

# ***Dynamic Scheduling***

**With Microsoft® Office Project 2003**

**The Book by and for Professionals**

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Downloads available to all readers of *Dynamic Scheduling with Microsoft Office Project 2003* consist of solution files for the Relocation Project exercises, answers to the sample exam questions in Appendix 1, filters to check the quality of your own schedule and about one hundred examples of schedules we certified. There is a solutions manual for professors with the answers to the remaining questions in this book.

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## Dedication

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### **In Dutch:**

Ik draag deze derde editie op aan mijn tweede dochter, Avery. Avery, het is zo'n geweldig plezier je op te zien groeien; als ik in je ogen kijk realiseer ik me dat je sneller wilt opgroeien dan menselijke ontwikkeling toestaat.

Ik draag dit boek ook op aan mijn partner, Shelley. Shelley, je maakt het mogelijk voor me om dit hectische werk te blijven doen. Als ik er niet zeker van kon zijn dat jouw zorg voor onze kinderen alles is wat ze nodig hebben, zou ik niet langer dit beroep kunnen hebben.

### **In English:**

I dedicate this third edition to my second daughter, Avery. Avery, it is such a joy to see you grow up; when I look in your eyes, I realize that you want to grow up faster than human development allows you to.

I dedicate this book also to my partner, Shelley. Shelley, you make it possible for me to continue doing this hectic work. If I could not be absolutely sure that you give our kids everything they need, I could not continue this profession.

## What Is New in This Edition

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- ◆ The book has been aligned with the new edition of the PMBOK®, the 2004 edition published in October of 2004 by PMI®. This book is one of the first books published that is aligned with the 2004 PMBOK®.
- ◆ All text has been reviewed and changed to work with the 2003 release that is now called Microsoft Office Project.
- ◆ The new features of Project 2003 are discussed throughout and indicated with a 2003 icon to make them easy to find. We maintained the 2002 icons that indicate what was new in the 2002 release, since this 2003 release came so fast.
- ◆ All screenshots were replaced, as Microsoft has done a complete makeover of the MS Project and Project Web Access interface.
- ◆ The index has eight times more entries and now also cross-references between the keywords. We put a lot of effort into making the index more consistent and more helpful.
- ◆ The files that come with the book now contain a macro that helps you find the resource-critical path in a schedule. This macro will make life much easier in resource-constrained schedules.
- ◆ You can now easily compare your results in the Relocation Project exercises with our solution files. We describe a process to compare two files electronically and have the differences marked.
- ◆ Project Server has a much more prominent place in this edition, since many organizations are moving towards realizing enterprise project management. People who are using Project 2003 in combination with Project Server will find the things they need to know in this book. People who are using Project 2003 as a standalone application are well served by this book as well.
- ◆ The checklist of guidelines for valid and dynamic schedules in Chapter 13 has been modified by our team of instructors. Some checks were added, many of them slightly modified. The checklist creates repeatability in project management processes, which can advance the project management maturity of individuals and their organizations. Also:
  - ◇ The checklist items refer to the pages in the book where they are discussed in more detail and with procedural steps.
  - ◇ The list comes with a corresponding set of filters and macros to perform the checks efficiently. The filters and macros are available for download at

[www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site.

- ◆ All learning objectives and sample exam questions have been updated again to truly capture the body of knowledge that participants are supposed to master in the Orange Belt course of our IIL certification curriculum.
- ◆ You will find that the book has a more international character. I invited more technical editors from different countries and their views and local experiences juice up the text in several places.
- ◆ This edition is written assuming that most readers are now using Windows XP. Some screen captures may differ depending on the operating system being used. The screen shots are made in Windows XP.

## Foreword by Harold Kerzner

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Over the years, I have been disappointed with books written on the scheduling software. This book, however, uses numerous practical examples from real life projects. You will quickly discover that the author exhibits the necessary experience to give you the insights you need to manage your projects more effectively. In addition, this one book contains all of the necessary information to attain the Orange Belt certificate from the International Institute for Learning, Inc. (IIL). This certificate is quickly gaining worldwide acceptance in the labor market, particularly since Microsoft has started endorsing it in a press release in the fall of 2003.

This book will convince you that project management can be done more efficiently and effectively using scheduling software. Historically, network diagrams were hung in the war rooms of large project teams. These charts provided insight into the downstream impacts of any changes made. Schedulers had to become skilled at identifying the impacts and the associated risks. Project management can be done easier by using Project 2003 and creating a dynamic model of your project. Slippages become immediately visible with a dynamic model. Scenarios can be developed easily with a dynamic model to address the slippages and keep the project on course.

In terms of the Project Management Maturity model I have introduced, this book creates a common language (Level 1) that will help you establishing common processes for the scheduling of projects (Level 2). The summary chapter of the book contains “*guidelines for dynamic schedules*” that reflect the best practices of scheduling with MS Project. If anything, you should consider these for the scheduling of your projects. These guidelines will help you move toward a singular methodology (Level 3). The guidelines are universally applicable to projects of any size and in any industry and are continuously improved (Level 5) with each new edition. Filters are included that help the reader verify the quality of their own schedules. This is where the book has added value over many other books that have been published. It combines the best practices of scheduling with the how-to steps in Project 2003 and tools to check if you did it right.

The scheduling guidelines are an integral part of IIL’s MS Project certification curriculum. Organizations are sending their project managers and project office staff to IIL’s courses. Some organizations have even made IIL MS Project certificates a requirement for project management positions. The scheduling guidelines have been embraced by a much wider circle of organizations. What seems to be evolving is a body of knowledge on scheduling with Project 2003. This book could very well become the standard.

Harold Kerzner  
Cleveland, Ohio

## Acknowledgments

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I would like to thank all the people I have had the pleasure of meeting during my MS Project courses and consulting. The discussions we had provided valuable input for this book. Many people have opened my eyes to remarkable insights. Where I remembered individuals, I have recognized them in this book. Unfortunately, I have forgotten where many thoughts and insights originated. To all of those who should have been mentioned, I apologize.

Some people were very actively involved in creating this edition of the book and deserve special recognition. First of all I would like to thank the technical editors for their contributions to the accuracy of the text. Because of their help, I have used the word “we” throughout the book when making recommendations. The recommendations are really a culmination of experiences and insights from this team, many of whom are instructors at the International Institute for Learning, Inc. (IIL). Let me thank them individually here:

- ◆ K. Jeff Turner, The Boeing Company, thank you for your comments that come from deep practical experience and insight. Jeff also created the helpful illustrations on WBS (aircraft), Critical Path and slack calculation.
- ◆ Brian Kennemer, Microsoft Project MVP, QuantumPM, thank you for your sharp observations on technical accuracy. You made me think again in several places.
- ◆ Judith W. Firestone, MPM, PMP, Senior Manager, Project Management Office, CSC, thank you for trying out the steps and catching many technical errors. I wished you had more time.
- ◆ Joël Séguin, Microsoft Project MVP, GO Gestion de projets, as you taught classes for IIL you often sent me tidbits of feedback. I wish I could instill that habit in all instructors. Most of your remarks were incorporated in the book. Thank you.
- ◆ James Carpenter, Systems Architect, RADASAP, Inc., thank you for your word choice suggestions.
- ◆ Keith MacMillan, PMP, Senior Instructor, IIL Canada, thank you for your many remarks on where students typically get lost in my verbiage.
- ◆ Wolfgang Wendl, Senior Instructor, IIL Germany, thank you for your international perspective on project management. It has made the book more international.
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- ◆ Eoin Callan, President & CEO, seaCastle, Inc., thank you for your feedback; I wished you had more time.

- ◆ Ellen Lehnert, Senior Instructor, IIL, thank you for your recommendations on how to make this information easier to teach and for your bug alerts.
- ◆ Ken Terry, Senior Instructor, IIL, thank you for your comments.

Technical editors who have been very involved in previous editions are:

- ◆ Linda Lawlor, Senior Consultant, IIL
- ◆ John Sullivan, Vice-President, Instructional Design, IIL
- ◆ Ray Moore, Director, Amethyst Project Management Limited, UK
- ◆ Frank Walker, TWG Project Management, LLC
- ◆ Thomas Sauerbrun, Senior Instructor, IIL

In addition to the technical editors, the following people have been involved:

- ◆ Kelly Sullivan, Editor, IIL, thank you for the English language editing. You improved not only the English, but also the format and the layout.
- ◆ Paul Mason, thank you for the cartoons that illustrate many of the points made from an angle that always surprises. Whenever I received a batch of new sketches, you gave me some good laughs.
- ◆ Rina van Adrichem, thank you for creating many of the snapshots, for checking the consistency in words and formats, and for entering all the language edits.
- ◆ LaVerne Johnson, CEO of IIL, thanks for your confidence that this third edition would be worthwhile again and for your persistence in the negotiations.
- ◆ Stephen Buda, VP New Business Development and Finance, J. Ross Publishing, Inc., thank you for your belief in the product and for your diligent organizing of everybody involved.

Last but not least, thanks to you, the reader of this book. I hope you will find it time well spent. If you have any comments or suggestions, please send them by e-mail to [EricU@iil.com](mailto:EricU@iil.com).

# Introduction

## Microsoft Office Project 2003

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Microsoft Project is a tool that helps you plan and control your project. This software can help you create Gantt Charts, network diagrams, resource histograms and budgets. It will provide reports tailored to your needs and allow you to depict the progress of your project. The strengths of the software are:

- ◆ The ease of use for novice users as well as for power users
- ◆ The flexibility in scheduling and re-scheduling
- ◆ The powerful reporting features  
With Project 2003 you can extract almost any information from the project database and present it in concise reports.
- ◆ The *collaboration* features  
These features help the project manager communicate with team members via the Internet, which is ideal for international project teams. You will need Project Server for this.

Project 2003 is a powerful tool and, like other tools, requires knowledge and skill to use correctly. The software is not a magic bean that will grow a successful project by itself. Experience has taught me that a successful project results from the combination of executive support, competent project management, a committed team and the right tools.

### What Is New in Microsoft Office Project 2003?

- 2003 ◆ The first thing that will strike you is the fresh new look of the interface; it has more color and style.
- 2003 ◆ Project 2003 outputs in the web formats of *HTML* and *XML* better than it ever did before. XML in particular will allow you to exchange data with many other line-of-business applications.
- 2003 ◆ Project 2003 has a new **Copy picture to MS Office** feature. This will allow you to create status reports and slideshows for status presentations very quickly.

- ◆ If that does not help with reporting, you will find a **Print Current view as a Report** wizard on the **Report** Project Guide.  
(2003)
- ◆ The **Help** has been improved dramatically and will even continue to improve as time goes by. The help features search the internet knowledge databases first by default when you are online. Microsoft asks for user feedback on how helpful the help text was. Microsoft rewrites the online help text regularly with that feedback. As you can see, the online help text is subject to continuous improvement.  
(2003)
- ◆ More sources are available directly from the Project 2003 interface: knowledge bases, online research features, online template gallery, online training, directory of solution providers and Microsoft partners, Spotlights (news announcements).  
(2003)
- ◆ If you have a Windows 2003 server, you can set up a shared workspace using the new Windows SharePoint Services (WSS). A shared workspace is like a virtual meeting room. This allows you to collaborate even without Project Server.  
(2003)
- ◆ The *Project Guides* in Project 2003 are easier to work with and also easier to deploy. Deployment now allows relative directory paths instead of absolute paths only. Project Guides are like wizards that guide you through an involved process. The Project Guides are entirely customizable for your organization. You can incorporate your own terminology, methodology and processes in them. Project Guides help new project managers get up and running quickly within your organization. They also foster standardization of processes.  
(2003)
- ◆ There are now two booking types for resources: *proposed* and *committed* booking. This is particularly useful for consulting firms.  
(2003)
- ◆ The Project 2003 interface is much more user-friendly for project managers that connect to Project Server and use filters extensively. The simple lists and tree structure lists that are customized in Project Server now also appear in the custom enterprise fields in MS Project and in Project Web access. In 2003, you don't need a great memory anymore to work with these custom enterprise fields.  
(2003)
- ◆ Last but not least, Project 2003 finally has a feature to compare two versions of the same project. This is a very good feature that will allow students to compare their schedule with the solution schedule provided with the book. Of course, it is also very useful for practicing project managers.  
(2003)

## Microsoft Office Project Server 2003

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This book is not a complete reference on Project Server. It does describe what you need to know as a project manager when you work with Project 2003 Professional and connect to Project Server.

*Project Server* is the web-based product that works with MS Project. You could think of Project Server as an add-on of MS Project and that is indeed how it came about. However, when you start to work with Project Server, you will soon realize that turning this statement around is more appropriate; MS Project is an add-on to Project Server. Project Server is the *Enterprise Project Management (EPM)* platform for organizations that really want to get serious with project management and gain competitive advantages through project management. When organizations improve their project management practices, they will lower the cost of managing their projects. Organizations, like construction and consulting firms, that have projects as their core business can benefit greatly. There is no doubt in my mind that Project Server will pay itself back quickly for many organizations. Let's have a look at the impressive list of functionality it brings.

Project Server facilitates the communication between the project manager and other project stakeholders:

- ◆ The project manager can easily send out time sheets and textual status forms to team members, have them filled in by team members, collect them back and then transfer the data into the project schedule.
- ◆ The project manager just needs to save the schedule and an executive can immediately see the latest updates on their portfolio of projects, check on any problems arising and develop what-if scenarios to find solutions.
- ◆ Clients, suppliers, banks, government agencies, unions or other stakeholders can also be given access to certain projects through the Internet. You don't need to fumble with emailing *GIF*-images (Graphics Interchange Format) or *PDF*-files (Portable Document Format) any longer.

The project manager needs Microsoft Office Project 2003 Professional to connect to the Project Server database, whereas other stakeholders only need *Internet Explorer* and a license for the web-based application *Microsoft Project Web Access* to access Project Server. Project Server allows the following applications to communicate with each other and acts as *middleware* between them:

- ◆ *MS Office Project*
- ◆ *MS Office Outlook*
- ◆ *MS Office Excel*

2003

- ◆ *Internet Explorer*
- ◆ *SQL Server database server*
- ◆ *SQL Server analysis server*
- ◆ *Windows SharePoint Services*
- ◆ *Web Server*

## What Is New In Microsoft Office Project Server 2003?

Project Server is more than just a postal service. Here is a complete list of benefits you can enjoy by using Project Server, some of which I have marked as new features:

2003  
Pro2003  
Pro

- ◆ Better visibility on the status and forecasts of projects for executives
  - ◇ The ultra-flexible reporting tools like the portfolio views, the portfolio analyzer and the portfolio modeler will provide you with much insight into your projects.
  - ◇ The data are stored in a relational database that can be mined efficiently using the OLAP-capabilities of Analysis Server (SQL Server). *OLAP* stands for OnLine Analytical Processing, which allows executives to slice and dice the data, and drill down where they want.
  - ◇ Any grid-like data in Project Web Access views can easily be exported to MS Office Excel or XML with the click of a button. Project managers just need to run a wizard to get an MS Office Word status report or an MS Office PowerPoint presentation on their project ready.
  - ◇ Digital dashboards can now easily be created. A digital dashboard is a one-screen overview of your project portfolio. Dashboards can be created by dragging & dropping your choice of six standard web parts onto the dashboard.
- ◆ Providing visibility of the project to other groups of stakeholders:
  - ◇ The administrator can create categories of target groups: team member, project manager, resource manager and executive manager. Each category comes with a set of access rights.
  - ◇ The administrator can give access to certain projects through portfolios of projects.
  - ◇ The administrator can give viewing rights to certain data in the project database through custom views. You can now keep data confidential and away from searching eyes.
- ◆ Standardization across the enterprise:
  - ◇ Project Server allows standardization of templates, calendars, fields and views. Project Server allows you to create an enterprise-wide resource pool of thousands of people. With MS Project as a stand-alone tool, you should not go over one hundred resources in the shared resource pool, unless you don't mind waiting five minutes for a schedule to open.

- ◇ The scalability has improved, because the Project Server database can now be spread over multiple servers.

2003  
Pro

- ◆ Modeling of portfolios of projects and integrated program schedules:  
Executives can interact with the data to their hearts' content and I would like to meet executives who do that. Most likely they have delegated this to their project office staff. The *project office* is a central support and/or standardization office for project managers within an organization. However, the interface is becoming so intuitive that it is not unthinkable that one day executives will start investigating various scenarios themselves. *Project Web Access* provides a flexible interface that allows you to slice and dice the project data and drill down into the supporting details. Executives and resource managers can thus make analyses to find answers to questions like:
  - ◇ What are our resource needs in the longer term so that we can train existing or hire new employees in a timely manner? In general, resource availability is flexible, as long as the need for the resource is about three months away.
  - ◇ Can we take on another project given the resources we have? If not, when can we take it on? Or, if we were to take it on right now, how much would that make our current projects slip?
- ◆ Projecting the resource needs of the organization in the long term  
Project Server also allows the organization to model their projects and related resource needs in the longer term. This will make your *Human Resources* department very happy.

2003  
Pro

In 2003, there are now two booking types: *Proposed* versus *Committed*. This allows consulting companies to propose resources without immediately over-allocating them.

- ◆ Optimization of resource usage in the medium term
  - ◇ Project Server is equipped with skill-based scheduling tools that allow you to optimize the use of your resources. The tools are the *Team Builder*, the *Resource Substitution Wizard* and the *cross-project leveling* features.
  - ◇ The skill-based scheduling has now become much simpler with the arrival of 10 multi-value fields for resources. This makes it easier to capture the multitude of skills that people typically develop over the years.

2003  
Pro

- ◆ Foster *collaboration* between project manager and team members
  - ◇ As a project manager, you can collect input from team members through Project Server, like new tasks, new issues, new risks, new documents, changes to the work times and vacation day requests. Project Server creates a two-way street between the project manager and the team members
  - ◇ The document, issue and risk management features now have check in and check out procedures so that the latest version is never lost. When checking in,

2003  
Pro

the editor is prompted to comment on the changes made which provides a complete history for a document. Different versions can be stored.

- ◆ Integrating *project planning* with *personal planning* for team members:
  - ◇ One single *integrated to-do list* of project and non-project tasks in *Project Web Access (PWA)* or in *MS Office Outlook*.
  - ◇ Team members can request for vacations and other time off through PWA.
  - ◇ Team members can now fill in their *time sheet* in *MS Office Outlook*.
- 2003 Pro
- ◆ *Delegating tasks*:
 

Project Server can accommodate large projects and more than two hierarchical levels in the project team: project manager, team leaders and team members. A team leader can delegate a task to a team member through the delegation feature. The delegation feature can also be beneficial for *matrix organizations*.

Resource managers in matrix organizations don't need MS Project any longer, because with the Web-based Team Builder they can assign their resource to the projects.

Delegation can now be restricted to only downward in the organizational hierarchy.
- 2003 Pro
- 2003 Pro
- ◆ Reporting progress electronically in *actual hours* worked, a narrative commentary or both:
  - ◇ Time sheets:
 

The big benefit of electronic time sheets is one-time data entry. Project Server allows the time sheets to be filled in online or offline by team members and the time sheets in Project Server can include project and non-project tasks. Project managers can automatically transfer the time sheet data into their project schedules.

Time sheets can now be designed by the project office in this 2003 release. Specific time periods can be designed, and past time periods can be locked so that actuals cannot be changed after the invoices have gone out.

Non-project time commitments now decrease the availability of resources.
  - ◇ Textual status reports:
 

The project manager can send out freeform status reports or create template status reports that have the fields he expects to be narrated by the team members.
- 2003 Pro
- ◆ Baselines can now be locked in by person. Hopefully, we will be able to do this by project in a future release.
- ◆ Semi-automatic updating of the project schedule:
  - ◇ A project manager can create rules that allow updates from trusted sources to be processed automatically.

- ◇ The project manager can even choose to manage by exception using this feature; if certain thresholds are exceeded, the message is not processed automatically, but called to his attention instead.
- ◆ Easy administration
 

This is where Microsoft has made significant strides in this release. The following new features all bring down the amount of effort for the Project Server administrator:

  - 2003 Pro ◇ *Active Directory* is a central database of user accounts in the Windows network operating system. The Active Directory can be synchronized with the enterprise resource pool and the synchronization can be scheduled to take place regularly. This will take care of the new hires and the people who left the company. Also, Active Directory security groups of users can be synchronized with Project Server security groups.
  - 2003 Pro ◇ Project managers can now check stranded projects in themselves after a power failure or network disconnect.
  - 2003 Pro ◇ Administrators can now remove resources entirely.
  - 2003 Pro ◇ *OLAP-views* can now be transferred between OLAP-cubes and re-used instead of re-created.
  - 2003 Pro ◇ *Portfolio models* are now dynamically refreshed instead of manually.
- ◆ Enhanced *Application Programming Interface (API)* for customizing and integrating into line of business systems. You can now create or retrieve just about any data or object in Project Server.

So, what did we lose?

- 2003 Pro ◆ Project Server does not come any longer with the SharePoint engine built into it. SharePoint has been renamed from *SharePoint Team Services (STS)* to *Windows SharePoint Services (WSS)*. WSS is now packaged as part of the Windows Server 2003 network operating system. You only need WSS on the server computer, so this does not affect you greatly. WSS now provides richly featured document management functionality.
- 2003 Pro ◆ The *workgroup* features have been hidden by default. The workgroup features allow you to send out *time sheets* by email instead of by web. It is clear that Microsoft wants to get rid of it, since this code has not been maintained or upgraded for two releases now.

## Is This Book for You?

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This book is different from other books written on Project 2003. It not only shows you how to use MS Project, but also adds insights and experiences from real life project management. This book teaches you how to manage projects using Project 2003 instead of teaching you all the features.

The book is intended for the following target groups:

- ◆ Project managers who use Project 2003 on a day-to-day basis  
It is aimed at the novice to intermediate user of MS Project, but I am confident that advanced users will find it worthwhile as well. Advanced users may find better ways to do things, and will find the best practices of scheduling with MS Project. Advanced users may discover better words to explain features to colleagues.
- ◆ People who schedule and manage a single project  
This book is aimed at people who manage a single project at a time with MS Project. We will not delve deep into multi-project management issues. This book is used as the course book in the “Managing a Single Project with Microsoft Office Project 2003” (Orange Belt) course at the International Institute for Learning (IIL). The Blue Belt focuses on managing multiple projects with MS Project and Project Server. The Black Belt course addresses the configuration and customization of *Project Server* from a project office or business analysis point of view.
- ◆ Students and professors at colleges and universities  
For effective delivery of (post-)graduate courses, we added:
  - ◇ Cradle-to-grave exercises on an office-relocation project
  - ◇ 40 sample exam questions  
In Appendix 1 at the end of the book you will find sample exam questions on Project 2003 that are similar to the questions used in the online exams for the certification curriculum at the International Institute for Learning, Inc.
  - ◇ Review questions for self-evaluation of understanding
  - ◇ Trouble shooting exercises from real life technical support
  - ◇ Case studies from real life consultingAll readers have access to the solutions of the first two items. Professors can request a solution manual from the publisher with the solutions to the remaining items. The publisher will give access to the solution manual if they make this book mandatory reading in their courses.

## What You Will Find in This Book

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I will present the features to create project schedules efficiently and the features that create effective schedules. These are the features that will benefit you most in practice. At IIL, we constantly ask our course participants what features they use, why they use them and how. We have captured the insights we gained in this book that will give you guidance in how to run your projects in practice.

Many people have asked me for a good process to follow for creating schedules. The structure of the book matches the order of steps we recommend you take. The recommended process is as simple as following the *Short Table of Contents* of this book. The book is aimed at the busy, practicing project manager who needs to get up to speed quickly with MS Project.

This book is entirely based on and aligned with the new 2004 Edition of the PMBOK® published by the PMI. However, I will not explain the concepts of the PMBOK®, but simply refer to them. If you have not read the PMBOK®, I recommend you read it first or, at least, keep it nearby.

I have kept the text as succinct as possible. Less text is more, in my opinion, and the last thing I want is to waste your precious time with too many words. When I read other books, I often find I have to read too many words for the point made. I therefore take pride in writing books that follow the principle of 'less is more', even though the book seems to grow with every edition. I have inserted graphics throughout the text wherever I could save words with an illustration. A picture is worth a thousand words.

This book has an attitude. It is not a complete description of the features of Project 2003. I will recommend certain features and I will argue against using some other features. An important criterion I use for my recommendations is that the schedule you build with Project 2003 should be a good schedule of your project. In our opinion, a good schedule is:

- ◆ **A model of the project**  
A *model* is a deliberate but smart simplification of the complex reality of the project.
- ◆ **A valid model of the project**  
A model is *valid* if it reflects the reality of your project and if it forecasts your project well.
- ◆ **A dynamic model of the project**  
A *dynamic* model updates itself when a change is entered. When one change happens in your project, ideally you would have to update only one field in the model to have a valid representation of your project — again. Changes happen often

during the execution of the project, when you also happen to be very busy. Therefore, a dynamic model is a tremendous help during project execution, because it helps you keep your project schedule alive, hence the title of this book: *Dynamic Scheduling with Microsoft® Office Project 2003*.

Static schedules do not maintain themselves. Some features in MS Project are nice to have, but create schedules that are hungry for maintenance. Therefore, I don't recommend features that continue to need attention from you. I have found the judicious application of features critical in using MS Project. Thousands of students have helped with determining what features in MS Project are most beneficial.

In this book we will cover two main configurations of MS Project currently in use: MS Project used as a standalone tool and Project 2003 Professional used with *Project Server*.

## What You Won't Find in This Book

- ◆ An explanation of all the features in Project 2003. I have made a careful selection of features that will benefit users most when managing a single project. This book is not a complete reference on Project 2003.
- ◆ An explanation of all there is to know about Project Server. This book will only cover the basics of working with Project Server that project managers need to know.<sup>1</sup>
- ◆ A discussion on how to manage multiple projects with MS Project. You will not find much content in this book on:
  - ◇ Managing many small projects
  - ◇ Managing one large, integrated program schedule that consists of subprojects
  - ◇ Managing a portfolio of projects



Please note that the book is entirely aligned with Project Server. The book is an essential first step on your way towards managing multiple projects. Skipping this book and immediately delving into managing multiple projects is a mistake made often. You need to be able to build a solid model of a single project first. Then you can roll them up into an integrated program schedule or a portfolio and expect to develop scenarios.

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<sup>1</sup> IIL has separate classes on Project Server; the Blue Belt Professional and Black Belt Professional courses. See [www.iil.com](http://www.iil.com) and follow the link *Microsoft Project*.

Now that you know that you are reading a book with an attitude, you may be interested in how the attitude came about.

## Who Is the Author?

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The author is a project management practitioner. Over the past 15 years I have managed many projects using MS Project and I have taught thousands of people in its use. The insights you will find in this book are a combination of the collective wisdom of the clients we met in our consulting and our courses by IIL. When I say ‘we’ I refer to my team of MS Project and Project Server consultants and instructors at IIL.

In September 1993, I became the first Canadian to be certified in MS Project by Microsoft. At that time, the current version was 3.0. When 4.0 came out, I recertified immediately. My career was progressing well and more eager than ever, I awaited the exam for Project 98 ... and waited ... and waited. It was never released. I realized that I was probably not the only person who was looking for it. I also observed that many people were wasting a lot of valuable work time in trying to learn MS Project on their own. I realized that organizations needed a meaningful certification curriculum so that they could implement MS Project quickly and thoroughly. Professional development curricula are only thorough if they measure the outcome of the training, and if they provide certificates that are meaningful in the marketplace. I decided to address the need for certification in the marketplace.

In 1998, I developed advanced courses in MS Project. I approached IIL to market them and was hired as Director, MS Project Certification. Since then we have held many certification classes in North America and in Europe. In these workshops, I have had the pleasure of working with some of the finest project managers and project schedulers.

The consulting and training I have done included people from a wide variety of sectors: information technology, telecommunications, banking, automotive, construction, manufacturing, pharmaceutical, international development and government. As a result, you will find a wide variety of examples in this book. It does not cater to one sector in particular. The principles I present in this book are universally applicable across industries.<sup>2</sup>

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<sup>2</sup> I always appreciate hearing if you think certain recommendations would or would not work for your industry. Please send those observations to me at [EricU@iil.com](mailto:EricU@iil.com). I promise you a response.

The Project Management Institute (PMI) certified me as a Project Management Professional (PMP) in March of 1994. IIL promoted me to Executive Director, Microsoft EPM Division. I develop the course content, manage the certification curriculum and lead the team of instructors. This team currently consists of thirty instructors in seven different countries.

## The Author's Perspective on Scheduling

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In my years of consulting and training project managers, I have made some observations:

- ◆ Some large schedules I have seen did not have a Work Breakdown Structure (WBS). All tasks were on the first (and only) indentation level. Imagine that this book did not have a hierarchy of sections, chapters and paragraphs. A well-known automotive company used schedules like these. (Sorry, no names!) Organizations were not using the basic concept of logical and hierarchical Work Breakdown Structures. Their schedules are difficult to explain to anyone who is not interested in detail activities — like executives.
- ◆ Many schedules created by “experienced” project managers turned out to have only a few dependencies (links between tasks). Not surprisingly, those schedules had many schedule constraints that anchored the task bars to their dates. Constraints, however, made the schedule very rigid. Every time a change occurred, the entire schedule needed to be reviewed and updated before it depicted the project well again. Isn't this reminiscent of the time when we made schedules on paper to hang on our walls? Such schedules are nice charts of the project, but are definitely not useful dynamic models of the project. These people spend too much time on scheduling. And they are spending this time when they don't have a moment to spare — during project execution. Needless to say, these project managers would inevitably stop updating their schedule after a few weeks into the execution of their project.
- ◆ Many organizations create schedules that are so complex that it takes weeks to understand them. I am always afraid to ask these project managers how long it took them to create monsters like that. If the *model* of the project is as complex as or even more complex than the reality itself, you do not have a better handle on the reality with the model you created. Modeling is, by its definition, simplifying the reality to get a better handle on it. Too many project managers seem to forget this. If you cannot explain your project schedule to your team, the schedule is simply too complex. If your team understands it, you get much more value from your schedule and scheduling efforts. If other stakeholders can also understand your schedule, even better.

- ◆ Many organizations invest in making schedules, but abandon them when the project execution starts. The chance that it will be abandoned increases with the complexity of the schedule, with the lack of dependencies or with an abundance of constraints. One aerospace company had never been able to keep any of its schedules alive during project execution. Only after they had one project manager trained in our program (sorry for this plug), this person managed to do that as a primer. Project managers tend to get very busy with fighting fires after the project kicks off. If you don't update your schedule, you don't have accurate forecasts of your project. You need your model to constantly forecast to control your project. A dynamic schedule is easy to maintain and continuously provides forecasts.
- ◆ Many project managers do not enter resources into MS Project. Even if they do, they often do not check if they over-allocated their resources. The schedule may show finish dates that executives like, which may result in swift approval of the project, but when the workloads are leveled, it becomes painfully clear that the promised dates are not feasible. If you notice that deadlines are often not accomplished in your organization, a lack of modeling resources may very well be the cause of that.
- ◆ Any organization that shares its resources across projects but does not have a central, shared resource pool will likely suffer from missed deadlines. The cause is the resource impacts across the projects. Many IT departments experience this. IT resources tend to be expensive and they are often shared across all projects. The individual schedules show date forecasts that executives like. When the project execution starts, project managers start stealing each other's resources in order to meet their own deadlines. Doing so wreaks havoc with each other's deadline accomplishment. And if the total workload of the resources has not been modeled across the projects, the dates shown by individual schedules may be too optimistic. With *Project Server* you can set up an enterprise resource pool that can relegate this issue to the past.
- ◆ Last but not least, in 1994 The Standish Group published a report on the performance of IT projects.<sup>3</sup> They surveyed 365 IT managers representing 8,380 applications from many different industries. Only 1 in 8 projects was delivered successfully. In 1996, the number had improved to 1 in 4, because the shock wave of the first report led to quicker cancellation of dead-end projects. My personal conviction is that the project management concepts are solid and could successfully be applied to IT projects. My personal observation is that many IT project managers, for some weird reason, are not applying the principles of project management or not applying them properly.

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<sup>3</sup> Chaos, The Standish Group International, 1994, Dennis, MA, page 2-7.

I admit, however, that in certain areas it is necessary to adjust the techniques used. One contribution this book will make in that respect is, for example, that most IT project managers will have to do a Resource Critical Path analysis instead of a Critical Path analysis, since most are in a resource-constrained situation. This relatively new concept is explained in this book.

If you have been bothered by any of these observations, you should read this book cover to cover. This book will provide you with insights and techniques to address them.

These observations on the current state-of-the-art in scheduling led me to believe a certification curriculum was much needed. Such a curriculum can elevate the skills of MS Project users to new heights and improve the accuracy of the forecasts. More projects will be successful. You will experience more reasonable workloads, less burnout and more reliable long-term forecasts of resource needs. The cost of managing projects should decrease and the competitiveness of the organization should increase in the global market place.

## Why Do We Need Valid and Dynamic Schedules?

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Most project managers create schedules to better forecast their projects. If the schedule is not *valid*, it does not produce reliable forecasts.

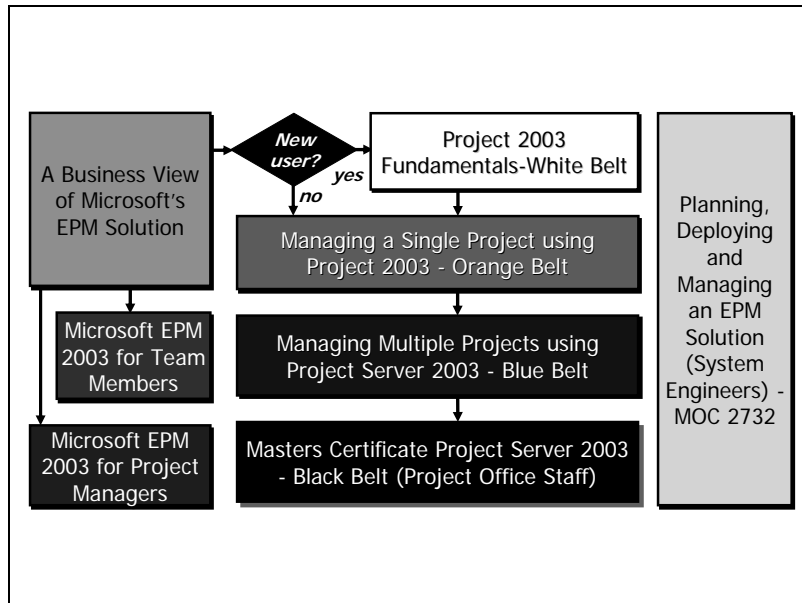
There are several reasons why we need schedules to be *dynamic* as well:

- ◆ Changes happen so frequently in projects that it is hard to keep up with them. If your schedule is not as dynamic as it can be, you will have to review the rest of the schedule whenever you make one change. You will spend too much time keeping it alive. You will likely stop updating it sometime during project execution.
- ◆ In order to explore *what-if scenarios* in MS Project and in Project Server to solve problems, the schedules need to be dynamic models. If there are many constraints in the schedules, it is hard to assess the impact of proposed solutions. In a typical project, many slippages need to be compensated for.
- ◆ Schedules of subprojects need to be dynamic *models* when you want to roll them up into a master schedule. Otherwise, you will spend too much time making changes in the master schedule. When dynamic models are rolled up, problems become visible in the master schedule. Problems can easily be resolved by creating *what-if scenarios*.
- ◆ In order to do schedule *simulation* for quantitative *risk analysis*, you will need dynamic models. *Monte Carlo schedule simulation* is essential to provide more realistic forecasts to executives and clients.

We have made an attempt to quantify the amount of time saved when working with dynamic schedule instead of a rigid schedule. We calculated for a 100 tasks and 3 month project that you will save about 50 hours of effort if you create a dynamic schedule in the first place, see page 217.

We have created a certification curriculum in MS Project and Project server. Organizations can use this curriculum as an instrument to evaluate if their project managers are effective and efficient at managing their projects.

## The MS Office Project and Project Server 2003 Curriculum



There are three tracks in the curriculum:

- ◆ The track on the left displays three new workshops on Enterprise Project Management (EPM): an overview course and workshops for team members and project managers. See the next page for more details.
- ◆ The track in the middle reflects certification curriculum that consists of four levels, each designed with a specific target group in mind:
  - ◇ Microsoft Office Project 2003 Fundamentals (*White Belt*) – for people who are new to MS Project; see page 17.
  - ◇ Managing a Single Project with MS Project (*Orange Belt*) – for project managers who use MS Project regularly; see page 17.
  - ◇ Managing Multiple Projects with MS Project (*Blue Belt Standard*) or with Project Server (*Blue Belt Professional*) – for project managers who manage multiple projects; see page 18.
  - ◇ Masters Certificate in MS Project (*Black Belt Standard*) or Project Server (*Black Belt Professional*) – for project office staff; see page 18.
- ◆ The track on the right is for Project Server deployment officers; see page 19 for more details.

If you are interested in detailed topical outlines of these workshops, visit [www.iil.com](http://www.iil.com) and follow the link *Microsoft Project*.

## Enterprise Project Management (EPM) Workshops

Many organizations requested more efficient, onsite and custom-made training to support the deployment of Project Server and Project Web Access. The *Enterprise Project Management (EPM)* courses can easily be adapted to the specific needs of your organization depending on your existing business processes and configuration chosen. Typically, these courses will be delivered on your site or in dedicated eLearning sessions. Currently, we offer three EPM-workshops (more are planned for the future):

- ◆ A Business View of Microsoft's EPM Solution – designed for those who need an introduction to Enterprise Project Management (EPM) with the Microsoft EPM Solution.
- ◆ Microsoft EPM for Team Members – designed for project team members who need to report progress, issues, risks and documents to their project manager. Team members will learn how they can collaborate online with the project manager.
- ◆ Microsoft EPM for Project Managers – designed for project managers who use Project 2003 and Project Web Access in an EPM environment. Project managers will learn how they can collaborate online with their team and manage their project efficiently and effectively.

## White Belt Workshop

In the 2-day White Belt workshop we get people started on scheduling their projects with MS Project. The White Belt is designed for the person who is new to MS Project and has not had much exposure to it. In this workshop, we have people build a schedule from the ground up and optimize it such that it meets the deadline, and we even have them update the schedule in the simplest way possible. This workshop is meant to raise the confidence level of people when working with MS Project taking them through an entire *project life cycle*. We stay away from the difficult situations and discussions. The White Belt course material is a carefully picked subset of this book.

## Orange Belt Workshop

In the 2-day Orange Belt workshop we bring people who make nice charts of their projects to the level of making *dynamic models* that are easy to maintain and to assess impacts with. Dynamic models continue to produce *valid* forecasts until the project is closed. If a person is certified at the Orange Belt level, this means to their employer that the person has demonstrated knowledge to create good schedules of their own projects.

The Orange Belt is tailored to experienced project managers and schedulers. We present all the best practices of scheduling with MS Project and encourage people to check their own schedules to verify if they used those best practices. We enter into intricate discussions on tricky situations that reveal the boundaries of the tool as a modeling tool and present workarounds where available. All in all, the Orange Belt course is a checkup for people who have been using MS Project for years, perhaps even on a day-to-day basis.

The Orange Belt certificate shows that people know how to create good schedules. These schedules are ready for advanced portfolio modeling and optimization. In other words, the Orange Belt course is an essential first step towards *enterprise project management*. The course material of the Orange Belt course is this entire book.

## Blue Belt Professional Workshop

The 2-day Blue Belt workshop is designed for people who manage multiple projects simultaneously with Project 2003 Professional in combination with Project Server. These people have successfully managed single projects and ended up managing multiple projects (as a reward?). They can be project managers, program managers, portfolio managers, resource managers and functional managers. Staff members who work in a project office often get involved with the modeling and monitoring of multiple projects as well.

In the Blue Belt Professional, we train project managers who have Project 2003 Professional to work with *Project Web Access* and *Project Server* for managing and controlling their projects.

## Black Belt Professional Workshop

The 2-day Black Belt Professional workshop is targeted at people in the project office who focus on decreasing the cost of managing projects in the organization. Project office staff can increase the efficiency of project managers by customizing and standardizing fields, developing views, optimizing resource usage and project portfolios. In other words, the Black Belt Professional is for people who need to know most about the Microsoft EPM tools.

## Planning, Deploying and Managing an EPM Solution Workshop

IIL offers a separate track for Project Server deployment officers.<sup>4</sup> It is the track on the right in the overview chart on page 16. This is course 2732 from the *Microsoft Official Curriculum* (MOC) with the impressive title: *Planning, Deploying and Managing an Enterprise Project Management Solution*. Microsoft developed this 5-day course and IIL features it in its assortment. This workshop is meant for system engineers and deployment consultants. It is very technical in nature and aims at preparing people for the installation and configuration of *Project Server* within their organization. Topics range from determining the number of servers and their hardware specifications, deciding which components of Project Server are loaded on which server, installing and configuring the system, testing it, administering and troubleshooting it. You can certify yourself through *Microsoft Learning* with the exam that is associated with this course.<sup>5</sup>

## Organizations That Endorse Our Certification Curriculum

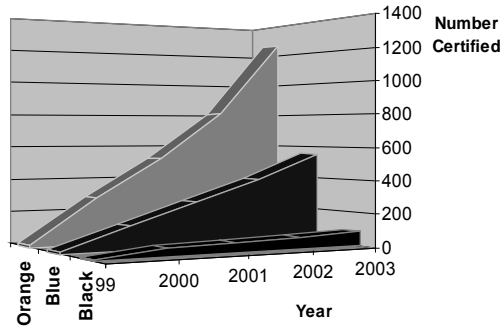
- ◆ Microsoft  
In October 2003, Microsoft formally recognized our curriculum for the first time, since we started it in 1998. Microsoft issued a press release in which they announced they would replace the MOUS-certification of MS Project with IIL-certification starting with the 2003 release in October 2003.
- ◆ *Project Management Institute (PMI)*  
PMI is offering our Orange Belt workshop in its *Seminars World* offering since 2002.
- ◆ *Project World*  
Project World is offering our Orange Belt workshop at their events since 2002.
- ◆ *American Council on Education (ACE)*  
The ACE audited our curriculum in September 2001 and accredited it. Since then people can get (elective) university credits with our IIL-certificates.

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<sup>4</sup> Please visit our website [www.iil.com](http://www.iil.com) for detailed course descriptions and topical outlines.

<sup>5</sup> Please visit [www.microsoft.com/learning/](http://www.microsoft.com/learning/)

## How Many Are Currently Certified?



As of December 31, 2003 there were 1271 people certified at the Orange Belt level, 551 at the Blue Belt level and 89 at the Black Belt level. As you can see the curve starts to bend upward; the growth is accelerating. Since October 14, 2003 Microsoft endorses our curriculum and we expect to accelerate even more as a result. We aim at increasing the number of certified people by 50% every year.

The following are some (volunteered and unpaid) quotes from participants:

### Orange Belt

*Best Project Training I ever attended; very systematical and practical approach for doing Project Management with MS Project. I use the book as an everyday reference.*  
Peter Vogel, Microsoft Services Germany

*I want to thank you and all the trainers from IIL for some of the best training I have taken.* David W. Weigel, New York State

*The knowledge I have gained by taking this course has set me apart from other project managers. I now create dynamic schedules that work!*  
Dino Nosella, Project Manager, SAP Canada, Inc.

*The practical and hands-on experience combined with the industry knowledge makes this a very beneficial course for even those who have used MS Project for years.*  
Michele L Bolen, Project Manager, American Red Cross

*I found the online Orange Belt course one of the most effective and beneficial software courses I have ever taken. The focus on 'how to use the software to manage a project' was a refreshing contrast to the usual 'how to use the functions of this software'.*  
Tommie G. Cayton, Ph.D., Assistant Director, Project Management, Harcourt

**Blue Belt**

*All project plans on this project come through me. It is very - and in most cases, painfully - obvious to me when someone submits a plan who hasn't been through your course.* Bill Shepherd, Associate, Booz Allen Hamilton Inc., Oct. 2003

*Superb instruction and excellent course content. A must for even experienced MS Project users.* Bill Reinhart, Project Manager, SBC/Ameritech, USA

*I have managed projects for a number of years, but the course was of such high quality that I now feel the quality and accuracy of my project plans will be enhanced.* Dave Kempster, Consultancy & Research Manager, Centrefile Limited, UK

*We reviewed a number of training vendors when we determined who to send our folks to and the IIL courses are by far the best quality with regard to content and instruction.* David Peeters, PMP, Sr. Project Management Consultant, Alliant Energy

**Black Belt**

*The black belt course was superb!* Bryan Menn, Project Manager, University of Texas Health Science Center.

*The IIL course teaches real world skills, by instructors with real world experience.* Jim Kasper, Project Control Officer, Altaresources

*The IIL MS Project Certification series should be required by every project manager who uses the product!* Stephanie Iverson, Director Program Management, Marriott Vacation Club International, USA

*Although there are millions of copies of MS Project sold, only a few thousand people really know how to use it. If you want to become a real 'master' user of MS Project, this is the class for you.* Jacob Myers, Program Manager, Limited Technology Services, USA

*This course focuses on teaching Project Managers how to use Microsoft Project to be more productive and proficient. It is extremely valuable.*

Len Maland, PMP, Senior Program Manager, HP Consulting & Integration Services, May 2002

We are currently experiencing a lot of interest in our certification curriculum not only from the United States, Canada, Mexico and Europe, but also from Brazil and China.

Overall, we are striving towards creating the universally accepted body of knowledge for scheduling projects using MS Project.

## What Are the Certification Requirements?

The certification levels have a combination of knowledge and skill tests:

- ◆ The White Belt candidates must pass the online multiple-choice test. The content of the White Belt test is a subset of this book. Topics are selected from each chapter. White Belt course participants receive a separate course binder.
- ◆ The Orange Belt candidates must pass the online multiple-choice test. This book contains the entire content of the Orange Belt exam. Sample exam questions can be found on page 705.
- ◆ The Blue Belt participants must pass the online multiple-choice exam. There is a separate Blue Belt course binder that is handed out to participants in a Blue Belt course.
- ◆ The Black Belt participants must complete an assignment in which they plan, implement and report on a customization of *Project Server* (Black Belt Professional). This is a test on competency of the individual. There is a separate Black Belt course binder that is handed out to participants in a Black Belt course.

The online multiple-choice tests consist of 30 questions. The questions have to be answered in one hour. The exam is an open-book and open-computer exam so that it reflects the circumstances of the workplace. The test objectives of the online exams are three-fold:

- ◆ Test your *readiness* to use the basic features
  - ◇ Basic features are features most people need when modeling their project, regardless of their industry.
  - ◇ Do you know the complete how-to steps of the basic features from memory? If you have to look up all the steps in the interface, you will need more than one hour to answer the exam questions.
- ◆ Test your *understanding* of the applications
  - ◇ Do you understand the behind-the-screens working of MS Project and Project Server?
  - ◇ Do you know the basic formulas that MS Project uses to calculate values in the calculated fields?
- ◆ Test your *practical knowledge and skills*
  - ◇ Do you know how to model real life situations instead of fictional examples?
  - ◇ Can you give sound advice in simple case situations?

With regard to the online exams, our experience shows that the exam discriminates well between people who prepared themselves and those who didn't.

The blend of knowledge tests and skill tests has proven to be very well liked by individuals and has also proven its value for organizations. For example, in the Black Belt assignment, instructors evaluate the candidate's implementation plan for a feature of Project Server. From my personal observations, I can say that IIL-instructors have steered several organizations away from pitfalls in the implementation of Project Server.

## Qualification Requirements for Instructors

In order to maintain quality in the delivery of our certification curriculum, we select instructors based on several criteria:

- ◆ Candidates must have hands-on experience in managing projects.
- ◆ Candidates must be using MS Project on an almost daily basis.
- ◆ Candidates must have the *Project Management Professional* (PMP) designation by the *PMI*.
- ◆ Candidates must have earned credentials in training groups in MS Project.
- ◆ Candidates must be certified in MS Project in our certification curriculum on one level higher than the level they will be teaching in the curriculum.
- ◆ Candidates must go through a train-the-trainer process.

If you are interested in becoming an instructor in this curriculum, please send me your resume at [EricU@iil.com](mailto:EricU@iil.com).

## Consulting

In addition to training and certification services, IIL offers consulting. We help people understand how tools like MS Project and Project Server can best be implemented in their organization. Every organization is unique and has its own needs. The output of the consulting can take the shape of:

- ◆ *Schedule evaluation and certification service*  
We can give you detailed feedback on the quality of the schedules of your project managers based on the checklist in the summary chapter of this book, see page 678. This checklist reflects the best practices of scheduling with MS Project. For about one hundred US dollar per submitted schedule, we will send you one report on the schedule with detailed instructions where your schedule needs improvements, why these improvements are important and how to go about implementing them. If your schedule meets all the requirements in the checklist, IIL will certify your schedule and IIL will send you a certificate for the schedule along with the report.
- ◆ *Implementation of Project Server*  
Determining hardware needed and establishing the configuration of the servers

considering the projected usage within your organization. Setting up the enterprise codes and resource pool. Designing views and reports needed by executives.

- ◆ **Creation of your project management methodology**  
A *methodology* can contain processes, templates, best practices, scheduling guidelines, lessons learned or a project management framework specific to your organization. The methodology of your organization can be captured in a custom *Project Guide* such that project managers can consult with the methodology inside MS Project.
- ◆ **Development of *project templates***  
Templates can contain custom views, tables, filters and groups. Custom Project guides and macros can be added if the basic functionality in MS Project does not support what is needed in your organization.
- ◆ ***Training and certification***  
After the tools are developed, people often need training in how to use them. We create new material or adapt our existing course material and train the project managers and schedulers. We can provide custom certification to verify if people acquired the knowledge and skills needed.
- ◆ ***Coaching, mentoring and help desk***  
A final step is often to coach and mentor on the job or provide technical support. People tend to get stuck sometimes when they strike out on their own to model their projects. If so, we are here to help.

## Give Us Your Feedback

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You are the person who can make the next edition of this book better. Please send me your feedback.

If you have any questions or if you would like to discuss any recommendations we make in this book, don't hesitate to contact me at [EricU@iil.com](mailto:EricU@iil.com).

Thank you for the time you will spend reading this book. I hope you will find it well worth the effort! If you did, please let me know, since it motivates me to write the next edition. And if you didn't, please let me know why.

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# About This Book

## Learning Objectives

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The following are the learning objectives we aim to accomplish with this book. After reading this book you will:

- ◆ Understand project management terminology aligned with the PMBOK® 2004 edition <sup>6</sup>
- ◆ Be able to create a valid and dynamic model of your own project:
  - ◇ Choosing the options and creating the project calendar
  - ◇ Entering tasks, estimates, dependencies, constraints, resources and assignments
- ◆ Be able to assess if you implemented the best-practices of scheduling established by IIL based on research of over one thousand real life schedules
- ◆ Know how to optimize the schedule to meet deadlines and budget restrictions while keeping the workloads of the resources within their availability
- ◆ Be able to create reports and custom views for the project that meet the need of stakeholders
- ◆ Know how to efficiently update the schedule when the project is running to continuously forecast the project cost and finish date

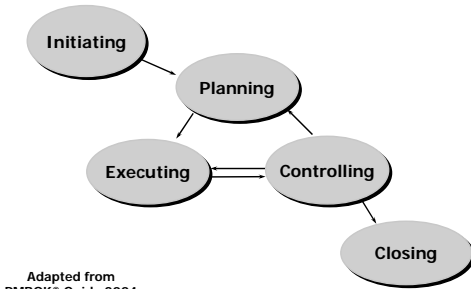
In general, you should feel very comfortable with Project 2003 and have a good understanding of how the tool functions and behaves. This knowledge will enable you to efficiently and effectively manage your project(s) after you finish reading this book. We will now outline the topics that will address these objectives.

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<sup>6</sup> See the PMBOK® Guide, 2004 Edition, published by the PMI.

## Outline of This Book

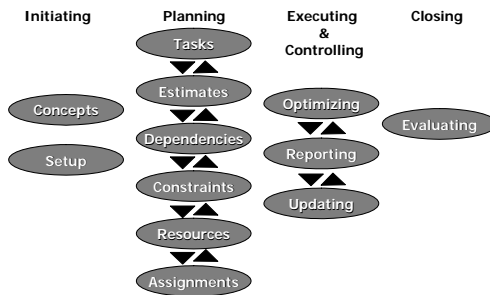
First you initiate the project, then you plan it, and while you execute it, you monitor and control it. At the end, you close it out. Sometimes you may have to re-plan the project



Adapted from  
PMBOK® Guide 2004

while it is running. The illustration shows these five process groups as distinguished by the Project Management Institute (PMI) in the Guide to the Project Management Body of Knowledge (PMBOK®), 2004 Edition. I omitted the word *monitoring* in the process group *monitoring and controlling* for the sake of simplicity. I will often refer to *Planning* as the *planning phase*. *Executing* and *Controlling* take place concurrently, and I will refer to them as the *execution phase*.

We have used the process groups to structure this book. In fact, we are treating the creation of the project plan as a mini-project in itself, and we mapped all the steps to create a schedule with MS Project to these process groups. The result can be seen in the illustration that provides an overview of the contents of this book.



Each balloon is a chapter. The overview illustration will be shown at the start of every chapter to indicate where we are. It will pull us back into overview mode before we delve into the details of the next chapter. Each balloon is a step in the process of creating and managing a project using MS Project. We recommend you use these same sequential steps when you model your own project with Project 2003.

We will now elaborate on each step (ellipse).

## Initiating

### Concepts (Chapter 1)

In this chapter, we will explain some basic concepts of project management. Even though this book is not meant to be a project management theory book, we will provide as much background information as you need to utilize Project 2003 well.

In this chapter, we will also explain the different purposes for using Project 2003. In this book, we will aim at accomplishing the most ambitious one — forecasting a project by building a dynamic model in Project 2003.

### Setup (Chapter 2)

In this chapter, we will introduce the Project 2003 interface. We will discuss file management, templates and views. Then we will start creating a new project. This includes naming the project and entering the project start or finish date. We will invite you to think about the default settings that are active in Project 2003, because some important options need to be set at this stage before any tasks are entered. We will create the project calendar at this stage.

## Planning

In this section, we will develop and enter all the schedule data into Project 2003. This step involves most of the effort in creating the schedule. There are six types of data that Project 2003 needs to create the schedule. We will discuss each of these in the next six chapters.

### Tasks (Chapter 3)

Tasks answer the question: *What needs to be done?* The task list is developed from the deliverables that together with the tasks form the Work Breakdown Structure (WBS). The structure can have several hierarchical levels like in an organizational chart. In MS Project the levels are called outline levels. This chapter will explain how to create and enter the structured list in Project 2003. We will also discuss how to reorganize the task list by moving and copying.

## Estimates (Chapter 4)

Estimates answer the question: *How long will the task take?* They can be made in business days (duration) or in person days (work). There are many factors to consider when estimating. We will provide a process in this chapter that will hopefully make estimating easier. We will also discuss the human side of estimating that may bias the estimating. We will discuss some difficulties that occur in practice. We will suggest how to handle these biases and difficulties.

## Dependencies (Chapter 5)

Dependencies deal with the question: *In what sequence do the tasks have to be done, and how will the tasks affect each other?* Dependencies are the logical cause-and-effect relationships between tasks that are very important for creating dynamic schedules. Scheduling with project management software does not require the user to enter dates for each task, even though many people do so. By entering dependencies instead, you can build a very powerful, dynamic model of the project. If you change the duration of one task, Project 2003 will reschedule all affected dependent tasks. It will do this on every change you make. The core secrets of dynamic schedules will be revealed in this chapter.

## Constraints (Chapter 6)

Constraints are the answer to the question: *What limitations are imposed on the schedule?* Constraints can be dates imposed on the project or promises to meet certain dates. Constraints can also be used for restricting Project 2003's freedom to move task bars around in the timescale, if the practical circumstances require this. In addition to constraints, we will also discuss the feature of deadlines. The Gantt Chart can be finalized after this chapter, and we will also show you how to create a printout of it.

## Resources (Chapter 7)

Resources are the answer to: *Who will do the work?* Resources can be human resources, facilities, machines or materials. In this chapter, we will discuss all these types of resources and how to enter them into Project 2003. We will explore the cost side of managing projects in this chapter. We will conclude it with how to print the list of resources.

## Assignments (Chapter 8)

This last type of project data answers the question: *Who does what?* Tasks and resources have a many-to-many relationship: multiple resources can be assigned to work on one task, and many tasks can be assigned to one resource.

Human resources do the work and have to be assigned to the appropriate tasks. We will discuss the mechanics of assigning human resources. We will also discuss assigning material resources, which is typically done to complete the cost picture of the project.

Project 2003 does its own thing when you work with assignments. Behind the screens it uses a formula to recalculate data you may have entered when you assign or change assignments. We will explain the when and how and provide you with the insight to help you predict what Project 2003 will do. Of course, from then on you will be in the driver seat and make the tool do what you want it to. The goal of this chapter is to make Project 2003 work for you instead of you working for Project 2003. If you found that MS Project did not do what you wanted, this is the chapter to read.

## Executing, Monitoring and Controlling

### Optimizing the Schedule (Chapter 9)

After entering all the data, Project 2003 shows a schedule that ends before or after the project deadline. The schedule may be under or over the budget. The first draft of the schedule hardly ever meets time and cost constraints. Changes may have to be made to stay within the deadline, the budget or the availability of resources; this is called optimizing the schedule.

We will present three different approaches for optimizing schedules. You should choose the approach that best fits your own project.

- ◆ Optimizing for Time
- ◆ Optimizing for Time and Cost
- ◆ Optimizing for Time, Cost and Resources

Each approach also includes consideration of *scope* and *quality*.

In *Optimizing for Time* we will explain the Critical Path method briefly and show how to highlight the Critical Path in your schedule. Sometimes the Critical Path is fragmented, and we will show you how to make it complete so that it explains the entire duration of the project. The Critical Path method applies to *logic-constrained schedules*, or schedules that are entirely driven by network logic only. We will then present many different ways in which you can reduce the duration of your project.

In *Optimizing for Time and Cost* we will make the optimization a bit more complex (or more interesting in my professionally deformed opinion) by incorporating the cost dimension of projects. We will explore the methods available to bring down the cost without compromising too much on scope, quality or time.

Optimizing is more complex when you also want to ensure that the required resources are available and not overloaded with work. Over-allocating resources can compromise the scope of the project or the quality of the deliverables and will often lead to missing deadlines. In the section on *Optimizing for Time, Cost and Resources* we will start to include the issue of over-allocations by leveling the workloads. We will also introduce the new concept of a Resource-Critical Path which is needed for this type of optimization. As you will see, the Resource Critical Path will appear like a regular Critical Path but will also take resource constraints into account. The Resource-Critical Path allows you to find the tasks that truly drive the finish date of the project in a *resource-constrained schedule*. Thus, the Resource-Critical Path allows you to shorten your schedule, just as the Critical Path allows you to do this in *logic-constrained schedules*.

After reading this chapter, you will be ready to print and distribute the plan to stakeholders.

## Reporting (Chapter 10)

In this chapter, we will not change the data in the schedule; we will only create different appearances of the schedule designed for the respective stakeholder groups. Views and reports can, for example, be used to communicate to resources what to do, what to deliver, and when and with whom to cooperate. Filters can hide certain tasks and display other tasks, and can be used to provide the overview to executives — or the detail of a specific problem to the team members. Tables can be used to communicate certain data by inserting or deleting fields. The task or resource records can be grouped by any commonalities found in the data. Different formats can be applied to lead the eye of the reader to the important parts of the report.

The first reports of the project will be used to get the project approved. After that, project managers typically produce status reports periodically.

## Updating (Chapter 11)

As soon as the project is approved, a baseline schedule is set based upon the approved schedule. The baseline schedule serves as the standard of comparison to track progress.

Progress information has to be entered into MS Project, which is known as *updating* the plan. Just like bookkeeping, this should be done on a regular basis. An updated schedule shows the actual performance compared to the baseline.

After updating, you need to establish whether another round of optimizing is needed in case there is slippage. During the *execution phase* of the project, status reports will support the decision making in the project, such as modifying the activities. They will also support the decision making about the project, i.e. approving the next phase.

During the executing and controlling phase of the project, many cycles will be made through the last three project management activities of optimizing, reporting and updating. Delivering a project involves many cycles of making progress (updating), monitoring the progress (reporting) and taking corrective actions (optimizing).

## Closing

### Evaluating (Chapter 12)

It is important to take some time to look back and see what went well, what went wrong and why. In this chapter, we will discuss what to evaluate in your project and why.

Evaluating your projects is the only way to become a better project manager. It can prevent you from running into the same traps with your next project. Looking back can also improve your skills in setting dependencies and estimating. These are the hardest skills to acquire as a project manager.

### Summary (Chapter 13)

In this chapter, you will find a summary of scheduling guidelines to create *valid* and *dynamic* schedules for your project, as discussed throughout the book. These reflect the results of our search for best practices in well over one thousand real life schedules. You can use this chapter as a handy reference to the appropriate pages if you need more explanation on specific topics.

## Appendix 1: Certification Curriculum Sample Exam Questions

This appendix contains sample exam questions on Project 2003. These questions are representative of the Orange Belt exam we conduct in the certification curriculum at the International Institute for Learning. The answers to these sample questions are available for download at [www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site.

## Appendix 2: Files Available For Download

This appendix describes all files available for download, including about one hundred examples of excellent real life schedules that reflect the best practices of scheduling with MS Project. You will find schedules from a wide variety of industries. The schedules are listed with the names of the people who created them and allowed us to publish them. The schedules are available for download at [www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site.

### Exercises

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You will find exercises at the end of each chapter. Several projects will be worked out step-by-step or evaluated throughout the exercises to familiarize you with the best practices of scheduling with MS Project.

### End of Chapter Exercises

#### ◆ Review

These exercises are meant to consolidate the knowledge you gained in each chapter. These questions review the theoretical concepts. Most answers can be found literally in the text of the book itself.

#### ◆ Hands-on exercise project: The Relocation Project

You can test yourself and see if you can create a schedule with Project 2003 in the *Relocation Project* exercises. The relocation project is an imaginary office move that you will lead as the project manager. You will be moving about 100 co-workers to a new location that you have yet to find. The solutions to these exercises are available for download at [www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site. These exercises are meant to provide a checkup to see if you also gained the skills with the knowledge.

#### ◆ Troubleshooting

These exercises will help you understand some of the pitfalls in MS Project. These exercises help you prepare for providing technical support to other MS Project users. All the troubleshooting exercises are situations I have run into over the years of staring at people's troubled schedules. We have reviewed well over one thousand schedules, since we first started certifying schedules in 1999. The typical troubleshooting situation is one in which the schedule stubbornly refuses to do what the creator expects.

#### ◆ Case studies

The case studies are meant to give an idea of what is going on in the practice of

project management in other organizations. They deal with the implementation of MS Project in particular. The case studies are from our consulting experience. In all cases, I have disguised the organizations involved.

## End of Book Exercises

In Appendix 1, you can find sample exam questions as used in the certification curriculum at the International Institute for Learning. If you want to check if you answered the multiple-choice questions correctly, compare them to the answers available for download at [www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site.

Professors can acquire a separate solution manual that contains all the answers to the review questions, multiple-choice questions, troubleshooting exercises and discussions on the case studies. This solution manual is only available to professors that use this book in their courses; please contact the publisher, *J. Ross Publishing*. The solution manual will be available for download at [www.jrosspub.com](http://www.jrosspub.com). Please, click the link *WAV Download Resource Center* to enter the download site.

## Conventions in This Book

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### Symbols and Typeface



The light bulb shows a tip or recommendation to the user. It may be a time saver or a way of achieving better project control information.



An exclamation mark shows a warning to the user of Project 2003. Heeding the warnings may keep you out of trouble and avoid unexpected results, loss of data or quirks in Project 2003.



The 2003 icon indicates that the feature is new in the *Project 2003* release, in both the *Project 2003 Standard* and the *Project 2003 Professional* edition. For people who are upgrading to Project 2003 from Project 2002 and just want to focus on new features, this is the thing to look for.



The 2003 Pro icon is for users of Project 2003 Professional who are upgrading from Project 2002 Professional. This icon marks the new features in Project 2003 Professional.



The 2002 icon indicates that the feature was new in the *Project 2002* release, in both the *Project 2002 Standard* and the *Project 2002 Professional* edition. I kept these icons in this 2003 book for those people who are upgrading from Project 2000 to Project 2003.

The 2002 Pro icon indicates features that were new in the Project 2002 Professional edition that is normally used with *Project Server*.

#### **File**

Words in bold type can literally be found on your screen in Project 2003 — either as a menu item or as a label or phrase in a dialog box.

#### *Quotes*

Italicized words are literal references. These can be literal quotes from people, data you literally need to enter into Project 2003 or literal words from the index at the back of the book. The indexed keywords are italicized so that you can find them easily in the text.



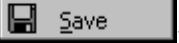
#### <file name>

Any text enclosed within the arrow brackets is text that should not be taken literally, because it refers to another thing. For example, <file name> refers to the name of the project file you currently have opened. File names often show up in menu items or in dialog boxes.

## Word Choice and Step Formulation

You will notice I use the words MS Project and Project 2003 often. I typically use *MS Project* when the feature was available in previous releases; I use *Project 2003* when it is a feature that is new in Microsoft Office Project 2003. I apologize to Microsoft's marketing department for not using the official name *Microsoft Office Project 2003* all of the time; the book would have been 10 pages longer.

We have not used creativity in formulating the stepwise instructions; in fact, we have followed very rigid guidelines to be as clear and consistent as possible in this respect. It is difficult enough to interpret technical books and consistent formulation might help you. These formulation guidelines are:

- ◆ For menu items, we always use the verb “*Choose*” as in:  
Choose **File, Save As**; the **Save As** dialog appears.  
In order to easily follow the procedural steps in this book, you may want to always display the full menus instead of the most frequently used menu items only. You can do this by choosing **Tools, Customize, Toolbars**, clicking tab **Options** and checking  **Always show full menus**. Since we will suggest new menu items to you, it will be easier to follow the steps if you change to full menus.
- ◆ For the toolbars, we always use the verb “*Click*” as in:  
Click **Open**  on the **Standard** toolbar.  
In this book, we assume you use the toolbars in their default layout. If you cannot find toolbar buttons that we refer to, you should consider resetting the toolbars to their default appearance by choosing **View, Toolbars, Customize**, click tab **Toolbars**, select a toolbar to reset and then click . While you are in this dialog, you might consider giving the Standard and Formatting toolbar each their own space, instead of having them share one row (which cuts both of them off). You can do this by clicking the tab **Options**, and selecting  **Show Standard and Formatting toolbars on two rows**.
- ◆ For buttons in dialog boxes, we always use the verb “*Click*” as in:  
Click .
- ◆ For tab pages in dialog boxes, we always use the verb “*Click*” with the name of the tab as in:  
Click **Advanced**
- ◆ For shortcut key combinations on your keyboard, we always use the verb “*Press*”:

- ◇ For a single keystroke: Press **g**.
- ◇ For two keystrokes: Hold down **a** and press **F**.
- ◇ For three keystrokes: Hold down **a + s** and press **l**.
- ◆ For entering text with your keyboard into fields that have a name, we always use “*Key in*” as in:  
Key in a file name of your choice in the field **File Name**.
- ◆ For check boxes that are checked or not and where the user can choose one or more, we always use the verb “*Check*” or “*Clear*” as in:  
Check  **Display Help on Startup**  
Clear  **Display Help on Startup**
- ◆ For radio buttons where the user has to choose only one option from two or more, we always use the verb “*Select*” as in:  
Select  **Automatic**.
- ◆ For lists with a label or with a screen tip, we always use the following convention:  
Select from the list **Field Name**  a column to be inserted where *Field Name* is the label next to the field or the screen tip that appears when you rest your mouse pointer on it.

## Alternative Options or Alternative Steps

Whenever you have two options that do different things I have separated them with a lowercase “*or*”. For example:

*Choose **File, Save** to save current changes into same file, or choose **File, Save As** to save it in a different file.*

If you have two alternative step procedures that accomplish the same goal, I have separated them with an uppercase “*OR*” on a separate line. For example:

*press **h***

*OR*

*select the item **All Tasks** from the list*  .

## Screenshots and Illustrations

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We used many illustrations in this book. Most illustrations only show a small part from a larger schedule. This allowed us to keep the illustrations concise and to the point.

The procedural steps include dialog boxes that are inserted in the steps right at the place where you should encounter them. This is to ensure that you are in the right dialog box before proceeding with the next step. Otherwise, you could easily get lost in intricate steps.



Where screenshots of MS Project views are shown, we have tried to show only the relevant portion of the screen. Where we did print the full screen, you will see the **Standard** and **Formatting** toolbars on two rows. If you want to display them on two rows as well on your computer, choose **View, Toolbars, Customize**, click tab **Options**, and select  **Show Standard and Formatting toolbars on two rows**.

We have annotated the screenshots with blue lines and callouts, so you can easily find the option or field referred to in the text. The annotations can even contain extra tips, so you may still find them worthwhile after reading the text.

## Meet the Cartoon Characters...

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Throughout this book you will find little stories with cartoons. One of the main characters in these stories is Bob, a very dynamic and successful project manager. This is Bob (any resemblance to actual people is purely coincidental):



As you can see, the man is busy communicating in several different ways at the same time. The smile on his face radiates success. Notice the certificate on the wall.

The second project manager looks rather confused and overwhelmed. His name is Nob (any resemblance to actual people is, again, purely coincidental):



As you can see, Nob has not mastered the latest communication technology, which is epitomized by the way he uses the computer monitor. For him it is just a bulletin board for yellow stickies.

Bob and Nob will share their project adventures with us. You will find several stories and cartoons on their experiences. Each chapter typically starts with one. I hope you will enjoy the cartoons during this serious project management stuff. Every time I received a new batch from the creator, Paul Mason, I had some good laughs.

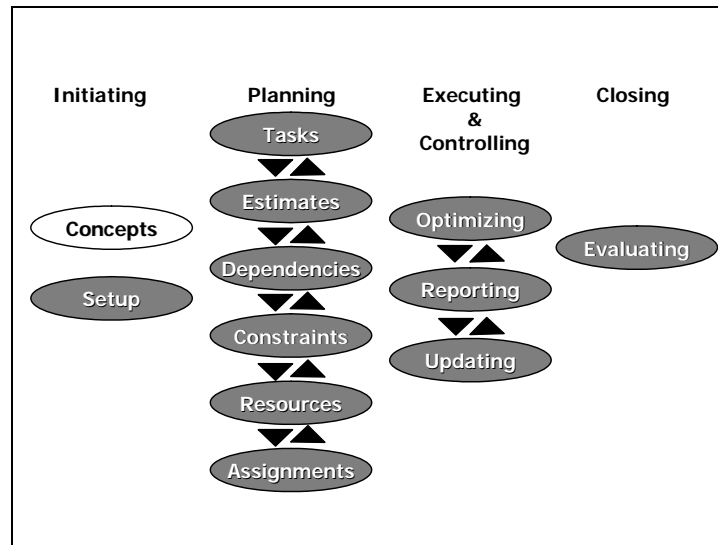
For the cartoons, I needed a successful project manager, and a loser. Paul and I discussed what their gender should be. There was no way we could come out unscathed by using both a male and a female. Was the successful project manager going to be a man and the loser a woman? Or was the loser going to be a man and the winner a woman? We realized it was a lose-lose situation, and eventually we decided to make both of them men. I apologize to those women who would have liked to see the successful project manager be female. The stories that come with the cartoons apply to both genders.

Throughout the book I will randomly use *he* or *she* in my examples.





# Chapter 1 Concepts of Project Management



The first *Initiating* phase starts with the *concepts* of project management. The first step is making sure every reader is clear on these concepts. Many concepts in this chapter are taken straight from the Guide to the Project Management Body of Knowledge (PMBOK®), 2004 Edition.

After reading this chapter you will:

- ◆ be aware of the Guide to the Project Management Body of Knowledge (PMBOK®)
- ◆ understand how projects relate to integrated program schedules and portfolios
- ◆ understand a schedule as a model of the real world project
- ◆ be able to recognize and analyze the driving forces in projects
- ◆ be able to determine the purpose of a schedule you are about to create
- ◆ know what project management software can do for you



### Why Can't It Just Do What I Want It To?

Nob is in agony when Bob enters his cubicle. "What's wrong?" Bob asks. Nob perks up when Bob shows this interest and quickly assesses Bob as a possible source to help relieve some of his work pressures. Nob explains: "I was busy entering my estimates. I tried entering a work estimate of 20 person days here in the Work field, but when I do that MS Project changes the duration of the five-day task to ten days. I have just been fighting with the tool for hours. Why can't it just do ... what I want it to?"

Bob sits down and says: "Let's see what is going on. Did you want to enter 20 days of effort on this task number 134? Let me try it ... oh, I see. The duration changed indeed. You did not want the duration to change? Well, let's change the duration back to five days. Wow! That changed the work to ten days. What's going on here? Oh, I remember learning something about a task field called 'Type.' Supposedly, it allows you to control what MS Project recalculates. Let's first set the 'Type' to 'Fixed Duration' and then enter the work estimate again. See ... it tells you now that you need four resources to work on the task. Do you have four resources?" Nob thinks and says, "No, I will only have three people for this task." Bob: "Okay, let's change the type to 'Fixed Work' and remove one resource. It now tells you that you will need almost seven business days to finish this task; does that sound right?"

"Yeah, I guess so!" Nob says, somewhat in awe of Bob's mastery of the tool.

## Projects



A project is a *temporary endeavor undertaken to create a unique product, service or result*.<sup>7</sup> A project is the vehicle to create change. Project teams create unique deliverables. When the deliverables are ready, the project is over. A project team is a temporary organization within an existing organization or between organizations.

A project has the following characteristics:

- ◆ A project is *temporary* by definition.  
The end date of the project is forecasted before the project begins. A temporary team creates the deliverables of the project.
- ◆ The objective is to create a *unique* product, service or result.  
It has a verifiable objective that is a relatively new or unique challenge for the organization in the sense that it has not been done to those specifications before. The project product can be divided into *deliverables* that are components of the project product, handbooks or software applications to support the new service, or a variety of documents or electronic files as the result of research.
- ◆ *Progressive elaboration*  
The project plan is elaborated progressively, which goes hand in hand with the unique nature of a project and the looming time constraint. The plan is developed in steps and completed in increments.

Some organizations have projects as their core operations, like construction, aerospace and consulting companies. There are full-time project managers in these companies. In other organizations, projects are often used to implement changes (like relocations and reorganizations) or for creating new systems (such as information and financial systems). The line manager of today often has one or more projects in progress. To manage any project endeavors, Project 2003 can be a helpful tool to create a solid project schedule and budget.

## Examples of Projects

We will give many examples of projects from different industries.

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<sup>7</sup> See the PMBOK® Guide, 2004 Edition, published by the PMI.

- ◆ **Organizational change projects**
  - ◇ Implementing a new financial system (*ERP*)
  - ◇ Implementing a *Six Sigma* quality system
  - ◇ Implementing supply chain management
  - ◇ Designing and implementing a project management methodology
  - ◇ Creating a *Project Management Office (PMO)*
  - ◇ Relocating the office
  - ◇ Business process re-engineering
  - ◇ Designing and implementing a new job classification system
- ◆ **Regulations implementation projects**
  - ◇ Projects to meet new environmental policy standards
  - ◇ Realizing equal opportunity regulations in the workplace
  - ◇ Airport security projects
  - ◇ Sarbanes-Oxley corporate reporting (USA)
- ◆ **Event projects**
  - ◇ Organizing a conference
  - ◇ Writing the yearly financial report
  - ◇ Creating a press conference
  - ◇ A formal presentation to investors
- ◆ **New product development**
  - ◇ Developing a new pharmaceutical drug
  - ◇ Developing new computer hardware

New product development typically involves *Research and Development (R&D)*.
- ◆ **Information systems projects**
  - ◇ Programming a desktop application
  - ◇ Implementing a LAN or WAN
  - ◇ Developing the company's e-commerce website
- ◆ **Construction projects**
  - ◇ Designing and constructing buildings
  - ◇ Designing and constructing new infrastructures like bridges and roads
  - ◇ Construction of a new plant
  - ◇ Assembly of a new manufacturing line
- ◆ **Education projects**
  - ◇ Developing and testing new courseware
  - ◇ Organizing training workshops across several sites
- ◆ **Maintenance-type projects**

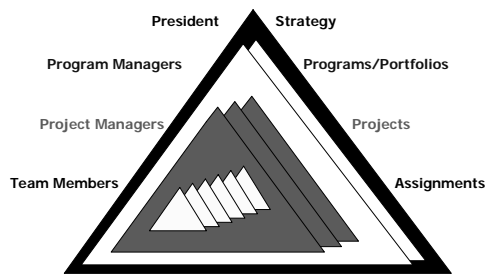
Project managers who schedule maintenance projects often deal with many small projects or "jobs". Sometimes the maintenance project is huge and can stop an entire

plant, as is the case when a condenser needs to be replaced in a coal-fueled power plant. Such a project can take up to five weeks during which operations are suspended. Every day early or late has huge financial consequences. Therefore, the project needs to be planned carefully.



## Managing Multiple Projects

When you start to manage multiple projects, the projects can be similar projects or related subprojects. A program is a group of related subprojects that need to be managed in a coordinated way. There are often dependencies between these projects. The schedule is an *integrated program schedule*, and the appropriate term is *program management*. Projects can be integrated into programs for a variety of reasons:



- ◆ A need for overall reporting on all projects
- ◆ A need to model the logical impacts each project has on other projects (*cross-project dependencies*)
- ◆ A need to monitor resource utilization when the projects share the same resources; when resources are shared, projects will impact each other through resource availability

A portfolio of projects consists of projects that support the strategy of the organization. Portfolios often are similar projects that use the same pool of resources. With *portfolio management*, you optimize the mix of projects given the scarce resources of the organization. As you can see, the level of complexity within a portfolio is less; however, the total investment in a portfolio is often much larger than for one integrated program.

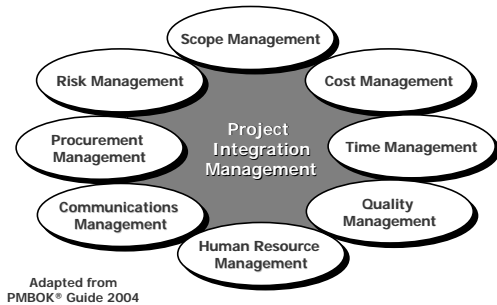
This book will deal with managing a single project only and not address issues related to managing multiple projects, be they integrated programs or portfolios.<sup>8</sup> However, unless you know how to create and manage a single project effectively, there is very little hope in managing multiple projects simultaneously.

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<sup>8</sup> The Blue Belt course is for people who manage multiple projects simultaneously with MS Project. Please visit [www.iil.com](http://www.iil.com) and follow the link *Microsoft Project*.

## Guide to the Project Management Body of Knowledge

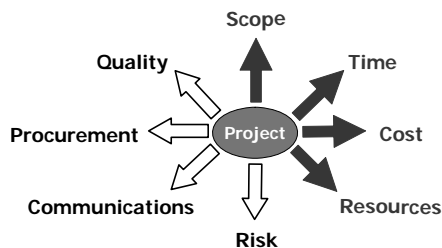
The Project Management Institute (PMI) has issued the Guide to the Project Management Body of Knowledge, or PMBOK®. The PMBOK® has become a global standard on project management. Most multi-national companies have embraced the PMBOK® as their glossary. Each project has to deal with all nine knowledge areas as specified in the PMBOK® (see the illustration on the left). This book is entirely based on and aligned with the 2004 Edition of the PMBOK® published by the PMI. If you have not read the PMBOK®, I recommend you read it first or, at least, keep it nearby.



The PMBOK® Guide 2004 describes project management as “*the application of knowledge, skills, tools and techniques to project activities to meet the project requirements.*”

### The Pulling Forces of a Project

All the areas in which project managers need to have knowledge and skills can also be seen as the areas that require attention from the project manager. The areas even pull the project in opposite directions and can be traded off against each other. The illustration on the left shows this.



MS Project, as a stand-alone tool, isn't a tool to help you in all these areas. For example, Project 2003 does not have many features to manage the quality, risk and procurement side of projects. It does not capture data on risk events, quality standards or contracts.



The five areas that can be managed well with Project 2003 are:

- ◆ *Scope*: what to accomplish
- ◆ *Time*: the deadline
- ◆ *Cost*: the budget
- ◆ *Resources*: availability (or capacity) and workloads of the resources, but only up to about 100 resources in a shared resource pool with MS Project as a standalone tool. If you use MS Project in combination with Project Server, you can build much larger shared resource pools of thousands of resources.

2003  
Pro

*Communication* is an information flow to and from project stakeholders. While Project 2003 provides many flexible reporting features, *Project Server* dramatically enhances real time communication with project stakeholders. You can also create libraries of documents and link them to tasks or projects. Project Web Access is now a richly featured document management system. It can handle different versions of your MS Project schedule and other types of documents. The latest version of a document is protected by checking out and checking in procedures. When checking the document back in, you are prompted to add comments on the changes you made.

2003  
Pro

An important activity in *risk management* is to identify adverse events, then rank, monitor and manage them. MS Project standalone can do PERT analysis and, yes, there are add-ons that do *Monte Carlo simulation*. Monte Carlo simulation can help you quantify the time risk of a schedule. We will explain both in chapter 9 Optimizing, see page 419. Project Server 2003 now has risk event management capability, and it already had issue management features.

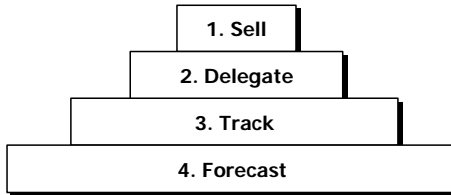
In project *procurement management* you want to create and track your contracts. There is no feature in Project 2003 that is designed to manage contracts, but what you can do is create links to contract documents (like MS Office Word files) using the hyperlink feature. Project 2003 and *Project Server* are not a procurement management system by themselves.

The area of *quality* can be managed only somewhat with Project 2003. Quality control activities can be scheduled, but the tool does not capture quality standards or requirements for deliverables, for example. The application is not a *quality management* system. Of course, you should always ask yourself if a change to the schedule could also have any quality impacts.

At this point we have to ask ourselves: *Why are we scheduling? Why do we create a model of our project?*

## Why Do We Schedule?

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There are four reasons why people prepare schedules of their projects. The reasons can be ranked by level of challenge with the least challenging first:

◆ **Sell**

Project managers may want to sell upper management on an idea in order to start a new project and manage it. Or, a consulting firm may try to sell a new project to a client. The selling is supported by making the timing of milestones visible in a high-level Gantt Chart. Gantt charts built for this purpose often look very slick. Selling requires the least amount of detail in your schedule and does not require the schedule to be dynamic. The expected result would be that you win the contract.

◆ **Delegate**

When you have a detailed Work Breakdown Structure (WBS), you can easily delegate by assigning activities to team members. In this case, the schedule is used as an easy vehicle to communicate commitments to team members. When you have all the assignments, you can easily create to-do lists for each resource to establish responsibilities; who is doing the work? The benefits of a schedule as a delegation instrument are that everybody knows what to do and when to do it. The expected result is a sense of direction in your project.

◆ **Track**

In order to track your project; you enter the current status regularly into your MS Project schedule. The output of tracking is a status report. A status report shows how far the project has progressed. Tracking allows you to report to stakeholders what has been accomplished. Tracking a project has the benefit that you can learn from past mistakes. If you don't track, you will lack the facts to learn from. The main benefit is for future projects.



◆ **Forecast**

You can use MS Project to model your project in such a way that you forecast the project end date and the total cost. You have to create the schedule in such a way that it immediately shows what impact actual events have on the project end date and cost as you enter progress information. Forecasting also requires that you enter the progress in such a way that the forecasts are updated. The main benefit of forecasting is that you benefit from this immediately in your current project. You will have answers for:

- ◇ When will deliverables be available?
- ◇ On what dates will individual resources be needed?
- ◇ When will the project be done?
- ◇ What will the project cost?

These four levels are listed in order of increasing challenge or difficulty. The farther down the list, the more ambitious you are with MS Project. Forecasting is the most ambitious goal you can have when using scheduling software. If you want to predict the outcome of your project, you have to set up your schedule in a particular way. For example, you have to use dependencies wherever applicable. We will provide you with all the guidelines to help you set up schedules that will give you this predictive power. The summary chapter of this book contains the complete checklist of guidelines. Forecasting is what most project managers aspire to accomplish with MS Project.



Notice that there is no hard hierarchy implied in these purpose levels even though the pyramid of the chart might suggest this. For example, in order to forecast, you don't need to track; the higher levels don't hinge on lower levels.

First, we need to deal with a well-known saying on project planning that does not reflect well on it.

## Dwight Was Right, But Is He Still?

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"In preparing for battle, I have always found that plans are useless, but planning is indispensable."

President Dwight D. Eisenhower  
(1890-1969)

In the time in which President Dwight Eisenhower lived (1890-1969), project plans only existed on paper. Paper plans are static in nature and dead as soon as they are written. They are a snapshot of the project and capture the vision of the project when the plan was written. A plan printed on paper is a project-plan-of-the-past. At best, paper plans are "*history-books-written-ahead-of-time*". In his time, Dwight was right.

With the advent of computers, we can now create plans that are alive and dynamic. Let's start thinking of a project plan as an online database that contains the most current status together with prediction algorithms. This project-plan-of-the-future is an up-to-date electronic model of your project. The model allows you to make forecasts at any time during the life of the project.

Such a dynamic model is a powerful tool for project managers. I like to think that, if Dwight were still alive, he would likely admit: "*In preparing for the global marketplace, I have found that planning is indispensable and dynamic models are the critical success factor*".

## Scheduling Is Modeling

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As a project manager, you should attempt to create a dynamic model of your project situation, not just draw a chart that you hang on your wall and that is just nice to look at. Nice charts are very useful for selling purposes, but not for managing purposes. The differences between a *static chart* and a *dynamic model* of your project are:

- ◆ **A model is a simplification of the reality.**  
Architectural models are small three-dimensional versions of the final building. A model is built at a fraction of the cost of the final build. Similarly, project models should be simple versions of large, complex realities. Simplification is a legitimate and essential activity when modeling.



- ◆ **A dynamic model has to be kept up-to-date.**  
A schedule that is not maintained is static and will be useless soon after it is ready. Dynamic models are never finished; they are living documents and should be kept alive until the project ends. If they are not or cannot be kept alive, they don't deserve the label *dynamic model*.
- ◆ **A dynamic model needs to be responsive.**  
In order for schedules to be easily kept up-to-date, they need to be responsive. A responsive model updates itself as much as it can. Schedules can do this if they are created with as many dependencies as needed and as few fixed dates as possible. Fixed dates are known as *constraints* in MS Project.
- ◆ **A dynamic model has predictive power.**  
Schedules need to show the latest forecasts of the finish date and the final expenses of the project. Only then can a schedule truly be a powerful decision-support system for the project manager. It is nice to have a prediction that holds true in, let's say, 9 out of 10 cases. This requires the model to use empirical, actual data that are translated into forecasts using algorithms. An example of such an algorithm is the 15% rule on *earned value* from Fleming and Koppelman.<sup>9</sup> The 15% rule states that if you are 15% into your project, you should be able to predict the final cost of your project within a margin of plus or minus 10%.
- ◆ **A dynamic model needs to be accessible online and in real time.**  
Project Server is one example of a new class of business intelligence tools arriving in the marketplace that allow you to slice and dice the data any way you want. *Project Server* allows you to drill down into the project database to see supporting detail. Once you have found the root-cause of problems, you can develop scenarios to resolve them. These powerful and dynamic features are accessible through a user-friendly interface that executives can use to keep their finger on the pulse of their portfolio of projects. Executives could do their own analysis and what-if scenario development using data that are as up-to-date as data can get (real time data). But best of all, with its web-based access, no longer are project reports tied to regular reporting periods and static formats. They can be viewed at any time and from any place with intranet or internet access.

In the chapters that follow, we will show you how to create a dynamic model of your projects — a model that meets all the criteria of a dynamic model as just explained.

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<sup>9</sup> See their book *Earned Value Project Management*, PMI, 2000.

The next thing we will do is explore the field of forces that surrounds our project. This will help us model the important aspects of our project.

## How Strong Are the Forces in My Project?

As we described in the previous paragraphs, scheduling treated as a modeling activity is supposed to simplify the reality of the project. One of the first things a project manager needs to do is find out how strong each of the forces is. Recognizing the dominant force and modeling the project accordingly can determine the success of the schedule early in the project life cycle. For example, if a nuclear power station has to be renovated, it is clear that the *scope* and the *quality* cannot be tampered with, because of the immense consequences an error could or would have (see the illustration). Meeting the quality standards of the International Atomic Energy Agency will be a dominant force, even if this leads to higher than anticipated cost and/or a delay in the project.



Remodeling a Nuclear Power Station

For most projects, however, the dominant force is less obvious. Sometimes two forces seem to be equally important. Therefore, a good question to ask before starting is: *Which force is dominant?* Or, if that question is difficult to answer, ask yourself first: *Which force is least important?*

Depending on whether scope, time, cost, quality or resources is the dominant force, different schedules will be the result. If the deadline is very hard, you may want to enter it as a constraint into the model and schedule regular status meetings. If the deadline is soft, you may choose to let it float freely. If the budget is very tight, you want to model all expenses in detail. If the resource availability is very limited, you want to capture all workloads. If quality is the dominant force, you could add more testing tasks. As you can see, being aware of the dominant force in your project is worth the effort.

## Project Management Software



In any project, the following seven questions are important:

1. *What needs to be done?* Deliverables and Tasks
2. *How long will it take?* Duration Estimates or Work Estimates
3. *In which order?* Dependencies
4. *When must it happen?* Constraints
5. *Who is going to do it?* Resources and Assignments
6. *When will it happen?* Start and Finish Dates
7. *How much will it cost?* Rate \* Assignment Effort

The user will have to enter the answers to the first five questions, and Project 2003 will automatically answer the last two questions by creating the schedule and the budget.



Notice that when you schedule electronically, you hardly ever enter start or end dates for tasks. You enter durations and dependencies instead. The software then calculates the start and finish dates by itself based upon those durations and dependencies. A schedule with dependencies is flexible and knows how to update the other tasks automatically when preceding tasks are changed. If you have been entering dates, we recommend you reconsider doing this from now on. If you want to change your habit, we recommend you select the **Start** and **Finish** column and press **d**. You can easily re-display the start and finish dates for read-only purposes to the left and right of task bars in the timescale. You can do this by choosing **Format, Bar Styles**, selecting the type of tasks in the list at the top and on the tab **Text** in the field **Left** you select the list item **Start** and in the field **Right** the item **Finish**. If you do this, you will definitely not be tempted any longer to enter dates while you can still view the resulting dates. Entering dates leads to many constraints.

Based upon resource cost rates and assignments you enter, the software calculates the total cost, per deliverable and for the whole project. MS Project calculates a lot of data automatically for you.

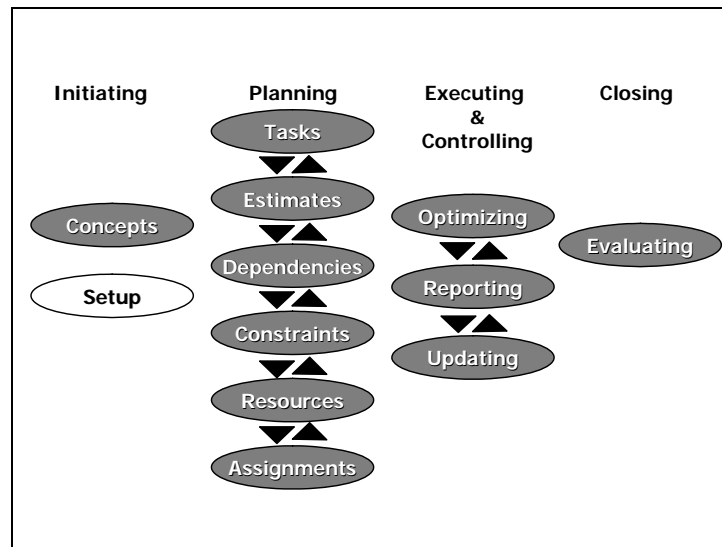
Scheduling software is efficient in reporting. The software behaves like a database in that you can pull data from the database to focus on any deliverable, any period or any resource you want. The type of information in a report can be changed as well, like scheduled dates or cost figures. Reports allow you to compare actual against planned progress.

## Review Questions

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1. What are the two main ways in which projects differ from other things such as programs, operations, task forces, committees, work groups and departments?
2. Are there organizations that never have any projects?
3. Are there organizations that only have projects?
4. What is the difference between project management and program management?
5. Which knowledge areas does the PMBOK® cover?
6. What are the forces that pull your project in different directions and that you constantly need to trade off between as a project manager?
7. What is the strongest pulling force in your current project? And, what is the weakest pulling force?
8. What are the differences between a *static chart* and a *dynamic model* of your project?
9. Why do you intend to create a schedule of your current project? Is it for selling, delegating, tracking or forecasting purposes?
10. What is the difference between tracking a project and forecasting a project?
11. What is the minimum data you need to enter into MS Project to generate a complete and dynamic schedule?

## Chapter 2 Setting Up a Project



Now that we have reviewed the terminology and some basic concepts, we are ready to explore the application interface of MS Project and set up a new project.

After reading this chapter you will:

- ◆ be familiar with the MS Project interface
- ◆ understand where MS Project stores the data:
  - ◇ be familiar with the file types MPP/MPT and the Global.MPT file when you work with MS Project as a standalone tool
  - ◇ understand the structure of the relational database of MS Project when you work with Project Server
- ◆ be familiar with the MS Project views
- ◆ know how to use a project template
- ◆ be able to set up a new project and choose the appropriate options
- ◆ be able to create the project calendar
- ◆ know the best practices for setting up new project schedules



### “Have You Been Choked by a Template Lately?”

Nob: “Hey Bob, I opened up this template that our project office put together and I found 300 tasks in there! Do we really have to use them? What the heck were these guys thinking?”

Bob: “Well my friend, the project office didn't put them together for nothing!”

Nob: “But come on ... 300 tasks for a software modification project; that is ridiculous!”

Bob: “Listen man ... the templates are part of this expensive methodology our company purchased. You don't want to be seen throwing that money away!”

Nob: “Spending the money was not MY decision!”

Bob: “Why don't you comb through the templates and use whatever seems applicable and just delete the rest.”

Nob: “You can't do that, can you?”

Bob: “Of course you can ... they just made these templates as reminders of everything that MIGHT be necessary in your project. If it is not applicable, it is not applicable! That is how I deal with these templates.”

Nob: “I am not sure...”

Bob: “They made more templates than necessary on purpose, because it is always easier to delete than to add!”

Nob: “How did you get so smart???”

## Microsoft Office Project 2003 Standard and Professional

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MS Project comes in two editions: *Microsoft Office Project 2003 Standard* and *Microsoft Office Project 2003 Professional*. The professional edition can connect to a Project Server database which provides the capability to implement *Enterprise Project Management (EPM)*. The word ‘*Enterprise*’ refers to the entire organization or a subset of the organization, e.g. the IT-department. EPM is a system to manage projects effectively within that (part of the) organization. EPM typically consists of:

- ◆ *Portfolio management* to support the strategic direction of the organization.
- ◆ *Resource management* to use the resources optimally
- ◆ *Project management* to help project managers manage their projects. The system provides ways for the project manager to collaborate with team members and other stakeholders.

When working with project schedules, there are differences between using Project 2003 with Project Server and using Project 2003 by itself as a standalone tool. We will call it *MS Project standalone* when it is used by itself, which is without Project Server; even Project 2003 Professional can be used as a standalone tool. We prefer the term *standalone*, because it describes the situation better than the term *Standard*.

## Working with Files in Project 2003 as a Standalone Tool

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### File Types

MS Project can store its data in project files and project template files among other file types. Project templates are like regular project files, but with an added protection against accidental changes. The protection is that when you open a template, the template first copies itself and you continue to work with the copy. The original template stays the same. Project templates are standardized schedules and are used in organizations that run similar projects over and over, like construction companies.

Project files (.MPP) and project template files (.MPT) can contain:

- ◆ *Data*: tasks, estimates, dependencies, constraints, resources, assignments
- ◆ *Objects*: views, tables, filters, groups, fields, calendars, reports, forms, maps, toolbars (including the menu bar) and modules (Visual Basic)

- ◆ *Project-specific options*: these relate to the project only and are stored in the individual project. You can easily recognize which options are local in the **Tools, Options** dialog. Where the section heading has the suffix *for <name of current file>*, the option is local and stored with the project.

A special template exists, the default template file, called *Global.MPT*. It contains all the default objects, like views, tables and filters that you use for reporting purposes. Also, the *Menu Bar* and *Toolbars* that reside in the *Global.MPT* are the menu bar and toolbars that you are currently using in the MS Project interface. The menu bar and the toolbars are active in all your projects. The *Global.MPT* could contain a custom menu bar and custom toolbar objects, if desired. The *Global.MPT* is always open when MS Project is running. The *Global.MPT* objects are available for use in new project schedules.

The differences between a *project template* and the *Global.MPT* template are that:

- ◆ The *Global.MPT* cannot contain schedule data like tasks and dependencies.
- ◆ Only the menu bar in the *Global.MPT* is active.
- ◆ Only the toolbars in the *Global.MPT* are accessible through the menu items **View, Toolbars**.

The file extensions have been well thought out by Microsoft:

- ◆ A project file has an **.MPP** extension, which stands for **M**icrosoft **P**roject **P**roject.
- ◆ A template file has an **.MPT** extension, which stands for **M**icrosoft **P**roject **T**emplate. Project and template files can contain project data, as well as objects and options. You can view the available objects in the Organizer by choosing **Tools, Organizer**.



Objects can be transferred from one file to another with the *Organizer* on the **Tools** menu.

When you *migrate* from Project 2002 to Project 2003, the first time you run Project 2003, you will be asked if you want to *upgrade* your Project 2002 *Global.MPT* to Project 2003:

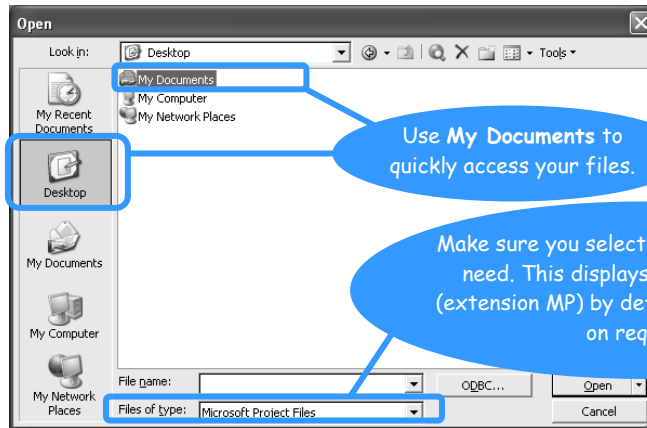
- ◆ **Automatically**: All the objects in your Project 2002 *Global.MPT* will be transferred. Choose this option if you have custom objects that you would like to keep.
- ◆ **Manually**: You can transfer selected objects to your Project 2003 *Global.MPT*.
- ◆ **Not at all**: In this case you get the new and default Project 2003 *Global.MPT* installed. Choose this option if you would like to throw out your own custom Project 2002 objects and start with fresh 2003 objects.

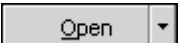


The *global options* and the default project-specific options are stored in the *Windows Registry*.


## Opening a Project File in Project 2003 Standalone

1. Choose **File, Open**; the **Open** dialog appears:



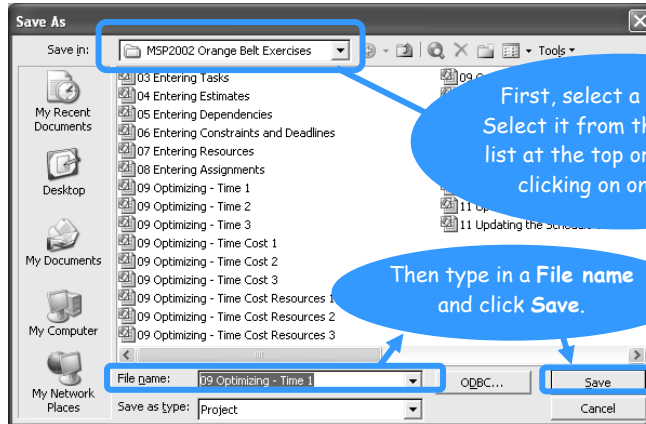
2. If the project is on a drive or directory other than the current one, navigate to it using the **Look in** list at the top of the dialog.
3. Double-click on the name of the file to open.  
OR  
Single-click on the file name and click .


## Saving Changes in an Existing MPP File

1. Click **Save**  on the **Standard** toolbar OR choose the menu items **File, Save**.
2. If your file exists already, the file on your hard disk will be updated with the changes. If the file does not exist, the **Save As** dialog will appear automatically.


## Saving a New File with MS Project Standalone

1. If you save a schedule for the first time or if you opened the file read-only and save it, you are prompted for a file name in the **Save As** dialog:



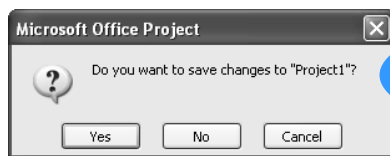
2. Click . Each project file will be saved with the extension **.MPP** by default.

## Saving an MPP File in a New Directory or Under a New Name

1. Choose **File, Save As**; the **Save As** dialog appears (see the previous screenshot).
2. Select the drive and directory from the list **Save In** at the top of the dialog.
3. At the bottom of the dialog, type a name in the field:  
**File Name:**
4. Click .

## Closing a File

1. Choose **File, Close**. If you have made changes to an open project, MS Project will prompt you to save the changes and the **Microsoft Project** dialog appears.




You never need to be afraid of losing data when closing a file, because MS Project will prompt you.

2. To save your changes, click  the **Save As** dialog appears if the project hasn't been saved before.
- To discard changes, click .
- To interrupt closing the file, click .



## Sharing All Project-Related Files: Shared Workspace

 Shared workspaces are a new feature that can be used with MS Project standalone. This feature requires *Windows SharePoint Services (WSS)* to be installed on a Windows 2003 server that is accessible for your team. You can save the schedule into a workspace that you share with others on this server. Other team members can easily retrieve the schedule by checking it out and contributing to it. The shared workspace allows people to collaborate on schedules and other project-related documents.



Project Server also allows other people to open your schedule, but Project Server does not provide a collaborative, virtual work space. A shared workspace emulates a physical meeting room in which people work together. A virtual workspace is an easier way for team members to collaborate with you on the creation of the *project charter*, *scope statement*, *project schedule* and *budget*.



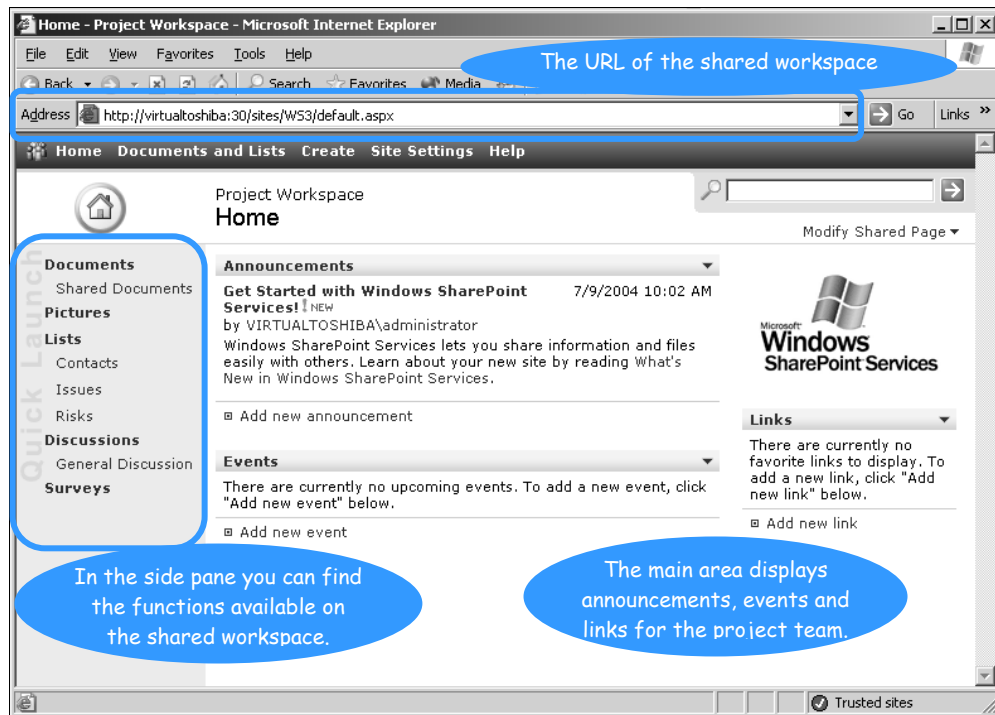
Note that a *shared workspace* in WSS is not the same as the *workspace* feature in MS Project (found under **File, Save Workspace**). The MS Project workspace is simply a set of files that can be opened all in once by opening the workspace file (MPW-file). The WSS shared workspace is like a meeting room table on which a group of people collaborate. The WSS shared workspace first needs to be created by the WSS administrator.

You can use the shared workspace through the Project 2003 interface or through Internet Explorer. Internet Explorer will give you a richer interface and a more intuitive experience. Therefore, we will discuss it first.

### Accessing the Shared Workspace with Internet Explorer

1. Start Internet Explorer

2. In the **Address** field enter the URL of the shared workspace (the WSS administrator can provide this). The following screen appears:



If you applied the **Project Workspace** template when you created the shared workspace site in the previous procedure, you can now do any of the following (If you applied a different template, you will have less or different choices.):

- ◆ View current announcements or create a new announcement by clicking **Add new announcement** in the main window. This is like a pin board in the kitchenette, near the coffee machine or other watering holes.
- ◆ View the upcoming events or add a new event by clicking **Add new event** in the main window. This is like calendar of events you would pin up in the gathering places.
- ◆ Access documents by clicking **Shared Documents** in the side pane on the left. If you want to change one, you will have to check it out and indicate what you changed in the document when checking it back in. This is like the company library or company document management system. Access rights can be different for each individual and can range from read-only, read-write to re-design the shared workspace site.

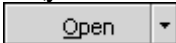
- ◆ Access posted pictures by clicking **Pictures** in the side pane on the left. Nice for posting pictures of all members of a remote team. This is a who-is-who gallery often seen in hallways of organizations.
- ◆ Access **Lists** of **Contacts**, **Issues** or **Risks** by clicking the item of your choice in the side pane on the left. The list of contacts can be synchronized automatically with the Windows *Active Directory*. Notice that you can create new types of lists that may be beneficial for the team.
- ◆ Join into a discussion by clicking one of the discussion threads listed under **Discussions** in the side pane on the left. This works similar to discussion groups on the Internet, though they are only accessible for your team members or other stakeholders in your project (that were granted access).
- ◆ Respond to a posted survey or create a new survey to poll your team by clicking on **Surveys**. This is a very powerful tool to gauge opinions on a variety of matters.
- ◆ Add *Intranet* or *Internet* links with relevant (or fun) material for the project team by clicking **Add new link** in the side pane on the right hand side.



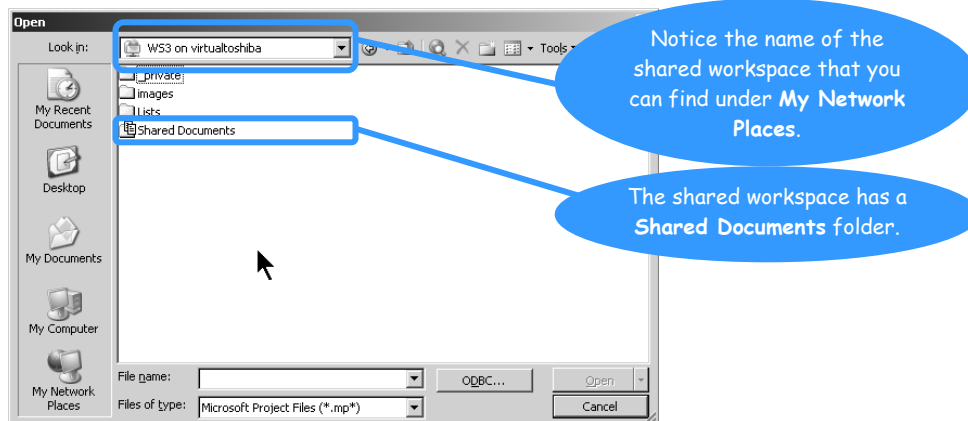
You can set alerts delivered by email that are automatically triggered and sent to you when documents are changed, new risks are identified or other things happen that you want to monitor.


### Accessing the Shared Workspace with Project 2003

The obvious thing you may consider doing is to post your project-related documents, like project charter, scope statement, budget, schedule, drawings, contracts and status reports to the shared workspace such that they can be reviewed. You can even allow certain documents to be modified by other team members. Team members can check these documents out and back in. When checking back in, they will be asked what they changed in the document. We will explain how you can save a schedule to the shared workspace:

1. Start or switch to Project 2003
2. Create the schedule and choose **File, Save**  
OR  
Open an existing schedule to share with the team and choose **File, Save As**
3. Click **My Network Places**, which displays a list that includes the shared workspace website. Double click that website.  
OR  
Enter the URL of the shared workspace (your WSS administrator can help you with that) in the filename dialog and click 

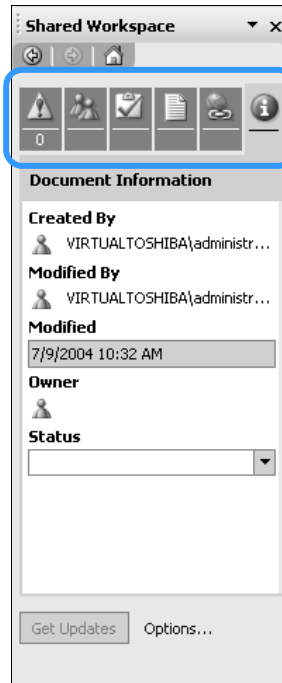
4. The listing in the dialog now lists the folders available on the SharePoint site as in following screenshot:



5. Double click the **Shared Documents** folder  
 If you save a schedule to a different folder it will not be accessible for other people; they will not see it listed, and you will be the only one working with it.
6. Enter a name for the schedule and click .



Notice that the side pane changes and now displays information about the shared workspace and buttons to manipulate the workspace:



These page tabs provide the functionality of the shared workspace.



You will also find new menu items on the **File** menu: **Check out** and **Version History**. On the Tools menu you will find the item **Shared Workspace** enabled.



Any *Windows SharePoint Services (WSS)* compatible application allows you to perform these same functions as we discussed in *Project 2003*. All *Microsoft Office 2003* applications are WSS-compatible.

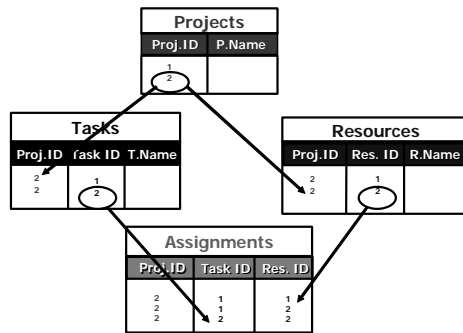
## Working with Schedules from the Project Server Database

When we use MS Project in standalone mode, the projects were stored as separate files on your file directory system. When you use *Project Server*, the projects are stored into one *SQL Server* database.



Notice that you should not use the word *file* for a schedule in the context of the Project Server database, since there is only one file in a Project Server EPM system and that is the SQL Server database file that contains all the schedules. It is better to use the word *schedule*.

## MS Project as a Relational Database Application



At first glance, the Project 2003 application bears a striking resemblance to a spreadsheet application. It has columns and rows. However, instead of seeing it as a spreadsheet, we suggest you think of Project 2003 itself as an application to access a relational database. A relational database has several different tables that are related to each other through fields they have in common. In MS Project, these are the ID fields.<sup>10</sup> You can see this in the illustration. The tasks and assignments

tables have a so-called one-to-many relationship, since one task can be assigned to multiple resources. Similarly for resources, one resource can be assigned to multiple tasks. It is the one-to-many relationships in the data that are hard to manage within a spreadsheet application.

There are three reasons for seeing the application as a relational database application:

1. **There are four types of data.**

There are four distinct types of data, or *data-entities*, in the database: projects, tasks, resources and assignments. In a spreadsheet table, you typically monitor only one type of data.

2. **The data have one-to-many relationships.**

The data entities are related and have one-to-many relationships between them.

3. **Each data entity has its own table.**

*Projects* can be found in the Projects table. *Tasks* can be found in the task table that can be seen in any of the task views. *Resources* are stored in the resource table and can be seen in the resource views. *Assignments* are in their own table as well, but do not have separate views in MS Project. Assignments can be found in between the tasks in the *Task Usage* view or in between the resources in the *Resource Usage* view.

Project 2003 Professional users store their projects in *SQL Server* as the relational database instead of in MPP-files. In a relational database, you can see each data entity in

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<sup>10</sup> In fact, the **Unique ID** field contains the unique identifiers, because the **ID** values are just row numbers that constantly change when items are inserted or moved.

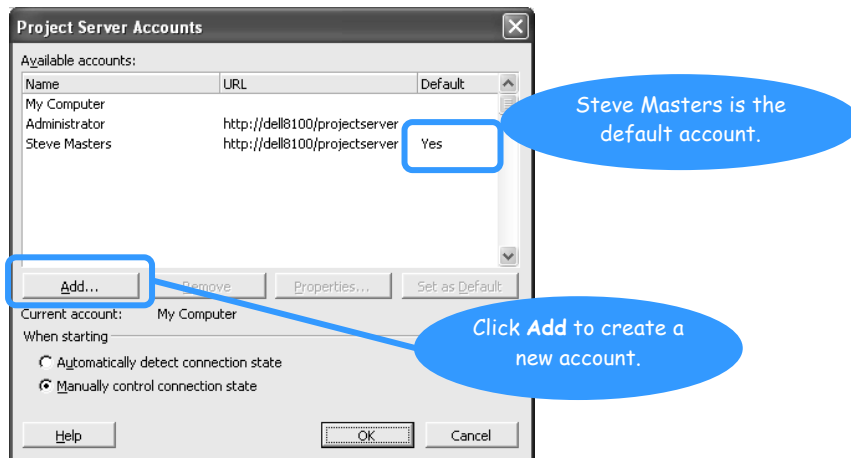
its own table. The (simplified) data model for the Project Server database is shown in the illustration. A multi-project database, like Project Server, has an extra table at the top that contains all projects. The *Projects* table is where Project Server stores all the project-level data, like project name, project manager and project start and finish date, among others, for all projects in the database.



## Entering an Account to Connect to the Project Server Database

Project Server keeps all projects in a *SQL Server* database. The Project Server administrator manages this database and the security, which determines who can read or write each schedule in the database. This is done through accounts in the Project Server database. The Project Server administrator has to set up an account for you as the project manager in the Project Server database. Then you can configure Project 2003 as a project manager in such a way that it uses this database account to establish a connection between Project 2003 and the Project Server database. Project 2003 will then be able to open schedules from the Project Server database and save changes back into the database.

1. In Project 2003 Professional, choose **Tools, Enterprise Options, Microsoft Office Project Server Accounts**. The **Project Server Accounts** dialog appears.



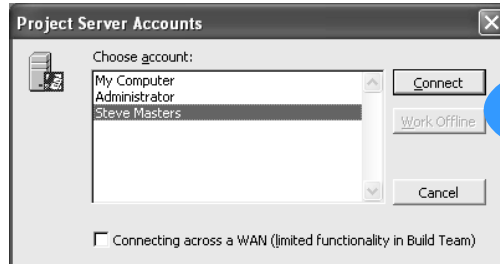
2. Click **Add...**; the **Account Properties** dialog appears:

Enter Account Name and URL, then Test Connection.

3. Enter the **Account Name**, which is a descriptive name of your own choice.
4. Enter the **Project Server URL** following the syntax:  
http://<server>//ProjectServer  
 where <server> is the name (like *Toshiba08*) or the IP address (like *63.118.100.55*) of the computer on which Project Server is installed.
5. Under **When connecting**, select either  
 **Use Windows user account** (account you logged into your computer with), or  
 **Use a Project Server account** and enter the **User name**.
6. Click **OK** and you are back in the **Project Server Accounts** dialog. You can select one of your accounts to be the default account and you can even select **Automatically detect connection state** if you don't want to be prompted any longer for which account to use. If you will always connect to Project Server and have only one Project Server account, you could select this to start the system faster.
7. Click **OK** and choose **File, Exit** to close MS Project. We have now created an account to connect to Project server while offline.

## Connecting to the Project Server Database

1. Restart Project 2003 Professional and the **Project Server Accounts** dialog appears (if you selected **Manually control connection state** in previous steps; if you selected **Automatically detect connection state** it is skipped):



The accounts that provide access to the Project Server database are listed.



2. You connect MS Project to the Project Server database in which case you need to identify yourself to the secure database by selecting an account which we will discuss from here.

OR


If you want to work with your file without a connection to the *Project Server* database, you can select **My Computer** and click **Work Offline**.

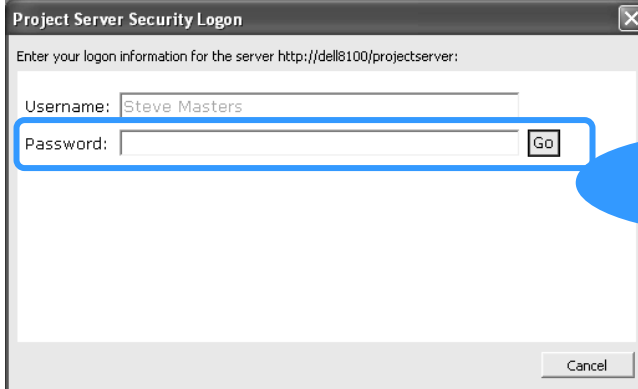
3. If you select  **Connecting across a WAN** (Wide Area Network), the bandwidth of your connection typically is low. This option limits the number of resources from the enterprise resource pool that you will see at a time.



4. Double-click the account you want to use from the list.

OR

Select the account and click . The **Project Server Security Login** dialog appears for a moment if you use *Windows authentication*. If it stays you are using a **Windows** account that is not recognized by the Project Server database or you are using *Project Server authentication* and you have to enter the **Password**.



5. Enter the password and click  to open the connection.



The account you choose will make the MS Project application talk to the Project Server database and allow it to retrieve schedules from it and save your schedule to it.



When you choose to work offline, you can be productive on a laptop while on a plane or wherever you don't have access to the server computer. In order to have your project schedules accessible offline, you first need to save them offline onto your laptop. Open the file you want to work on offline in Project 2003 and choose **File, Save offline**. While your schedule is offline, it is checked out such that nobody can change it. When you come back from your trip, you choose **File, Save online** to synchronize the Project Server database.

## Two Global Containers in the Enterprise Environment

MS Project standalone uses the *Global.MPT* as a container for the default objects. This container is accessible across all your projects. You can copy objects into your *Global.MPT* that you want to standardize on across your projects.

An important difference between MS Project standalone and Project Server is that in an *enterprise* environment, you have a second global container of default objects, the so-called *Enterprise Global*. This container is accessible to all project managers across the enterprise and serves up the corporate standards to you in terms of templates, calendars, views, tables and filters.

You can see this second container if you choose **Tools, Organizer**; at the bottom left of the dialog in the list **Views available in** you can now see **Global (+non-cached Enterprise)**. The term *+non-cached Enterprise* is Microsoft speak for the second enterprise containers. When connected, you have access to default objects in two containers simultaneously instead of just the local **Global** one. It uses only the local **Global** when you work offline.

The second container, the Enterprise Global, provides extra views that typically have a name that starts with the word *Enterprise*. These views are standard views that your *project office* has created and you cannot change them. If you do make changes, they will be discarded.

As you can see, with this complex situation of your own local *Global.MPT* and the Enterprise Global, you have the best of both worlds; you can still customize your own work environment by making changes to your local objects (*Global.MPT*), but the organization can also help you along by providing standard objects (*Enterprise Global*). Project managers do not need to re-invent the wheel and can use best-practice views developed by the project office.

