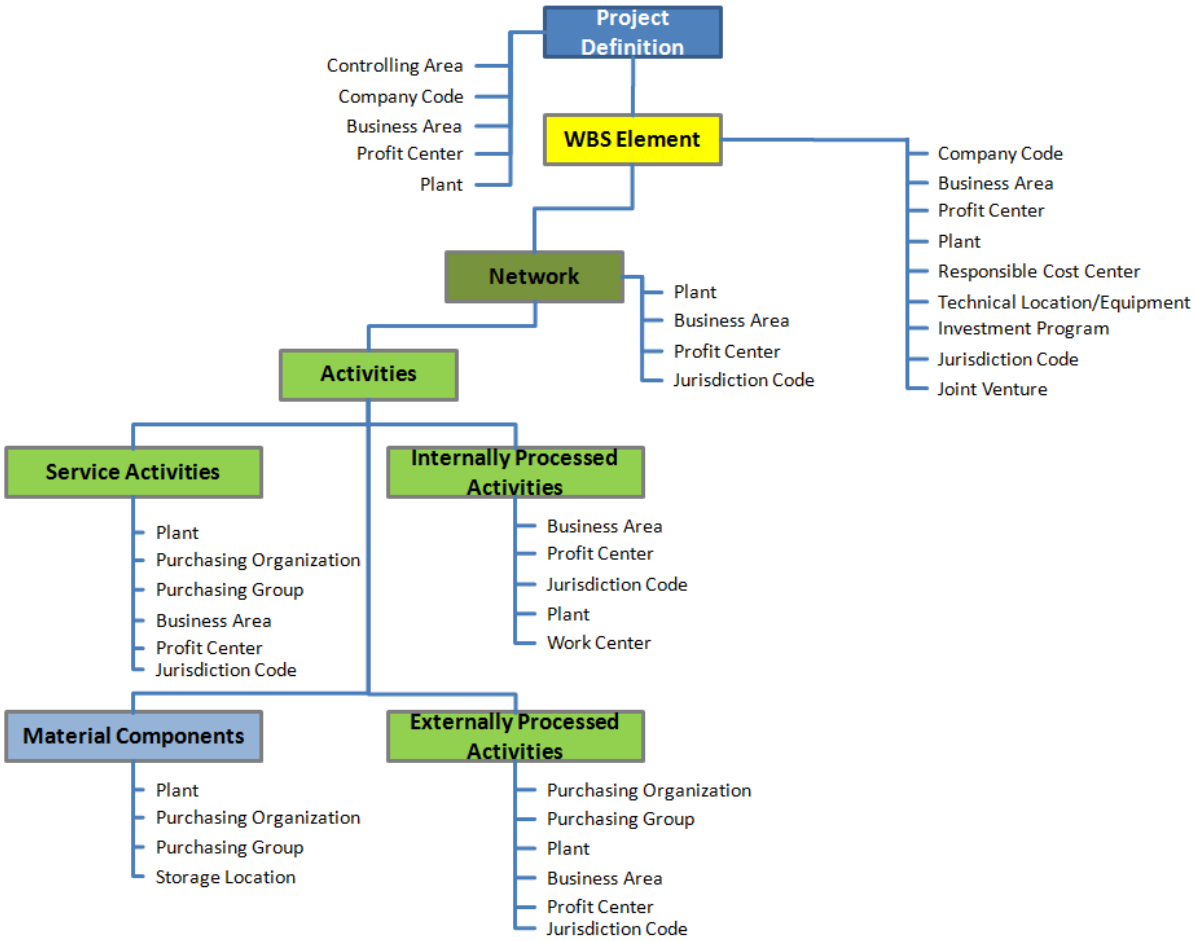


Figure 31: Organizational Levels in SAP PS: help.sap.com

2.5.1.2 Master Data in Project Management

Projects are mapped in SAP PS by using:

- one **Work Breakdown Structures** (WBS)
- one or multiple **Networks**
- or a combination of both

Work Breakdown Structure

- represents the organization/structure of a project
- visualizes the tasks in the project ***hierarchically***
- represents the ***operative*** basis for planning
    - Costs
    - Revenues
    - Payments
    - Schedules (dates)
    - Budgets

Networks

- represent the ***flow*** of a project or parts of a project
- individual aspects of a project are represented as ***Activities***
- activities are linked to each other by using ***Relationships***

Activities

- Activities are used to map the flow of a project or the flow of Activities of a project.
- Activities are the operative basis of planning and controlling
  - dates,
  - costs and
  - resources (personnel, machines, production resources/tools, material).
- Can be assigned to **WBS Elements**
- Dates and costs that are defined in Activities are rolled up according to the project hierarchy and are totaled in the WBS Elements to which they are assigned. These data can then be evaluated on the aggregated level of the WBS Element or WBS.
- Funds that an activity needs to process its work are checked against the budgets of the superior WBS Elements and, thus, consume the budget of the WBS Element.

2.5.1.3 Phases of a Project

During the execution of a project, different phases are accomplished. Ideal project processing:

- Concept
  - Create WBS
  - Assign documents to describe the project and outline goals
- Rough-Cut Planning
  - Create WBS elements on the highest level
  - Create Network and Activities on the highest level
  - Make first cost calculations as basis for budget assignment
- Detailed Planning
  - Create detailed hierarchical model of the project using WBS Elements, Milestones, PS Texts
  - Create detailed process flow model of the project by using Activities, Activity Elements, Milestones, PS Texts
  - Schedule dates
  - Plan costs in detail
  - Plan resources required
- Approval
  - Budget is approved and assigned
  - Project is released
- Execution
  - Activities are executed
  - Orders (SD, CO, PP) are realized and confirmed
  - Goods receipts, goods issues are confirmed
  - Commitments, costs, revenues are posted
  - Milestones are confirmed

- Period-end Closing
  - Costs are settled to controlling objects
  - Invoices are issued
  - Project is closed
  - Project is analyzed and evaluated

2.5.2 Project Structures and Master Data

- You use WBS and WBS Elements without using Networks when you want to create a project that focuses on controlling aspects (e.g., cost and investment projects) → Hierarchy aspect.
- You use Networks to create projects that focus on logistical aspects (e.g., automatic time planning by using scheduling, planning resources, procuring materials) → Flow Aspect.

2.5.2.1 Work Breakdown Structure

- Used for representing the organization/hierarchy of a project in SAP ERP.
- You use WBS Elements to further structure a project (WBS) and to visualize the hierarchical form until the required level of detail for a project is reached.
- A project can contain up to 99 structure levels.
- Each level can have any number of WBS Elements.
- Recommended: WBS (project) should contain a maximum of 10000 WBS Elements.

Work Breakdown Structure: Functions

- Main focus of WBS is
  - Planning
  - Describing
  - Managing
  - Monitoring costs, key dates and the budget
- Planning dates, costs and payment dates is often carried out by using Activities that are assigned to WBS Elements.
- Functions of Work Breakdown Structures:
  - Planning and recording dates
  - Hierarchical budget management
  - Cost planning and assignment of documents
  - Planning and billing of revenues
  - Planning and monitoring payment flows
  - Inventory management for materials
  - Diverse period-end tasks
  - Monitoring the project progress
  - Aggregated evaluation of data

There are several ways to structure a Work Breakdown Structure within a hierarchy level:

- Phase-oriented structuring
- Function-oriented structuring
- Structuring according to organizational characteristics

Operative Indicators of WBS Elements

- Operative indicators are used for controlling WBS Elements and determine which task a WBS Element carries out during project processing.
- Indicators are set in the basic data tab of WBS Elements
- Following indicators are available:
  - **Planning:** You can plan costs on WBS Elements → real cost element
  - **Account Assignment:** You can assign orders (also Activities and Networks), documents or invoices at WBS Elements
  - **Billing:** You can plan revenues and post actual revenues on the WBS Element.
- Independent of the level in the Work Breakdown Structure, you can set any combination of these ***three*** indicators.
- **Statistic indicator**: If you use this indicator, actual costs are only posted on the WBS Element a statistical figure (no real costing object!). The value type 11 (statistic actual) is used for the CO posting instead of value type 4 (actual). When a WBS element is marked as statistical, you can post costs on the WBS element, but you need to assign an additional "real" assignment object (any real controlling object), which carries the costs, since the WBS Element in this case only, carries the statistical data for, e.g., analyses and reporting.

Hierarchy Chart

- Displays the hierarchical organization of a Work Breakdown Structure in a graphical way
- You can
  - change the operative indicators of a WBS Element,
  - call up the detail screen for a WBS Element and
  - create and delete WBS Elements directly from the hierarchy chart.

2.5.2.2 Network

- **Networks** represent the flow of project activities.
- You use Networks to allow for **logistical integration** in materials management, production, maintenance, capacity planning and purchasing.
- You use **Activities** to represent the work to be done in the Network.
- You use **Relationships** to represent the sequence and links of the ***Activities***.
- Recommended: Networks should not exceed a size of 500 Activities.
- Lock logic: Each time a Network object is processed, the entire Network is locked.

Networks and Activities: Structure

A Network consists of:

- **Network Header** contains:
  - Controlling profiles
  - Indicators
  - Default values for assigned Network objects (Activities)
  - Network profile
  - Network type
  - Plant (Determination of company code and controlling area based on plant assignment)
- **Activities**
  - Describe the individual tasks and project steps
  - Activities are linked by using Relationships (causal and time sequence)
  - Are a quantity structure for planning:
    - Dates (automatically via scheduling)
    - Costs (automatically via costing)
    - Resources (internal and external Activities)
    - Material requirements (via assigned components)
  - There are four **Activity categories** in Networks:
    - ***Internal Processing***: Activity provided by company-own capacities.
    - ***External Processing***: Activity provided by company-external resource. End date of the external activity, material group, purchasing organization in charge and purchasing group are used to generate a purchase requisition during project execution.
    - ***Service***: Allows for planning and procuring several services as well as entering data concerning activities that are not yet specified exactly.
    - ***Costs***: Planning and later assigning costs that do not incur due to internal activities, procurement of external activities via purchasing or material consumption
- **Relationships**
  - Definition of sequences of Activities
  - You define which Activity is the antecessor and which one is the successor (logical sequence).
  - Types of Relationships:
    - ***FS Relationship***: The following Activity starts when the previous one is finished.
    - ***SS Relationship***: The next Activity starts simultaneously or after the previous Activity starts.
    - ***FF Relationship***: The subsequent Activity ends simultaneously or after the previous Activity ends.
    - ***SF Relationship***: The previous Activity starts after the subsequent Activity ends.
- **Activity Elements**
  - Are used to detail Activities
  - Feature the same functionality as mentioned for the categories

- Do not feature Relationships. Thus, they are not relevant to scheduling the Network.
- Types of Activity Elements:
  - ***Internal Processing Element***
  - ***External Processing Element***
  - ***Service Element***
  - ***Cost Element***

Networks and Activities: Functions

- Represent projects in a flow-oriented way
- Relationships: logical sequence and time dependency between two Activities
- Cross-Network Activity: Linking Activities of different Networks possible
- Advantage of Networks: Automatic determination of plan dates, buffer times, and timely critical Activities based on the duration of the individual Activities and their sequence.
- Personnel, capacities, materials, resources/tools and services required for the different tasks of the project can be planned.
- Important functions of a Network:
  - Scheduling
  - Resource planning
  - Confirmation of work
  - External procurement of Activities
  - Material planning, procurement and delivery
  - Network costing
  - Several period-end closing tasks
  - Monitoring of the project progress

Network Structure Graphic

- Represents Activities of one or several Networks graphically.
- Activities are organized according to their logical sequence.
- Activities can be grouped according to used work centers or WBS Elements to which they are assigned.
- Create, change, change sequence (drag & drop), delete functions are available.
- Can be called up by using different transactions, e.g., from the Project Builder, the information system and the Project Planning Board.
- Cycle analysis (only available in Network structure graphic)
- In case of a cycle, the Network cannot be scheduled

2.5.2.3 Other Structures in the SAP Project System

Milestones

- Are used to represent events of importance
- Data regarding the intended use and function, a short and long text and a planned date at which the Milestone is presumably completed are defined.
- Reaching a Milestone can be documented by setting the actual date.

- Milestones can be assigned to WBS Elements.

PS Texts

- Individually defined texts managed in a PS Text Catalog
- Are differentiated according to several text types
- Can be assigned to one or several WBS Elements or Activities
- Can be entered in SAP ERP SAPscript or in Microsoft Word format

Document Management Integration

- SAP ERP Document Management System can be used to assign document info records to WBS Elements and Activities.
- Document info records and the corresponding originals can be accessed from the project information system.
- The originals can also be displayed via Internet.

2.5.2.4 Processing Options

- In SAP PS, there are standard WBS, standard Networks and other project structures and simulation versions available as copy templates from which you can build your own project structures.
- You can define project structures manually, too.
- Important tools for project creation (create, change, display) of project structures are the **Project Builder** and the **Project Planning Board.**

Project Builder

- Maintenance of all objects except for assignment of productions resources/tools
- Central tool for defining projects
- The Project Builder screen consists of three areas:
  - Worklist and template area
  - Structure tree
  - Detailed work area
- You use the Project Builder to create or change:
  - Project definition
  - WBS Elements
  - Activities
  - Activity Elements
  - PS Texts
  - Documents
  - Milestones
  - Material components
- Detailed screens, lists or charts (hierarchy chart, Network chart) are available
- You can
  - manually create project structures
  - use standard project structures (WBS structures or Networks) or standard structures (standard WBS structures, standard Networks) as templates

- include WBS structures, standard WBS structures and standard Networks in an already existent project structure
- copy an operative project or a standard project including all objects of subsequent levels (WBS Elements, Activities, PS texts, documents, milestones, items)

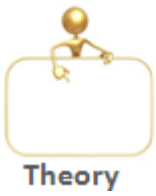
Project Planning Board

- Graphical user interface that can be used to create and process all data for a project:
  - Project definition, WBS Elements, Activities, Relationships, Milestones, Documents and PS Texts
  - Planning dates and resources (internal/external processing)
  - Cost planning via Activities
- Is based on an interactive SAP bar chart graphics
- You can access important navigation help as follows:
  - By double-clicking the Project Planning Board items, you can branch into detailed screens to change field selections or time settings.
  - By clicking the right mouse button, all options for the corresponding cursor position are displayed (important: the options depend on the cursor position!)
  - When selecting all objects and choosing *show all dependent objects*, all objects of the Project Planning Board are displayed.

3 Project Planning and Project Budgeting

The following section delivers insight into project planning and budgeting functionalities of SAP PS.

3.1 Theory: Project Planning and Project Budgeting



After representing the project by using a Work Breakdown Structure and/or a Network, you can use different functions in the SAP project system to plan dates, anticipate costs and possible revenues, plan internal or external procured resources or materials and ensure availability on schedule prior to project execution.

3.1.1 Aspects of Planning

The SAP PS component (Project System) provides many ways to plan projects. Thereby, the following project related facets can be planned:

- Dates (Scheduling)
- Resources
- Materials
- Costs, Budgets and Revenues
- Payments

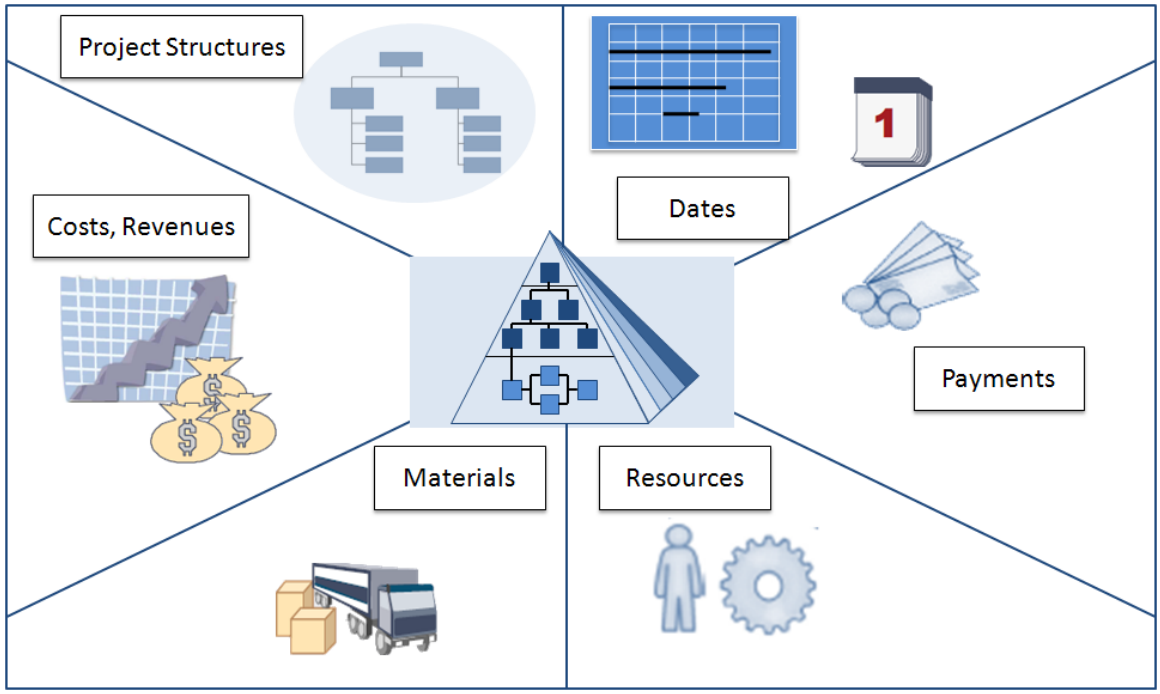


Figure 32: Aspects of Planning

The **project planning board** is the main tool for planning projects. You can use the project planning board, to create all the data required for a project (first and foremost, the dates) and process and evaluate it.

In the project planning board, project data is presented in table format and as graphical display. This provides users with a comprehensive overview of the project at any time. With the project planning board, you can:

- plan, check and change dates
- plan, schedule and check resources
- determine and distribute work
- compare capacity
- calculate costs

The central element of the project planning board is the Gantt chart. It consists of a table area and a diagram area, which show the hierarchical setup of the project as well as the corresponding scheduling situation. You process the project in the Gantt chart. In addition to WBS elements and activities, you can show or hide other overviews such as the capacity overview in the lower area of the Gantt chart if necessary.

Consider that, in addition to the project planning board, other interfaces can also be used. For instance, the Project Builder can be used to maintain the very same data for planning and scheduling. It depends on the user's preferences which tools are utilized.

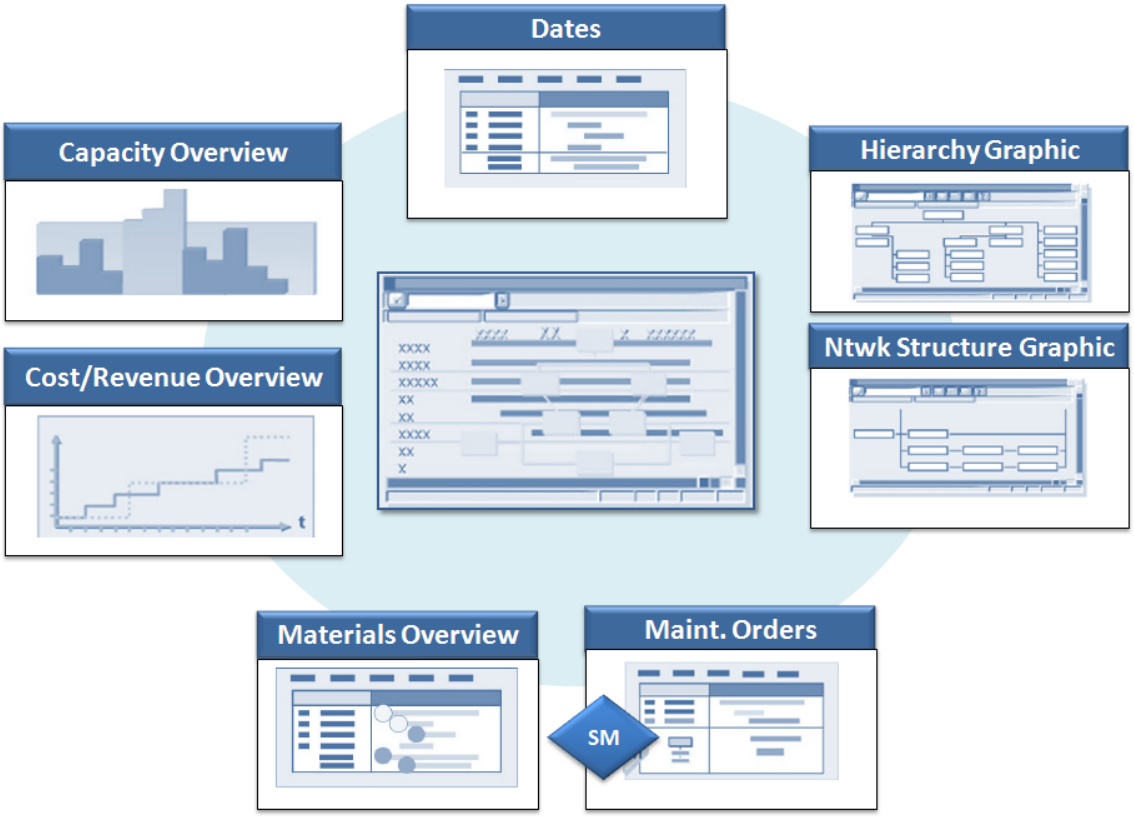


Figure 33: Graphical Displays of Project Planning Board

3.1.2 Scheduling (Planning Dates)

Scheduling of projects or project parts is a crucial aspect of project planning. For example, capacity planning requires previous scheduling. In addition, cost planning using Easy Cost

Planning or using Network Costing refers to scheduled project dates. There are different functions available for project scheduling, depending on whether Work Breakdown Structures or Networks are used to map a project.

3.1.2.1 Scheduling with WBS Elements

In the project definition, you can schedule dates and enter key dates for individual WBS Elements. Already when creating a project, you can determine planned start and end dates of a project. Thereby, the corresponding dates are entered in the detail screen of the WBS Elements in the Project Builder. You can then plan the dates in the Project Planning Board by using tables or graphics.
In rough-cut planning, dates for WBS Elements are set that are mandatory for detailed planning. This rough-cut plan can be used as a basis for detailed planning or scheduling with Networks, as long as Networks are used in the project definition.
Using several scheduling functions, you can later compare, coordinate or calculate dates. For example, if a date changes for a WBS Element in detailed planning, the system issues only a warning in case of a date that is out of the date range in the project definition. Moreover, date changes do not automatically result in changes to planned dates of other WBS Elements because there are no Relationships between WBS Elements.
When required, dates can be inherited or extrapolated for scheduling in the Work Breakdown Structure of the SAP Project System. Dates are always inherited top-down, i.e., from the highest WBS Element downwards and extrapolation is carried out bottom-up. Dates can also be maintained manually.
You can check the consistency of your scheduling data within the WBS structure.

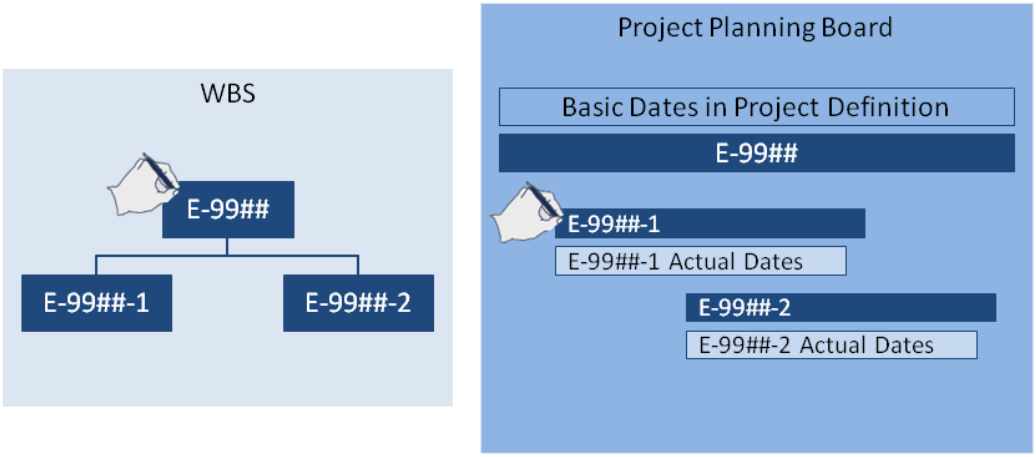


Figure 34: Scheduling with WBS Elements

3.1.2.2 Scheduling with Networks

While plan dates for WBS Elements can also be entered manually by inheriting or extrapolating, plan dates of Activities in Networks are calculated by the system automatically. This form of planning dates in Networks is referred to as *scheduling*. That is, for projects which use Networks, the Network Activities can be used to schedule dates automatically. Thereby, scheduled dates (or earliest and latest dates for Activities) are determined automatically when

Network Activities are scheduled. Scheduled dates are determined for WBS elements by summarizing the scheduling data of the corresponding activities.
The following transaction options are available

- ***Network plan scheduling***: In Network plan scheduling, exactly one Network is scheduled. All Activities of the Network are selected and their dates are determined.
- ***Overall scheduling***: In overall scheduling, several Networks are scheduled at the same time. Therefore, the individual Networks must be linked via relations. All Activities of the Networks involved are scheduled.
- ***WBS scheduling***: In WBS scheduling, one or multiple WBS Element or the entire project are selected and scheduling is initiated. The system selects all Activities for scheduling assigned to the selected WBS Elements and calculates their dates.

There are two principles available for scheduling: Dates can be determined by using ***forward scheduling*** or ***backward scheduling***.
In **forward scheduling,** the system considers Activities that do not have any predecessors anymore. Based on their start dates and the Activity durations, the earliest start dates for all Activities involved are calculated. Forward scheduling determines the ***earliest starting point*** for Activities.
Contrastingly, in **backward scheduling** Activities are selected that do not have any successors anymore and using end dates and Activity durations, the latest end dates for all Activities involved are calculated. Thus, backward scheduling determines the ***latest starting point*** of Activities.

3.1.3 Resource Planning

When representing a project with a Work Breakdown Structure, you can plan costs for internal and external resources and later, for example, assign costs for activity allocations, purchase requisitions, goods receipts and inspections to WBS Elements and, thus, costs for resource consumption can be posted to the project directly.
Resource planning in terms of capacity planning or automatic data transfer between project structures and purchasing documents is only possible in the project system when using Networks. Manual cost planning for the required resources and manual allocation of purchasing documents on WBS Element-level is not necessary when using Networks. Correspondingly, we will focus on capacity planning by using Networks in the subsequent sections.

You can use the corresponding Activities in the Network for planning resources required for a project. In the project system, there are the following resources that you are already familiar with:

- ***Internally Processed Activities*** determine Activities to be provided by machines and/or personnel for the execution. The capacities at the work centers can be evaluated, planned differently if required, and work can be distributed to employees.
- Using ***Externally Processed Activities,*** you can determine which Activities are required for exertion provided by a different company. External processing handling is managed by the purchasing department.

- ***Service Activities*** are used for Externally Processed Activities as well. In contrast to Externally Processed Activities, you can determine service specifications, value limits for unplanned Activities by using Service Activities. Service handling – including Activity recording and accepting – is carried out by purchasing.

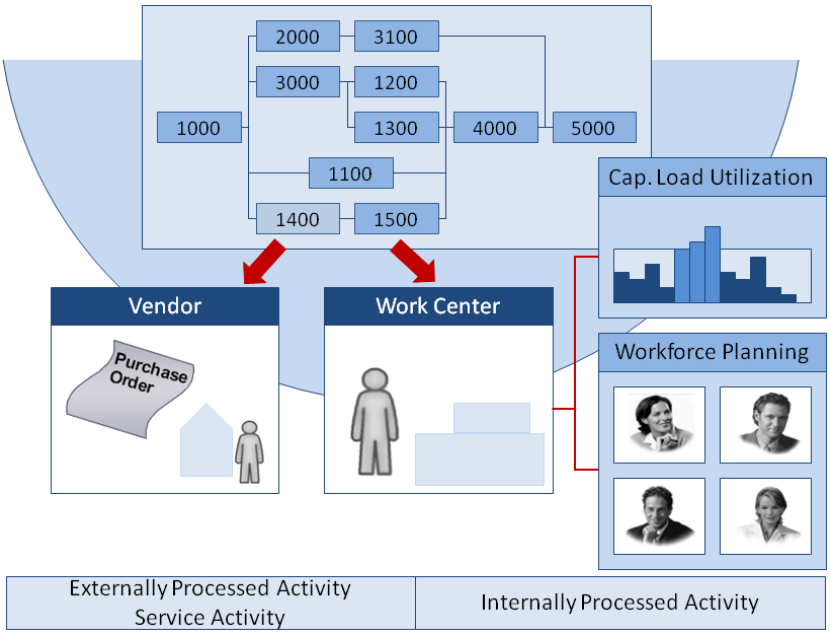


Figure 35: Resource Planning

3.1.3.1 Internal Processing

To plan capacities for a project and to be able to calculate costs for Activities, you need to maintain work data for an Activity. You have to enter the amount of work involved and the work center at which the work is performed. Using work centers is a prerequisite for capacity planning with Networks.

The **work** determines the output to be provided by machines or personnel for the execution of Activities. The **work center** is the location at which these Activities are carried out or the work output is produced, respectively. Work centers contain costing data allowing for costing Activities. Work centers also contain scheduling and capacity data required for scheduling and capacity planning.

You can determine work center capacities for the Activities. If necessary, you can use the Project Planning Board or the Capacity Planning Tables to level capacities. You can also distribute the work among employees (workforce planning). Generally speaking, when you confirm activities, you consume (reduce) capacity requirements and enter actual dates and actual costs.

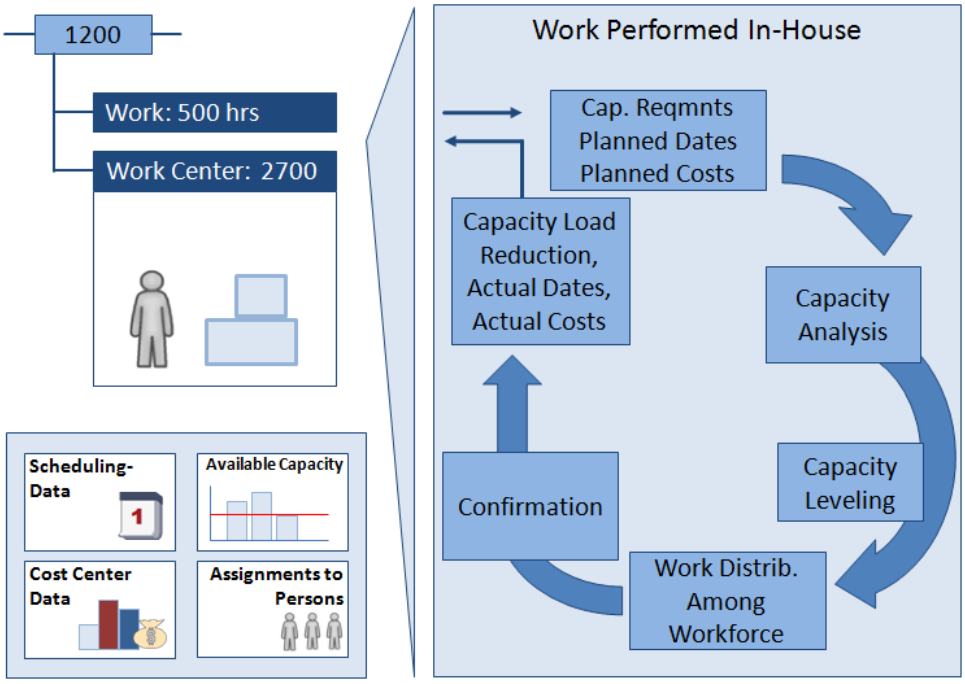


Figure 36: Internal Processing

3.1.3.2 External Processing

Activities and Activity Elements in a Network can be created as Externally Processed Activities or Externally Processed Activity Elements. For example, you can place an order for the construction of a machine at a construction office. Such an Activity creates a purchase requisition that is further processed in purchasing. The system can access data from purchasing for external processing (e.g., purchasing info record containing prices and delivery times for external processing).

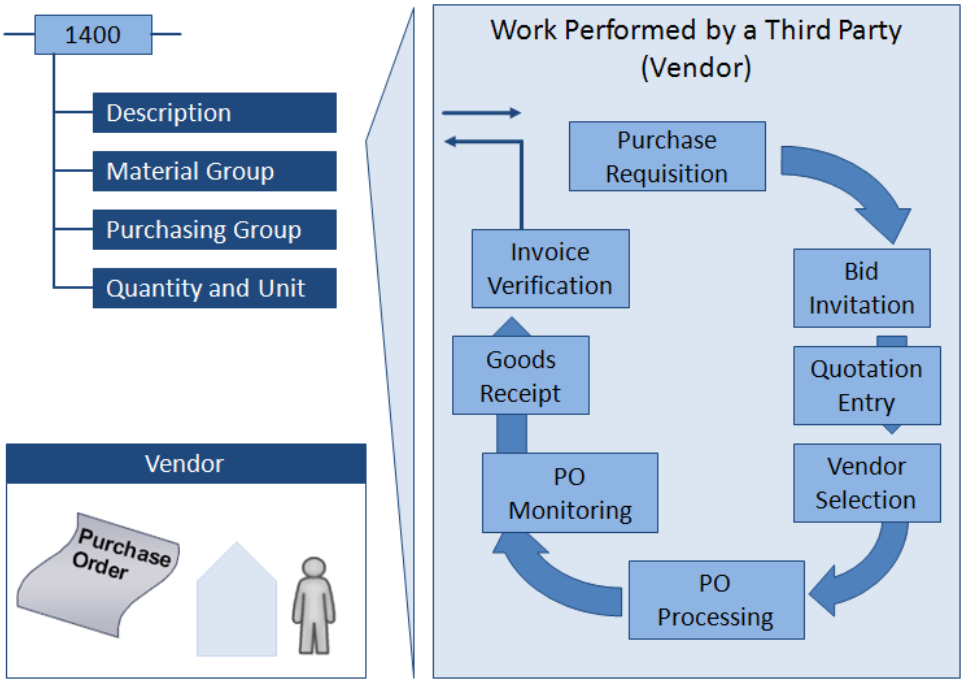


Figure 37: External Processing

A Service Activity triggers a similar purchasing process as an Externally Processed Activity. However, it can also be a hierarchy of planned services that are supposed to be purchased from a vendor. A goods receipt of services consists of two steps:

- Entry of services performed
- Acceptance of services performed.

You use the control key to determine whether an activity is externally processed or not.

3.1.4 Material in the Project

Material is the link of the Project System (PS) to Sales and Distribution (SD), Material Management (MM) and Production Planning (PP).

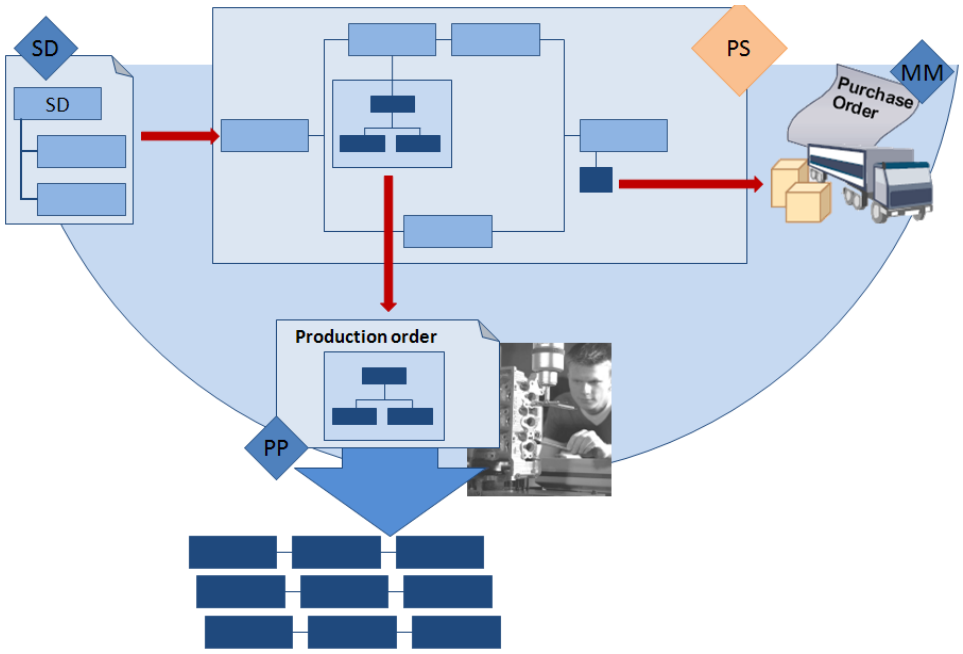


Figure 38: Material in the Project

Material is required for the execution of many projects. Within the framework of project planning in the Project System, you can plan required material, its procurement, consumption and delivery.

Using WBS Elements, costs for procured materials can be planed and several documents such as material reservations, purchase requisitions, orders, goods issues and goods receipts can be assigned to the WBS Element.

An integrated material planning featuring an automatic data transfer between a project and purchasing or production is only available when using Networks. You plan material requirements by assigning material components to activities. Material requirements form the basis for procurement - whether the material is to be produced in-house (production) or procured externally (purchasing). You can assign material components to activities manually. Alternatively, you can use the BOM-PS interface to assign BOM components automatically to activities.

3.1.5 Cost Planning in the Project

When using only Work Breakdown Structures for representing projects, costs must be planned manually on WBS Element level for the subsequent execution of the individual project parts. Cost planning in WBS Elements includes:

- **Hierarchical planning (Overall planning)**: ***Hierarchical planning*** (also referred to as structure-oriented planning) is the roughest form. You can enter costs for each WBS Element. If desired, you can split costs according to fiscal year.
- **Detail planning**: ***Detail planning*** of primary costs and Activity inputs is a cost element based and period based way of planning.
- **Unit costing**: In ***unit costing,*** a scheme for entering quantities (materials, internal processes, external processes, variable items, etc.) is used. This form of planning is cost element based.
- **Easy Cost Planning**: As of SAP R/3 release 4.6C, ***Easy Cost Planning*** is a component of the SAP standard solution. Easy Cost Planning provides you with a simple tool for cost planning according to cost elements with a quantity structure. Using the *Executive Services*, you can enter commitment and actual data for planned costs later.

Along with manual planning in the WBS, you can also create Activities for WBS Elements and plan costs by using these Activities. Based on resource and materials planning with Networks, the SAP system can calculate planned costs for procurement and consumption of resources and materials automatically. This form of cost planning is called Network Costing and features the following advantages:

- The resulting plan can be copied to a new project.
- When postponing project parts, cost planning is changed in accordance to the Activities.
- Planning via Network Activities is cost-element-specific and period-specific.

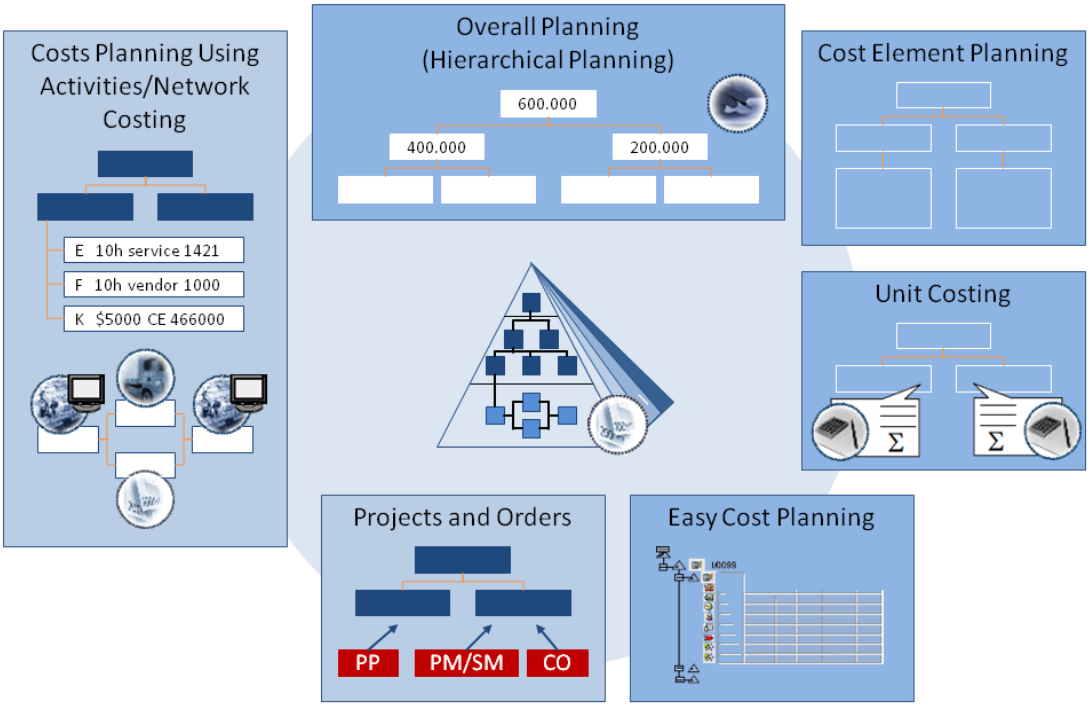


Figure 39: Cost Planning in the Project

3.1.5.1 Easy Cost Planning

As of release 4.6C, the SAP system provides a simple tool for cost planning at WBS Element level. This tool is called "Easy Cost Planning". You can call up Easy Cost Planning from the Project Builder. Cost planning by using Easy Cost Planning is period-specific.

The application of Easy Cost Planning and correspondingly, planning costs for projects, is facilitated especially by using planning templates for entering costing items. The planning templates can be based on SAP standard (best practice solutions) or on already executed projects. For example, if you carry out a software development project and a plan template of empirical values already exists in the system due to completed projects, you can use this cost plan for planning the new project.

In the process, characteristics are valued. The example below shows work in hours being valued at 100. The characteristic values from the planning forms are linked to quantities, values or actions from the costing items. In the example above, the link is to the quantity for an internal activity. The planned costs are in the periods of the basic start dates of the WBS elements. If the basic start dates are changed and a revaluation takes place, the costs are redistributed.

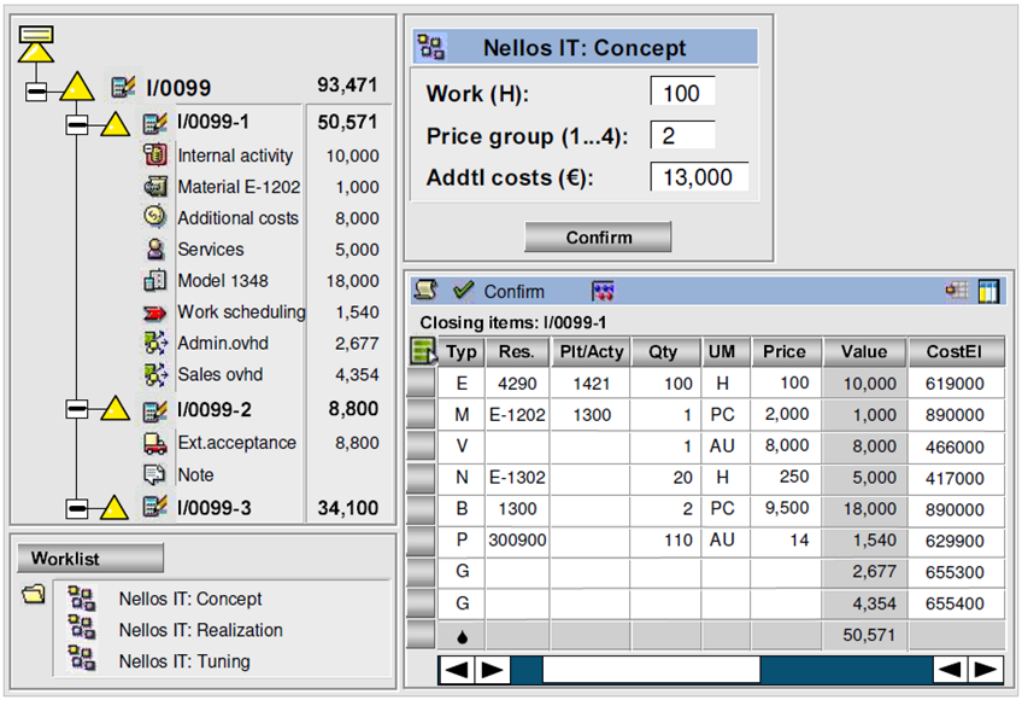


Figure 40: Easy Cost Planning

3.1.6 Assigning an Order to a Project

You can assign different orders to a project, for example, internal orders, production order,and maintenance orders can be linked with a project. Thus, you have the possibility to evaluate the orders with respect to the project.
The orders are determined by using the order category. The Network is an order category. The order categories for corresponding expenditures are determined by the system. Within an order category, you can set individual order types. The order type controls the following aspects:

- Number assignment
- Default value settings
- User-specific status management
- User-specific field control

Depending on the order type and the plant, networks can be header- or activity-assigned. Normally, activity-assigned networks are used where costs are gathered in each activity. Header assigned networks are only significant for the assignment of networks to sales orders (without WBS).

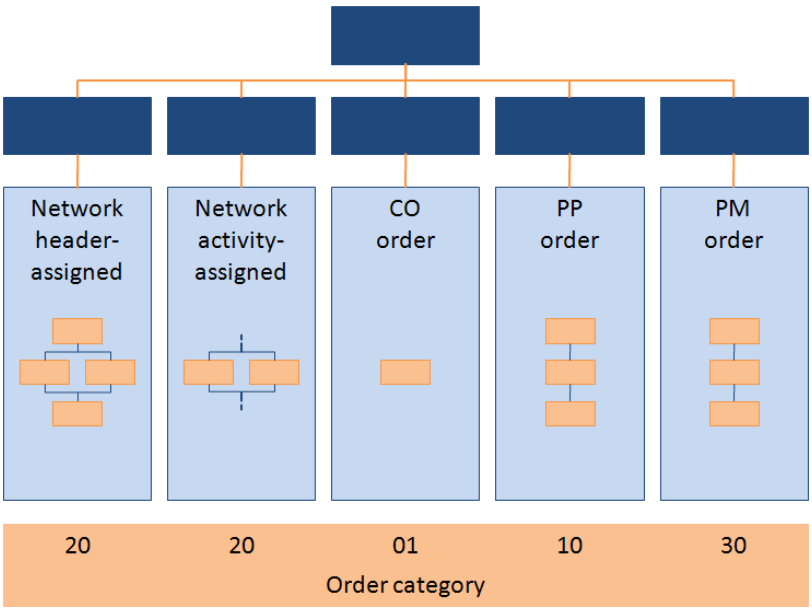


Figure 41: Order Assignment to a Project

3.1.7 Cost Planning and Budgeting

Depending on the company requirements, different function for budget control of projects can be used. In the planning stage, project costs are estimated as exactly as possible. In the subsequent approval stage, funds are assigned in form of a budget. The budget differs from the project cost planning in its binding character. Having estimated the costs as accurately as possible by using the different tools during the planning phase, you then prescribe the funds available for your order in the form of a budget. The budget is the framework for developing the project costs within a particular period, determined by the management.

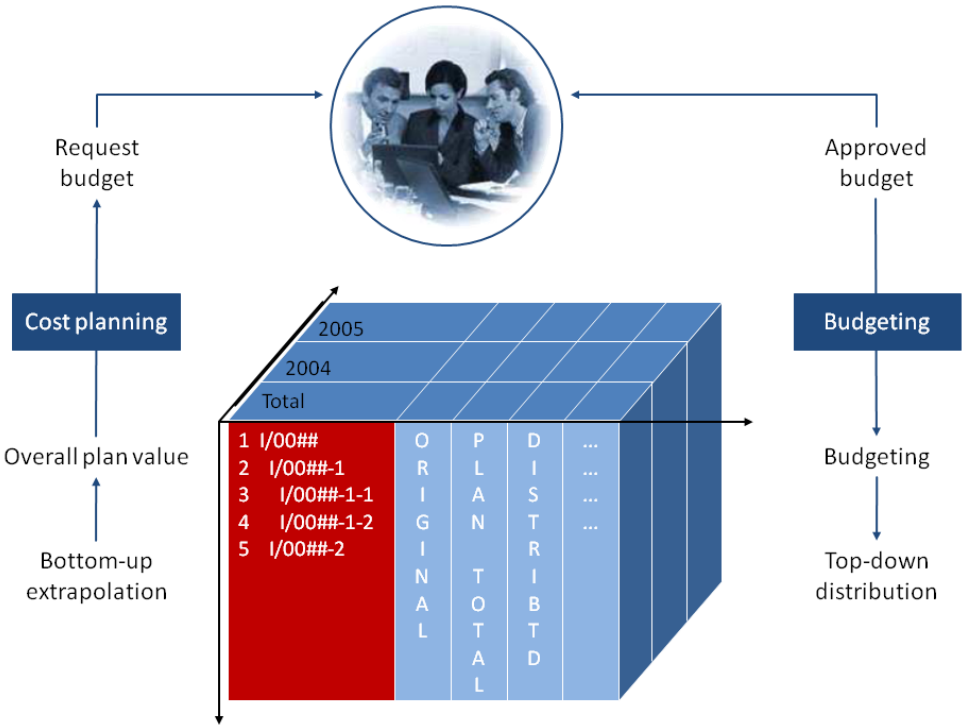


Figure 42: Cost Planning and Budgeting

3.1.7.1 Budgeting

While you must estimate your project costs as accurately as possible during cost planning, it is in the approval phase that funds are assigned in the form of a budget.

Original Budget: The first step of budgeting a project in SAP ERP is assigning a so-called **original budget**. The original budget is the originally allocated budget. After a point in time that you specify, this budget can only be corrected by using budget updates.
To assign funds to a project and to its parts, the transaction "maintain original budget" (CJ30) needs to be called up. This transaction lists all WBS Elements of a project in a table. The entire budget of a project can be allocated to subordinate WBS Elements top-down, or it can be combined from individual budgets bottom-up. The hierarchical consistency check ensures project consistency. Moreover, you can set in the budget profile whether the budget is assigned completely or separated into years.
Additionally, you can determine that only particular users may maintain the entire budget in the system by assigning corresponding user status. When locking (freeze) the original budget for particular user groups in this way, budget changes can only be carried out by defining supplements, returns and transfers by these users.

Budget Update: During a project, it can become necessary to adjust the budget of the project or individual WBS Elements to the actual costs. Therefore, you can either modify the original budget (transaction CJ30), or more reasonably, you can carry out a **budget update**. For budget updates, the system distinguishes between ***budget supplements, budget returns*** and ***budget transfers***.

Budget Release: Sometimes it makes sense to base budget allocation on the actual release of budgets for the execution of projects or project parts. For this purpose, SAP features the **budget release** function. It allows for releasing a budget at different times during a fiscal year.

Carryforward Budget: The **carry forward budgets** function allows you to transfer unused funds from the previous year to the new fiscal year.

Current budget: The current budget is derived from: Original budget + Supplements – Returns +/- Transfers

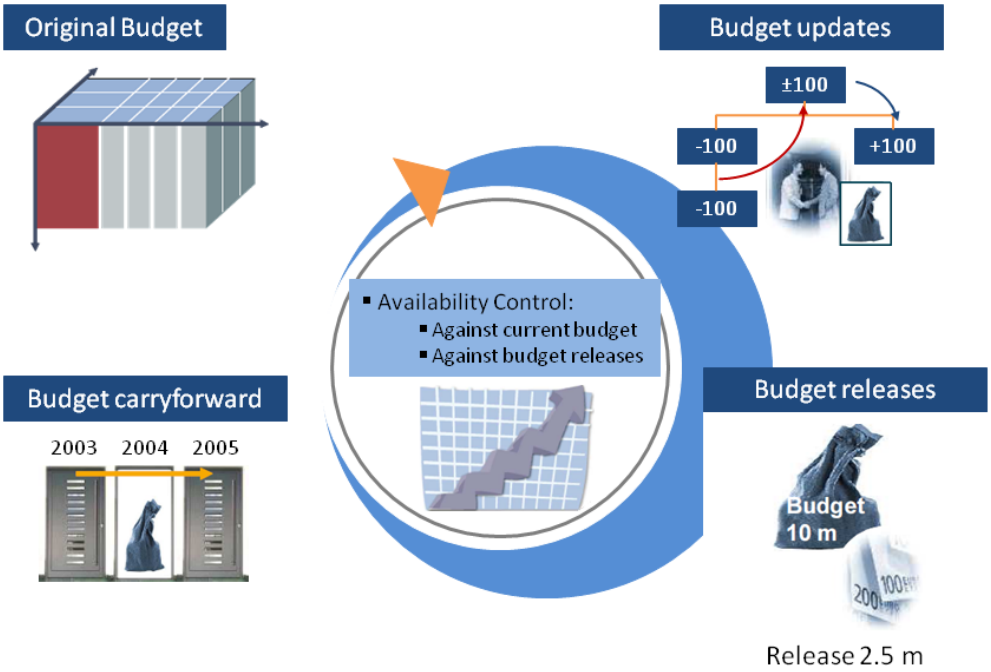


Figure 43: Budgeting

3.1.7.2 Fund Assignment and Availability Control

During project processing, the available funds are committed to different locations. One major task of fund assignment in projects is to contrast the budget of the individual project parts. That is, the approved costs, with planned costs, commitments and actual costs due to orders, activity inputs or, e.g., material withdrawals during project execution are opposed against each other. These liabilities, so-called commitments, are set up and, thus, actual costs incur. These two forms of fund binding, together with costs of anticipated orders, represent the funds disposal.

The funds overview can be considered a “passive availability check”. The project system, however, also supports active availability control. Thereby, the corresponding funds are determined and checked against the budget. The funds can be located at the budget-bearing WBS Element and the superior, assignable WBS Elements. If particular threshold values are exceeded (shortfall or overrun of budget), corresponding system reactions can be triggered. In customizing, you can set the action to be performed in accordance to the threshold values.

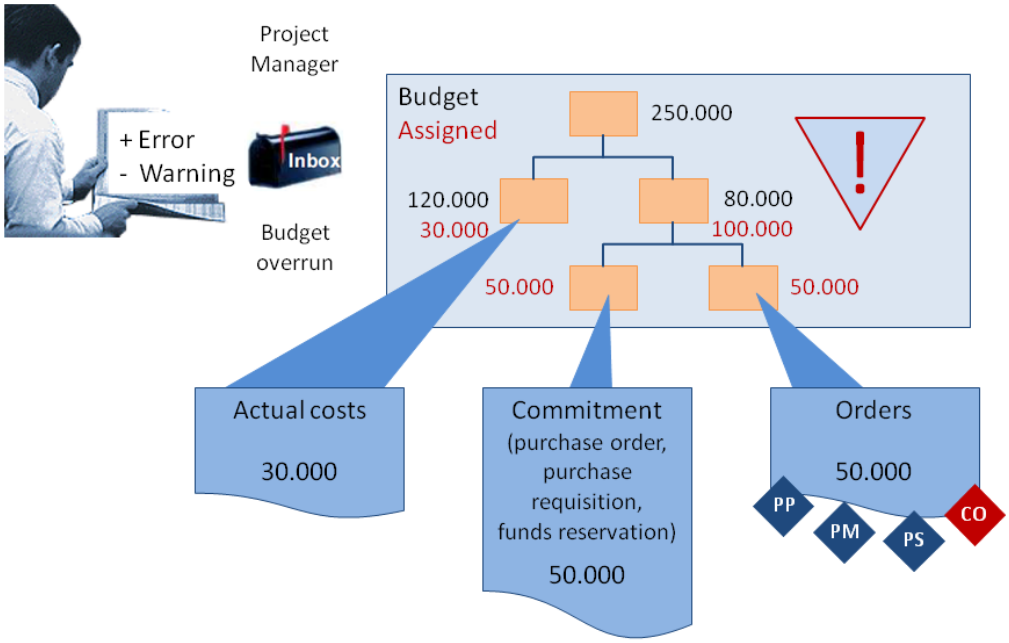


Figure 44: Availability Control

3.2 Practice: Project Planning

Subsequently, you will carry out project planning. You need to schedule the individual project phases and determine the resources required for processing the project as well as carry out cost planning.

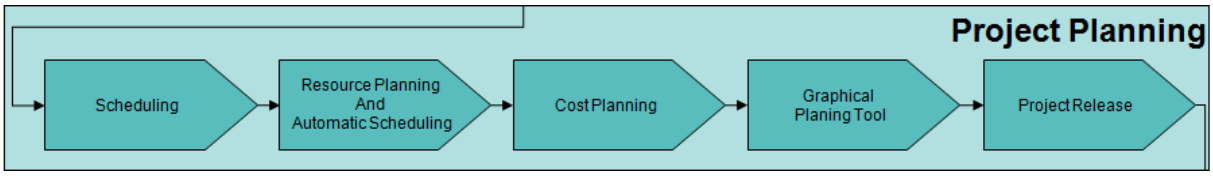


Figure 45: Process Overview: Project Planning

3.2.1 Scheduling

Schedule the individual project parts. Set the basic data if known.

3.2.1.1 Scheduling WBS Element Development

Choose

Logistics → Project system → Project → Project Builder (CJ20N)

1. On the lower left screen, you see the previously processed project under **worklist/ Last Projects Processed**. Double-click the project definition to display your project.

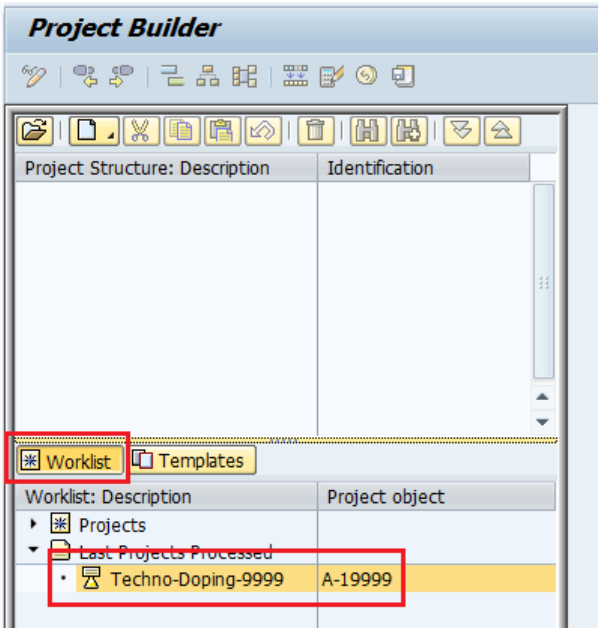


Figure 46: Worklist: SAP-System-Screenshot

2. Select the WBS Element for the first project stage (***Development-fixed price***) in the project structure (left upper screen). Go to the **Dates** tab.
3. To enter **basic dates,** enter the ***current date*** into the **BscStart** field.

4. Confirm with *Enter*.
5. Skip possible notifications (e.g., no working day) with *Enter*.

3.2.1.2 Scheduling WBS Element Blueprint

Go to the WBS Element ***Blueprint***.

1. Choose the **Dates** tab.
2. Again, enter the ***current date*** as **BscStart** date.
3. Into the **BscFin** field**,** enter the ***current date + 14 days***.
4. Confirm with *Enter*. Skip possible notifications (e.g., no working day) with *Enter*.

3.2.1.3 Scheduling Milestone Blueprint

Go to the Milestone ***Blueprint***.

1. Enter the **basic fixed date** ***today + 14 days***.
2. Confirm with *Enter*.
3. Skip possible notifications (e.g., no working day) with *Enter*.

3.2.1.4 Scheduling WBS Element Prototype

Go to the WBS Element ***Prototype***.

1. Go to the **Dates** tab.
2. Enter the ***current date + 14 days*** as **BscStart**.
3. Confirm with *Enter*.
4. Skip possible notifications (e.g., no working day) with *Enter*.

Further scheduling of the prototype project stage is carried out automatically by using the scheduling function of the Network. Therefore, resource planning is a prerequisite.

3.2.2 Resource Planning and Automatic Scheduling

Subsequently, you will plan the resources for the Activities ***Specification*** and ***Construction***.

3.2.2.1 Resource Planning Specification

The specification of the new racing bicycle is carried out by work center **2100** (specification mechanics) in plant **1300**. The engineers at the work center will need approximately **20** days.

1. Select the **Activity** ***Specification xxyy***.
2. Select the **Internal** tab.
3. Enter the following data:
   - **Work center** ***2100***
   - **Plant** (behind the slash) ***1300***
   - Confirm with *Enter*.
4. The system automatically fills in the field **activity type** with ***1421*** (personnel time).
5. Enter the scheduling duration as **20** (days) in the **normal duration** field.

6. Confirm with *Enter*.
7. The system calculates the work provided by the work center by using work center formulas and writes ***180*** hours into the work field.
8. Set the ***Project sum.*** flag.
9. Confirm with *Enter*.

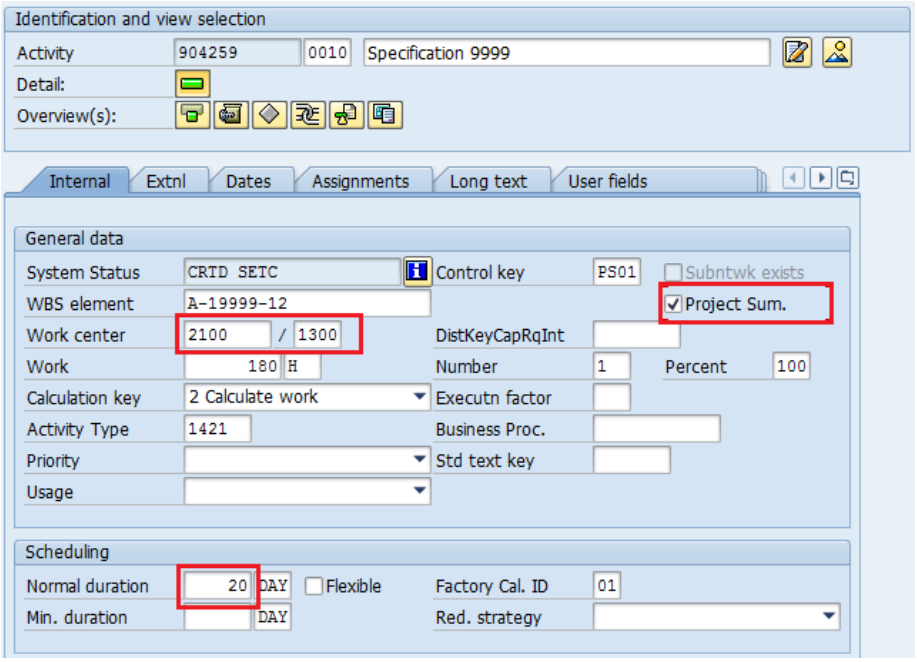


Figure 47: Ressource Planning Specification: SAP-System-Screenshot

3.2.2.2 Resource Planning Construction

The construction of the prototype is carried out by work center **PS01** (work center PS01) in plant **1300**. The engineers at the work centers will need approximately **30** days to do so.

1. Select **Activity *Construction***.
2. Select the **Internal** tab.
3. Enter **work center *PS01*** and behind the slash **plant *1300***.
4. Confirm with *Enter*.
5. The system automatically fills in the field **activity type** with ***1421*** (personnel time).
6. Enter the scheduling duration as **30** (days) in the **normal duration** field.
7. Confirm with *Enter*.
8. The system calculates the work provided by the work center by using work center formulas and writes ***270*** hours into the work field.
9. Set the ***project summarization*** flag.
10. Confirm with *Enter*.

Thus, you have completed resource planning for the project stage. To conclude, carry out scheduling for the entire project.

11. Select the project definition ***Techno-Doping-xxyy*** from the project structure on the upper left screen.

12. Select ***Edit → Dates → Schedule*** from the menu.
13. The system should display ***scheduling carried out*** in the status bar.

You can ensure scheduling consistency by choosing the **WBS Element *Development-fixed price*** and selecting the **dates tab**. There should be a date in the ***order finish field***. This date should be in accordance with the ***order finish date*** for the WBS Element **prototype** and with the ***end date*** of the **Network**. The duration of the project should be **64** days.

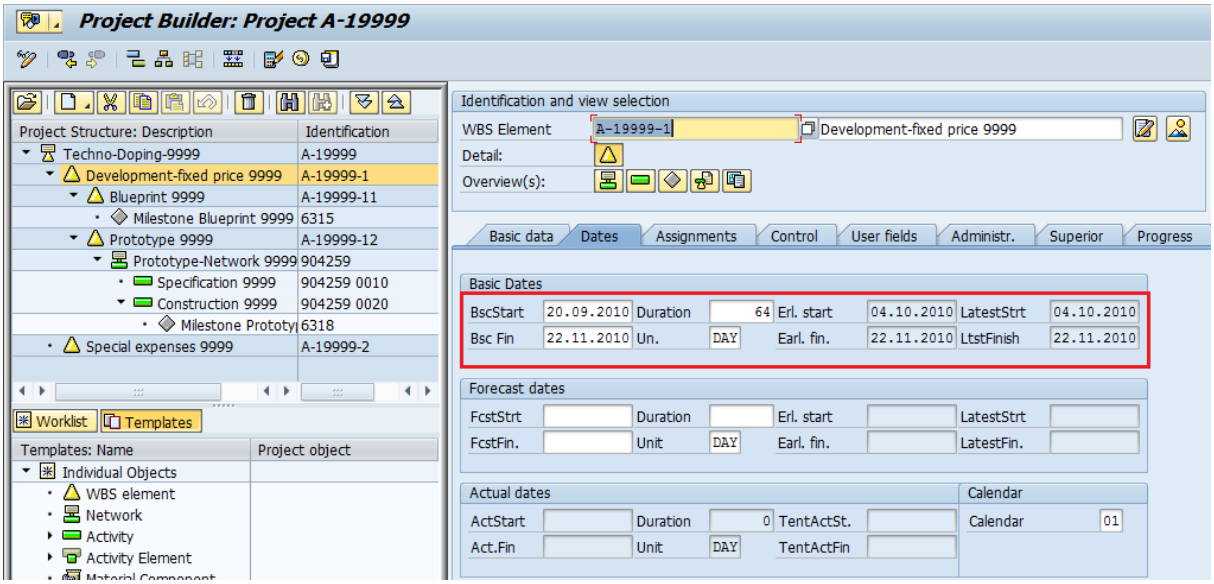


Figure 48: Dates WBS Element Prototype: SAP-System-Screenshot

Also, check the dates in the ***dates* tab** of the individual Activities. **Start date** of the Activity **specification** should be in correspondence to the ***start date*** of the **Network** and its ***end date*** should be prior to the ***start date*** of the **construction** Activity.

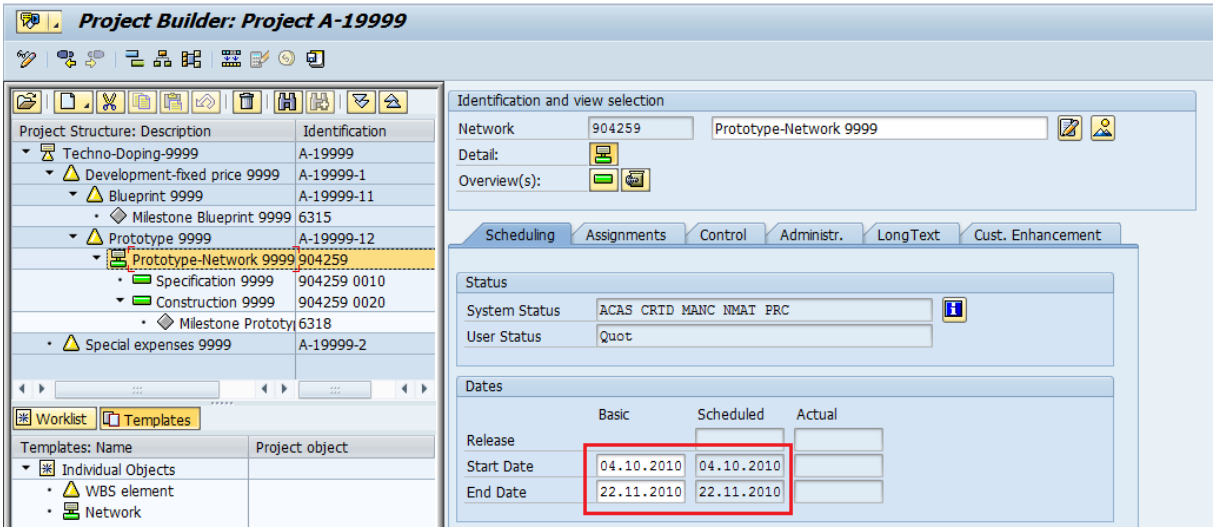


Figure 49: Dates Network Prototype: SAP-System-Screenshot

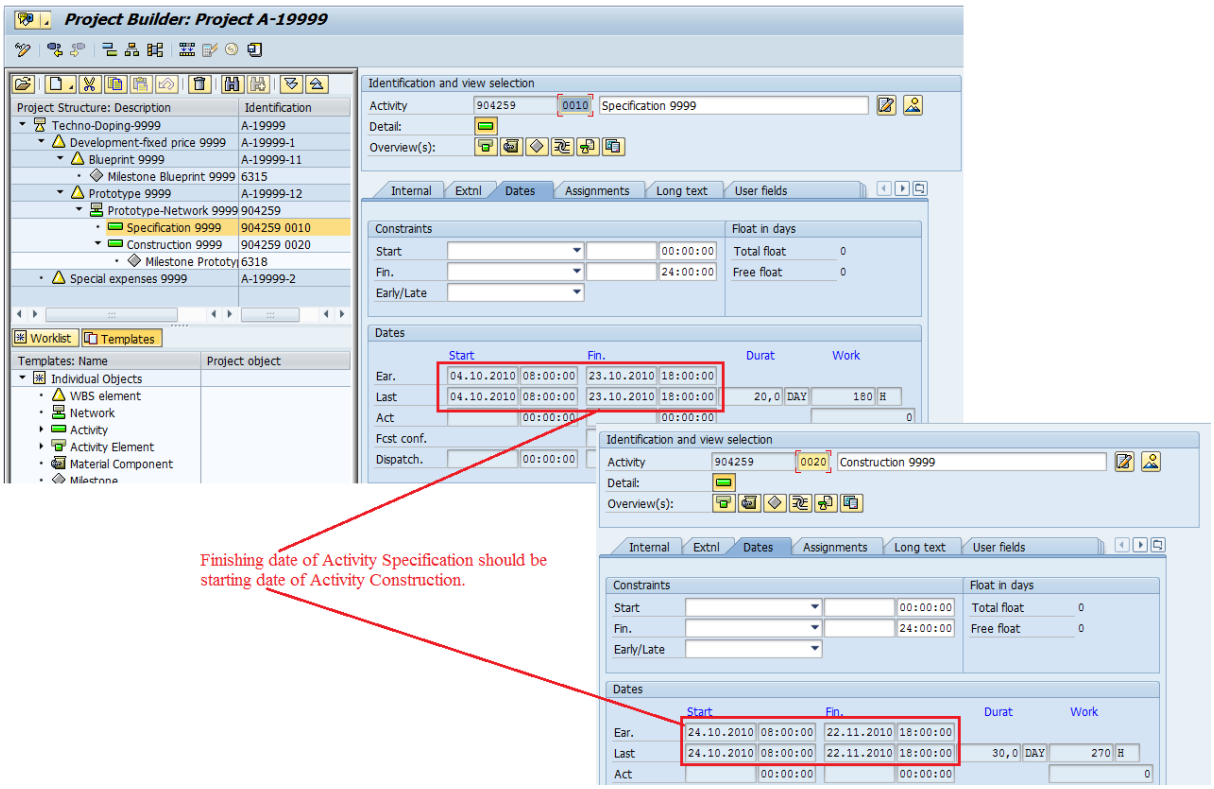


Figure 50: Dates Activity Specification/Construction: SAP-System-Screenshot

If this is not the case, carry out scheduling for the Activity **Specification** once again.
If the finishing date of Specification is not the starting date of Construction, check the FS Relationship indicator in the Relationship between the two Activities.

14. **Save** your project.

3.2.3 Cost Planning

Cost planning is next. Firstly, plan the costs of the Blueprint stage manually by using Easy Cost Planning.

3.2.3.1 Easy Cost Planning

Open your project again.

1. Select the WBS Element ***Blueprint*** from the project structure.
2. In the menu, choose ***Go to/Easy Cost Planning.***
3. Enter **Costing Variant *PS06***.
4. Press Create Cost Estimate.
5. On the left screen, select **Blueprint xxyy**. On the right screen, Choose Planning Form appears. Press it.
6. On the appearing search screen, confirm with *Enter*.
7. A selection of **planning references** is displayed that are available in the SAP system.
8. Scroll down until planning reference ***ZPS101 (Elevator Engineering)*** is displayed.

To simplify, we assume that developing the racing bicycle features the same cost and expense structure as an already completed project concerning the construction of elevators.

9. Double-click **planning reference *ZPS101***. On the left screen of Easy Cost Planning, an entry field for ***internal working*** hours and ***additional costs*** appears.

We assume that executing the project stage, Blueprint will take approximately 600 engineering hours and that there will be no additional costs.

10. Enter ***600*** into the **Internal Labor Hours** field. Leave the **Additional Costs** field blank.
11. Confirm by clicking the **confirm** button.
12. Now, on the left screen under the Blueprint stage, there are two cost items listed (engineering 1 and 2) with a total amount of ***23640 €.***
13. Select the Show/Hide Item View button to take a look at the individual cost items.

You should see the following screen

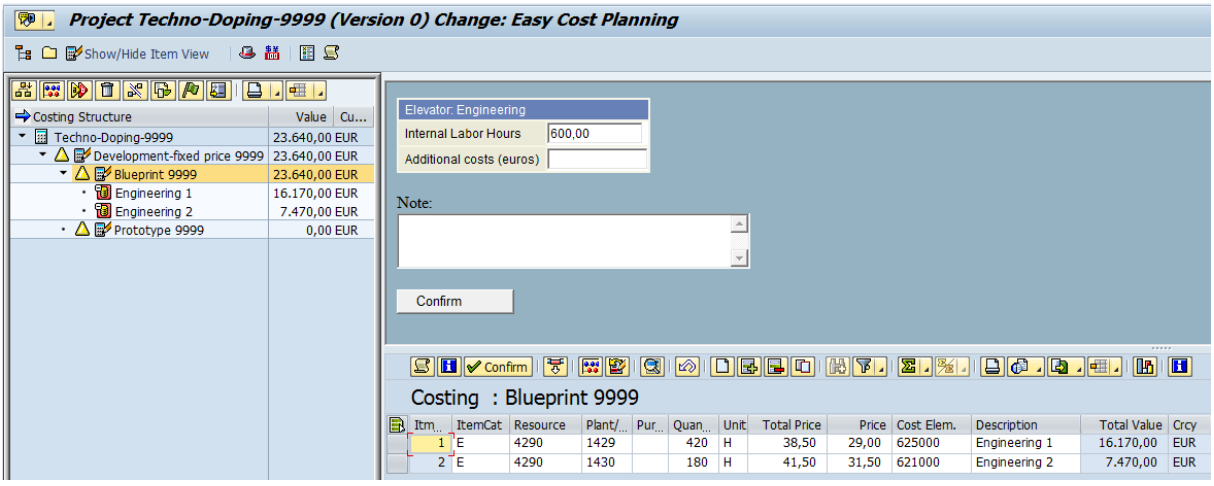


Figure 51: Easy Cost Planning: SAP-System-Screenshot

You can modify or delete items in the individual listing on the lower screen. If required, you can also add additional items. We will accept this costing for our **project cost planning** without any changes.

1. Mark both rows (use Control-button on your keyboard) and press the Confirm button.
2. On the left screen, select the node **Blueprint** again and press the button to complete costing.
3. Return to the Project Builder. The system issues a notification.

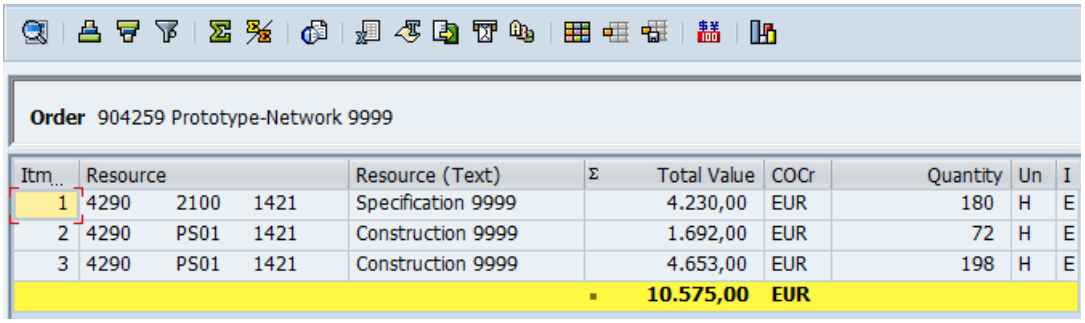
As you can see, Easy Cost Planning is a comfortable tool for **manual** cost planning concerning WBS Elements by using pre-defined planning references and their links with controlling (work centers, Activity types, prices, etc.). References are based on either previously com-

pleted projects or SAP best practice solutions, or can be created individually if required. Corresponding functions to create planning references are available in the SAP ERP system.

3.2.3.2 Network Costing

Next, you will carry out costing for the prototype stage. This step is easier than the one using Easy Cost Planning, since all required values (work center, work time, activity types, etc.) were already entered in the Network (or in the Activities, respectively) in resource planning and scheduling.
Also, that is the great advantage of Network Costing, since all required data for calculating costs are derived from the SAP CO master data (work center, work time, activity types, activity prices etc.) and, thus, costing is performed automatically.

1. On the upper left screen, select your **Network (Prototype-Network)** from the project structure.
2. Select ***Edit/Costs/Calculate costs*** from the menu.
3. The system issues a notification that the costs were calculated.
4. Select ***Edit/Costs/Costs itemization*** from the menu. You can see that the individual cost items for the Network total up to approx. 10.575 € (there may be small deviances).



Order 904259 Prototype-Network 9999

Itm...	Resource			Resource (Text)	Σ	Total Value	COCr	Quantity	Un	I
1	4290	2100	1421	Specification 9999		4.230,00	EUR	180	H	E
2	4290	PS01	1421	Construction 9999		1.692,00	EUR	72	H	E
3	4290	PS01	1421	Construction 9999		4.653,00	EUR	198	H	E
						10.575,00	**EUR**			

Figure 52: Network Costing: SAP-System-Screenshot

3.2.4 Graphical Planning Tools

In the SAP project system, you can also display the project definitions and project planning graphically.

3.2.4.1 Hierarchy Graphic

Take a look at your project by using the Hierarchy Graphic tool.

1. Go one step back to the Project Builder main screen.
2. Select the highest node of your **project definition** (Techno-Doping-xxyy).
3. Select the  button.

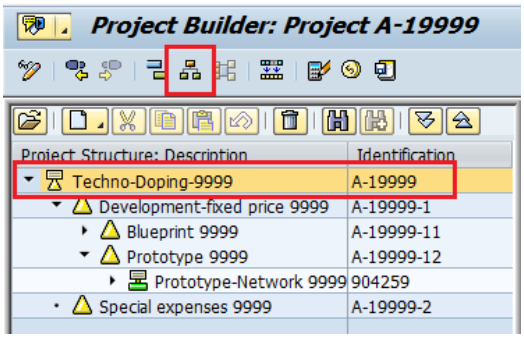


Figure 53: Open Hierarchy Graphic: SAP-System-Screenshot

4. You can see the hierarchy graphic of your Work Breakdown Structure.

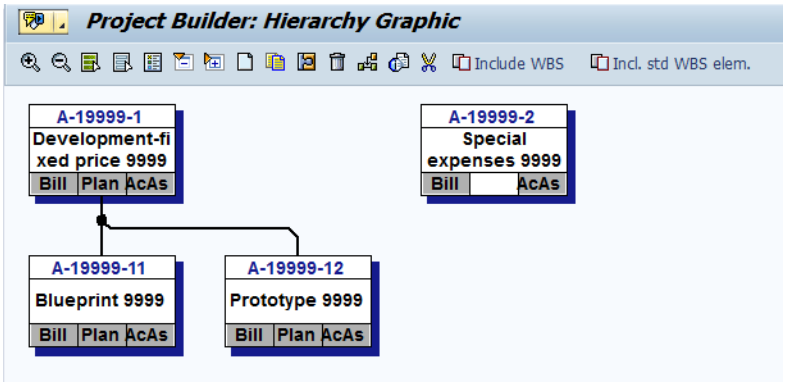


Figure 54: Hierarchies Graphic: SAP-System-Screenshot

5. All functions to maintain your project are available from this graphic. By double-clicking the individual WBS Elements, you can branch into details and modify them. Moreover, you can create new WBS Elements, re-arrange or delete them.
6. Go back to the Project Builder.

3.2.4.2 Network Graphic

Select your **Network.**

1. Choose the  button.
2. The Network graphic for your prototype Network is displayed including the individual Activities and their Relationships.

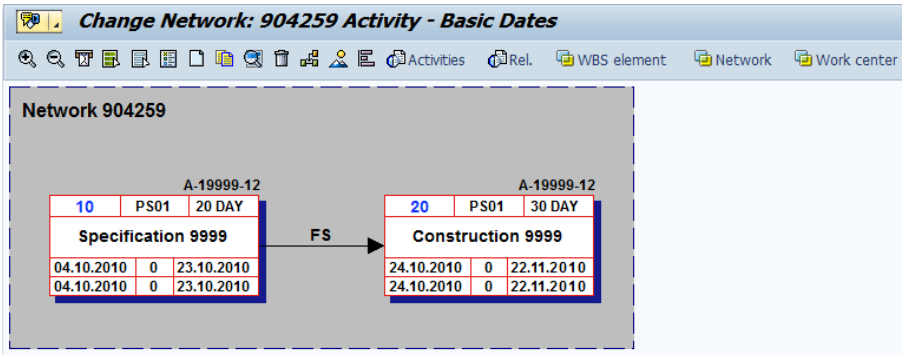


Figure 55: Network Graphic: SAP-System-Screenshot

3. The Network graphic provides you with all options for maintaining your Network as well. Along with Activities and Relationships, you can see the start and end dates of the Activities. By double-clicking an Activity, you can branch into the details.
4. Go back to the Project Builder.

3.2.4.3 Project Planning Board

Display your project in the Project Planning Board.

1. On the upper left screen, **expand** all nodes of your project structure. Choose the **highest node** of your project definition (Techno-Doping-xxyy).
2. Choose the  button.

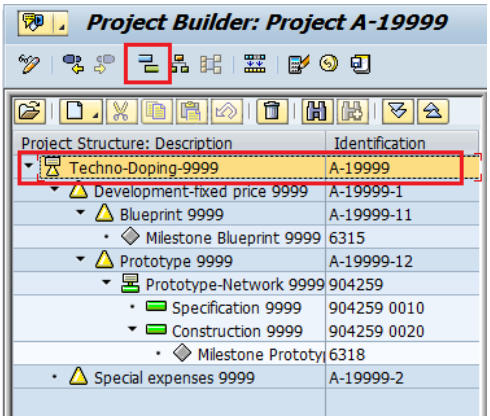


Figure 56: Open Project Planning Board

3. The Project Planning Board for your project definition is displayed.
4. As you know from the theoretical section, this tool is a complete replacement of the Project Builder. All functions of the Project Builder are available from the Project Planning Board.
5. On the right screen, all project stages are displayed on a timeline. On the left screen, the individual project items are listed in a table with the corresponding plan costs and dates, etc. Of course, actual costs and revenue is not listed yet.

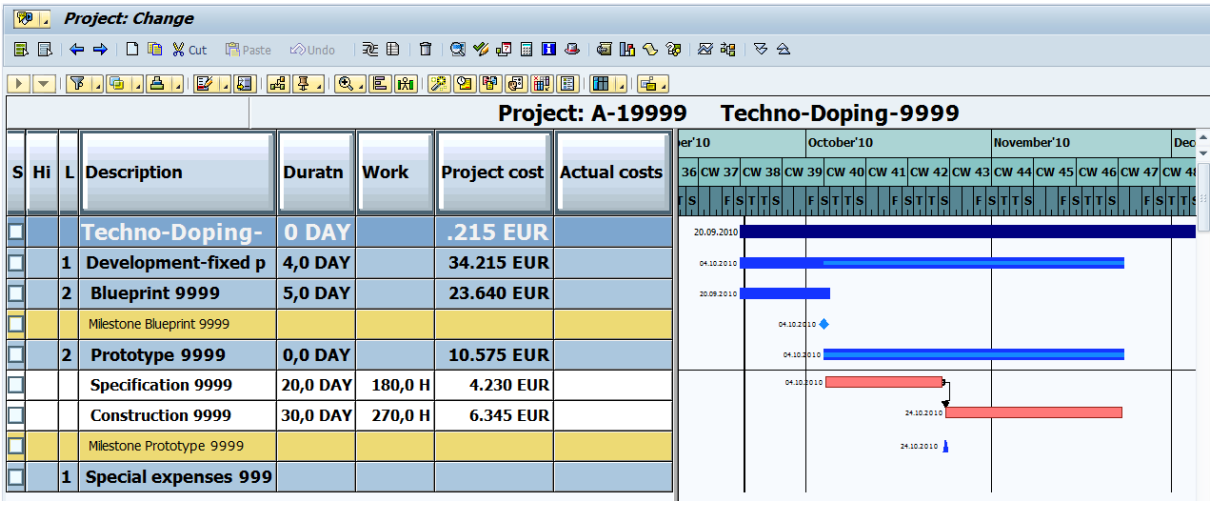


Figure 57: Project Planning Board: SAP-System-Screenshot

6. Leave the Project Planning Board (save if prompted).
7. **Save** your project. Leave the Project Builder.

3.2.5 Project Release

Now that you have planned dates, resources and costs, you can start negotiating with the customer. With customer 5xxyy (sales order management case study), you agree on carrying out the project for 50000 Euro plus costs for special expenses. The customer agrees and you release the order. After order release, you can create a sales order for the customer.

Call up the following transaction

Logistics → Project system → Project → Project Builder (CJ20N)

1. Select your project.
2. On the upper left screen, the system displays the project structure. On the right screen, you can see the system **status field** on the **basic data** tab. This status should be ***created*** (CRTD), since this value is automatically set when creating a project.
3. To be able to operatively process the project, you need to release it. Therefore, choose the following from the menu:
   Edit → Status → Release.
4. The **system status** is now ***released (REL)***.
   To receive further information regarding the status, click the symbol. Choose the button to go back to the project overview.
5. *Save* the released project and close the **Project Builder**.

3.2.6 Create Project-related Sales Orders

Subsequently, you will create the sales orders and you will process credit management

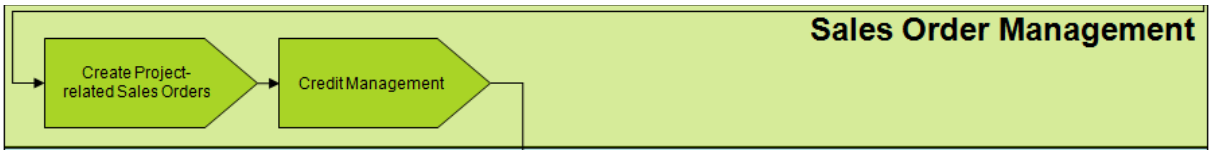


Figure 58: Process Overview: Sales Order Management

For order processing and subsequent billing, you need to enter the sales orders for the project. Overall, you must enter two sales documents: One for the project part, which is charged with the fixed negotiated price and one for the order billed according to the actual expenses of the tests. The Relationship between project and order is visualized below.

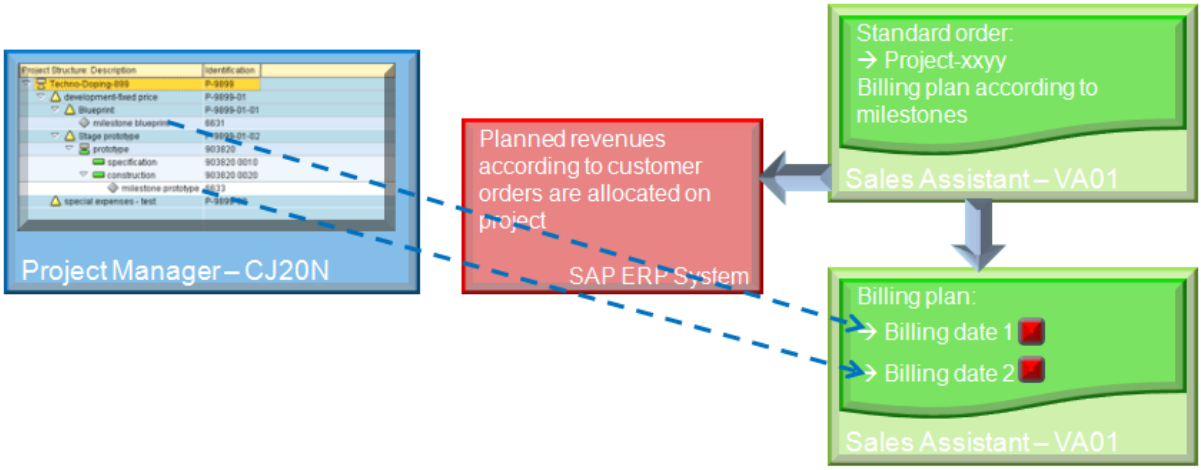


Figure 59: Sales Order and Milestone Billing: Integrations-Fallstudie SAP PS, 2007

As you can see from the figure above, a sales order for milestone billing is created. The sales order refers to the project to be carried out. The two milestones in the project structure are transferred to the order in correspondence with the basic dates. Thus, billing of the sales order is carried out by using the individual milestones of the Work Breakdown Structure. As soon as a milestone is reached, e.g., when the first project stage Blueprint is completed, the customer can be charged with reference to the standard order.

3.2.6.1 Create Order for Milestone Billing

Create an **order for milestone billing**. Therefore, you need to carry out the steps described subsequently. Clarify the relationship to the project created in the first part of this case study when processing the following steps.

Now, choose the following transaction

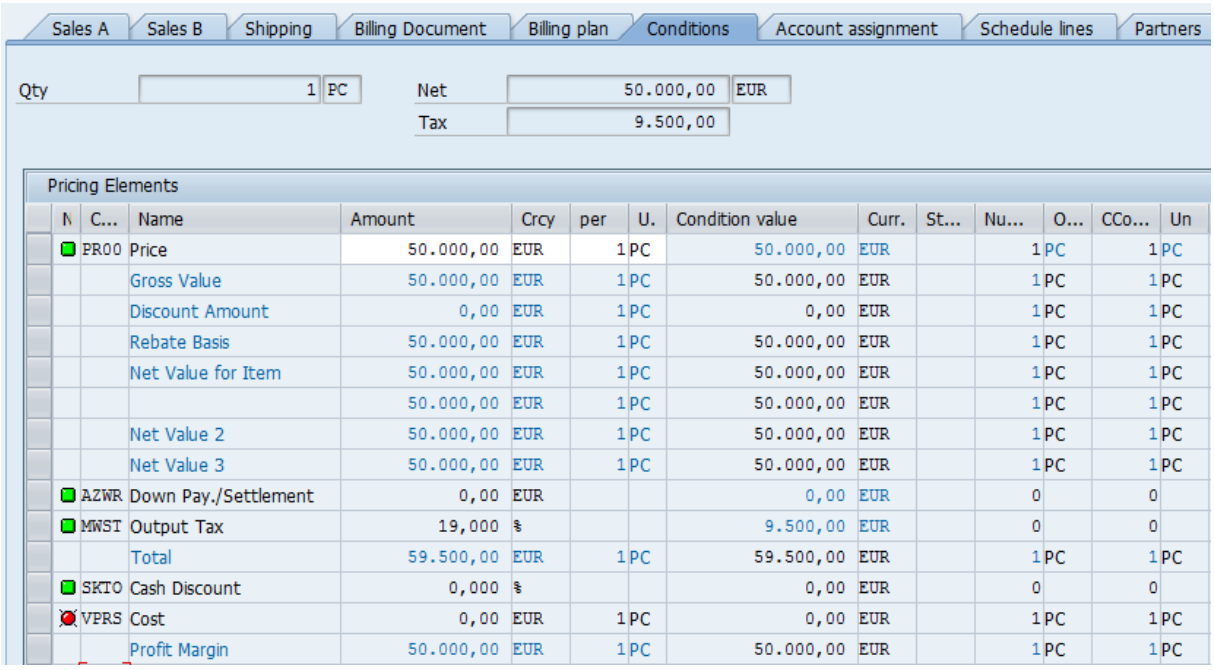
Logistics → Sales and Distribution → Sales → Order → Create (VA01)

1. Enter the following data:
   - **Order type** ***OR (Standard order)***
   - **Sales organization** ***1000 (Germany Frankfurt)***
   - **Distribution channel** ***10 (Customer sales)***
   - **Division** ***00 (Cross-division)***
   - Press *Enter*.
2. Enter the following data:
   - **Sold-to party** **5*xxyy***
   - **PO number** ***1234xxyy***
   - Confirm with *Enter*.
3. As **material,** enter the previously created dummy master record ***Techno-xxyy*** and enter **order quantity *1***. Confirm with *Enter*.

   The system notifies you that the credit limit of your customer was exceeded. Skip this message. The system now notifies you about a **pricing error**. In this case, it is on pur-

pose. The price for a project is always subject to actual negotiations and must be entered manually.

4. Select the line of the material so that it is highlighted. Choose ***GoTo → Item → Conditions*** from the menu.
5. You are in the **Conditions** for item 10 tab.
6. In the first white line of the table, enter into the condition type (**CnTy**) column ***price (PR00)*** and into the **amount column *50000***. Confirm with *Enter*.
7. The system carries out costing again and moves the line to the top. The **total amount** of ***59500*** including taxes appears.

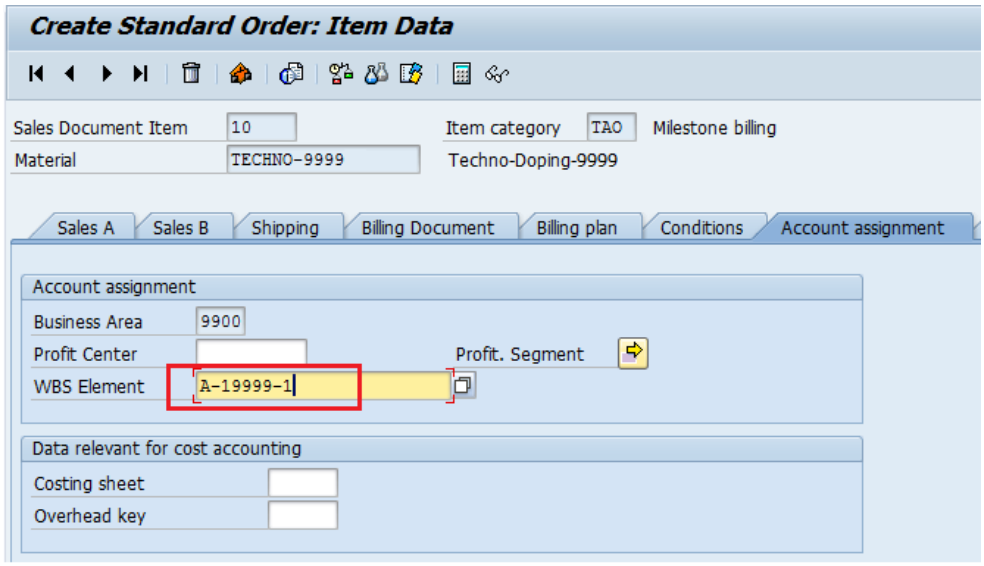


N	C...	Name	Amount	Crcy	per	U.	Condition value	Curr.	St...	Nu...	O...	CCo...	Un
	PR00	Price	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
		Gross Value	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
		Discount Amount	0,00	EUR	1	PC	0,00	EUR		1	PC	1	PC
		Rebate Basis	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
		Net Value for Item	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
			50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
		Net Value 2	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
		Net Value 3	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC
	AZWR	Down Pay./Settlement	0,00	EUR			0,00	EUR		0		0	
	MWST	Output Tax	19,000	%			9.500,00	EUR		0		0	
		Total	59.500,00	EUR	1	PC	59.500,00	EUR		1	PC	1	PC
	SKTO	Cash Discount	0,000	%			0,00	EUR		0		0	
	VPRS	Cost	0,00	EUR	1	PC	0,00	EUR		1	PC	1	PC
		Profit Margin	50.000,00	EUR	1	PC	50.000,00	EUR		1	PC	1	PC

Figure 60: Condition for Project Sales Order: SAP-System-Screenshot

8. Click the **Account Assignment** tab. In the **WBS Element** field, enter the fixed price element of the project: ***A-1xxyy-1***. Thus, the order is linked with the project structure.

*If the **WBS Element field** is not displayed, then you have an error in your material master of Techno-xxyy. In that case, leave this transaction **without saving** and go back to MM02. Enter Techno-xxyy and check whether you have entered the Strategy Group 21 and the Item Groups 0005. Then restart 3.2.6.1. If the **WBS Element field** still is not displayed, contact your tutor. **Do not work further without solving this issue!***



Make sure you enter **A-1xxyy-1** here.
If the WBS Element field is not displayed, **do not work further!**

Figure 61: Account Assignment to Project: SAP-System-Screenshot

9. Next, select the **Billing Plan** tab.
10. The displayed billing dates are from an IDES template. Actually, they should correspond to your project milestone dates. Therefore, delete the present dates. Click the  symbol (**select all**) and then the  symbol (**delete row**).

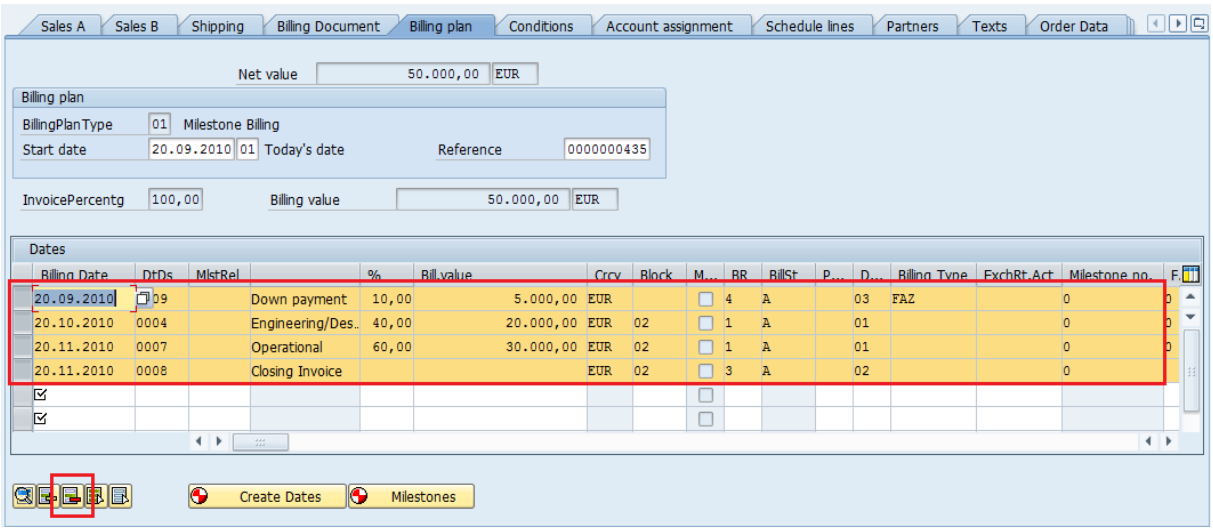
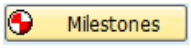


Figure 62: Billing Plan (1): SAP-System-Screenshot

11. To generate dates from the milestones, click the 

symbol.
12. The system opens the **selection criteria** window. Select **WBS Element** and enter your project part ***A-1xxyy-1***. Confirm with *Enter*.
13. The system displays two milestones. Select both rows and click the 

symbol.
14. The system copies both milestones including planning data and billing percentages from the planning structure. In the **blocking** column, both entries should be ***complete***

confirmation missing (02). Thus, it is ensured that invoices are only issues after completing a milestone.

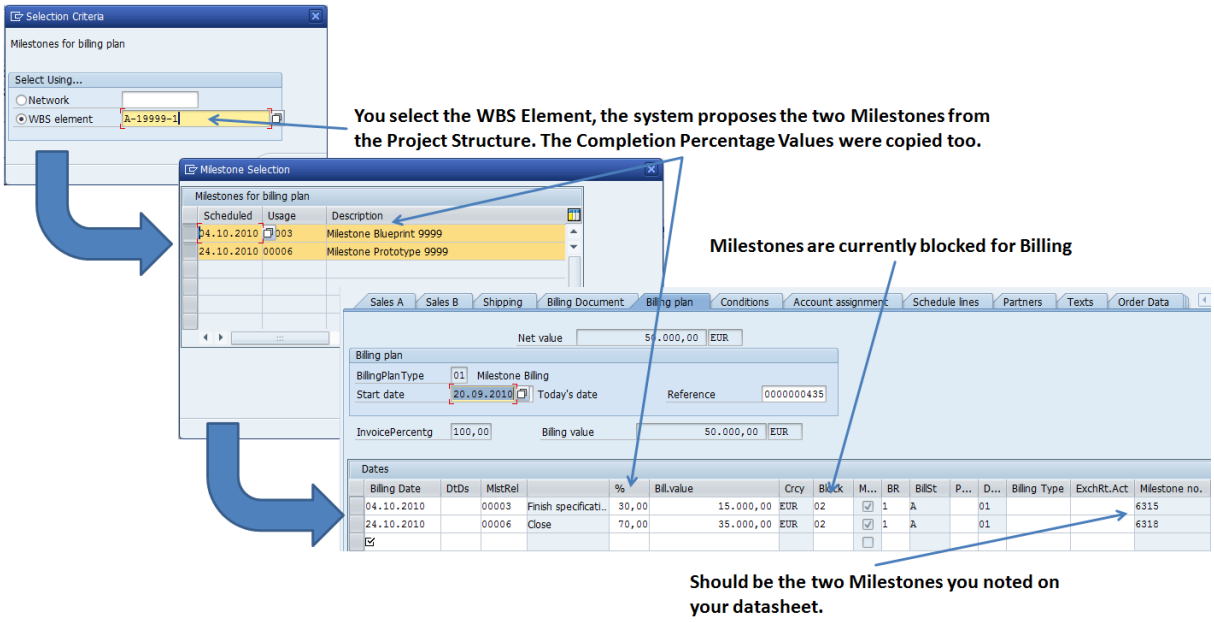


Figure 63: Billing Plan (2): SAP-System-Screenshot

15. Choose the button (**back**). Skip possible information (e.g., credit check) with *Enter*.
16. Save your order and list the **order number**.

Standard order 1 (milestone billing)**:** _____

3.2.6.2 Create Order for Resource-related Billing

Create the second **order for the resource-related billing**. Complete the following steps.

Caution

In the context of resource-related billing, expenses (confirmed consulting hours = source data) are mapped to sales materials. Instead of the internal hourly price, a (higher) SD sales price is calculated. Thereby, the internal hourly rate that you set for the test driver (Activity type T-xxyy) and the costs for the Activity are stated and replaced by an external sales price in correspondence to the material testdriver1. Your tutor prepared this material previously. This material is the dummy material for the second standard order to allocate the consulting Activities.
In billing, you will subsequently receive a pending invoice of 200 Euro. Do **not** *process this bill, but only process the amount of 800 € resulting from mapping in* ***resource-related billing****. This amount also takes account of the quantity of the Activity provided.*

Again, choose the transaction

Logistics → Sales and Distribution → Sales → Order → Create (VA01)

1. Enter the following data:
    1. **Order type** ***OR (Standard order)***
    2. **Sales organization** ***1000 (Germany Frankfurt)***
    3. **Distribution channel** ***10 (Customer sales)***
    4. **Division** ***00 (Cross-division)***
    5. Press *Enter*.
2. Enter the following data:
    1. **Sold-to party** **5*xxyy***
    2. **PO number** ***1234xxyy***
    3. Confirm with *Enter*.
3. Enter **material** ***Testdriver1*** and order **quantity** ***1***. This material was previously created by your tutor. Confirm with *Enter*. Again, skip a message regarding credit check.
4. The system determines **quantity unit** ***hour*** and a **price** of ***200 EURO***. You can check these entries by scrolling to the right hand side.

A test driver hour is not only a dummy value, since invoice creation is subsequently not carried out with reference to the order quantity (here: 1 hour) but with reference to the actually provided times (will be discussed together with the Dynamic Items Profile later).

5. To link the order with the corresponding project structure, select the first line and choose ***Go To → Item → Account Assignment*** from the menu.
6. Enter the previously created Element for **Special expenses** ***A-1xxyy-2*** into the **WBS Element** field.

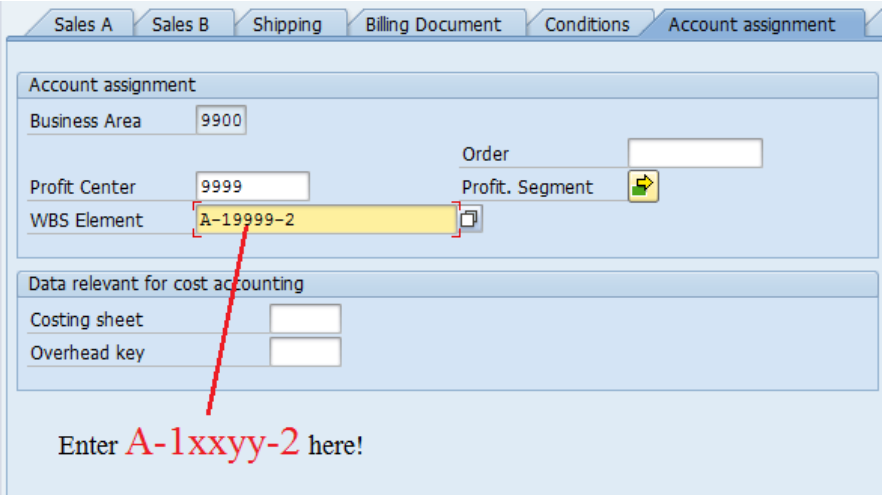
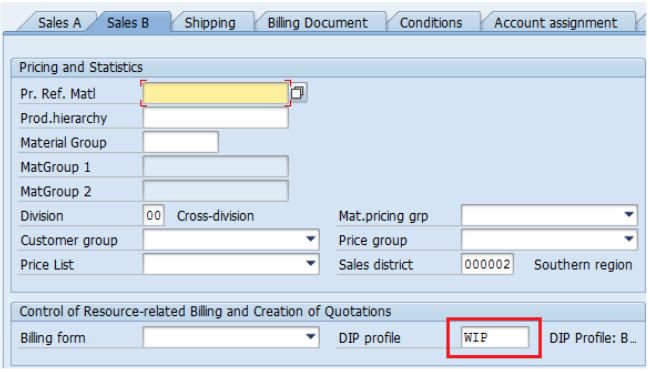


Figure 64: Account Assignment Special Expenses: SAP-System-Screenshot

7. Press *Enter*. Skip a possible notification concerning **the event object being derived again** by clicking *Enter* once again.
8. Go to the **Sales B** tab.
9. In the **controlling resource-related billing** section, enter **WIP** into the **DIP profile (Dynamic Item Profile)** field**.**



The **dynamic item processor** is a tool that the system uses to summarize data (for example, line items, totals records) into **dynamic items** in sales price calculation, resource-related billing, or data determination.
The DI profile controls how the system summarizes the data into dynamic items. A DI processor profile can have different usages.

Dynamic Item
Summarized intermediate level of data that is produced during processing (for example, during resource-related billing or quotation creation).
The system summarizes data (for example, line items that result from confirmations, or goods movements) from defined sources (for example, actual costs line items or actual costs totals records) into dynamic items. This summarization is controlled by the dynamic item processor profile.
Afterwards, the dynamic items can be transferred into sales documents (for example, billing requests or quotations).

Figure 65: Dynamic Items Profile: SAP-System-Screenshot

10. Confirm with *Enter* and *save* your order.
11. Skip a possible notification concerning credit check. List the order number.

Standard order 2 (resource-related billing)**:** _____

3.2.7 Credit Management

Presumably, you received a notification regarding an exceeded credit limit for your customer 5xxyy when creating both orders.

Exercise (!):
If you received a notification regarding the credit limit, you ***must release*** *both orders manually. You already know how to do this from the* ***Financial Accounting*** *case study.* ***Carry out order release for both orders on your own****.*

3.3 Elucidation

What have we learned so far?

You have learned how the planning phase is realized in SAP PS and which process parts belong to this phase.

3.3.1 Aspects of Planning

The SAP PS component (Project System) provides many ways to plan projects. Thereby, the following project related facets can be planned:

- Dates (Scheduling)
- Resources
- Materials
- Costs, Budgets and Revenues
- Payments

The **project planning board** is the main tool for planning projects. You can use the project planning board, to create all the data required for a project (first and foremost, the dates) and process and evaluate it.
In the project planning board, project data is presented in table format and as graphical display. This provides users with a comprehensive overview of the project at any time. With the project planning board, you can:

- plan, check and change dates
- plan, schedule and check resources
- determine and distribute work
- compare capacity
- calculate costs

3.3.2 Scheduling (Planning Dates)

Scheduling with WBS Elements

- You can schedule dates and enter key dates for individual WBS Elements.
- Planned start and end dates can be determined directly when creating a project in the Project Builder. You can then plan the dates in the Project Planning Board by using tables or graphics.
- In rough-cut planning, dates for WBS Elements are set that are mandatory for detailed planning. Rough-cut plan dates can be used as a basis for detailed planning or scheduling with Networks.
- You can later compare, coordinate or calculate dates by using te scheduling functions.
- Date changes do not automatically result in changes to planned dates of other WBS Elements because there are no Relationships between WBS Elements.
- Dates can be inherited or extrapolated for scheduling in the WBS of the SAP Project System. Dates are always inherited top-down and extrapolation is carried out bottom-up.

- Dates can also be maintained manually.
- You can check the consistency of your scheduling data within the WBS structure.

Scheduling with Networks

- Plan dates of Activities in Networks are calculated by the system automatically (scheduling function).
- Following transaction options are available:
  - Network plan scheduling
  - Overall scheduling
  - WBS scheduling
- Two principles available for scheduling:
  - **Forward scheduling:** Starting from the first Activity, the earliest start date (***earliest starting point***) regarding all Activities involved are calculated based on the start dates of the Activities and the Activity durations.
  - **Backward scheduling:** Starting from the last Activity, the latest end dates (***latest starting point***) for all Activities involved are calculated based on their end dates and the Activity durations.

3.3.3 Resource Planning

- Using Work Breakdown Structure, you can assign/post costs for resource consumption posted to the project directly. This includes:
  - Plan costs for internal and external resources
  - Costs for activity allocations, purchase requisitions, goods receipts and inspections costs
- Networks are used when resource planning in terms of capacity planning or automatic data transfer between project structures and purchasing documents is required. Manual cost planning for the required resources and manual allocation of purchasing documents on WBS Element-level is not necessary when using Networks.
- You can use the corresponding Activities in the Network for planning resources required for a project. In the project system, there are the following resources:
  - Internally Processed Activities
  - Externally processed Activities
  - Service Activities

Internal Processing

- You plan capacities and costs for Activities on your company-own work centers.
- You enter the amount of work required and the work center at which the work is performed on the Activity details page.
- The work determines the output to be provided by machines or personnel for the execution of Activities.
- Using work centers is a prerequisite for capacity planning with Networks.
  - Work centers contain costing data allowing for costing Activities.
  - Work centers contain scheduling and capacity data required for scheduling and capacity planning.

  - You can determine work center capacities for the Activities.
- You can use the Project Planning Board or the Capacity Planning Tables to level capacities.
- You can also distribute the work among employees (workforce planning).

External Processing

- You use this, when you procure resources externally
- Creating purchase requisitions, purchase orders, accessing data from purchasing for external processing (e.g., purchasing info record containing prices and delivery times for external processing), etc., can be initialized from these types of activities.

Service Activity

- Similar to External Processing Activity
- Can also be a hierarchy of planned services that are supposed to be purchased from a vendor
- Goods receipt of services consists of two steps:
  - entry of services performed
  - acceptance of services performed.
- You use the control key to determine whether an activity is externally processed or not.

3.3.4 Material in the Project

- Using materials in SAP PS establishes the link to SAP SD, SAP MM and SAP PP
- In a project, you can plan required material, its procurement, consumption and delivery.
- Using WBS Elements, costs for procured materials can be planed and several documents (material reservations, purchase requisitions, orders, goods issues and goods receipts) can be assigned to the WBS Element.
- When using WBS Elements, the manual accounting of document to WBS Elements is no longer necessary (as of ECC 5.0).
- When using Networks, integrated material planning featuring an automatic data transfer between a project and purchasing or production is available (not featured when using WBS)

3.3.5 Cost Planning in the Project

- When using only Work Breakdown Structures (without Networks), costs must be planned manually on WBS Element level.
- Cost planning in WBS Elements encompasses:
  - Hierarchical planning (Overall planning)
  - Detail planning
  - Unit costing
  - Easy Cost Planning

- You can create Activities for WBS Elements and plan costs by using these Activities.
    - Based on resource and materials planning with Networks, the SAP system can calculate planned costs for procurement and consumption of resources and materials automatically.
    - This so called Network Costing features the following advantages:
        - The resulting plan can be copied to a new project.
        - When postponing project parts, cost planning is changed in accordance to the Activities.
        - Planning via Network Activities is cost-element-specific and period-specific.

Easy Cost Planning

- Simple tool for cost planning at WBS Element level in the Project Builder.
- Cost planning by using Easy Cost Planning is period-specific.
- You use planning templates for entering costing items
    - planning templates can be based on SAP standard (best practice solutions)
    - planning templates can be from already finished projects
- IDEA behind Easy Cost Planning: You use the cost structure of an already completed project, which can be compared to your actual project, to estimate costs for the actual project.
- Example: You have a template of the cost structure (used activity types, work centers, resources, etc.) of a software project. Now you want to estimate costs for a new software project. You use the template to estimate the costs for the new project. You only need to enter amounts (work hours, employees, material amounts used, etc.), the rest is calculated by using the data from the template.

3.3.6 Assigning an Order to a Project

- You can assign different orders to a project (internal orders, production order and maintenance orders)
- The orders are determined by using the order category. The Network is an order category, too.
- The order categories for corresponding expenditures are determined by the system.
- Within an order category, you can set individual order types. The order type controls the following aspects:
    - Number assignment
    - Default value settings
    - User-specific status management
    - User-specific field control
- Depending on the order type and the plant, networks can be header-assigned or activity-assigned. Normally, activity-assigned networks are used, where costs are gathered in each activity. Header assigned networks are only significant for the assignment of networks to sales orders (without WBS).

3.3.7 Cost Planning and Budgeting

1. In the planning stage, project costs are estimated as exactly as possible.
2. In the subsequent approval stage, funds are assigned in form of a budget.
3. The budget differs from the project cost planning in its binding character. That is, a budget is binding, cost planning is not.
4. The budget is the framework for developing the project costs within a particular period, determined by the management.

Budgeting

Budgeting process:

1. You assign a so-called **original budget** (transaction CJ30)
   - All WBS Elements of a project are displayed in a table.
   - The entire budget of a project can be allocated to subordinate WBS Elements top-down or it can be combined from individual budgets bottom-up.
   - The hierarchical consistency check ensures project consistency.
   - You can set in the budget profile whether the budget is assigned completely or separated into years.
2. You can set **authorizations** for budget maintenance.
3. During a project, you can **adjust** the budget of the project or individual WBS Elements to the actual costs.
   - You can modify the original budget (transaction CJ30).
   - You can carry out a budget update.
   - For budget updates, the system distinguishes between
     - budget supplements
     - budget returns
     - budget transfers
4. **Budget release** allows for releasing a budget at different times during a fiscal year.
5. **Carry forward budgets** allows to transfer unused funds from the previous year to the new fiscal year.
6. **Current budget:** The current budget is derived from: Original budget + Supplements – Returns +/- Transfers

Availability Control

These components enable you to monitor and control project costs. The project manager can use availability control to call up an overview of the assigned funds and see which type they are.

Availability control enables you to control costs actively by issuing warnings and error messages when costs are incurred. The component is fully integrated with upstream and downstream components, for example:

- Controlling (CO)
- Financial Accounting (FI)
- Production Planning and Control (PP)
- Materials Management (MM)

Availability control monitors funds by using budget allocation.

- **Passive Availability Control:** Overview of funds, their assignment and type.
- **Active Availability Control:** Prevents the assignment of too many funds. If you enter business transactions that create costs on a Controlling element (for example, posting of an invoice), the system checks whether there is still sufficient budget available for the controlling element or not. For projects, you can also use releases as an alternative to the current budget. It uses the tolerance limits specified in Customizing for the check.

Availability control checks the current distributable budget (or release) against the assigned value.

- **Distributable Budget**: The budget from the controlling element that is not yet distributed to other, lower-level WBS elements.
- **Assigned Value**: Costs incurred by a Controlling element.

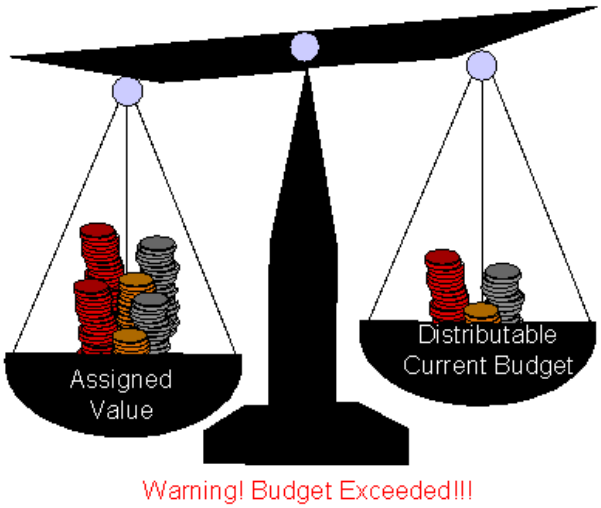


Figure 66: Availability Check: help.sap.com

Fund Assignment

You use this function to enter anticipated costs or revenues where you do not yet know which business transaction will later cause them (purchase order, material reservation and so on). In this way, you can reserve parts of the budget in advance. You can assign funds commitment to internal orders, cost centers or projects.

A funds commitment that is assigned to a WBS element, a network or an internal order is part of the active budget availability control. The funds commitment checks whether the available budget is still sufficient or not. The system includes defined tolerance limits below and above the budget.

The system displays the funds commitment as a commitment in the information system for the account assignment objects.

Funds commitment includes the following single activities:

- **Creating Funds Commitments**: You create a funds commitment as a marked document, which contains:
  - data in the document header that is valid for the entire document

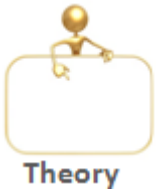
  - at least one funds commitment item that contains the actual data on the funds commitment

- **Changing Funds Commitments**: You can change the funds commitment as well as enter more items for funds commitment.
- **Reducing Funds Commitments**: When you manually reduce a funds commitment, you enter the reduction amount for the funds commitment item. You use the open amount to determine the reduction amount. The reduction amount is always the difference between the funds commitment amount and the total of the partial amounts already reduced. The reduction amount must not be greater than the open amount.

4 Project Execution

This section describes the main actions that are performed during project execution in SAP PS.

4.1 Theory: Project Execution



In the realizing stage of projects, Activities consume capacities of your company, external resources are involved in project execution, material is purchased, produced internally, consumed and delivered, vendor invoices are received and invoices are sent to customers, etc.

4.1.1 Aspects of Project Execution

In correspondence to the integration of the SAP ERP system and the resulting link of the project system with other applications of the SAP ERP system, almost all project-related data can be updated automatically at the relevant projects or they can be evaluated in reporting of projects. It does not matter whether the corresponding documents were created in purchasing, production or SD. Hence, many aspects result that need to be considered in project execution. For example, entering actual dates can trigger the creation of a billing document in SD or a goods receipt in materials management results in debiting a WBS Element with material costs. Consumed working hours in project execution are entered in human capital management and incurred costs are updated in controlling. Consider that before you can post any actual costs to a project, it must be released.
Since considering all aspects of project execution would go beyond the limits of this teaching unit, only some aspects are briefly presented in the following.

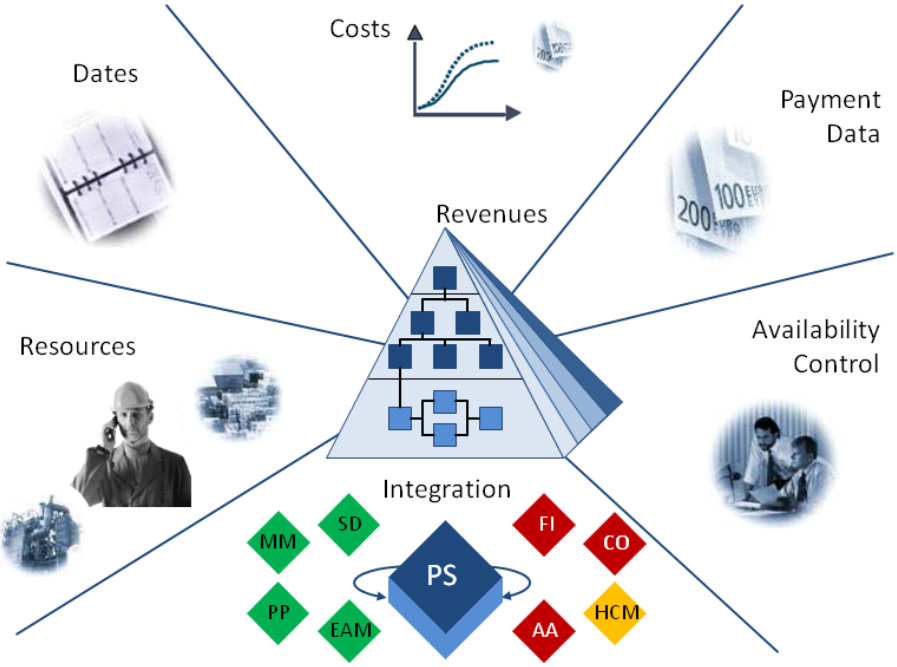


Figure 67: Aspects of Project Execution

4.1.2 Confirmation Options

Using confirmations, the processing status of Activities and Activity Elements in a Network can be documented. Thus, a forecast of future developments is facilitated. Different business transactions are carried out automatically, resulting from confirmations. This includes posting actual costs, actual work and if applicable changes to the Activity status.
There are different options available to create a confirmation in the SAP system:

- An individual confirmation for a Network, an Activity, an Activity Element or an individual capacity.
- As a collective confirmation
- Using the structure information system (selection of Activities and accessing individual or collective confirmation); a user can send a confirmation workflow to another user or organizational unit from the information system.
- Using the cross-application time sheet (CATS)
- Via internet (creation of an individual confirmation or entering time data in the time sheet)
- Using Handhelds via open PS interface
- Via PDC interface (process data capturing)

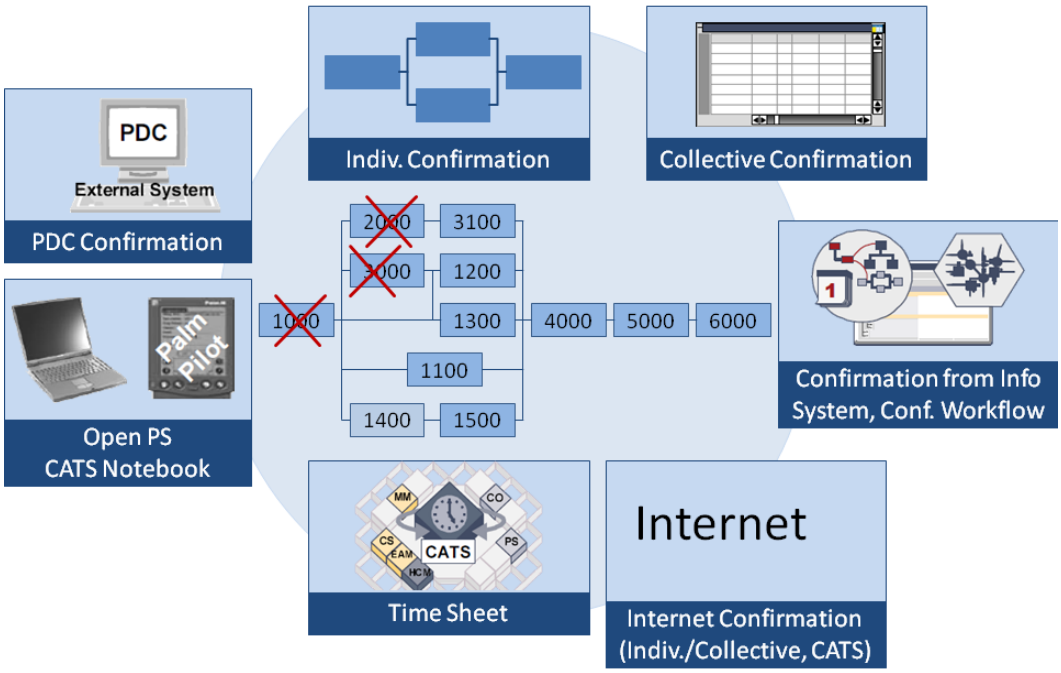


Figure 68: Confirmation Options

Actual Dates for WBS Element

During the planning phase, you entered basic dates for WBS elements, for instance, by creating graphical time bars in the project planning board. In the execution phase, you can set actual dates in the same way in the project planning board. The status Partially Released or Released must be set before you can enter actual start and actual end dates for WBS elements. To monitor dates in the project, you compare the basic dates with the actual dates, that is, you compare the planned dates with the actual dates or forecasted completion dates. You can use the project planning board or structure information system for analysis purposes.

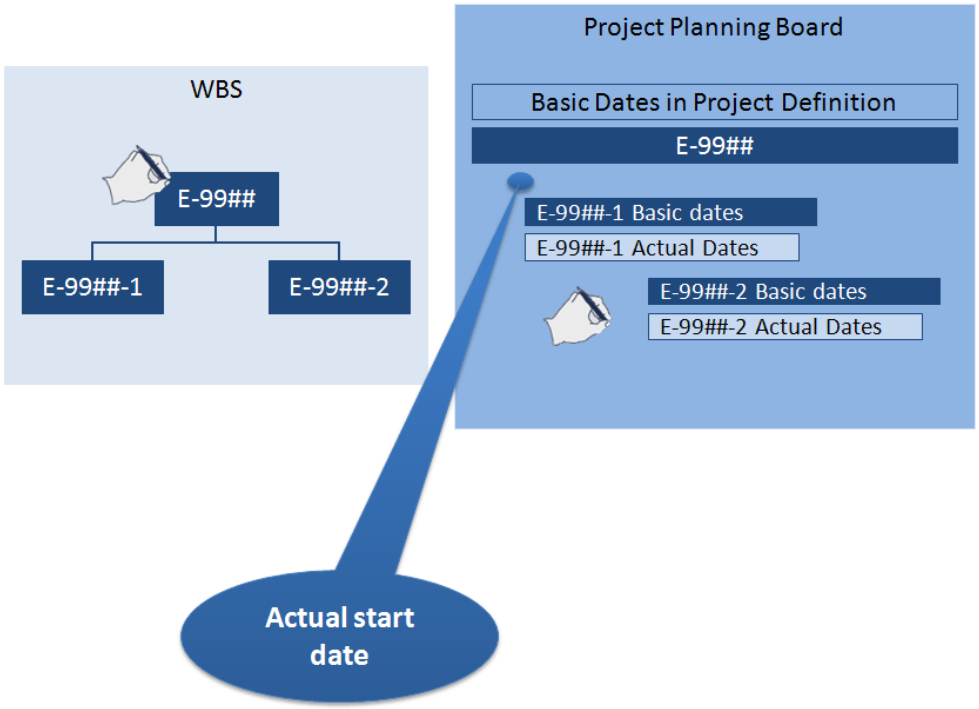


Figure 69: Actual Dates for WBS Element

Cross Application Time Sheet - CATS

Many companies that use SAP ERP employ the CATS time sheet as central transaction for recording working times of their employees. The time data recorded with CATS can approved and subsequently be transferred to other applications such as controlling or project system and, thereby, create activity allocations or confirmations automatically. Thus, CATS is an integrated function to record activities relevant to HCM, PS, PM, CS, and CO. Layouts can be individually set by using entry profiles.

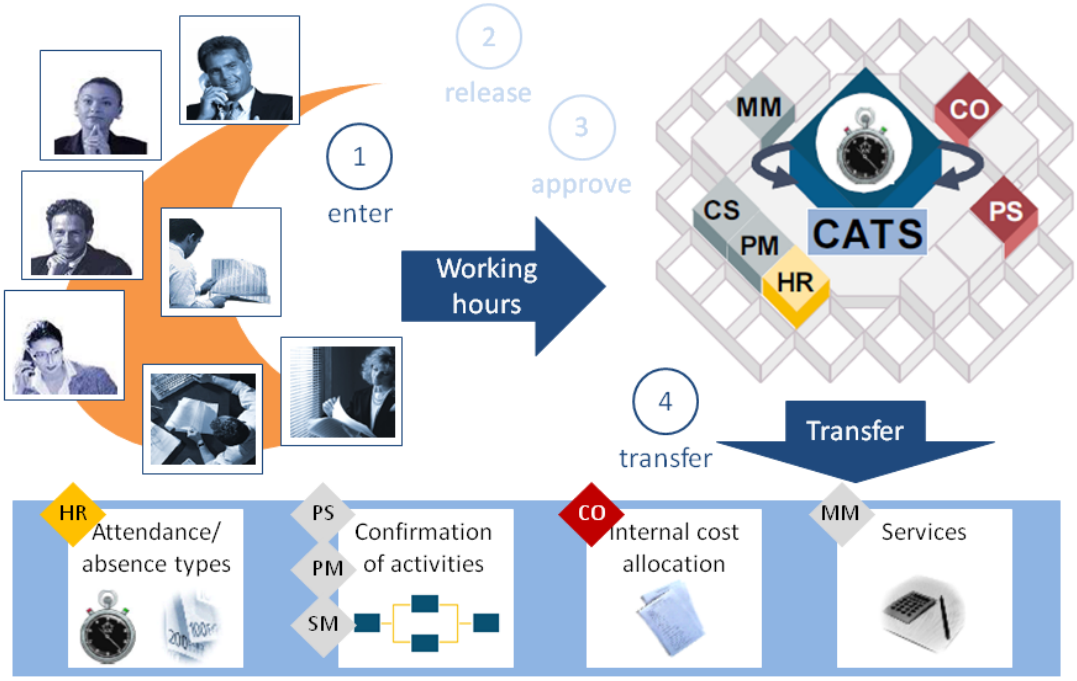


Figure 70: Cross Application Time Sheet

Execution Services

You can use Execution Services to enter commitment and actual costs for items that you planned by using Easy Cost Planning. The following postings are possible:

- Internal activity allocation
- Direct process allocation (for processes)
- Reservations (for material items)
- Goods issue (for material items)
- Purchase requisition (for material items, external activity items, service items, variable items)
- Purchase order (for material items, external activity items, service items, variable items)

4.1.3 Integration with the Purchasing Process

The Network creates purchase requisitions for External Processing Activities, Service Activities and directly procured material components, which are then transferred to the purchasing department for further processing. Purchasing processing includes, if applicable, a request for quotation to a vendor, quotation entry, vendor selection, transferring the purchase requisition into a purchase order and purchase order monitoring until goods receipt and invoice receipt.

A Service Activity triggers a similar purchasing process as an External Processing Activity; however, it can contain a complete hierarchy of planned services that are supposed to be purchased from a vendor such as value limits for unplanned Activities. Goods receipt of services is structured into two steps (service entry, service acceptance).

The purchase requisition results in a purchase requisition commitment for the account assignment object (Activity or WBS Element). When transferring the requisition into the order, the order commitment is assigned to the account assignment object (if other value type than the purchase requisition commitment). Controlled by the account assignment category of the order, the actual costs are posted at the time of goods receipt or invoice receipt. They are assigned either to the Network Activity or the WBS Element, depending on the account assignment.

As an alternative to the automatic creation of purchase requisitions by the Network, purchase requisitions or purchase orders can be created manually and assigned to WBS Elements.

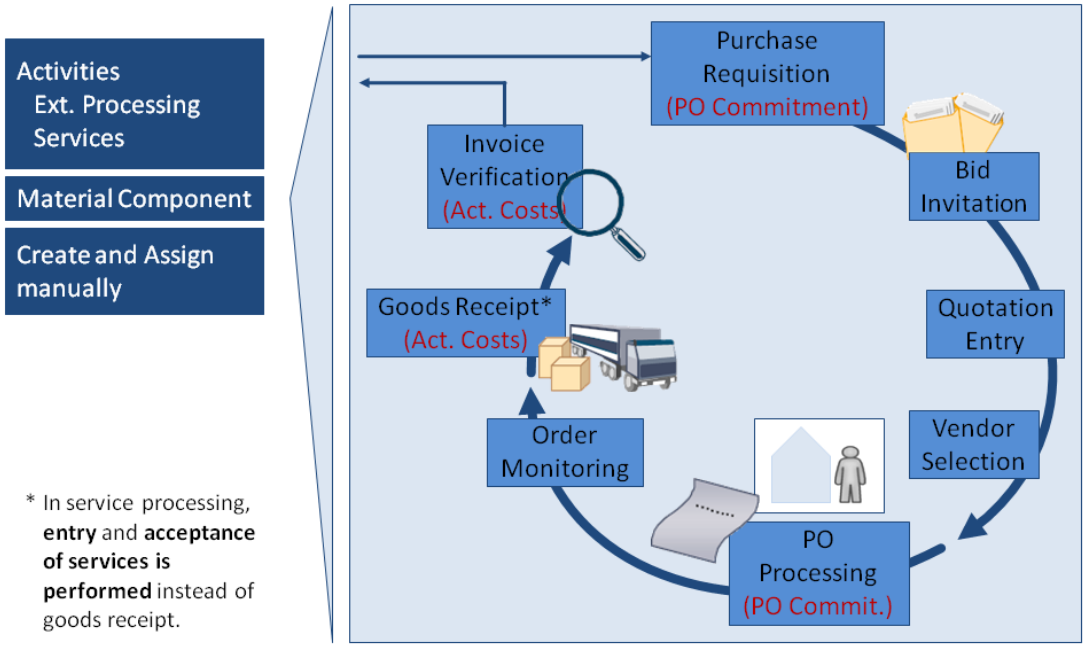


Figure 71: Integration with the Purchasing Process

4.1.4 Assignment of Documents

The following figure displays business transactions that establish a connection to WBS elements or activities via an assignment. By assigning the appropriate documents to the project structures, the commitment or actual costs resulting from these documents (sales order, purchase order, etc.) are posted directly to a WBS element or the network/activity.

During the project planning phase, these costs were planned accordingly. You can, for example, plan the costs for purchase requisitions, purchase orders and goods receipts at network or activity level. These activities are captured in a project using externally-processed activities, service activities or material components that are procured directly. Furthermore, you can withdraw stock from the warehouse by using the appropriate stock items, post invoices by using cost activities and costs arising as a result of confirmations by using internally-processed activities.

Actual costs and revenues arising from purchase requisitions, purchase orders, goods receipts, activity allocations or invoices for WBS elements match the values of the primary costs, activity input or revenue planning data for the work breakdown structure.

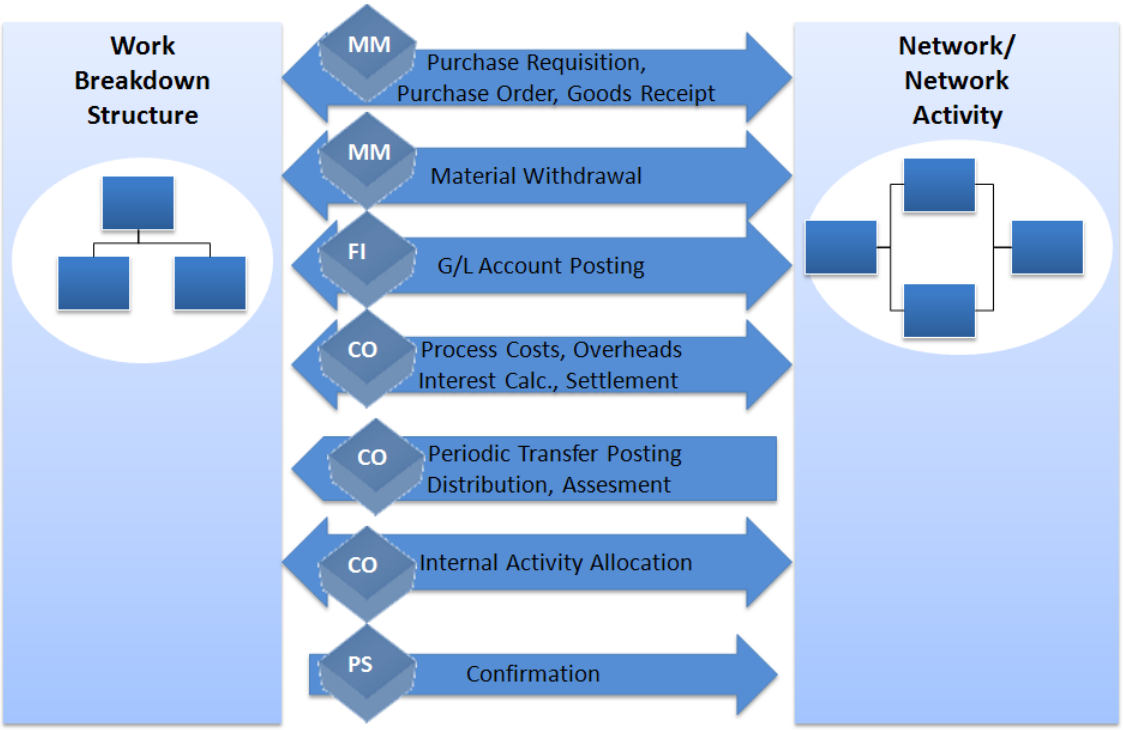


Figure 72: Assignment of Documents

4.2 Practice: Project Execution

You have executed the project and corresponding cost items incurred. Subsequently, you have to enter these actual costs.

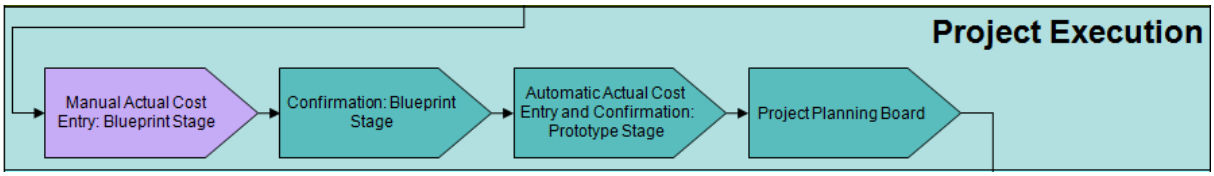


Figure 73: Process Overview: Project Execution

4.2.1 Manual Actual Cost Entry: Blueprint Stage

In the first project stage, your engineers worked well at cost center 4290 and they created the construction plans. They used the planned 420 (activity type 1429) and 180 (activity type 1430) hours completely. These activities need to be posted to the project by CO to record the incurred costs (Direct Activity Allocation), correctly.

Choose

Logistics → Project System → Financials → Actual Postings → Activity Allocation → Entry (KB21N)

1. If prompted, enter Controlling Area ***1000***.
2. Enter the current date as **document date** and **posting date**.
3. Select the entry ***04 SAP WBS Element/order*** from the **Scrn variant** drop-down field.
4. Select the entry ***L List Entry*** from the **Input Type** drop-down field.
5. In the first line, enter the following data:
   a. **SendCstCtr** ***4290***
   b. **SendActType** ***1429***
   c. **Receiver WBS Element** ***A-1xxyy-11***
   d. **Total quantity** ***420***
6. Enter the following data into the second line:
   a. **SendCstCtr** ***4290***
   b. **SendActType** ***1430***
   c. **Receiver WBS Element** ***A-1xxyy-11***
   d. **Total quantity** ***180***
7. Confirm with ***Enter***.

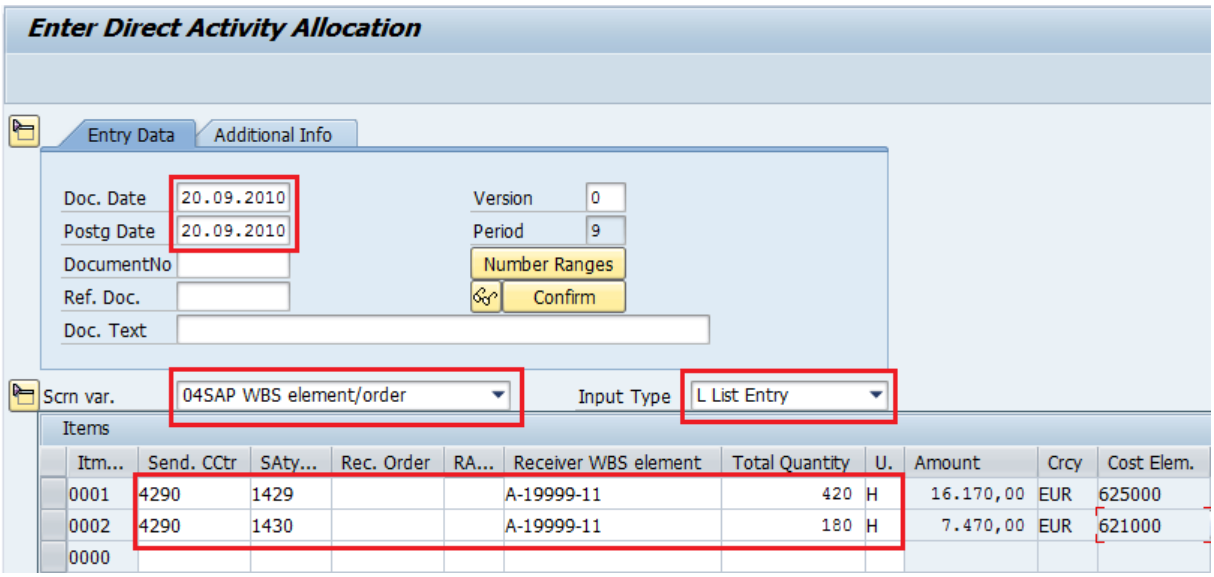


Figure 74: Actual Cost Entry Blueprint: SAP-System-Screenshot

Save the document and list the document number

Document Blueprint: _____

4.2.2 Confirmation Blueprint Stage

Now that the Blueprint stage is completed and the costs for the project stage were entered, you must complete the project stage in the Project Builder. Complete the first project stage by setting the **actual date** for the milestone of **project stage 1**.
The following figure integrates this step into the project context.

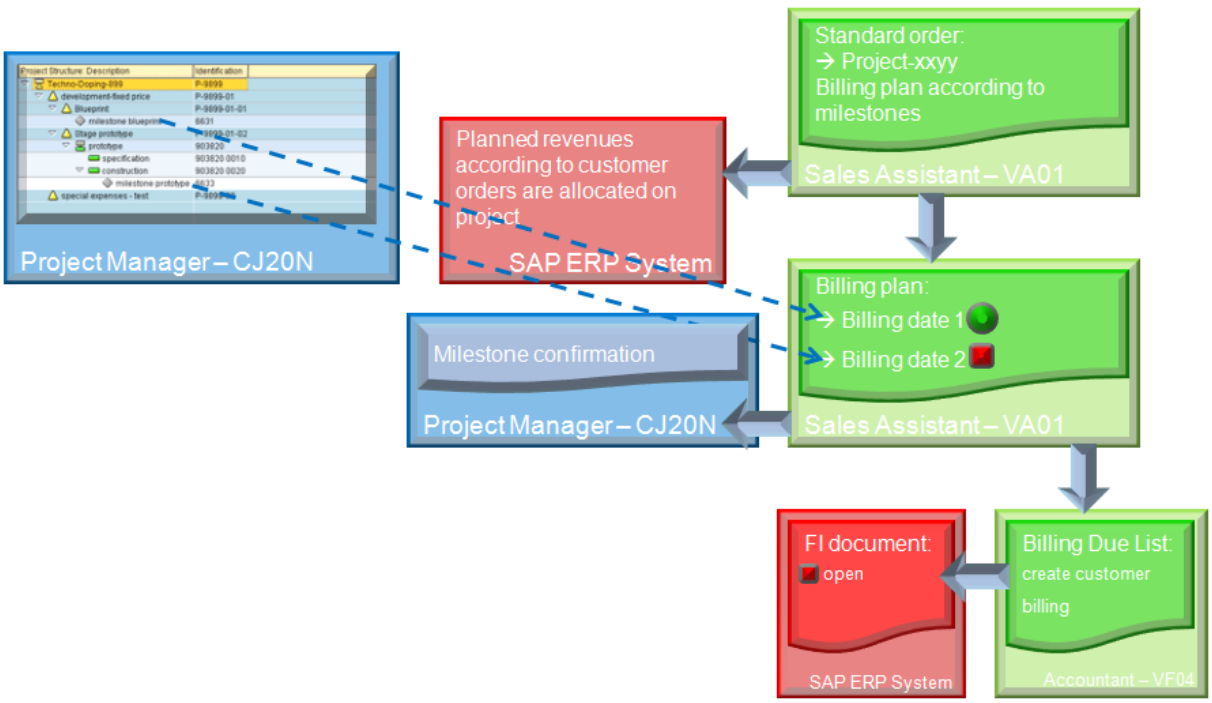


Figure 75: Milestone Billing: Integrationsfallstudie SAP PS, 2007

After completing a project stage (e.g., reaching the first milestone), billing for the first sales order is created automatically. Since the project structure is linked with the sales order, scheduling the first milestone results in entering the billing for this stage into the billing due list. This billing due list contains all billings that are not yet processed. You can create a customer invoice from the corresponding billing. Therefore, call up the following transaction:

Logistics → Project System → Project → Project Builder (CJ20N)

1. Open your project **A-1xxyy** by double-clicking it from the work list of recently processed projects.
2. Branch into the structure on the upper left screen until you reach the ***Milestone Blueprint xxyy***. Select it so that it is highlighted.
3. On the right screen, you can now see the detailed data for the milestone. Enter the current date as **actual date** and choose .

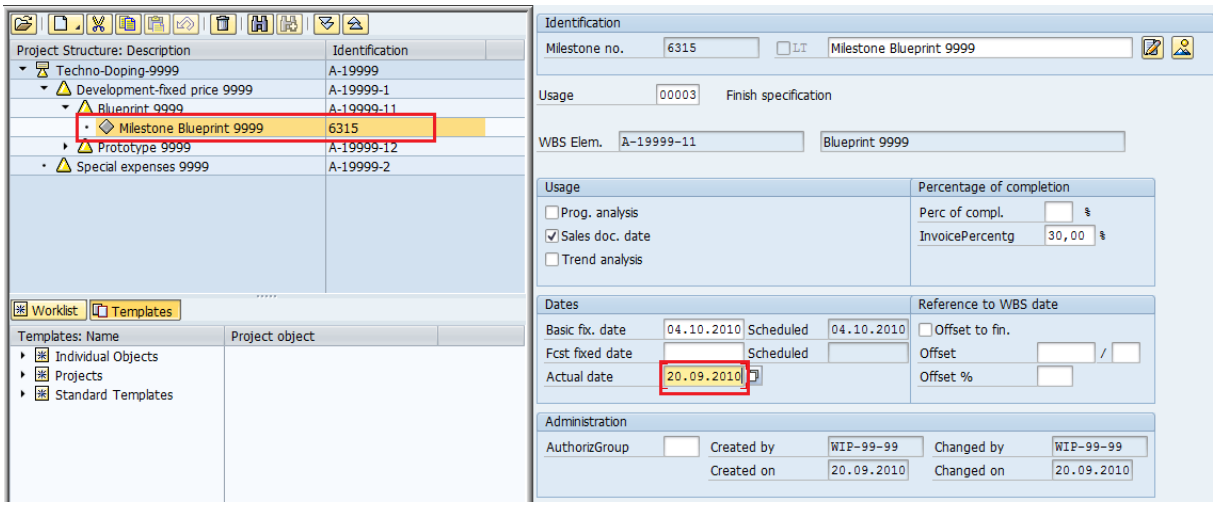


Figure 76: Milestone Billing: SAP-System-Screenshot

4. Skip possible warnings with ***Enter*** and ***Save***.

*By entering the actual date, this stage is completed and the **billing block (02, missing confirmation)** that was previously set in the billing plan of your first sales order is deleted. Thus, you can **create** an **invoice** for the first project stage.*

However, you have already completed the entire project and you want to process the other project parts first, before creating a customer invoice.

4.2.3 Automatic Actual Cost Entry and Confirmation: Prototype Stage

Your engineers have finished the creation of the prototype. Therefore, you must confirm both Activities to enter the actual costs. Entering costs of the second stage (prototype) can be executed from the Network directly. Open your project again.

1. Open your project once again. Select the first **Activity *Specification***
2. Choose ***Edit/Activity/Confirm*** from the menu**.**
3. A dialog screen appears, prompting you to enter the provided work hours.

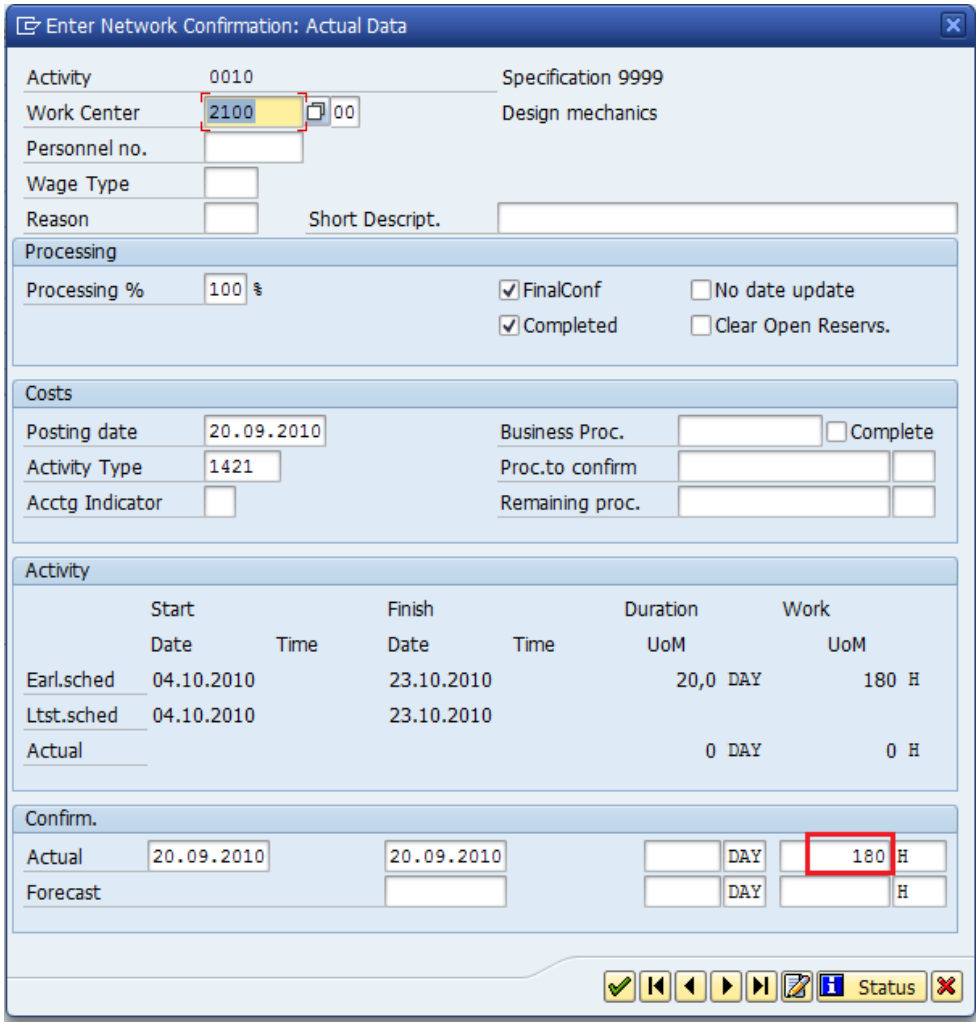


Figure 77: Confirm Activity Specification: SAP-System-Screenshot

4. We assume here as well that the planned 180 hours were actually provided. Confirm the confirmation with the **green checkmark**.
5. Skip possible notifications (current date is not a working day) with *Enter*.
6. Hence, the Activity status is set to ***CNF*** (confirmed).

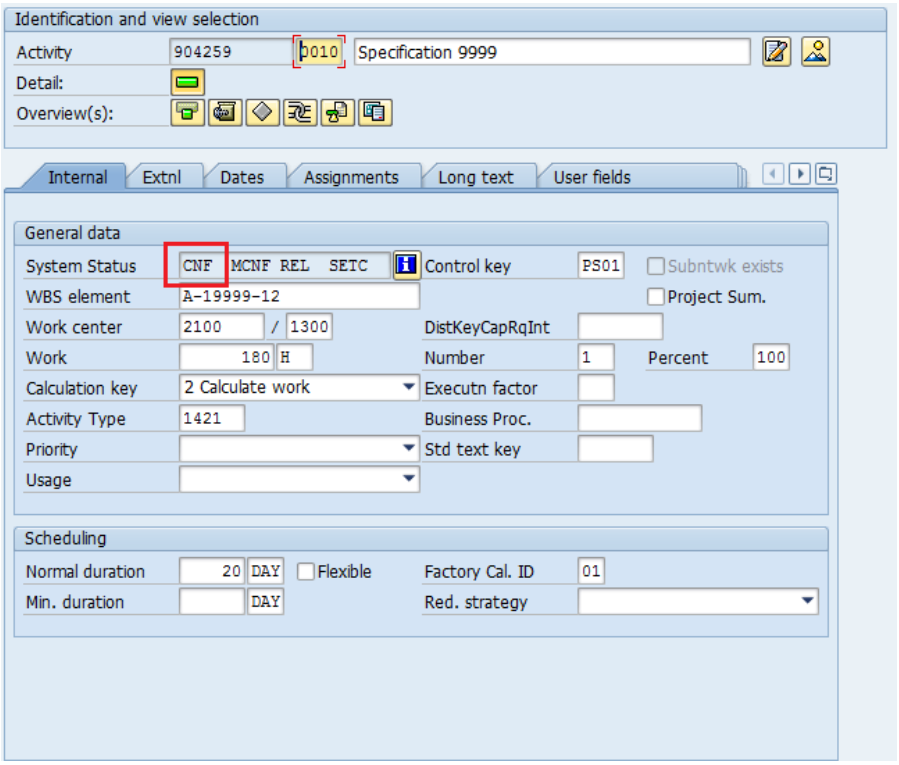


Figure 78: Activity Status: SAP-System-Screenshot

7. Select the second **Activity *Construction.***
8. Again, choose ***Edit/Activity/Confirm*** from the menu**.**
9. A dialog screen appears, prompting you to enter the provided work hours.
10. We assume here as well that the planned 270 hours were actually provided.
11. Confirm the confirmation with the **green checkmark**.
12. Skip possible notifications (current date is not a working day) with *Enter*.
13. Thus, the Network and the **project stage *Prototype*** are confirmed and the costs are entered automatically. Go to the **second milestone**. You can see that from the link of the milestone with **second Activity *Construction***, the **actual date** was set automatically and, thus, the second project stage was completed as well.

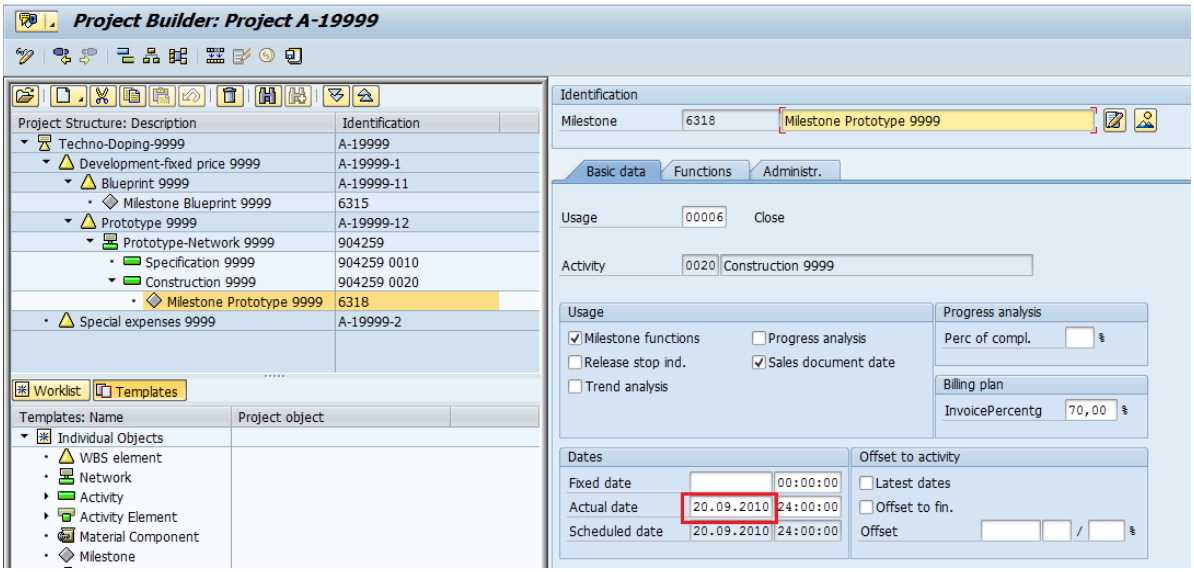


Figure 79: Milestone End Date set Automatically: SAP-System-Screenshot

14. *Save* your project.

4.2.4 Project Planning Board

Call up the Project Planning Board to display the project's progress and to be able to comprehend actual costs entry.

1. Open your project and expand all the nodes in the structure.
2. Select the top node of your project (Techno-Doping-xxyy) and choose .
3. You can see that the actual costs are listed on the Project Planning Board (small deviances to the planning data are possible).

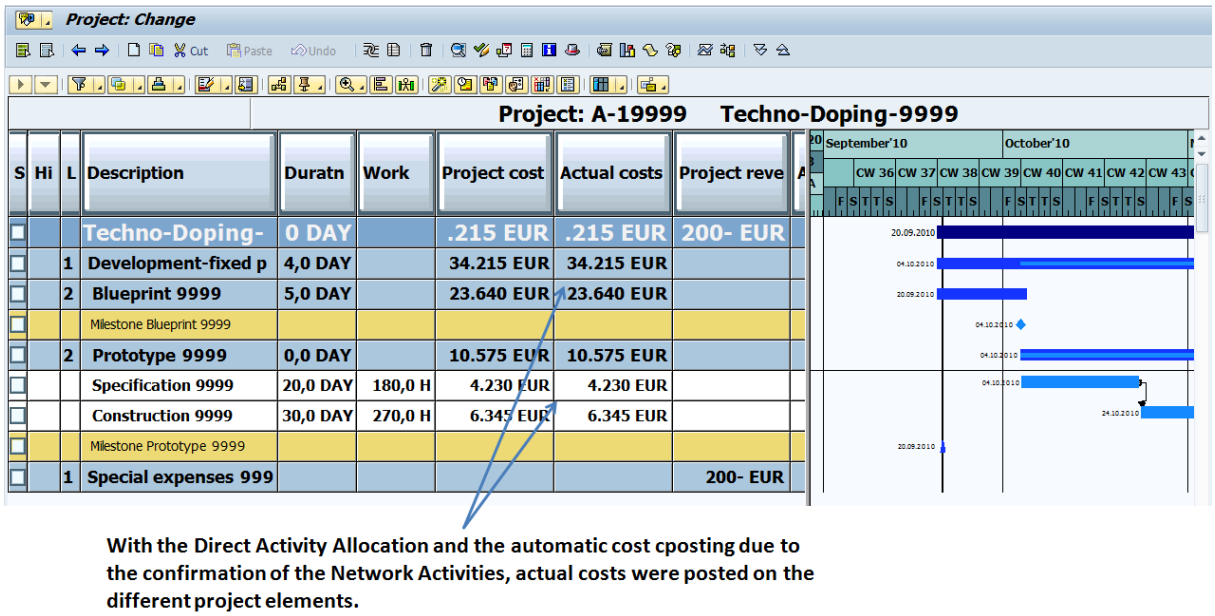


Figure 80: Actual Costs – Project Planning Board: SAP-System-Screenshot

4.2.5 Entering Project Hours: Special Expenses

Your test driver worked tirelessly and tested the new racing bicycle 40 hours a week. You task is to **enter** the **time** and to **further process** these time data.

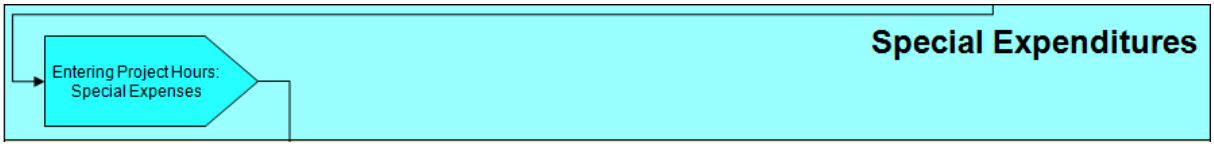


Figure 81: Process Overview: Special Expenses

4.2.5.1 Task: Entering Project Times in CATS

The SAP component CATS (cross application time sheet) is used for time entry. This **cross-application component** can collect all types of time data and provides them subsequently for

further processing in many SAP applications. The following figure is meant as further comprehension of the explanations above.

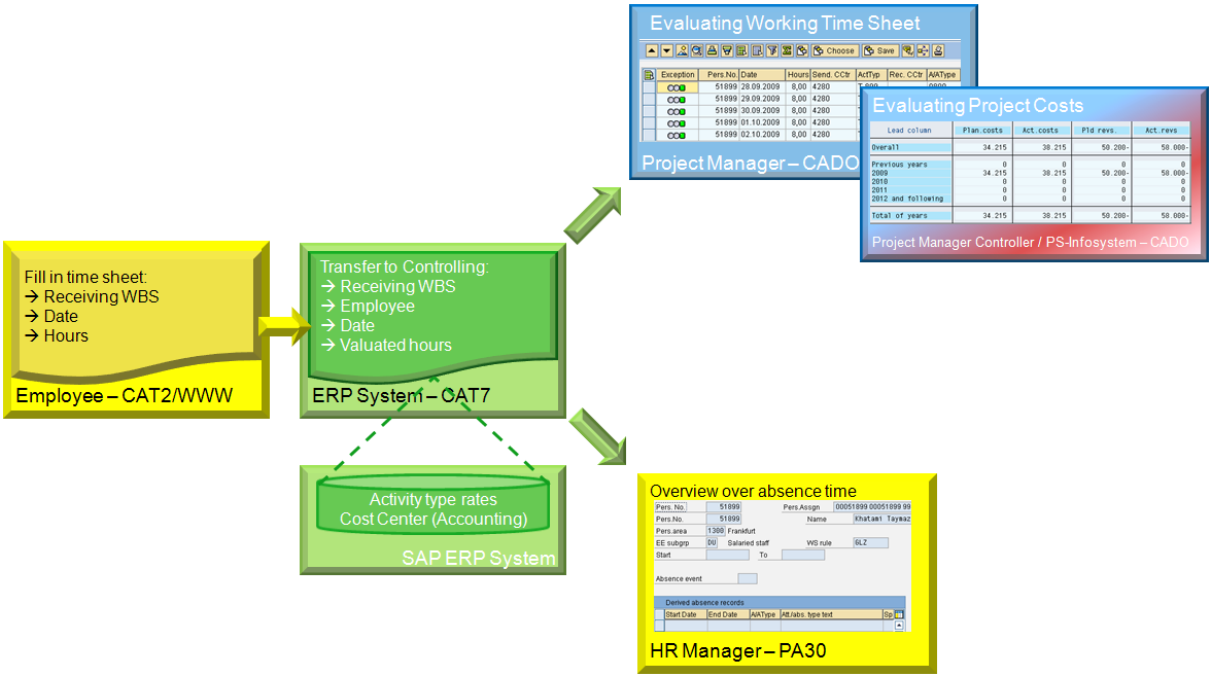


Figure 82: CATS (Cross Application Time Sheet): Integrationsfallstudie SAP PS, 2007

Times entered under CAT2 in the personnel master of the consultant are transferred to controlling by using transaction CAT7. Thus, the provided expenses are available in cost accounting and in the project system for evaluation and for assigning incurred costs.

4.2.5.2 Data Entry

Enter the time data for your employee by calling up the subsequent transaction:

Human Resources → Time Management → Time Sheet → CATS Classic → Recording Times (CAT2)

1. Enter **Data Entry Profile** ***1303 (PS/HR/CO: allow posting to WBS (without check))***. Press *Enter*.
2. Enter the previously created employee ***990xxyy*** into the **Personnel Number** field. Press *Enter*.
3. Enter the ***current date*** as **key date**. After that, click the  symbol (**enter times**).
4. The **time sheet: entry view** screen appears. Enter the stage ***A-1xxyy-2 (special expense)*** into the first white line of the **receiver WBS Element** column.
5. Enter ***8 hours*** for each of the **first five working days** in this line.
6. Confirm with *Enter*.
7. The system automatically fills in the fields **Send.CCtr** (cost center 4280) and **activity type** (***T-xxyy***) with the corresponding data from the personnel master record.

Compare your entries with the following image.

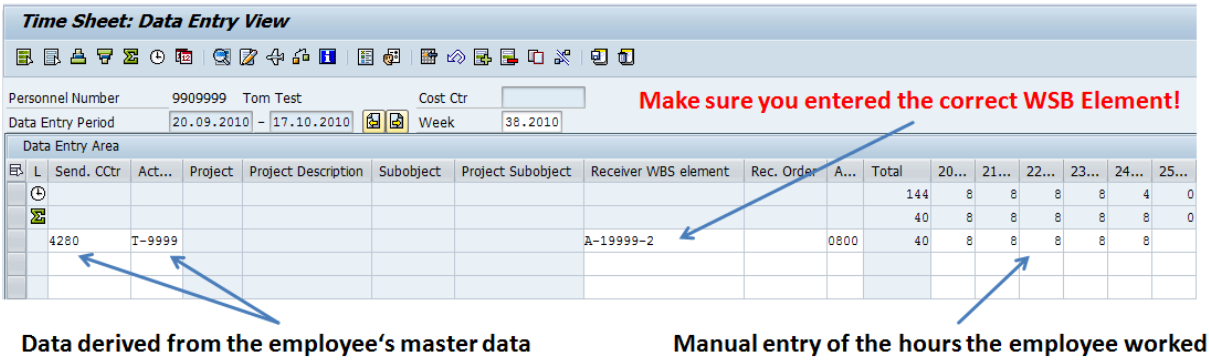


Figure 83: Time Entry Consultant Hours: SAP-System-Screenshot

8. Release the entered times for the target applications HR/PS/CO by clicking the Release view symbol (**release view**).
9. Select the previously entered line and click the symbol (**release**).

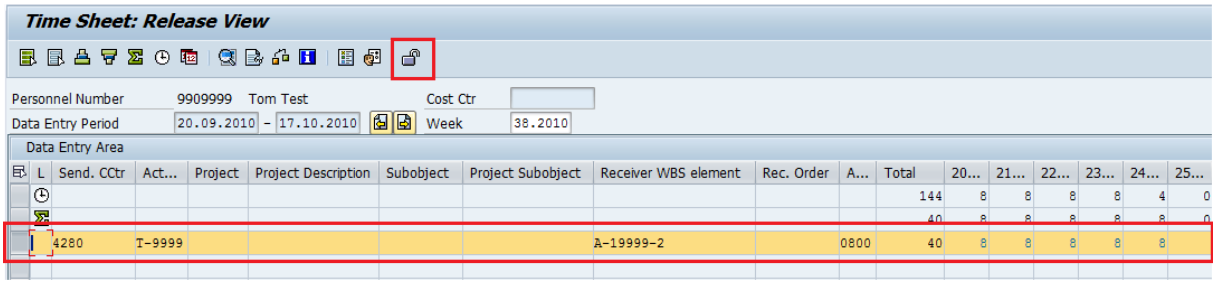


Figure 84: Release Working Hours: SAP-System-Screenshot

10. The system issues a message saying that **5 times** were releases. Save the time sheet and close the transaction.

4.2.5.3 Further Processing of Time Data

As mentioned in the description of the CATS component, recorded project hours are, in contrast to HR, **not** automatically transferred to the CO and PS functional areas.
Transfer and allocation have to be triggered explicitly. This is your next task.

Choose the following transaction

Human Resources → Time Management → Time Sheet → Transfer → Accounting (CAT7)

1. Enter the **personnel number** of your employee ***990xxyy***. Click the symbol (**run**).
2. Three documents should be posted and the system should issue the following message: **All data were transferred to CO**.

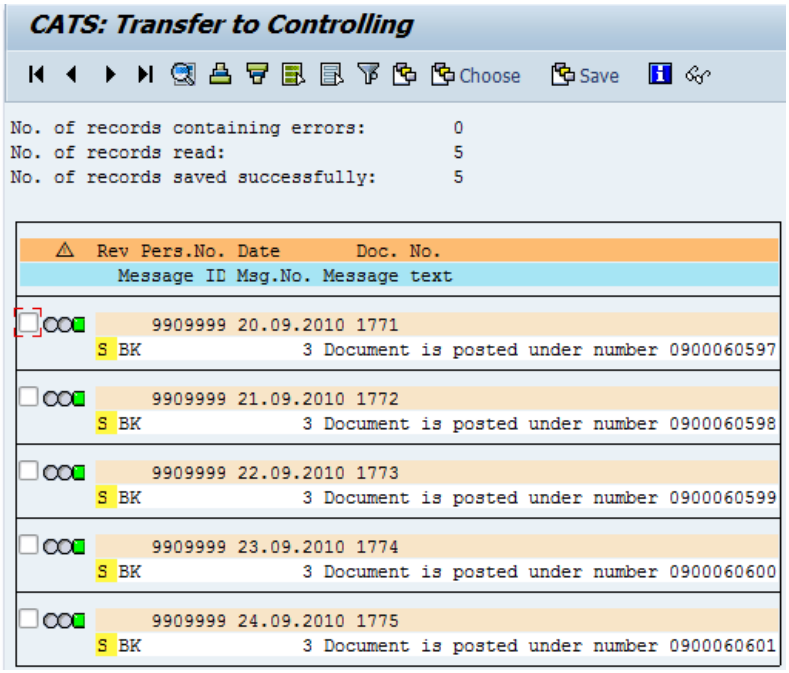


Figure 85: Data Transfer to SAP CO: SAP-System-Screenshot

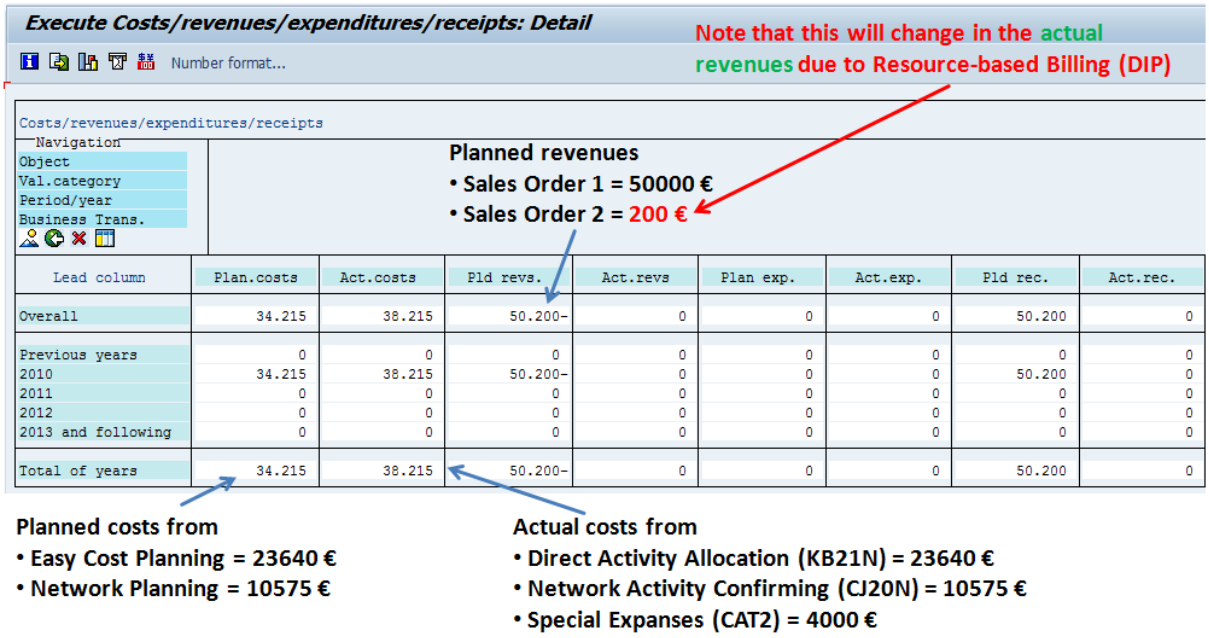
3. Choose exit ( ).

Do display the effects, choose:

Logistics → Project System → Information System → Financials → Costs/Revenues/ Expenditures/Receipts (S_ALR_87013531)

4. If you have to enter a **controlling area**, enter ***CO Europe (1000)*** and confirm.
5. If you need to enter a **DB profile,** enter profile ***standard selection (structure) (000000000001)*** and confirm.
6. On the next selection screen, enter your project ***A-1xxyy*** into the **Project** field.
7. Enter **plan version** ***plan/actual (0)*** and select the ***classical drilldown report***.
8. Clear all other fields and click the symbol (**run**).

For comparison:
The report for the current fiscal year should contain planned revenues of EUR 50200 and actual costs of approx. EUR 38214. The planned revenues are based on the amount of the two entered sales orders for the project and the actual costs are based on the previously entered actual costs for the *development* project stage. The transfer of the test driver hours caused a difference of 4000 € (= 40 hours * 100 €, 100 € are the price set for the Activity type T-xxyy) between planned costs and actual costs. Not planning the costs of the special expenses caused this. On the one hand, we entered planned revenue of 50000 € for the first sales order (dummy material Techno-xxyy) at a fixed price and on the other hand, we had 200 € for the second sales order (dummy material testdriver). Thus, the revenues of 200 € incur because we entered the quantity of one hour in the second sales order. The actual expense of 40 hours (i.e., revenue of 8000€) was entered in CATS. The quantity-based entry for the order is not carried out until resource-related billing.



Lead column	Plan.costs	Act.costs	Pld revs.	Act.revs	Plan exp.	Act.exp.	Pld rec.	Act.rec.
Overall	34.215	38.215	50.200-	0	0	0	50.200	0
Previous years	0	0	0	0	0	0	0	0
2010	34.215	38.215	50.200-	0	0	0	50.200	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013 and following	0	0	0	0	0	0	0	0
Total of years	34.215	38.215	50.200-	0	0	0	50.200	0

Figure 86: Costs-Revenues-Report: SAP-System-Screenshot

*If you do not have the planned revenues of 50200 € in this report, then the following issues might be the problem: (1) Your Project (WBS) and/or the WBS Elements do not have the indicator **Billing element** set. (2) You did not release your first sales order in **Credit Management**. (3) You did not maintain the **condition PR00** for your first sales order.*

4.2.6 Sales Order Billing: Blueprint and Prototype Stages

By entering actual dates into milestones and confirming individual project stages. Stages are considered completed and the previously set billing block in the billing plan of the first sales order (***billing block 02 missing confirmation***) is deleted. Thus, you can ***create an invoice*** *for the first project stage*. Since the project represents a service (and is not delivered, in contrast to goods) **billing with reference to the order** is carried out, as opposed to billing with reference to delivery (such as in the logistics integration case study). According to the billing plan for the first sales order, **30% of the order value** is due after completion of the first project stage and **70%** are due after completion of the second project stage. Next, you will create both invoices.

Figure 87: Process Overview: Billing

For creating the invoices, choose the following transaction

Logistics → Sales and Distribution → Billing → Billing Document → Billing Due List (VF04)

Usually, the billing due list contains all billable transactions of a company at a selected due date. To avoid billing orders of another case study participant, you need to limit the results to your customer.

1. Enter the following data:
   - **Billing date to** ***the end date of the second milestone*** (or a date far in the future, e.g., current day + 4 month).
   - **Sold-to-party** ***5xxyy***
   - **Order-related** *Select*
   - Press the DisplayBillList button (**display billing due list**) to display the billing due list.
2. Select the row from the billing due list that contains the number of your first standard order (milestone billing) and a net value of ***15000*** Euro. After selecting the row, click the Individual billing document button (**individual billing document**).

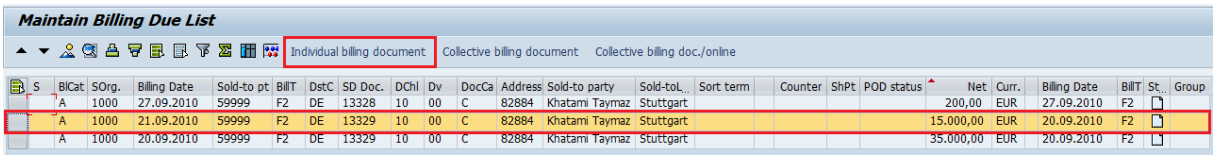


Figure 88: Billing: SAP-System-Screenshot

3. The system generates the billing document. **Save** and list the billing document number.

   Billing document 1 (milestone 1): _____

4. Next, select the row from the billing due list containing a net value of ***35000*** Euro. After selecting the row, click the Individual billing document button (**individual billing document**).
5. The system generates the billing document. **Save** and list the billing document number.

   Billing document 2 (milestone 2): _____

6. Return to the menu structure ( )
7. Choose the following transaction:
   Logistics → Sales and Distribution → Billing → Billing Document → Display (VF03)

8. The ***number of the recently created (second) billing document*** should already be entered in the **billing** field. Choose the Accounting button (**accounting**) to display the created accounting documents for the billing document. On the appearing screen, double-click **accounting document**.

9. You can see the accounting document which caused posting the payment to the customer ***5xxyy***. Double-click the posting row containing **revenue account *800000*** in which the net revenue was entered.

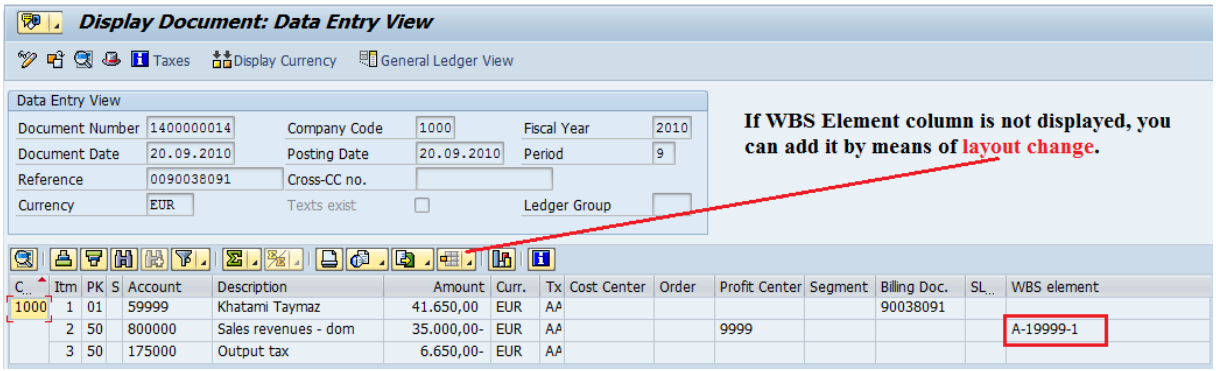


Figure 89: Accounting Document: SAP-System-Screenshot

You can see the details for the posting item. In the **additional account assignment** section, you should see the number of your billing item in the **WBS Element** field of your project structure ***A-1xxyy-1***. Thus, it is ensured that only actual revenue is assigned to your project in CO.
Thus, you completed the fixed price project and you settled it with the customer. We will now focus on the provided special Activities.

4.2.7 Resource-related Billing: Special Expenses

In contrast to the previously executed milestone billing, you will now run a **resource-related billing** for the special expenses.

Resource-related billing:
In the framework of resource-related billing, expenses (in this case, the consumed test driver hours as origin data) are converted into sales materials (dynamic items). Instead of the internal hourly price, a (higher) external SD price is calculated. The system then creates a billing request out of these dynamic items, which is then the basis of billing.

This excursus is supposed to give you an in-depth understanding of resource-related billing and will clarify why you assigned the Activity type T-xxyy to activity type group testdriver.

*Your tutor created the activity type group **testdriver** as preparation for this course. Furthermore, your tutor has created the DIP profile WIP. The DIP Profile WIP converts all dynamic items "collected" during the sales process for the second sales order into Billing Request items accounting for price and quantity of the dynamic items.*
*Thereby, the activity type group (and, thus, the assigned activity types T-xxyy) is linked with dummy material **testdriver1**. Moreover, condition record **PR00** with a sales price of **200 €** was assigned to material **testdriver1**.*

*Since you assign your activity type **T-xxyy** to activity type group testdriver, your activity type is also linked with the material **testdriver1** and the corresponding condition record, so that you sell your activity type at a price of 200 € to the customer.*

The following figure will clarify the procedure:

1. *The material testdriver1 is linked with the activity type group testdriver via DIP profile WIP.*
2. *Your activity type T-xxyy was assigned to activity type group testdriver. Thus, your activity type is also linked with the material.*
3. *Your activity type T-xxyy is entered in the personnel master record of your test driver. Thus, all hours provided by your employee are settled/allocated with this activity type.*
4. *You entered all time data for your employee in the CATS application to WBS Element A-1xxyy-2. Thus, the 40 hours provided by your employee (performed expenses = resources consumed, therefore: resource-related billing) are assigned to this WBS Element.*
5. *You have entered the material testdriver1 in your second sales order (quantity = 1, price = 200 €). Furthermore, you have entered the WBS Element A-1xxyy-2 as Account Assignment Element in the second sales order. Thus, there is a link with the provided testing hours and the quantity of material testdriver1 entered in the sales order.*
6. *The DIP profile WIP, which you have entered in the second order on the Sales B tab, ensures that for resource-related billing, the assigned material in the order is updated with a quantity of 40 hours. Thereby, the sales order (material testdriver1) collects the provided working hours of the employee as Dynamic Items.*
7. *When performing resource-related billing in transaction DP91, the dynamic items produce the billing request positions (in this case only 1 position). The position contains the 40 hours (performed activity type amount of T-xxyy) times 200 € (price for material testdriver1) due to the "calculation"-procedure in the DIP profile. This results in a final revenue of 8000€ (without taxes), including the condition of 200€ that is debited to the customer.*

Note that you entered a price of 100 € for your activity type T-xxyy. However, the DIP profile does not contain a price indicator (on purpose) and, thus, the material price of 200 € is taken into account. That is, you use the activity type price for internal cost allocation and cost determination, but you use a different price to sell this activity to your customer. Thus, you make an extra profit by charging the customer 8000 € instead of 4000 €.

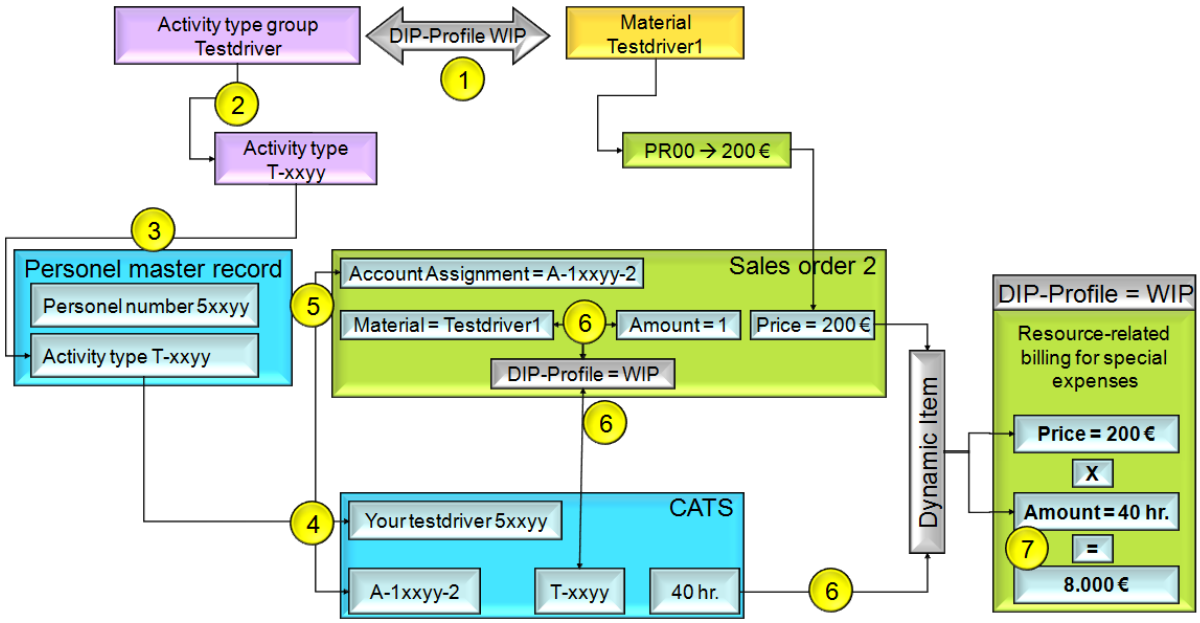


Figure 90: Schema of Resource-related Billing

The DIP profile, thus, links controlling (activity type T-xxyy) with SD (material testdriver1) via quantity update (time data from CATS). To simplify, the provided quantity for an item of the sales order is entered by using activity type T-xxyy, not directly in the sales order. The advantage of this is that you do not need to enter a quantity that is yet unknown in the sales order.

4.2.7.1 Determine Activities for Billing

To settle the special expenses of the test driver appropriately (resource-related), determine the Activities to be invoiced. Choose the following transaction:

Logistics → Sales and Distribution → Sales → Order → Subsequent Functions → Resource-Related Billing Document (transaction code: DP91)

1. Enter the ***number*** of the ***second (!) sales order*** into the **sales document field** on the appearing screen. Enter ***the last day of the next month*** as **posting date**. Click the  button.
2. The system switches to the expense view in which the activities to be invoiced are displayed with their internal (!) hourly prices. With a click on the small triangle in front of the order number, expand further entries and double-click the bottom one. The system should display **testdriver costs** with an original amount of ***4000 EUR***. This is not the amount that the customer is debited with, but the company-internal hourly price. Click the **quantity** tab.

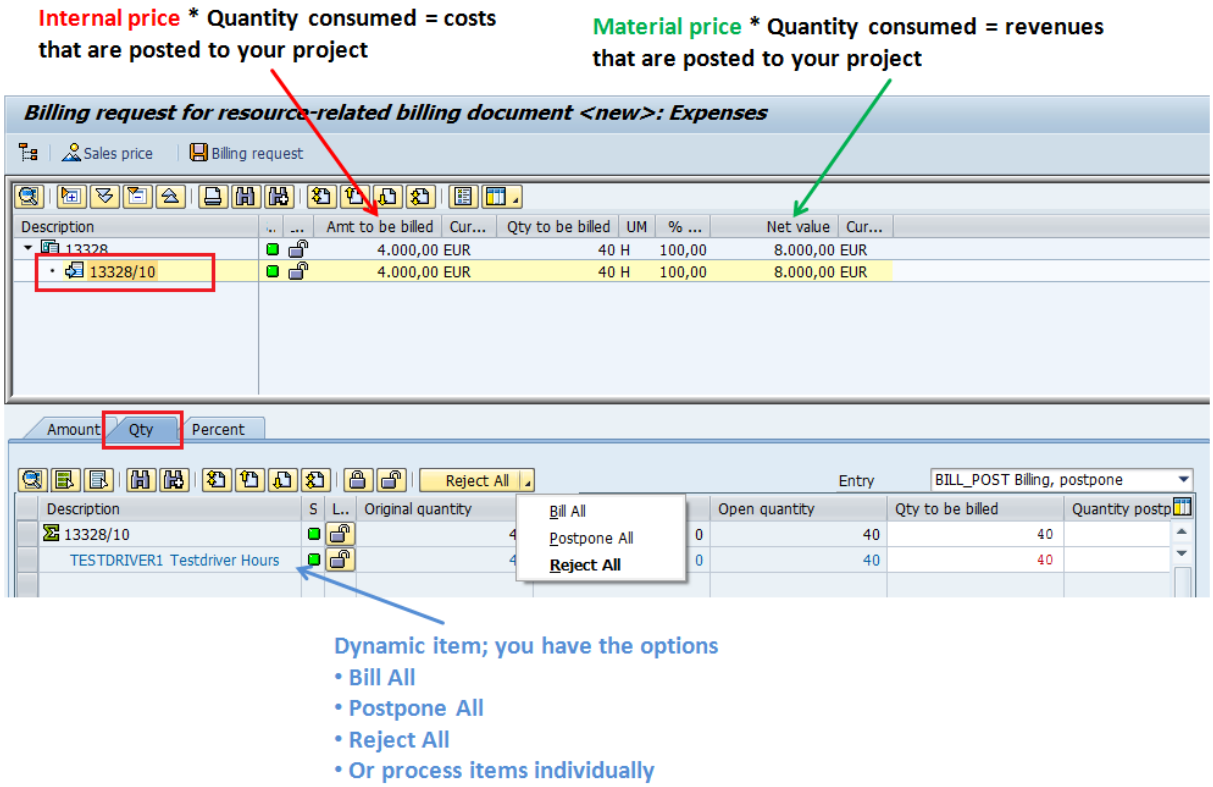


Figure 91: Resource-related Billing (1): SAP-System-Screenshot

3. The system displays the number of provided hours, and you can differ between already invoiced quantities, quantities to be invoiced now and open quantities. You could, for example, postpone billing here as well. However, we will not do so and, thus, switch to the sales price view by clicking the Sales price button (**sales price**).
4. On the upper screen, expand the debit memo request up to the lowest level. You can see that for the test driver hours, costs and revenues of ***4000 EUR*** and ***8000 EUR*** are listed. On the upper screen, double-click the bottom line **Testdriver Hours**.
5. You can see that in the bottom section, a price of ***200 EUR*** for a **test driver hour** is invoiced.
6. Do not leave the dialog.

For comparison:
Compare your screen to the following figure.

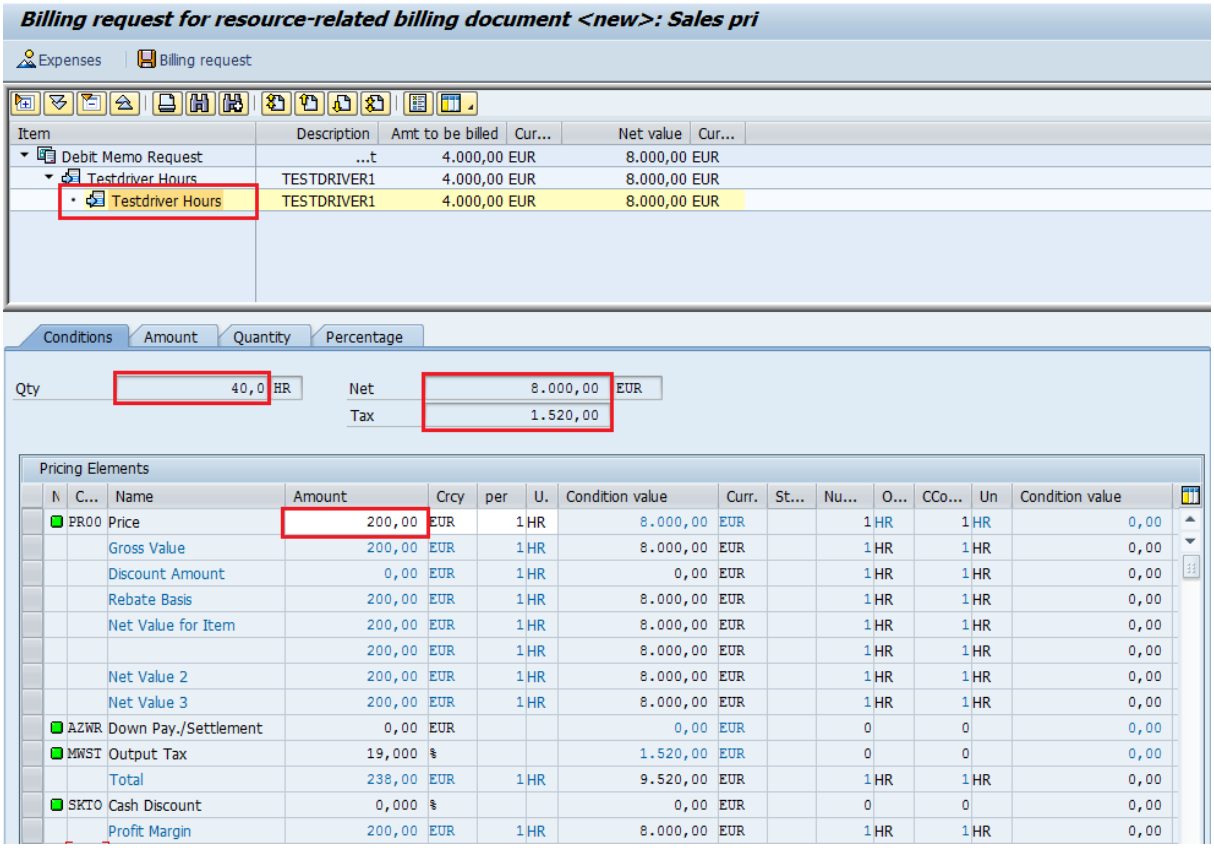


Figure 92: Resource-related Billing (2): SAP-System-Screenshot

4.2.7.2 Create Billing Request

Create a **debit memo request** from the dynamic item to initiate the invoice creation process.

1. Click the 

button (**billing request**).
2. Answer the question with ***Yes***.
3. Next, a billing request is created. For the moment, this billing request is only an internal document and later the template for creating the customer billing document.
4. By default, a newly created debit memo request is blocked for billing to allow for checking them again. In the **Item overview** tab select the ***empty entry*** from the **billing block** field (drop-down field), to release the billing request.
5. Go to the tab **Sales** and select any ***Order reason***.

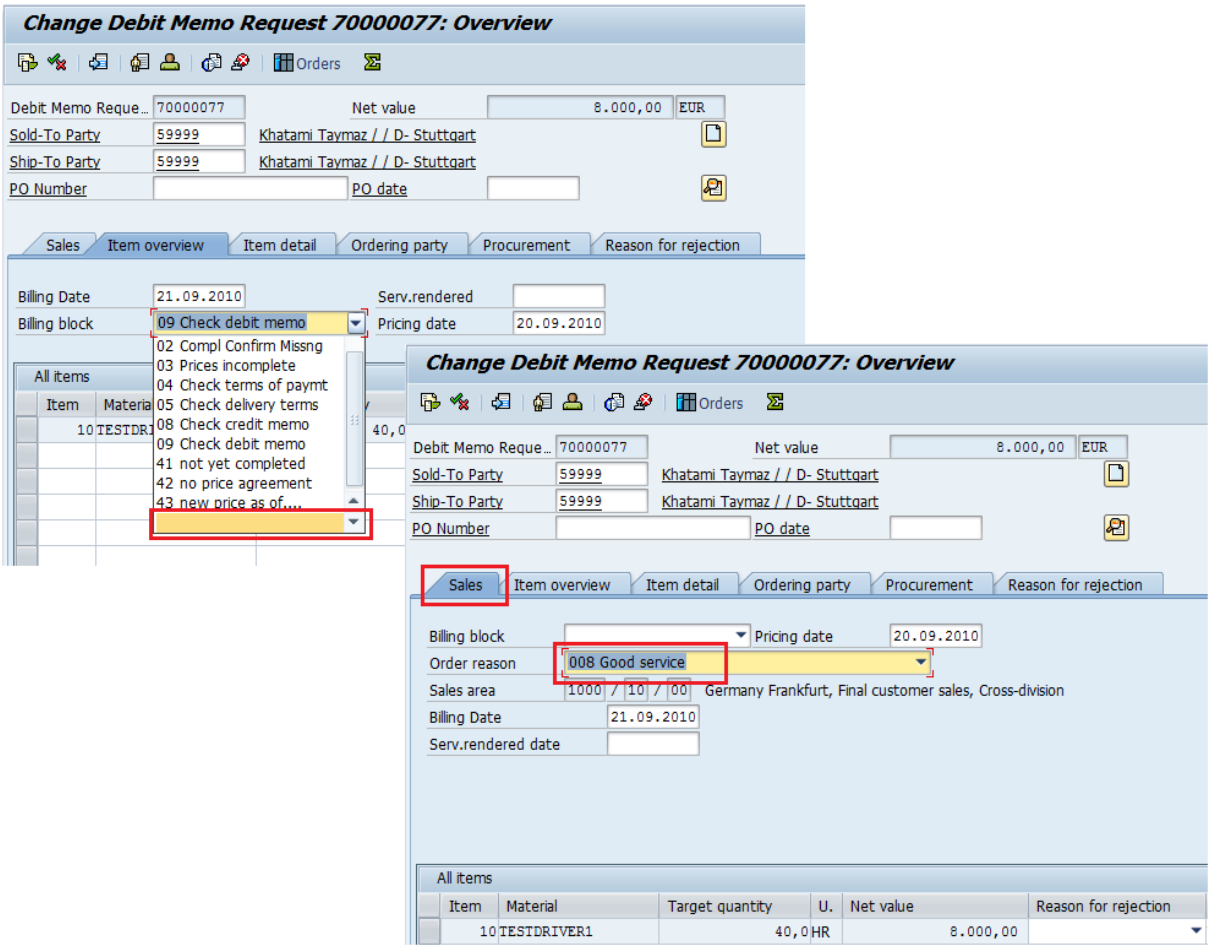


Figure 93: Resource-related Billing: SAP-System-Screenshot

6. *Save* your document.

   Debit memo request: _____

4.2.7.3 Create Customer Billing Document

Finally, your task is to create the **billing document for the customer**.

Choose the following transaction

Logistics → Sales and Distribution → Billing → Billing Document → Process Billing Due List (VF04)

1. Enter the ***last day of the next month*** into the **billing date to** field. In the **SD document** field**,** enter the ***number of the debit memo request you just created***. Select the **order-related** flag. Choose the DisplayBillList button (**display billing due list**).
2. On the next screen, select the ***line of your previously created debit memo request with the amount of 8000 €***. Again, click the Individual billing document button (**individual billing document**).

3. The system generates a debit memo with the corresponding items for the consulting hours. Save it and list the document number.

   Document (for debit memo)**:** _____

4. To display the debit memo you just created, choose the following transaction:

   Logistics → Sales and Distribution → Billing → Billing Document → Display (VF03)

5. Enter the ***number of the previously created debit memo*** into the **billing document field**. Then, choose ***Billing Document → Issue Output To*** from the menu.
6. The system proposes **output type *invoice (RD00)***. Display the invoice by clicking ***print preview***. Subsequently, the print preview of your debit memo is displayed. By scrolling down, you can see the individually calculated Activities in detail.

For comparison:

Since your customer is German (address entry in the master record), the SAP System generates the bill in German language.
Furthermore, consider that the SAP system probably does not recognize your printer. In that case print preview is not possible.

Bedingungen Währung EUR
Zahlungsbedingungen Bis zum 29.09.2009 ohne Abzug

Lieferbedingungen EXW

Gewichte (Brutto/Netto) - Volumen - Markierung

Pos.	Material	Bezeichnung	Menge	Preis	Preiseinheit	Wert
000010	TESTDRIVER1	Testdriver-Hours	40 H	200,00 EUR	1 STD	8.000,00

Summe Positionen				8.000,00
Ausgangssteuer	19,000 %		8.000,00	1.520,00
Endbetrag				9.520,00

Skontofaehiger Betrag 9.520,00

Figure 94: Billing Document - Print Preview: SAP-System-Screenshot

4.3 Elucidation

What have we learned so far?

You have learned that in the realizing stage of projects, Activities consume capacities of your company, external resources are involved in project execution, material is purchased, produced internally, consumed and delivered, vendor invoices are received and invoices are sent to customers.

4.3.1 Aspects of Project Execution

- Integration of SAP ERP allows for updating almost all project-related data automatically at the relevant projects or can be evaluated in reporting of projects.
- Hence, documents created in other applications (SAP MM, SAP PP, SAP SD, etc.) have to be considered in project execution.
- Before you can post any actual costs to a project it must be released.
- Examples:
    - Entering actual dates can trigger the creation of a billing document in SD.
    - Goods receipt in SAP MM results in debiting a WBS Element with material costs.
    - Consumed working hours in project execution are entered in SAP HR incurred costs are updated in SAP CO.

4.3.2 Confirmation Options

- Using confirmations, the processing status of Activities and Activity Elements in a Network can be documented.
- Different business transactions are carried out automatically, resulting from confirmations.
- This includes posting
    - Actual costs
    - Actual work
    - Changes to the Activity status
- There are different options available to create a confirmation in the SAP system:
    - Individual confirmation for a Network, an Activity, an Activity Element or an individual capacity
    - Collective confirmation
    - Structure information system allows a user to send a confirmation workflow to another user or organizational unit from the information system
    - Cross-application Time Sheet (CATS)
    - Via internet
    - Handheld via open PS interface
    - PDC interface

Execution Services

You can use Execution Services to enter commitment and actual costs for items that you planned by using Easy Cost Planning. The following postings are possible:

- Internal activity allocation
- Direct process allocation (for processes)
- Reservations (for material items)
- Goods issue (for material items)
- Purchase requisition (for material items, external activity items, service items, variable items)
- Purchase order (for material items, external activity items, service items, variable items)

4.3.3 Integration with the Purchasing Process

1. The Network generates purchase requisitions for external processing activities, service activities and materials, which are passed on to the purchasing department, where they are processed further.
2. The purchasing process involves
   - issuing a request for quotation to vendors (if applicable)
   - entering these quotations in the system
   - selecting vendors
   - converting the purchase requisitions into purchase orders
   - monitoring the orders until the goods and invoices are received

   A service activity triggers a similar purchasing process. Differences:
   - Can contain a hierarchy of planned services
   - Can contain value limits for unplanned services
   - The goods receipt for services involves two steps: entering services performed and accepting them.
3. The purchase requisition results in purchase requisition commitments for the account assignment object (activity or WBS Element).
4. When the purchase requisition is converted into a purchase order, this results in purchase order commitments for the account assignment object.
5. Depending on the account assignment category of the purchase order, actual costs are posted upon goods receipt or invoice receipt (valuated, non-valuated goods receipt).
6. Based on the account assignment, they are passed on to the Network Activity or WBS Element.
7. You can also create purchase requisitions and purchase orders manually and assign them to WBS elements.

4.3.4 Assignment of Documents

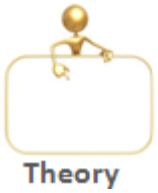
You can assign different documents from SAP SD, SAP CO or SAP FI to project structures like WBS elements and Network Activities and, thus, establish a connection between resources used and costs incurred with the project.

Therefore, you can assign, e.g., sales orders to WBS elements and, thus, post costs and revenues of the sales orders to a WBS element.
In the same way. you can assign material consumptions through the project by assigning material withdrawals from stock or purchase orders to material component or service activities.
Furthermore, you can assign work accomplished by internal work centers by assigning these working hours to Internal Processing Activities of a Network. Work provided by external sources can be assigned by using External Processing Activities.

5 Period-end Closing and Information Systems

This section presents the activities that are performed during period-end closing in SAP PS. Furthermore, the SAP Project System Information System is introduced.

5.2 Theory: Period-end closing and information systems



The plan data of a project, which are calculated based on detailed planning, or the actual costs, which are assigned to a project due to direct activity allocation, material documents or invoices, are usually incomplete. Typically, additional overhead costs, which are provided by cost centers (e.g., management, IT infrastructure, etc.) and which have no direct relation to the provided activity, need to be considered. Moreover, due to changed prices, adjustment postings for allocated activities can be required. This applies especially to cost-intensive projects that last for several years in which you need to take account of interest profits or losses. For all these tasks, the project systems features functions that are usually carried out periodically and are, thus, considered period-end closing tasks.

5.2.1 Period-end Closing: Process

In the framework of period-end closing, period-related business transactions are carried out. The period-end closing ensures that all data are determined for a period and that these data are available for controlling.

Period-end closing activities are executed periodically in the background (usually once a period). They are, e.g., executed at the beginning of a month for the previous month. You can use the Schedule Manager for the period-end closing. The Schedule Manager supports workflows for FI, CO, PS, etc.

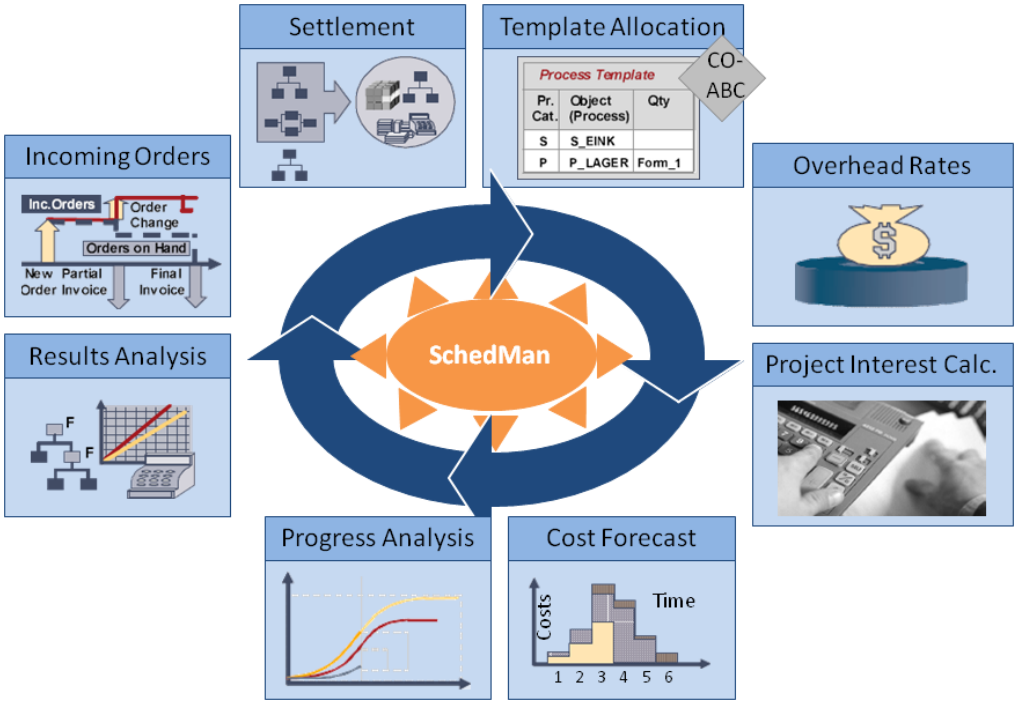


Figure 95: Period-end Closing: Process

5.2.1.1 Debit-Credit Settlement

When processing a project, costs are incurred and revenues are generated. Just like internal orders, production orders or sales orders, projects serve as cost collectors, which accumulate costs only temporarily.

As part of period-end processing, these costs are settled to one or more cost receivers. A Settlement is the process where the actual costs incurred for a WBS element, network or activity are allocated, in whole or in part, to one or more cost receivers. In this settlement process, offset entries crediting the project are generated automatically. The debit postings remain in the receivers after settlement. You can display them in the information system. The settled costs are recorded in the relevant receiver and you can evaluate them in reporting.

Actual costs and actual revenues for a project are determined from:

- Material withdrawals and goods receipts
- Vendor invoices
- Customer billing
- Internal activity allocation, assessments, costs allocations, process costs, surcharges
- Confirming Network Activities

Settlement transfers costs/revenues to:

- Financial accounting (G/L account)
- Asset accounting (fixed assets)
- Costs and profitability analysis (order, cost center, profitability segment)
- The Project System (WBS Elements, Networks, Activities)

For execution settlement, a settlement rule is required. The settlement rule is defined at the sender object. It contains distribution rules and settlement parameters for a sender object.

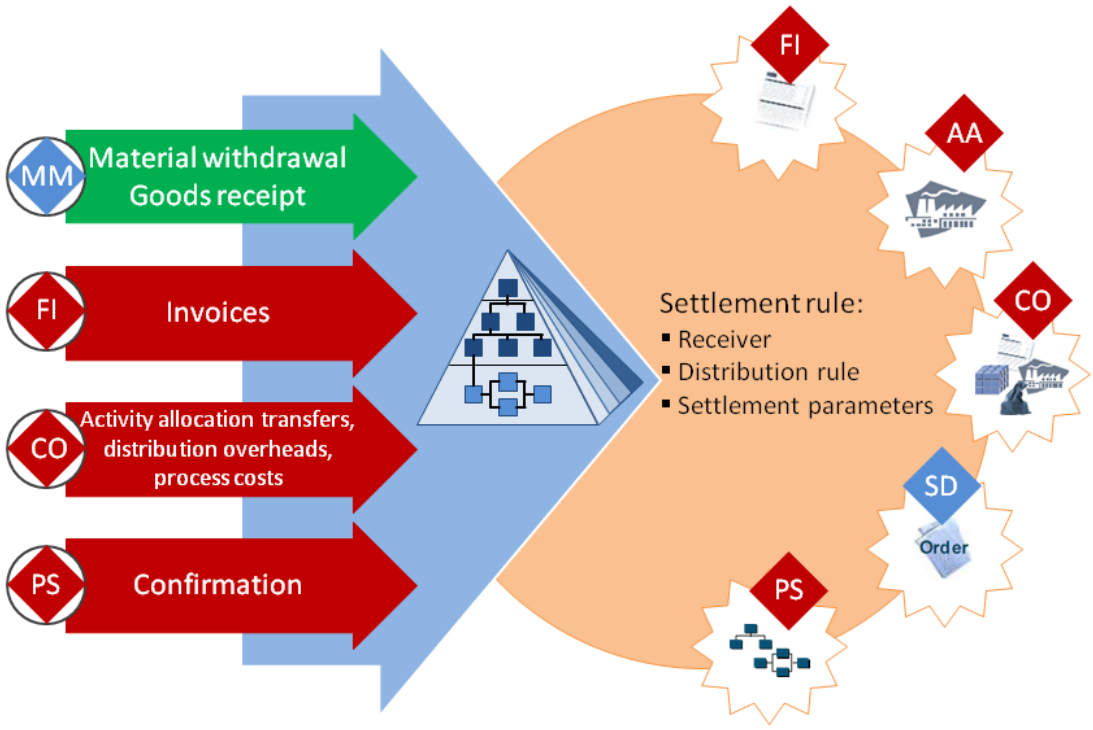


Figure 96: Debit-Credit Settlement

5.2.1.2 Multiple Settlement – Direct Settlement

In direct settlement, each object (WBS Elements, Networks, orders and Activities) in a project is directly allocated to a cost object that is not included in the project such as a profitability segment.
In multi-level settlements, Activities, orders and WBS Elements are firstly settled to the WBS Elements of a higher level in a project. This highest structure element then settles the complete, collected costs.

When maintaining or entering the settlement rule, you determine which settlement type is supposed to be used:

- Multi-level settlement is used for settling cost on WBS Elements of other projects or internal orders.
- Direct settlement is used for settling PS structures to other receivers as mentioned above.

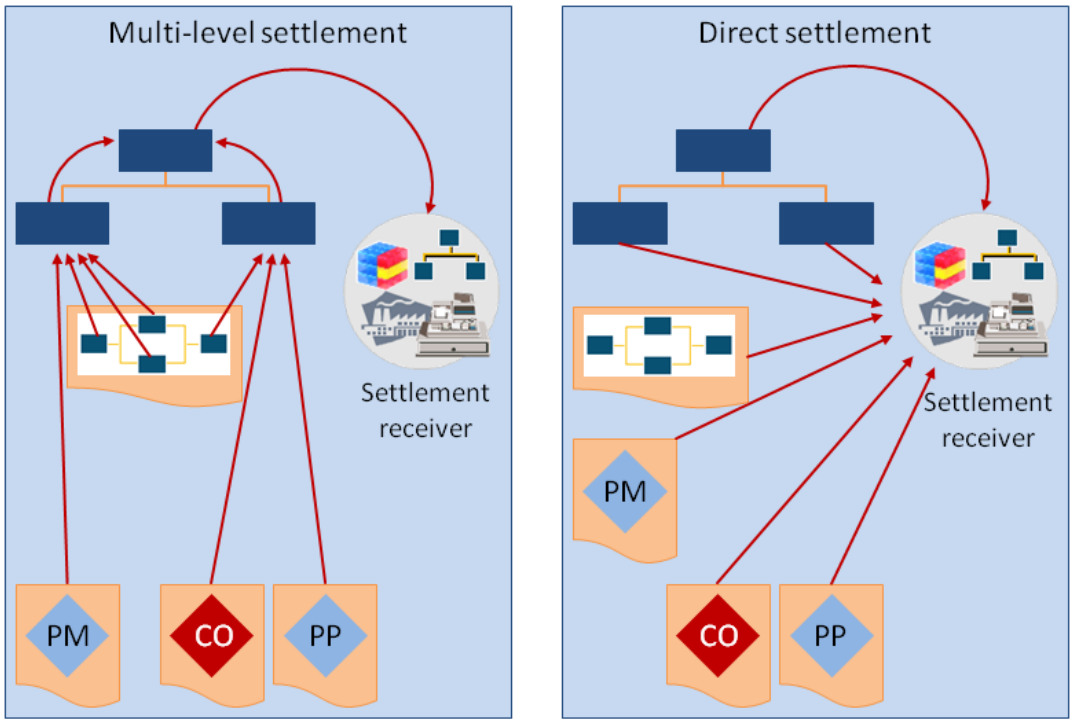


Figure 97: Multiple Settlement – Direct Settlement

5.2.2 Information Systems: Overview

For monitoring and controlling projects, reports are required that provide you with current information regarding, e.g., costs, revenues, dates and resources. Therefore, the reporting of the Project System provides you with different standard reports. For the evaluation of important key figures of a project, you can use the following information systems:

- Structure information system
- Information system costs/revenues/payments (Controlling) with hierarchy- and cost element reports and SAP list viewer for individual items
- Capacity analysis
- Order report, reservation lists, purchase requisitions, orders for a project, ProMAN (information system for evaluation procurement activities in the project system)
- Stock/requirements overview
- Progress analysis, progress tracking
- SAP Business Information Warehouse

The following reports and systems are available especially for cross-project evaluations:

- Project summarization
- SAP executive information system
- Profit center accounting reports
- Profitability analysis reports

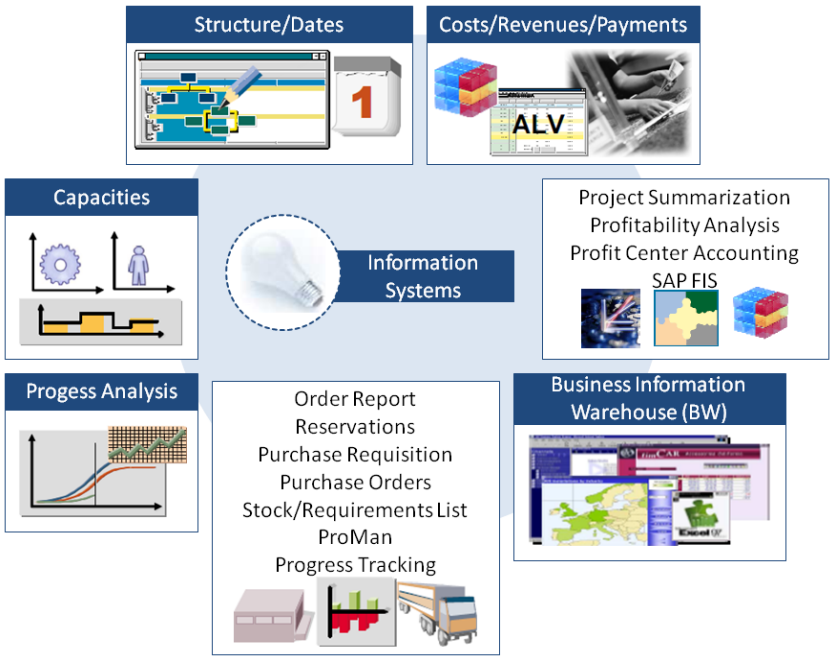


Figure 98: Information Systems: Overview

5.2.2.1 Structure Information System

The Structure Information System is not only a tool for displaying information, but it also allows you to create and change reports from project structures. For a multi-level project structure with manufacturing orders and planned orders (assigned to WBS Elements), the entire structure is displayed in the structure overview and can be modified from there. Moreover, additionally assigned orders can be called up to change or to display these objects. Apart from that, you can confirm Activities in the information system and initiate confirmation pools or workflows. The following figure shows the control functions in the Structure Information System.

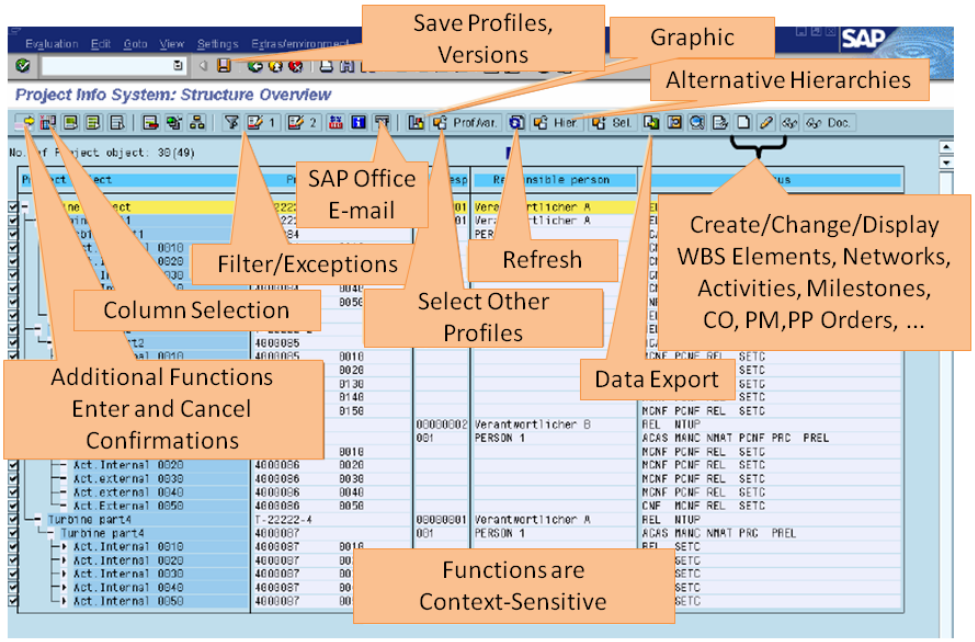


Figure 99: Structure Information System

5.2.2.2 Cost Element Report

Cost Element Reports list costs according to cost elements. You can, for example, choose the object whose costs are supposed to be evaluated from a structure in the Cost Element Report by using the navigation panel, or you can call up a corresponding list and the period that you want to evaluate. Along with sorting and filtering functions, it also provides you with different currencies for data display.

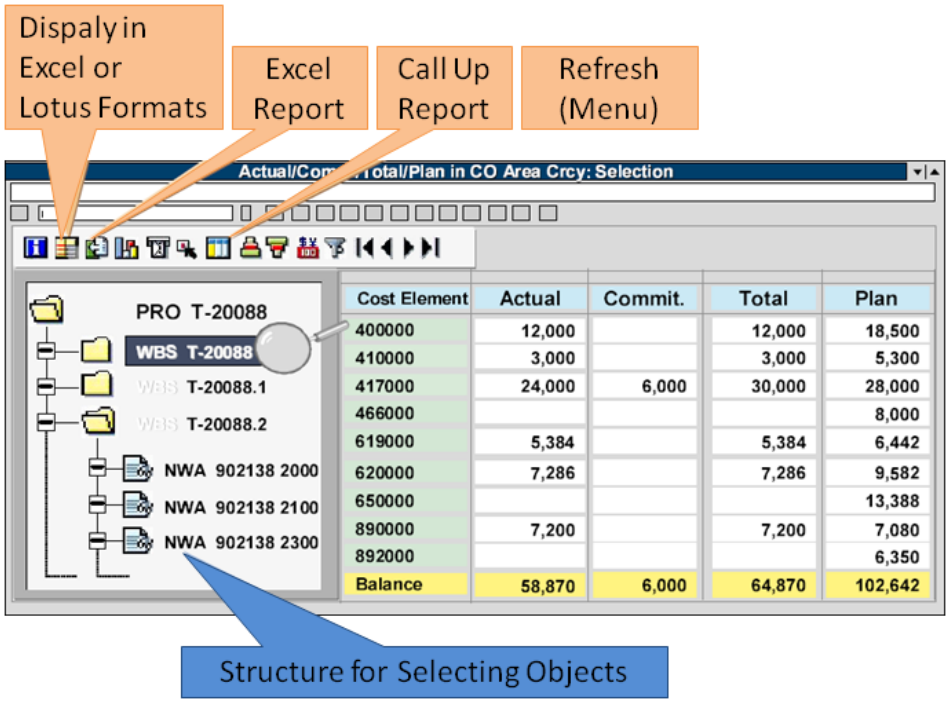


Figure 100: Cost Element Report

5.3 Practice: Information System

Once again, take a look at the costs/revenues/expenditures/receipts report to display the effects of billing.

Figure 101: Process Overview – Information System

Choose

Logistics → Project System → Information System → Financials → Costs/Revenues/ Expenditures/Receipts (S_ALR_87013531)

1. If the system asks you to enter a **controlling area**, enter ***CO Europe (1000)*** and confirm.
2. If the system asks you to enter a **DB profile**, enter profile ***standard selection (structure) (000000000001)***. Confirm.
3. On the subsequent selection screen, enter the name of your project ***A-1xxyy*** into the **project** field. Enter **plan version** ***plan/actual (0)*** and select ***the classical drilldown report***. Click the symbol (**execute**).

The following report is displayed

Execute Costs/revenues/expenditures/receipts: Detail

Number format...

Costs/revenues/expenditures/receipts

Navigation
Object
Val.category
Period/year
Business Trans.

Lead column	Plan.costs	Act.costs	Pld revs.	Act.revs	Plan exp.	Act.exp.	Pld rec.	Act.rec.
Overall	34.215	38.215	50.200-	58.000-	0	0	50.200	0
Previous years	0	0	0	0	0	0	0	0
2010	34.215	38.215	50.200-	58.000-	0	0	50.200	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013 and following	0	0	0	0	0	0	0	0
Total of years	34.215	38.215	50.200-	58.000-	0	0	50.200	0

Figure 102: Cost-Revenue Report (1): SAP-System-Screenshot

You can see that along with the planned costs in the project (plan costs column), the costs posted in the project (actual costs column), the revenues and receipts planned using sales orders (plan revenues and plan receipts columns), a value was entered into the actual revenues column (58000 €). This amount results from billing the two sales orders (50000 + 8000 €).

4. The report also offers you further analyses possibilities (see figure below).

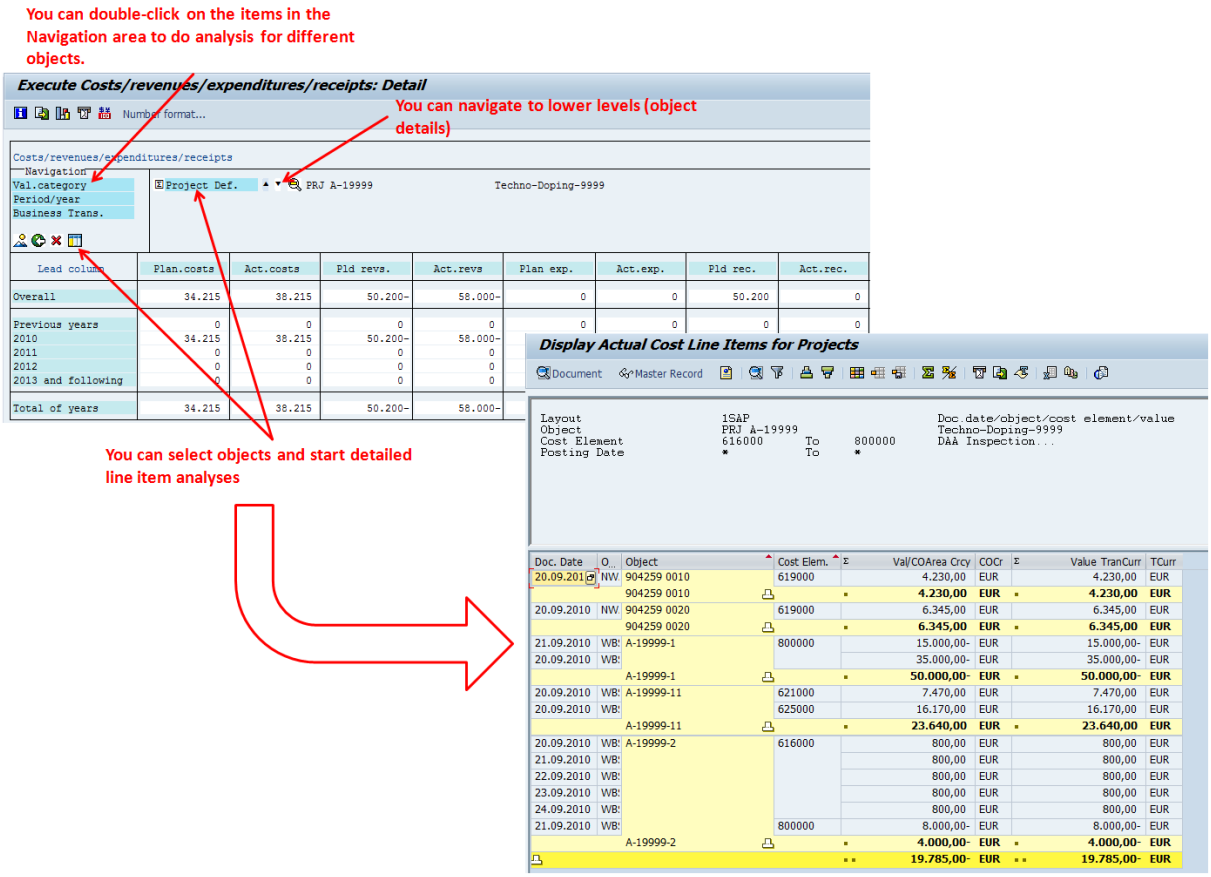


Figure 103: Cost-Revenue Report (2): SAP-System-Screenshot

5.4 Elucidation

What have we learned so far?

You have learned what activities are performed during period-end closing in SAP PS. Furthermore, the SAP Project System Information System was introduced.

5.4.1 Period-end Closing: Process

In the framework of period-end closing, period-related business transactions are carried out. Period-end closing activities are executed periodically in the background (usually once a period). They are, e.g., executed at the beginning of a month for the previous month:

- Settlement
- Template Allocation
- Overhead Rates
- Project Interest Calculation
- Cost Forecast
- Progress Analysis
- Result Analysis
- Incoming Orders

You can use the Schedule Manager for the period-end closing. The Schedule Manager supports workflows for FI, CO, PS, etc.

Debit-Credit Settlement

Actual costs and actual revenues for a project are determined from:

- Material withdrawals and goods receipts
- Vendor invoices
- Customer billing
- Internal activity allocation, assessments, costs allocations, process costs, surcharges
- Confirming Network Activities

Settlement transfers costs/revenues to:

- Financial accounting (G/L account)
- Asset accounting (fixed assets)
- Costs and profitability analysis (order, cost center, profitability segment)
- The Project System (WBS Elements, Networks, Activities)

Multiple Settlement – Direct Settlement

- Direct settlement:
  - Each object (WBS Elements, Networks, orders and Activities) in a project is directly allocated to a cost object that is not included in the project such as a profitability segment.
  - Direct settlement is used for settling PS structures to other receivers.
- Multi-level settlements:

- Activities, orders and WBS Elements are firstly settled to the WBS Elements of a higher level in a project. This highest structure element then settles the complete, collected costs.
- Multi-level settlement is used for settling cost on WBS Elements of other projects or internal orders.

5.4.2 Information Systems: Overview

The reporting of the SAP PS offers multiple standard reports and information systems to evaluate important key figures of a project:

- Structure information system
- Costs/revenues/payments (Controlling) with hierarchy- and cost element reports and SAP list viewer for individual items
- Capacity analysis
- Order report, reservation lists, purchase requisitions, orders for a project, ProMAN (information system for evaluation procurement activities in the project system)
- Stock/requirements overview
- Progress analysis, progress tracking
- SAP Business Information Warehouse

The following reports and systems are available, especially for cross-project evaluations:

- Project summarization
- SAP executive information system
- Profit center accounting reports
- Profitability analysis reports

Structure Information System

- You can display project information
- You can create and change reports from project structures
  - For a multi-level project structure with manufacturing orders and planned orders (assigned to WBS Elements), the entire structure is displayed in the structure overview and can be modified from there.
  - Orders assigned to the projects can be displayed and changed.
- You can confirm Activities in the information system and initiate confirmation pools or workflows.

Cost Element Report

- Lists costs according to cost elements
- Selection of objects, whose costs are supposed to be evaluated, using the navigation panel or from corresponding list.
- Provides sorting and filtering functions as well as display in different currencies.

6 Data Sheet

*Congratulations! You completed the **Project Management** case study.*

The subsequent case studies are based on the results of this case study. In case your data differs from the description in the script, please contact your tutor prior to processing another case study.

Finally, please **submit the carefully completed data sheet** to your tutor (use support email address from the welcome mail) for the case study ***Project Management***.

Please comply with the naming rules. Non-compliant data sheets will not be accepted; i.e., rename the document that you downloaded from this course's download area as follows:

11-project_management-xxyy-zzz-surname.doc

Thereby, you need to replace **xxyy** with your user number **without** the "***WIP***" and without the hyphen (WIP-xx-yy) and replace zzz with the number of the client you are working on.

Example:
Your name is **Max Mustermann,** you are working on **client 901** and your **user number is** WIP-**99-99**. Then, name the document as follows:

11-project_management-**9999-901-Mustermann**.doc

7 Reflexion

Test your knowledge. In this section you are confronted with some question regarding the theoretical chapters of this teaching unit. Try to answer the questions on your own before taking a look at the standard solutions.

7.1 Questions

Comprehension Questions

1. Projects are tasks with particular characteristics. List six characteristics of projects:

   _____
   _____
   _____
   _____
   _____
   _____

2. Activities are linked to each other by means of Relationships. This results in a causal and chronological Activity sequence. List the different types of Activities used in the project system:

   _____
   _____
   _____
   _____
   _____

3. What are the six typical areas of focus for project planning?

   _____
   _____
   _____
   _____
   _____
   _____

4. List the three modules integrated tightly to PS with respect to materials.

   _____
   _____
   _____

5. Name the Operative Indicators for WBS Elements?

   _____
   _____
   _____

6. A _____ is a model of a project and shows the project Activities to be fulfilled in hierarchical form. It shows the operative basis for planning costs, revenues and payments as well as for scheduling and budgeting.

7. The _____ in a project describe the various steps and work involved in the project.

8. _____, _____, _____, _____, _____, _____, _____ are all examples of period-end transactions run for a project.

True/False

9. An externally processed Activity determines the output to be provided by machines or personnel in order to complete the Activity.

10. Actual data is posted to the project by business transactions from only one other component of SAP.

11. The project definition contains data that affects the entire project.

12. Operative indicators determine whether planning, accounting or billing will be performed for a WBS Element.

13. WBS Elements can be created within the Hierarchy graphic.

14. You can re-arrange the WBS Element hierarchy in the Hierarchy graphic. (True or False)

15. A Network contains Activities, which describe the sequence of work and flow of a project. (True or False)

Multiple Choice Questions

16. Which of the following statements about Work Breakdown Structures are correct? (2 correct answers)
    a. WBS is a model of the project.
    b. Project Builder is the only tool available to define the WBS.
    c. WBS is used to plan only the costs associated with a project.
    d. WBS Elements that you use to plan costs are identified as Planning Elements.

17. Which of the following are Activity Categories? (4 correct answers)
    a. Internal Processing
    b. External
    c. Resources
    d. Services
    e. Cost

18. Which components of mySAP ERP can post actual data to a project? (4 correct answers)
    a. Inventory Management
    b. Plant Maintenance
    c. Production Planning
    d. Business Warehouse
    e. Controlling

19. Which are typical functions inside project systems? (4 correct answers)
    a. Dates
    b. Responsibility
    c. Costs/Revenues
    d. Budget
    e. System Status
    f. Payments

20. What is the organizational unit that is unique for the entire project?
(1 correct answer)
    a. Business Area
    b. Controlling Area
    c. Company Code
    d. Enterprise

7.2 Standard Solution

Comprehension Questions

1. Projects are tasks with particular characteristics. List six characteristics of projects:

Projects

(1) are usually complex, unique and involve a high degree of risk
(2) have precise targets that are agreed on between the contractor and the cold-to party
(3) are limited in duration and are cost and capacity intensive
(4) can be cross-departmental
(5) are subject to specific quality requirements
(6) are of mostly strategic significance to the business carrying them out

2. Activities are linked to each other by means of Relationships. This results in a causal and chronological Activity sequence. List the different types of Activities used in the project system:

Internal processing (for capacities to be staged in your own company), external processing (for tasks to be assigned externally), services (for procuring external services) and cost Activities (for planning additional primary costs).

3. What are the six typical areas of focus for project planning?

The typical areas of focus for project planning are

(1) project structures
(2) dates
(3) payments
(4) resources
(5) materials
(6) costs/revenues

4. List the three modules integrated tightly to PS with respect to materials:

Materials establish the link between the project system and

(1) sales and distribution
(2) materials management
(3) production planning

5. Name the Operative Indicators for WBS Elements:

Planning
Accounting Assignment
Billing

6. A **Work Breakdown Structure (WBS)** is a model of a project and shows the project Activities to be fulfilled in hierarchical form. It shows the operative basis for planning costs, revenues and payments as well as for scheduling and budgeting.

7. The **Activities** in a project describe the various steps and the work involved in the project.

8. **Template allocations, overheads, interest calculation, cost forecast, progress analysis, results analysis, incoming orders and settlement** are all examples of period-end transactions run for a project.

True/False

9. An externally processed Activity determines the output to be provided by machines or personnel in order to complete the Activity.

False! An internally processed Activity determines the output to be provided by machines or personnel in order to complete the Activity.

10. Actual data is posted to the project by business transactions from only one other component of SAP.

False! Actual data is posted to the project by business transactions from various SAP components including

(1) Materials management (purchase order, goods receipt for materials and services)
(2) Inventory management (goods issues)
(3) Sales and distribution (billing of the sales order)
(4) Production planning (confirmation of assigned production orders)
(5) Plant maintenance (confirmation of assigned PM orders)
(6) Controlling (internal Activity allocation, assigned CO orders)
(7) Financial accounting (down payments, journal entries)
(8) Asset management (settlement to assets)
(9) Human resources (entry of work for persons, posting of Activity confirmation)

11. The project definition contains data that affects the entire project.

Answer: True

12. Operative indicators determine whether planning, accounting or billing will be performed for a WBS Element.

Answer: True

13. WBS Elements can be created within the Hierarchy graphic.

Answer: True

14. You can re-arrange the WBS Element hierarchy in the Hierarchy graphic? (True or False)

Answer: True

15. A Network contains Activities, which describe the sequence of work and flow of a pro-jec.

Answer: True

Multiple Choice Questions

16. Which of the following statements about Work Breakdown Structures are correct? (2 correct answers)
    a. WBS is a model of the project.
    b. Project Builder is the only tool available to define the WBS.
    c. WBS is used to plan only the costs associated with a project.
    d. WBS Elements that you use to plan costs are identified as Planning Elements.

Answers: a, d

17. Which of the following are Activity Categories? (4 correct answers)
    a. Internal Processing
    b. External
    c. Resources
    d. Services
    e. Cost

Answers: a, b, d, e

18. Which components of mySAP ERP can post actual data to a project?
(4 correct answers)
    a. Inventory Management
    b. Plant Maintenance
    c. Production Planning
    d. Business Warehouse
    e. Controlling

Answers: a, b, c, e

19. Which are typical functions inside project systems?
(4 correct answers)
    a. Dates
    b. Responsibility
    c. Costs/Revenues
    d. Budget
    e. System Status
    f. Payments

Answers: a, c, d, f

20. What is the organizational unit that is unique for the entire project?
(1 correct answer)
    a. Business Area
    b. Controlling Area
    c. Company Code
    d. Enterprise

Answer: b