

Reading Sample

SAP Project System's innovative design allows for cross-platform usage. This is good news for companies who manage projects through different programs and software. This selected reading takes a look at the typical scenarios that one can expect when integrating SAP Project System with these other programs.



"Integration Scenarios with Other Project Management Tools"



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The Author

Mario Franz

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In many enterprises, projects and project portfolios are managed using a variety of programs. This chapter looks at some typical scenarios that illustrate how SAP Project System can be integrated with other programs.

7 Integration Scenarios with Other Project Management Tools

The *External Project Software* (EPS interface) interface and—as of EHP 3—services of SAP's service-oriented architecture (SOA) can be used for bidirectional data exchange with other project management tools or generic external programs from within SAP Project System.

The purpose of SOA is to enable companies to design their IT-based business processes in a more flexible manner. The core element of SOA is the Enterprise Services. From a business point of view, an Enterprise Service represents an executable business function within a business process. From a technical point of view, an Enterprise Service is an encapsulated function of an SAP or non-SAP application that can be accessed through well-defined interfaces. If you couple the Enterprise Services of different applications, you can easily map business processes across different systems and enhance them at a later stage, if necessary. As of EHP 3, SAP Project System provides more than 50 Enterprise Services.

Enterprise services

Typical uses of the EPS interface include exporting project data for presentation purposes, initial data transfer from legacy systems to SAP Project System, and integrating special tools that are often developed in-house and deal with individual aspects of project management (that is, creating materials lists, scheduling, and offline object processing). The EPS interface is based on business object types and BAPIs.

EPS interface

Business objects Business object types are used to structure data from the SAP system into individual components, in accordance with business criteria. SAP Project System has the business object types *Project Definition*, *Work-BreakDownStruc*, and *Network*, among others, which are used to encapsulate data for project definitions, work breakdown structures, and networks. Each business object type provides clearly defined methods for communicating with external programs. These methods are referred to as *BAPIs*. Data exchange that is based on BAPIs between the external programs and a business object can flow in either direction.

BAPIs The data in business objects is only visible to the outside world via BAPIs. This separation of data and access methods enables you, with the help of BAPIs, to read, modify, and create business objects without having to know all of the SAP-specific implementation details of the relevant business object type. You can use the BAPI transaction to view a list of the business object types, the BAPIs available in each case, and detailed documentation for every BAPI in the SAP system. For a list of the BAPIs for the three business object types in SAP Project System, see Appendix A.

The EPS interface enables access to the data in SAP Project System; however, to exchange this data with other programs an additional interface is required that maps SAP Project System data to data fields in the external software and vice versa. You can develop this interface, if you like, but there already exists an entire range of such interfaces for a variety of standard programs, such as Microsoft Project and Oracle Primavera P6. You can purchase these interfaces from SAP partners or other providers. SAP provides its customers and partners with a free interface for data exchange between SAP Project System (SAP PS) and Microsoft Project Client. This interface, known as the *Open PS interface for Microsoft Project*, is discussed in more detail in the following sections. The SAP Enterprise Project Connection interface can be used for the integration with other project management tools and, in particular, Primavera (introduced in Section 7.2). Finally, this chapter describes integration scenarios for SAP Portfolio and Project Management, and SAP Commercial Project Management which you can use to supplement SAP Project System with additional processes and functions.

7.1 Open PS for Microsoft Project

You can use the Open PS for Microsoft Project interface to download projects from SAP Project System to the Microsoft Project Client. You can also use this interface to roll up project data to SAP Project System to create new projects or modify existing ones. The ability to download projects in Microsoft Project is particularly important for project team members who need access to offline project data—for customer presentations, for example. You can download projects as often as you like. When doing so, you can either create a new project each time in Microsoft Project or update a previously downloaded project.

If necessary, you can also modify projects that you downloaded in Microsoft Project—for on-site scheduling arrangements with business partners, for example—and then transfer your modifications back to the SAP system or create new projects in Microsoft Project and then use the rollup function to create new projects in SAP Project System. To roll up modified or newly created projects in the SAP system, you must explicitly assign the `SAP_PS_EPS` role to users. You first have to create this role in the SAP system using Transaction PFCG. This is the only action you need to take for this role.

The Open PS interface is used mainly to exchange data regarding structure, scheduling, and resources between SAP PS and Microsoft Project. However, for information purposes planned costs and actual costs of activities can also be downloaded to Microsoft Project. Furthermore, to carry out resource planning at the personnel level in Microsoft Project you can download personnel data from the HR module in the SAP system to Microsoft Project.

Because Microsoft Project and SAP Project System use different project structures and data fields, Open PS must have a suitable means of mapping these structures and this data. For example, in Microsoft Project, activities are mapped as individual tasks, whereas WBS elements, if activities are assigned to them, are mapped as summary tasks; otherwise, they are also mapped as individual tasks. One characteristic of material components is that they cannot be downloaded. The Open PS interface documentation contains a detailed explanation of how the

various structure objects are mapped; in particular, it provides information on which PS object fields are mapped to which Microsoft Project fields.

Because Microsoft Project and SAP Project System also use different scheduling logics, differences can occur with regard to the project dates in those two project management tools. To avoid that, Open PS allows you to disable the automatic recalculation of project dates in Microsoft Project after the import of project data. This option also imports buffer times from the SAP system, which are then used to highlight time-critical activities in Microsoft Project. However, note that this option does not allow for importing additional resources and that you cannot roll up changes at a later point in time.

!! Data Consistency in Microsoft Project and SAP Project System

Due to the different handling—for example, of work, duration, or date restrictions—in Microsoft Project and SAP Project System, the dates and other data are not always fully consistent. Ensure that you use appropriate settings in the projects in SAP Project System and Microsoft Project to avoid inconsistencies. The Open PS documentation and SAP Note 1332046 provide further information on the appropriate settings.

Open PS installation You must download the documentation and the Open PS interface using SAP's Software Distribution Center. To use the Open PS interface, you have to install it on the same local computer on which the Microsoft Project client is installed. If you then start Open PS, Microsoft Project, with an additional Open PS toolbar, is also started automatically. To create a link to SAP Project System, you then have to manually enter information about the SAP user and the SAP system, which you should save so that you don't have to enter it each time.

Open PS settings In the Open PS settings, select the object types that you want to be exchanged between SAP Project System and Microsoft Project (see Figure 7.1). If you also want to exchange PS user field data with Microsoft Project, then you have to specify the assignments of user fields to Microsoft Project fields in the settings. The other settings are predefined and usually don't require modification.

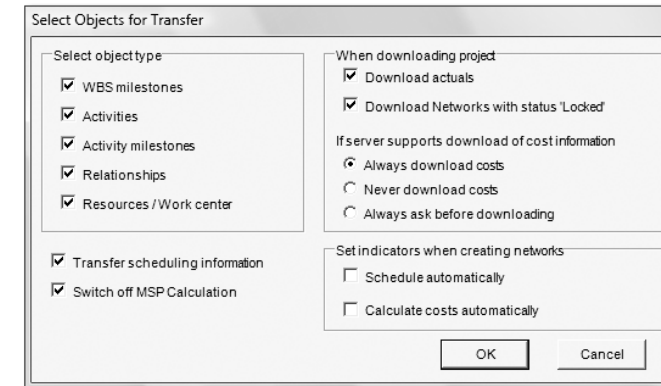


Figure 7.1 Open PS Data Transfer Settings

In the remainder of this section, a simple example scenario is described to illustrate how Open PS can be used. After setting up and starting the interface, you can establish a connection to an SAP system. First, log on to the SAP system with an SAP user. Once you have done this, you have access to more functions in the Open PS toolbar. For example, you can download a project from SAP Project System by selecting the project you want to download in the appropriate dialog box (see Figure 7.2); note that you cannot download multiple projects simultaneously. If necessary, you can automatically lock networks belonging to this project while editing in Microsoft Project. Once the download process is completed, you can view details of the process in a log file.

Using the Open PS interface

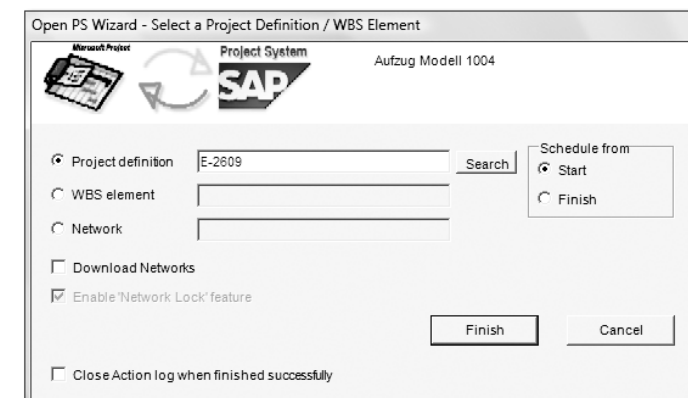


Figure 7.2 Open PS Dialog Box for Downloading Projects to Microsoft Project

Resource screen

The downloaded project is then displayed in the Open PS screen in Microsoft Project (see Figure 7.3). The work centers of the activities can also be downloaded to Microsoft Project as resources, along with structure and scheduling data, and can then be analyzed there in the RESOURCES screen. If you want to use additional work centers and personnel resources from the SAP system for resource planning in Microsoft Project, then you should use Open PS to search for the appropriate resources in the SAP system and to download these as well.

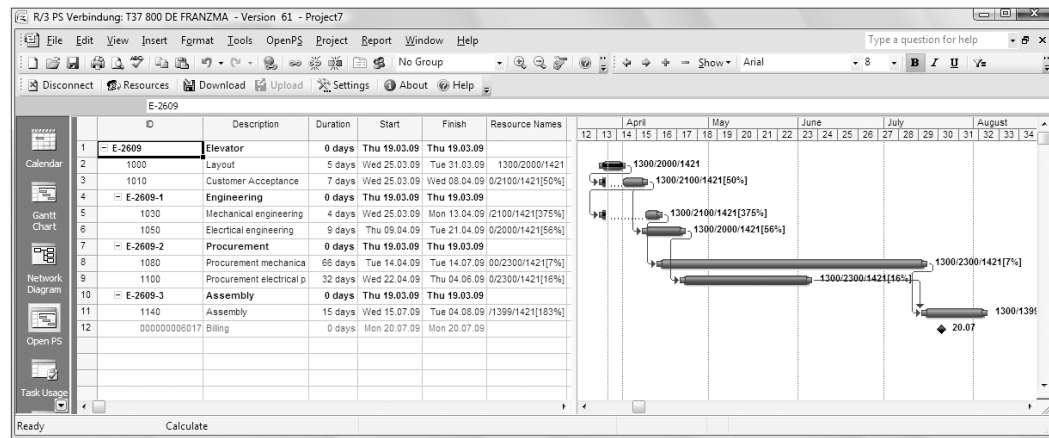


Figure 7.3 Display in Microsoft Project of a Project Exported Using the Open PSInterface

Modifying a project in Microsoft Project

You can now analyze and, if necessary, modify the project in Microsoft Project. For example, you can modify the time scheduling, add new tasks, create relationships, or assign resources to tasks. If you assign more than one resource to a task, especially personnel resources, these are mapped in SAP Project System as activity elements after they are rolled up. For new tasks, you can use an indicator to control whether these tasks can be uploaded to SAP Project System later or whether they are only to be used for planning in Microsoft Project.

To transfer the modified project data back to SAP Project System, start the project rollup process. If you locked certain networks during the download process, then you have to unlock these networks before uploading. Open PS now compares the project in Microsoft Project with the project in SAP Project System and displays a list of updates. You can

now choose whether to transfer all of the updates or just a select number of updates. As before, a log file is created that contains all of the details of the upload process.

7.2 SAP Enterprise Project Connection

Through SAP Enterprise Project Connection (EPC), SAP provides an interface specifically for the integration of data from SAP Project System and Plant Maintenance with other project management and scheduling tools. In the standard version, EPC can be used to exchange data with Oracle Primavera P6 and, as of EPC 2.0, with Microsoft Project Server. SAP EPC consists of the following components:

▶ Integrated Services

This component comprises services that can be called via the SAP EPC user interface and ensure data transfer.

▶ Central Technical Configuration

This is a Java component that allows for configuration of the system connections and other control functions.

▶ SAP ERP add-on component

The SAP ERP add-on component includes BAPIs and transactions for the execution and evaluation of data transfers in the SAP ERP system.

▶ Sample content for integration

The sample content contains details regarding the mapping of SAP ERP data to data and objects in Primavera or Microsoft Project Server.

The *Integrated Services* and *Central Technical Configuration* components are installed on SAP NetWeaver Application Server and are used for interface administration only.

Users can transfer data with the SAP ERP add-on component by using the transactions provided therein. The following transactions are available for SAP EPC, for example, for data exchange:

- ▶ TRANSFER PROJECTS
- ▶ TRANSFER PM ORDERS
- ▶ DISPLAY TRANSFER RESULTS

Components

Data exchange

The TRANSFER PROJECTS transaction allows for data exchange between projects in SAP Project System and Oracle Primavera P6 or Microsoft Project Server (see Figure 7.4). In the initial screen of this transaction, you select the projects whose data you want to exchange as well as a transfer mode and a transfer type. The AUTOMATIC TRANSFER mode directly triggers the data transfer of the selected projects upon execution; the INTERACTIVE SELECTION mode enables you to check the scope of the selection again. The transfer type defines the direction of the data exchange—that is, from the SAP system to Primavera/Microsoft Project or vice versa. A separate transfer type is available for the export of actual costs. If required, you can also save your selection as a variant and schedule it as a background job. You can find more details on the data transfer, on the mapping of objects and fields, and on the mapping rules used in the SAP Library and in SAP Notes 1887361 and 1842546.

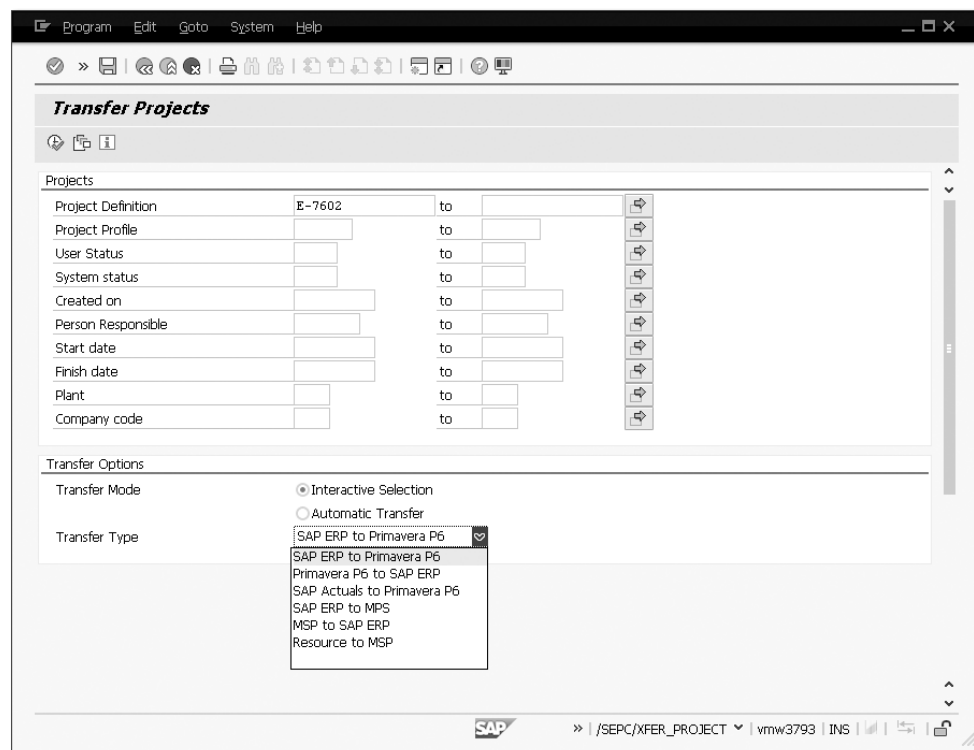


Figure 7.4 Transaction for Data Exchange with Primavera or Microsoft Project Server

After the data transfer, you can view the transfer result. Status information and the respective traffic lights indicate warning messages or transfer errors. You can view detailed information that helps you to eliminate errors or post-process exchanged data.

Transfer evaluation

The DISPLAY TRANSFER RESULTS transaction allows you to obtain a central overview of the data transfer result.

7.3 SAP Portfolio and Project Management

SAP Portfolio and Project Management (PPM) consists of the closely integrated components *PPM Portfolio Management* and *PPM Project Management*. Portfolio Management provides functions for company-wide management, for example, of IT projects, innovation projects, or investment projects. The Project Management component is another SAP tool for operational project management. SAP PPM is the successor of cProjects and SAP Resource and Portfolio Management and combines the two solutions in one product with a harmonized user interface and an extended functional scope. The following information deals with the Portfolio Management and Project Management components and SAP Project System integration scenarios in particular.

7.3.1 PPM Project Management

PPM Project Management's design and functional scope make it particularly suitable for IT, development, and service projects. You can use PPM Project Management independent of or in combination with SAP Project System. In this context, different integration scenarios are available. On the one hand, you can use a project in SAP Project System for project accounting of a PPM Project Management project linked to it, and on the other hand you can use projects simultaneously in SAP Project System and in PPM Project Management to implement different project views for different user groups.

Usage

PPM Project Management includes functions for phase-based and task-based structuring of projects (see Figure 7.5), time scheduling, and various document management options. Resource planning in PPM Project

Functional scope

Management is based on roles, which describe the resource requirements of a project, and business partners, who are used as resources for role assignment. Resources can be assigned to these project roles in SAP PPM in different ways: in addition to the direct staffing of roles in a project (for example, by the project manager), you can also use advanced, cross-project staffing scenarios. In these processes, depending on the status of the role, resource managers are responsible for the role assignment. For this purpose, PPM provides two fast-entry screens: RESOURCES and ASSIGNMENT OVERVIEW.

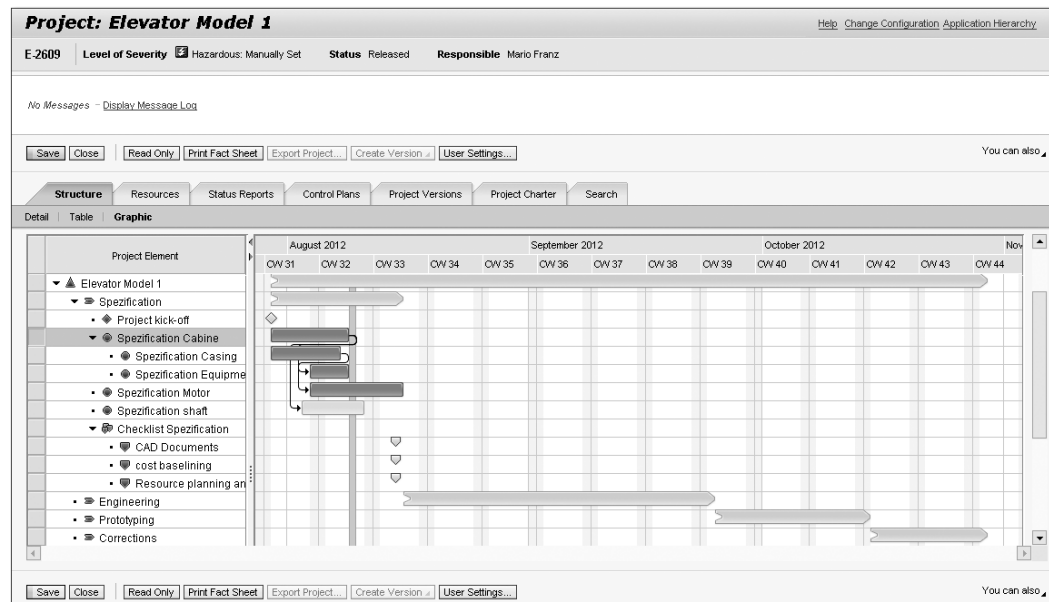


Figure 7.5 Sample Project Structure in PPM Project Management

Project templates To simplify the project creation process, you can use PPM Project Management to define project templates and use these to copy operative projects. You can also use it in the project execution process to incorporate simulation versions for what-if scenario analyses. The structure objects of a project in PPM Project Management can have a status, which you can use to control the lifecycle of the structure objects. The transition from one phase of a project to the next is usually controlled in PPM Project Management via special approval processes. In these processes,

you can use *checklists* to ensure that all of the mandatory conditions for a particular phase of the project are fulfilled. You can also use project status reports and versions to document the progress of a project in PPM Project Management.

In PPM Project Management, an authorization concept, which is based on Access Control Lists (ACLs), enables you to easily assign authorizations at the object level, down to the level of individual documents. Different options to link PPM Project Management projects with each other and the use of a *multiproject monitor* in PPM also enables you to perform multiproject management in PPM Project Management. Special project evaluations, predefined Business Content for SAP BW, and a function for connecting PPM Project Management to SAP Alert Management allow you to effectively monitor all your PPM Project Management projects. PPM Project Management provides additional integration scenarios for the following, among other things: SAP Supplier Relationship Management (SRM), for procuring external project resources, for example; the CATS, for recording time spent on tasks in PPM Project Management projects; and PPM Portfolio Management in particular. Also, *object links* can be used to connect almost all of the structure objects of SAP PPM projects with objects of an SAP ERP system.

Object links enable you to create links, such as a link between a PPM Project Management phase and a PS network. This means that in PPM Project Management evaluations you can analyze network data together with the phase data, for example. Moreover, in PPM Project Management, you then can use network data to identify *threshold value violations* and therefore to trigger automatic alert messages. Object links also enable you to analyze network data directly in the specific phase (see Figure 7.6) and, if necessary, to go directly from PPM Project Management to the detailed display or to processing transactions for the network.

Customizing of PPM Project Management is where you define the object links and the Remote Function Call (RFC) connection to the SAP ERP system. The standard version already contains various object links for PPM Project Management. Figure 7.7 shows an example of an object link definition for networks in SAP Project System.

Authorization concept

Object links

Header Data	
Network:	907461
WBS element:	E-2609
Plant:	1300
Scheduled finish:	03.08.2012
Basic finish date:	03.08.2012
Description:	Prototypenbau
Currency:	EUR
Scheduled start:	29.06.2012
Basic Start Date:	29.06.2012

Costs	
Project cost plan:	178.052,06
Order cost plan:	178.052,06
Project revenue plan:	0,00
Order revenue plan:	0,00
Budget:	0,00
Available:	178.052,06
Residual order plan:	0,00
Ttl cost commitment:	0,00
Act.revs:	0,00
Incoming payments:	0,00
Project cost plan 2:	0,00
Order cost plan 2:	0,00
Proj.rev.plan 2:	0,00
Order revenue plan 2:	0,00
Assigned:	0,00
Release:	0,00
Fixed price cmnt:	0,00
Actual costs:	0,00
Payments out:	0,00
Currency:	EUR

Progress	
BCWS:	0,00
BCWP, adjusted:	0,00
N-agg. plan POC:	
POC actual, non-agg.:	
BCWP:	0,00
Aggr. plan POC:	
POC act.agg.:	

Figure 7.6 Example of a Display of Network Data in PPM Project Management

Object Type: ONETWORK Network (PS)

Object Types for Object Links

- Active
- Key: 0LR3_TS_CAUFV_INT_ID
- Identification: 0LR3_TS_CAUFV_EXT_ID
- Group: NP Network (PS)
- Existence Check
- Search Help
- Read Data
- Edit
- Own Persistence
- Search Fields: 0LR3_TS_CAUFV_SHLP
- Proxy Class: CL_DPP_0LR3_NETWORK
- Log. System: QV5CLNT004
- Destination: QV5CLNT004
- Web Server: QV5CLNT004

Figure 7.7 Definition of an Object Link in PPM Customizing

Integrating Financials Functions

Special integration scenarios between SAP Project System and PPM Project Management can be used to exchange CO data. Because PPM Project Management does not provide any Financials functions (apart from a rudimentary cost and revenue planning function that is based on planned resource requirements), you can run projects in SAP Project System parallel to your projects in PPM Project Management, which hierarchically map all financial aspects of project planning and execution. Specific information on planned activities and their costs and revenue rates can be transferred from PPM Project Management to SAP Project System for this purpose, and, if necessary, additional cost, revenue, and budget data can be added here.

There are various ways, or *CO methods*, of linking a PPM Project Management project to a PS project:

► Hierarchical CO (structure element, manually)

Manually create a work breakdown structure in SAP Project System and then assign phases, tasks, and subtasks of a PPM Project Management project to the WBS elements.

► Hierarchical CO (project role, manually)

Likewise, create a work breakdown structure in SAP Project System and then assign roles to the various WBS elements in PPM Project Management.

► Hierarchical CO (structure element, automatically)

To define a PPM Project Management project, the system automatically creates a project definition and a billing element in SAP Project System. In accordance with the structure of the SAP PPM Project Management project, subordinate WBS elements are created for phases, tasks, and subtasks and linked to these. You can define the maximum number of levels by defining a CO level. All subordinate structure elements of the SAP PPM Project Management project are then assigned to the WBS elements at the lowest level.

► Hierarchical CO (project role, automatically)

A project definition and a billing element are automatically created at the highest level in SAP Project System. Additional WBS elements are created for every role in the SAP PPM Project Management project.

Controlling methods

You can also use additional CO methods if you don't require hierarchical CO for an SAP PPM Project Management project and instead want to use internal orders rather than WBS elements as the CO elements in the SAP ERP system for integrating Financials functions.

[+] Manual Changes of Automatically Created Assignments

If necessary, before a project is released in PPM Project Management, you can make manual changes to the assignments that were created using automatic CO methods. If you do this, however, you cannot revert to the automatic CO method. From here on, this means that you will have to create links manually for project elements that were retroactively created in PPM Project Management.

Project elements and WBS elements

A project element in PPM Project Management can be assigned to a maximum of one WBS element. However, a WBS element can be linked to multiple elements in PPM Project Management, provided that these elements all belong to the same SAP PPM project. Also, note that you cannot assign the project elements of a project in SAP PPM to WBS elements belonging to different projects in SAP Project System; however, different WBS elements can be assigned to project elements of different projects in SAP PPM.

You determine the CO method, the CO level, and a CO scenario (such as one that contains data on the costing sheet or the settlement profile of the CO objects in the SAP ERP system) based on the project type in SAP PPM specified in the Customizing section of the SAP ERP system under the menu item **INTEGRATION WITH OTHER SAP COMPONENTS • COLLABORATION PROJECTS** (see Figure 7.8). The Customizing section also contains documentation on the various BAdIs available to you for making customer-specific adaptations in the process of integrating Financials functions.

Transfer In the Customizing section of PPM Project Management, you also need to specify when projects and WBS elements should be automatically created and when the cost-relevant data of a project in SAP PPM should be transferred to SAP Project System in accordance with the project type. This process, known as *transfer*, can take place independent of the status of the project in SAP PPM every time the project is saved, automatically

every time the project is saved if the **FLAGGED FOR TRANSFER** status is set, or if the **RELEASED** status is set.

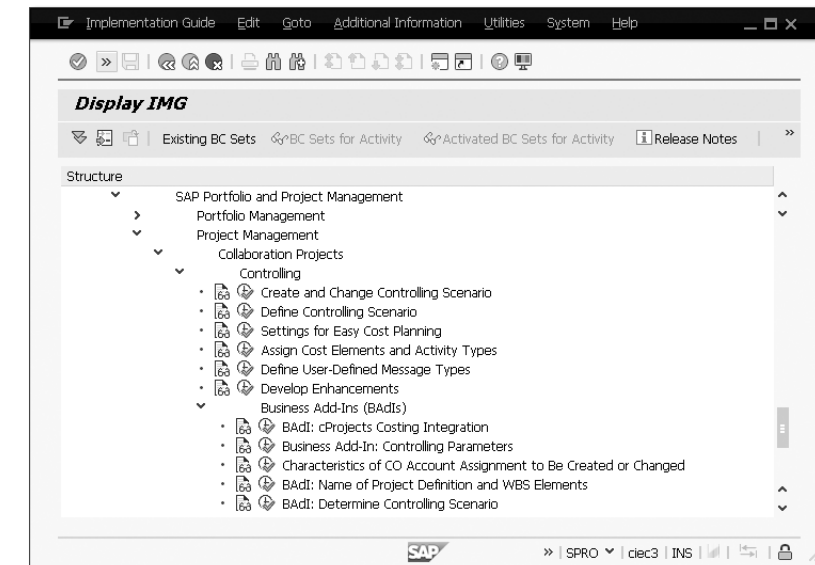


Figure 7.8 Settings for Financials Integration in the SAP System of the Project System

The technical process of integrating Financials functions is also based on object links. In the standard version, PPM Project Management comes with the object type **OFIN_INT_ERP_PS**. In this object type, you only have to create the RFC connection to the SAP ERP system of SAP Project System to use the RFC for object links. As soon as an object link is created between a project element in PPM Project Management and a WBS element, you can display various data of the WBS element directly in the project element in SAP PPM or call various Internet services for the WBS element in PPM Project Management.

7.3.2 PPM Portfolio Management

Although SAP Project System and PPM Project Management can be used for the detailed planning and operational management of projects, PPM Portfolio Management is used for the strategic analysis and control of entire project portfolios and, in particular, for planning and approving project ideas at an early stage.

Portfolio structuring

To manage project portfolios, you can define various *portfolios* in SAP PPM and hierarchically subdivide these portfolios into *portfolio buckets* (see Figure 7.9). At the portfolio bucket level, you can already plan costs, budgets, or capacity data, for example. You can then assign *portfolio items* to the portfolio buckets at the lowest level. At an early stage, portfolio items can be used to define project proposals and ideas in SAP PPM and to support selection and approval processes later on. At this stage, created projects and detailed planning are usually not available yet. You can then manually or automatically generate projects in PPM Project Management or SAP Project System and link them to a portfolio item at a later stage—for example, after the respective approval processes. Synchronization scenarios serve to automatically exchange data between the portfolio item and the linked project. This enables you to monitor and analyze project data in Portfolio Management using various dashboards, reports, and metrics.

The screenshot shows the 'Portfolio Structure' view in SAP PPM. The main area displays a tree view of buckets under the 'Capital Project Portfolio'. The tree is expanded to show the following structure:

- IDES AG (0 items, Active, European Euro, Monthly, Consulting ...)
- Germany (0 items, Active, European Euro, Monthly, Consulting ...)
- Berlin (5 items, Active, European Euro, Monthly, Consulting ...)
- Hamburg (7 items, Active, European Euro, Monthly, Consulting ...)
- Munich (7 items, Active, European Euro, Monthly, Consulting ...)
- USA (0 items, Active, United States Dollar, Monthly, Consulting ...)
- Chicago (9 items, Active, United States Dollar, Monthly, Consulting ...)
- New York (10 items, Active, United States Dollar, Monthly, Consulting ...)

The table below represents the data shown in the screenshot:

Bucket Name	Items	Status	Currency	Financial Period Breakdown	Capacity Unit	Capacity Period Breakdown	Parent Name	Reviews
IDES AG	0	Active	European Euro	Monthly	Consulting ...	Monthly		0
Germany	0	Active	European Euro	Monthly	Consulting ...	Monthly	IDES AG	1
Berlin	5	Active	European Euro	Monthly	Consulting ...	Monthly	Germany	0
Hamburg	7	Active	European Euro	Monthly	Consulting ...	Monthly	Germany	0
Munich	7	Active	European Euro	Monthly	Consulting ...	Monthly	Germany	0
USA	0	Active	United States Dollar	Monthly	Consulting ...	Monthly	IDES AG	0
Chicago	9	Active	United States Dollar	Monthly	Consulting ...	Monthly	USA	0
New York	10	Active	United States Dollar	Monthly	Consulting ...	Monthly	USA	0

Figure 7.9 Sample Portfolio Structure in SAP PPM

Classification Hierarchies

[+]

For valuation purposes, you can define several alternative portfolio hierarchies, so-called *classification hierarchies*. Portfolio items can then simultaneously be assigned to different portfolio buckets of the classification hierarchies. The percentage distribution that you specify for assignments determines the details of the data aggregation in the classification hierarchies. Typical portfolio structuring options include, for example, structuring by region or by functional or organizational aspects.

Now we will describe the usage of portfolio items and the integration with projects in SAP Project System via an example of the construction of a new office building.

In your enterprise, several structural measures are supposed to be implemented as investments. One of the investment proposals includes the construction of a new office building. To evaluate this proposal, you first enter a portfolio item in an appropriate portfolio bucket (see Figure 7.10).

Portfolio item

The screenshot shows the 'Item: Office Building' view in SAP PPM. The main area displays the 'Key Information' section with the following details:

- Name: Office Building
- ID: E-1005
- Status: Created
- Type: Capital Project (RDS)
- Description: Construction of new Office building
- Proposal:
- Escalation:
- Forecasted Start/Finish: /
- Planned Start/Finish: 01.01.2011 / 01.01.2013
- Actual Start/Finish: /
- Days Left Until Next Decision: 0

Figure 7.10 Sample Portfolio Item in SAP PPM

Entering key figures

In addition to general data for the description and scheduling of this proposal, you also enter various key figures—for example, those to do with risk, feasibility, or the economic benefits of this plan. These key figures were defined for the portfolio as a common basis for later approval processes in your enterprise in advance. *Questionnaires* and *evaluation models* can be used to simplify the definition of the key figures and make it more transparent or to automatically derive key figure values from other field values. In addition to various standard key figures, you can also define custom key figure fields and integrate them with SAP PPM. If there are relationships with other objects, then you can define them as dependencies with other portfolio items or by means of object links and documents in the portfolio item.

[+] Initiatives and Collections

Initiatives can be used in SAP PPM to group and manage various portfolio items and projects. Initiatives are usually used for innovation plans in which the development of new products and their introduction to the market are supposed to be managed together.

An alternative, less strict form of portfolio item groups in SAP PPM is *collections*. Collections merely serve to monitor several portfolio items of different buckets together.

Decision points

The lifecycle of a portfolio item can be divided into different phases, so-called *decision points*. You schedule the start and end dates and the decision dates for the individual phases of the office building project. Statuses control the process of the individual phases. At the portfolio item level, you can view information on the current decision point at any time.

Financial and capacity planning

In a next step, you perform first rough financial and capacity planning for the office building project at the portfolio item level (see Figure 7.11). Depending on the settings, planning can be implemented for fiscal years or individual periods, for example. You can define the financial and capacity planning structure freely in SAP PPM Customizing using *views*, *types*, and *groups*. If required, you can also upload (rollup) certain financial and capacity data to the parent portfolio buckets in order to compare it to the corresponding higher-level planning data.

The screenshot shows the SAP Financial Planning interface for 'Office Building'. It displays a table with columns for months (JAN 2011 to JUN 2011) and rows for different project categories. The 'Initial Amount' column shows values for each category, and the monthly columns show the planned amounts.

View - Category - Group	Deactivated	Sponsor	Initial Amount	JAN 2011	FEB 2011	MAR 2011	APR 2011	MAY 2011	JUN 2011
03 Requested Project External			0	300.000	300.000	300.000	300.000	300.000	300.000
External			0	300.000	300.000	300.000	300.000	300.000	300.000
Material		Select [x]	0	200.000	200.000	200.000	200.000	200.000	200.000
Other		Select [x]	0	0	0	0	0	0	0
Service		Select [x]	0	100.000	100.000	100.000	100.000	100.000	100.000
04 Requested project Internal			0	0	0	0	0	0	0
05 Approved Project			0	0	0	0	0	0	0
06 Current Plan			0	0	0	0	0	0	0
07 Commitments			0	0	0	0	0	0	0
08 Actuals			0	0	0	0	0	0	0

Figure 7.11 Sample Financial Planning at the Portfolio Item Level

After completing the definition of the portfolio item data, the corresponding approval processes can be implemented. PPM supports these approval processes—for example, with status management and workflow and with *portfolio reviews* and *scoreboards*. Portfolio reviews are used for approval—but also for portfolio item monitoring—and can be carried out periodically (for example, annually) or ad hoc. After creating a review in SAP PPM, you can assign this review the portfolio item that you want to evaluate. A *reporting cockpit* provides an overview of the essential key figures and planning data of the review items in tables and diagrams. The scoreboard function allows you to have the system create ranking lists of the review portfolio items automatically, based on the different evaluation models. Evaluation models are defined in SAP PPM Customizing and are based on a weighted valuation of the portfolio item key figures.

What-if scenarios within reviews can be used to simulate different key figures, financial data, and capacity data for all or a part of the review items. For what-if scenarios, separate reporting cockpits and dashboards are available with which you can compare the simulated key figures and planning data to the original data.

Reviews and scoreboards

What-if scenarios

Links to projects After the office building project has been approved in a portfolio review, you change the status of the portfolio item or of the last decision point accordingly. You create a new operational project in SAP Project System automatically using a customer enhancement or by setting the CREATE PROJECT ON SAVING indicator and selecting an appropriate project template in the portfolio item overview. You can now have the system automatically create various object links between the project and the portfolio item as well as between the decision points and the project elements, which allows for data exchange—for example, of date information, system status, financial data, or capacity data. The following object links are available:

- ▶ Portfolio item ↔ Project
- ▶ Decision point ↔ WBS elements or activities
- ▶ Object link to Financials integration

The exchange of the data or status information can be *bidirectional*, *synchronous*, or *asynchronous*. This enables you, for example, to transfer forecast dates from the portfolio item to the project as well as planned and actual dates from the project to the portfolio item.

[+] Manually Creating Projects and Linking Objects

As an alternative to creating and linking projects from portfolio items automatically, you can also manually create a project in SAP Project System and link project definition, WBS elements, or activities in SAP PPM to the portfolio item or the decision points.

Financials integration If an object link to the Financials integration between the portfolio item and project exists, then you can exchange financial data between the two objects. To upload accounting data from SAP Project System, use the /RPM/FICO_INT_PLANNING program, which you can schedule in SAP PPM as a regular background job, for example (see Figure 7.12). The data transferred from the project to financial planning of the portfolio item can also be automatically uploaded within the portfolio structure so that it is available in the parent portfolio buckets for valuation purposes.

The screenshot displays the SAP program 'FI-CO Integration and Planning at Portfolio Item and Item (Init) Level'. The interface is organized into several sections:

- General Options:** Includes a checked option for 'Test Mode (No Database Update)'.
- Execution Option:** Features radio buttons for 'Integr., Planning and Rollup' (selected), 'Integration and Planning', 'Integration', 'Planning and Rollup', 'Planning', 'Rollup', and 'Consistency Check'.
- PS Logical System:** Contains a text input field for 'Destination System'.
- Portfolio/Bucket Selection:** Includes text input fields for 'Portfolio ID' and 'Bucket ID'.
- Date Selection:** Provides date pickers for 'Forecasted Date', 'Planned Date', and 'Actual Date', each with a 'to' field and a date selection icon.
- Item-Specific Selection:** Includes text input fields for 'Item ID', 'Item Type', and 'Item Status', each with a 'to' field and a date selection icon.
- Cost Version:** Lists 'Actual Cost', 'Planned Cost', 'Budget', and 'Commitment', each with a numeric input field (all set to 0) and a date selection icon.

The SAP logo and system information (SA38, lddcx3t, INS) are visible at the bottom of the window.

Figure 7.12 Program for the Integration of Accounting Data

You can implement detailed settings for the Financials integration in the Customizing of SAP PPM and of the SAP ERP system. In SAP PPM, besides the technical details of the object link, you define, for example, how data of hierarchically subordinate objects in the project and of assigned orders is supposed to be processed. In particular, you define

the assignment of the cost and revenue elements in the SAP ERP system for financial views, types, and groups in SAP PPM. If necessary, you can add further details to this assignment by specifying cost centers and activity types. In Customizing of the connected SAP ERP system, you can also determine how already settled values are supposed to be processed in the context of the integration with SAP PPM.

Budget transfer In addition to loading accounting data from SAP Project System to Portfolio Management, you can also transfer financial data from portfolio items as hierarchically structured planned costs or budgets to the assigned projects. In this way, you can transfer the budget assigned to the construction of the new office building in Portfolio Management from financials planning of the portfolio item to the project. The person responsible for the project can then distribute this budget within the project structure (see Chapter 3, Section 3.1).

Integration of capacity data In addition to the financial data, you can also upload capacity data from SAP Project System in Portfolio Management and compare it to the planned values in SAP PPM. To derive capacity data, however, SAP PPM does not directly use the capacity data of projects in SAP Project System (see Chapter 2, Section 2.2.1) but derives the corresponding values from the transferred accounting data. In SAP PPM Customizing, you assign cost elements, activity types, and cost centers to the respective capacity views, types, and groups. When uploading accounting data from SAP Project System using the /RPM/FICO_INT_PLANNING program, the system automatically transfers the quantity data from the CO records to the assigned capacity records in SAP PPM. In contrast to the Financials integration, you cannot download capacity data from portfolio items to the assigned projects in SAP Project System.

Thanks to the integration of the portfolio item with the project, you can now also monitor aggregated project details in Portfolio Management. If required, you can also directly navigate from a portfolio item to the SAP Project System processing or reporting transactions to view further details. Numerous reporting options, such as various dashboards, the reporting cockpit, metrics management, predefined BI content and reports, and integration scenarios for SAP BusinessObjects BI, support you in monitoring and controlling your project portfolios in SAP PPM.

7.4 SAP Commercial Project Management

SAP Commercial Project Management (SAP CPM) is an add-on of the SAP ERP system, which complements Project System and also SAP PPM Project Management and other SAP applications with various functions for optimizing business processes. SAP CPM was specifically developed for handling customer projects that are focused on professional-service scenarios or construction projects. Various functions of SAP CPM, however, can also be used for other project types and industries. SAP CPM comprises three components that are described in more detail in the following sections.

7.4.1 Project Cost and Revenue Planning

The *Project Cost and Revenue Planning* component offers another option for financial planning of projects. In contrast to the options outlined in Chapter 2, you can use the financial plan of Project Cost and Revenue Planning also in the quotation phase of a customer project for which a project structure for planning may not exist yet. A financial plan of SAP CPM enables you to define your own quotation structure, which can then be used for structured financial planning. If a project structure exists later on, then you can assign the quotation structure to the project structure and transfer the planned values to it. Of course, you can also use a project structure directly for financial planning if it already exists at the time of planning.

Further advantages of SAP CPM Project Cost and Revenue Planning include, for example:

- ▶ Use of SAP BusinessObjects Analysis and Microsoft Excel as a planning interface to allow you to define your own workbooks and to integrate analysis functions with planning
- ▶ A uniform planning tool across all project phases, starting from cost estimations, to detailed project calculations and planning of variance costs, to special functions and workbooks for cost forecast
- ▶ Collective planning of quantities, costs, and revenues in one planning interface with embedded analysis functions

- ▶ The option to plan based on months, weeks, or days
- ▶ Enhanced functions for copying and versioning financial planning data as well as for comparing planned/actual and version values

Figure 7.13 shows an example of Project Cost and Revenue Planning using SAP CPM. From the technical perspective, Project Cost and Revenue Planning of SAP CPM uses SAP BW Integrated Planning. Different from the planning described in Chapter 2, Section 2.4.5, in SAP CPM the financial planning data is not directly written to the planning tables of SAP ERP but stored in real-time InfoCubes of SAP BW. If required, you can transfer the planning data to the SAP ERP system for follow-up processes later on—for example, in the form of a cost or revenue planning, for quantity or material component updates in networks, or for resource staffing processes to MRS. Thanks to this flexible technical framework, Project Cost and Revenue Planning of SAP CPM provides you with many adaption and enhancement options.

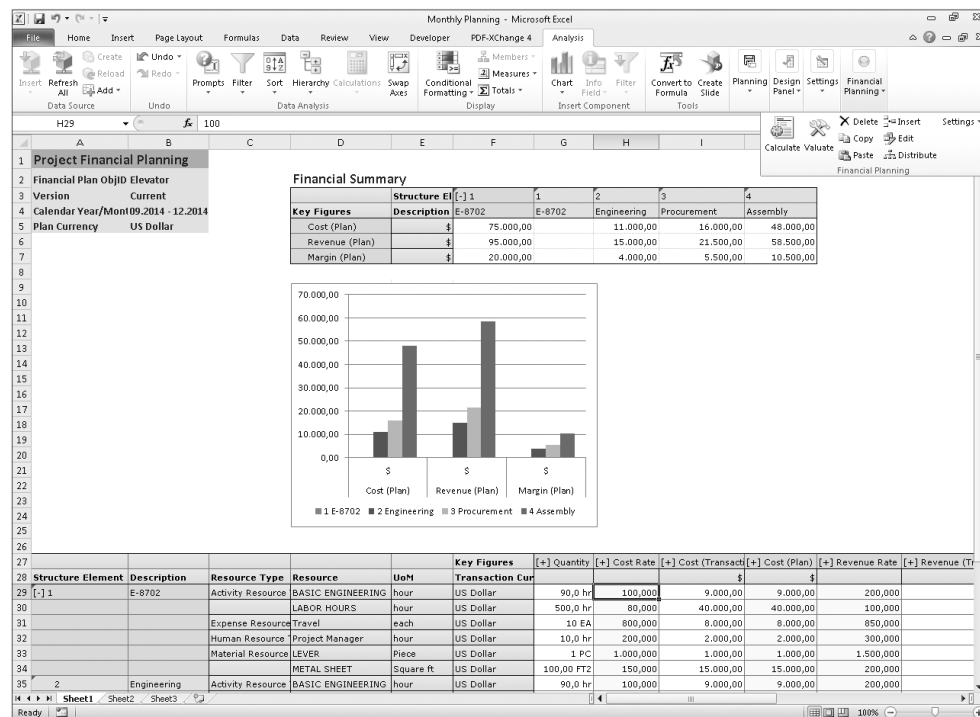


Figure 7.13 Example of Project Cost and Revenue Planning Using SAP CPM

7.4.2 Project Issue and Change Management

The *Project Issue and Change Management* component of SAP CPM constitutes a modern, Web Dynpro-based alternative to the Claim Management discussed in Chapter 4, Section 4.8. The two essential business processes that are supported by this component involve the entry and processing of issues within project processing and the handling and approval of project-related change requests. These two processes, which are often linked with one another, are described in more detail in the following sections.

Project Issue and Change Management

Entering and Processing Issues

To document and possibly solve difficulties within the flow of a project, you can use *issues* in SAP CPM (see Figure 7.14). The information that you can store for an issue includes the following:

Issues

- ▶ General issue details, such as identification, title, description, type, and priority of the issue as well as employee responsible and processing status
- ▶ Measures for further processing of the issue, up to solution and completion
- ▶ Information on relevant internal or external business partners and their roles
- ▶ Reference objects referring to the issue—for instance, project item or purchasing or sales documents—which you want to display or process from the issue
- ▶ Documents of document management, attachments, or links in the form of URLs
- ▶ Information on the possible effects of the issue—for example, estimated variance costs or estimated scheduling delay—as well as expected date of solution and a solution proposal itself
- ▶ A document history enables you to track subsequent changes to the issue

Figure 7.14 Entry of an Activity as a Measure for an Issue

Activities Figure 7.14 shows an example of entering an issue and the corresponding measures in SAP CPM. Measures are defined via *activities*. Activities can be created manually, using templates, or automatically. If you assign partners to activities, then you can also use activities to send corresponding notifications via email or define approval processes in the form of workflows, for example.



BRFplus

The rules for automatically creating activities and sending workflows and emails can be configured very flexibly using Business Rule Framework plus (BRFplus).

Change Management

Within the scope of a project, issues or change requests of customers may require changes to a project that can impact the schedule, the

resources required, costs, or revenues. By means of Change Management, you can document these requirements, estimate and evaluate impacts on the project plan, and define approval processes.

Change Management occurs with reference to a *change request* in SAP CPM. You can create a change request directly, copy it, or create it based on an issue. In the latter case, you can then copy the data from the issue to the change request and transfer the issue as a reference object. If required, you can also create a collective change request by grouping various change requests in order to optimize further processing. A change request provides functions and fields that are similar to the issues described previously—for example, assignment of partners, attachments, and reference objects and the use of activities to define measures and approval processes. In a change request, you can also enter cost estimation alternatives.

Cost estimation alternatives in combination with the appropriate workbooks of Project Cost and Revenue Planning of SAP CPM enable you to plan changes to the financial planning of your projects or project parts and link them with the change request. In this context, you can also enter multiple cost estimation alternatives for a change request. Later on, you can mark an alternative as ready for approval by setting a status. When a cost estimation alternative is approved, its values can be evaluated together with the other financial planning values in the project cost status reporting of SAP CPM. The approval process is performed via the appropriate activities and BRFplus.

7.4.3 Project Workspace

Many business objects and documents from different applications or systems play a role during the various phases of a customer project. These include, for example, opportunities of SAP Customer Relationship Management (SAP CRM), quotations, orders from sales and distribution, financial plans, projects, issues and change requests, purchase requisitions, orders, and so on. Furthermore, employees with different roles are involved depending on the phase, such as sales employees, project managers, controllers, or (project) purchasers. The third component of SAP CPM, *Project Workspace*, constitutes a user-friendly

Change requests

Cost estimation alternatives

Project Workspace

working environment for all project participants, in which users are provided with information on all relevant objects and documents in an integrated manner. The information a user can view depends on his or her role.

Figure 7.15 shows the initial screen of SAP CPM Project Workspace, in which various key figures and information for different projects are displayed in a clear overview. Before we discuss Project Workspace and its cross-project and project-specific views in more detail, we will first take a look at the integration and display of relevant data from SAP CRM, SAP ERP, or SAP PPM using *master projects*.

Master Project		Cost (USD)	Revenu... (USD)	Change ...	Issues	WIP (USD)	Margin (USD)
☐	E-0070: Township Construction Project-1 Customer: Dynamic Customer (06.03.2013 - 18.08.2014) Stage: Opportunity/Bid	317.561	3.000.0...		2		3.317.5...
➤		590.400	662.940				72.540
	Open Refresh						Last Refresh: 05.06.2014 11:59:22 CET
△	E-0071: ERP-Implementation Customer: Dynamic Customer (12.01.2014 - 18.06.2014) Stage: Opportunity / Bid	152.775	89.750-				242.525-
➤		302.234	350.181				47.947
	Open Refresh						Last Refresh: 05.06.2014 11:59:30 CET
☐	E-0074: SRM-Implementation Project Customer: Dynamic Customer (02.01.2014 - 20.06.2014) Stage: Blueprint	204.550	167.500-	14	2	167.500	372.050-
➤		793.500	1.061.750				268.250
	Open Refresh						Last Refresh: 05.06.2014 11:59:37 CET

Figure 7.15 Cross-Project View of the Project Workspace in SAP CPM

Master projects A master project in SAP CPM serves as the link for all business objects that are relevant for a customer project and originate from SAP or non-SAP systems. The master project is thus the leading object in SAP CPM. Besides the type of the master project, a description, and an ID, you can allocate additional information to a master project, such as details of the organizational assignment, start and end dates, the current project phase, or reporting attributes that can be configured freely in CPM Customizing. By means of BADIs, you can synchronize various pieces of information with the business objects assigned to the master project.

For example, you may automatically synchronize the start and end date with the dates of a project definition in SAP Project System or transfer reporting attributes to the customer fields of assigned SAP objects.

The structure of a master project is defined by the assigned business objects. The assignment of business objects can be made manually or partly automated. For example, if you assign a project definition to a master project, then the subordinate project items or linked sales documents can be assigned automatically to the master project. In SAP CPM, you can add further information and attributes to the assigned business objects as required. In addition, in SAP CPM you can define different *views* of the master project structure. With this structure, you specify the business objects to be displayed and how their hierarchical structure is to be presented. This allows for different Project Workspace views for the sales employees and project managers, for example.

Master project structure

For master projects, the SAP CPM Project Workspace provides you with additional functions. These include the following:

- ▶ Definition of teams and roles for the documentation of all relevant project members and their responsibilities. By assigning roles to the team members, you can influence their views and authorizations in SAP CPM Project Workspace.
- ▶ The Rate Card Editor to specify master project-specific prices, which are taken into account during pricing of the assigned sales documents.
- ▶ The Billing Plan Manager for advanced planning and control of billing events (for instance, collective planning of fixed price and resource-related billing events or usage of delta data records when changes are made to the quantity or amounts of billing-relevant events).
- ▶ Status Management, with the option to enter descriptive texts and trends on the current status of individual, freely configurable aspects (for example, overall status, quality, budget, and so on). You can track the development of the project status via change logs, status reports, and functions for checking or reviewing the status.
- ▶ The Alerts Framework for the flexible definition of exceptional situations that are to be displayed directly in Project Workspace. Examples of alerts that are available to you by default include variances of

planned and actual costs, open invoices or overdue customer payments, number of issues or change requests, and so on.

Cross-project view The cross-project view of Project Workspace (see Figure 7.15) provides an overview of critical key figures of your projects, the current status trends, and relevant alerts and important key dates. Many settings of this view can be adapted in a user-specific manner—for instance, the order in which the master projects are displayed, their grouping in categories, the selection of key figures, or alerts settings.

Master project workspace From the cross-project view, you can now navigate to the master project workspace. Depending on your role and the authorizations in the project, the system displays different views in the master project workspace. Figure 7.16 shows the overview of the master project workspace as an example.

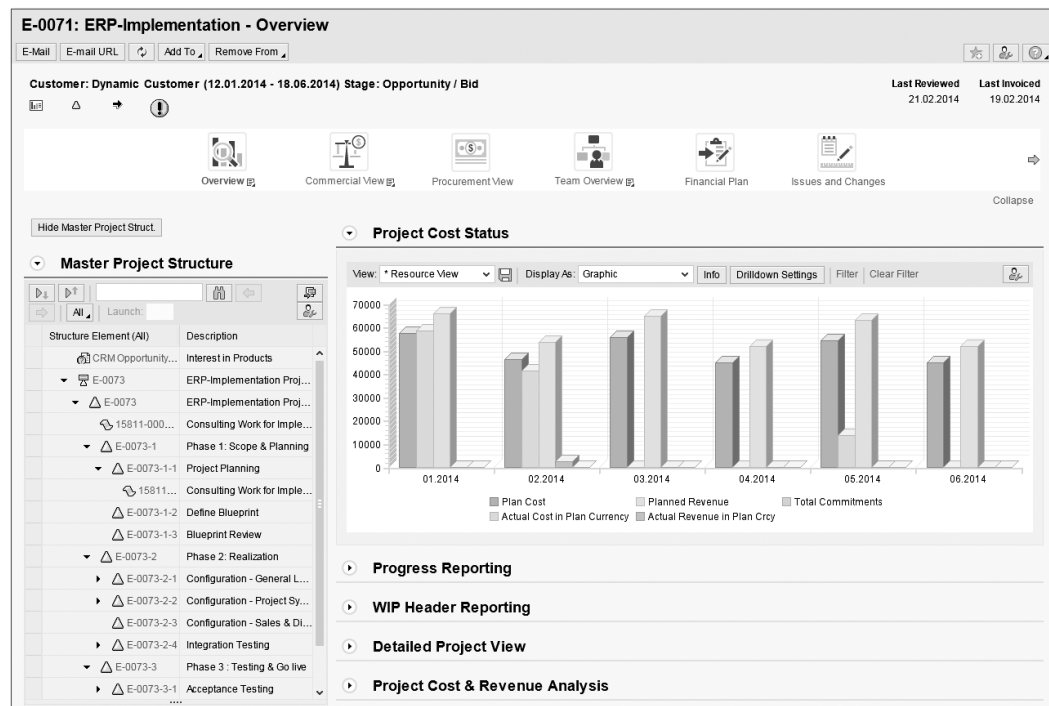


Figure 7.16 Overview of a Project in the Master Project Workspace of SAP CPM

On the left hand side, you can view the structure of the master project with the various business objects. From here, you can navigate within the master project structure, view important information on an object, or directly go to the transactions for displaying or processing objects. On the right hand side, you can find analysis functions that are integrated with the workspace. You are provided with current information on different aspects of the object selected, such as costs, work in process, or project progress (in a tabular or graphical form).

The master project workspace provides the following default views:

- ▶ Commercial View for analyzing assigned sales documents and navigating to their processing area
- ▶ Procurement View for providing an overview of the information on the purchasing history, including purchase orders, open purchase requisitions, service entry sheets and invoices, for calling the corresponding transactions
- ▶ Team overview
- ▶ View for analyzing and creating financial plans (see Section 7.4.1)
- ▶ Overview of all issues and change requests for the master project (see Section 7.4.2)
- ▶ Documents for viewing and assigning documents and attachments

The use of Floorplan Manager (FPM) and the embedded analysis functions as well as various customer enhancement options of SAP CPM allow for many different customer-specific and partially user-specific Customizing options of the workspace.

7.5 Summary

SAP Project System provides a range of BAPIs and Enterprise Services for data exchange with external programs. These BAPIs and services of the service-oriented architecture can be used to export project data from SAP Project System, modify projects, or create new project objects. SAP provides special interfaces for data exchange with Microsoft Project and Oracle Primavera. Projects in PPM Project Management can use SAP

Project System integration scenarios—for example, for Financials integration with the SAP ERP system. The integration of SAP Project System with PPM Portfolio Management can be used to define, approve, control, and monitor entire project portfolios. SAP Commercial Project Management complements SAP Project System with various functions and processes, specifically for customer project handling.

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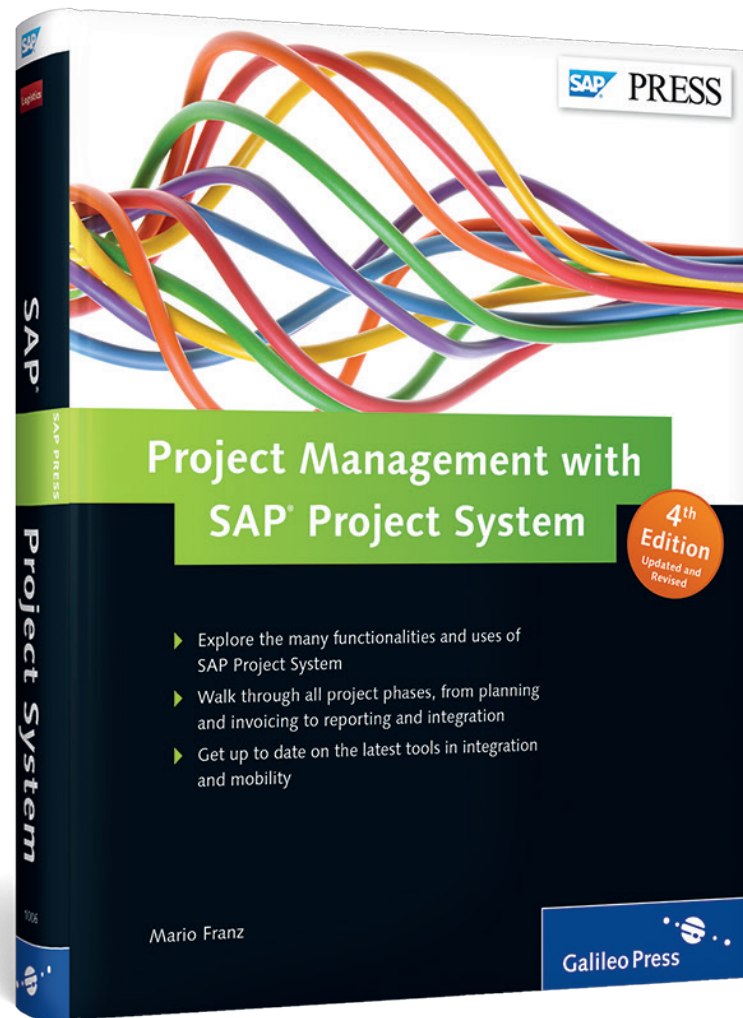
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Mario Franz currently assumes responsibility for SAP Project System at SAP's development department. Previously, he held various roles at SAP taking care of Enterprise Portfolio and Project Management. In particular, he ran SAP courses on this topic for several years and has trained SAP Project System consultants.

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