# MODERN PROJECT PORTFOLIO MANAGEMENT SOFTWARE

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## ABSTRACT

*An overview of the history of project management (PM) software is provided starting from the early 1960s up to today. The architecture of PM software packages is discussed leading from older software suitable for the management of single projects, right up to modern software systems aimed at enterprise Project Portfolio Management (PPM) implementation. Critical Chain PM software is briefly discussed. Various definitions of PPM is presented as well as an overview of the components of a modern PPM system.*

*This paper discusses three popular systems which cover the majority of implementations in SA. These are Microsoft Project 2003 EPM, Sciforma's PSNext and Pacific Edge's Project Office. These systems discussed in relation to ten requirements of a PPM toolset. The typical life cycle of successful software is also discussed.*

## KEY WORDS:

Project management software, portfolio management software, Project Portfolio Management, Microsoft Project, Microsoft EPM, Sciforma, Project Scheduler 8, PS8, PSNext, Pacific Edge Project Office.

# MODERN PROJECT PORTFOLIO MANAGEMENT SOFTWARE

## OVERVIEW

The world of project management has matured rapidly during the last ten years. Several significant trends have emerged that have transformed the project management (PM) profession. Those trends have included the widespread application of enterprise project management, as well as the growth and maturing of the project management profession itself. The development of PM tools, processes and applications have also continued with PM vendors using new computing and communications technologies to produce a new breed of software which did not exist 10 years ago, ie. Project Portfolio Management (Pells 2004)

## EARLY PM SOFTWARE

When asked to think of project management software, most people will think of a Gantt chart. This chart was developed by Mr Henry L Gantt in 1917, a mechanical engineer, to display production tasks on a time scale. Today the Gantt chart is so pervasive, that many people think that planning a project consists of creating a Gantt chart, ignoring all the other vital actions.

The next major development in the late 1950s was the use of PERT, developed by the US Navy for the development the Polaris missile submarine programme. The PERT (Programme Evaluation and Review Technique) was an important step to allow improved management of complex projects. Today a network diagram is commonly called a PERT chart. More or less at the same time the Critical Path Method (CPM) was developed by Du Pont and Rand Remington.

Allegedly, the first project management software was developed by Datasaab (the data processing arm of Saab Automobile) for a computer manufactured by Datasaab, the D21 in the early 1960s. It was tailored to support the PERT technique. (Wikipedia)

Project management software started to be used on large projects in the 1970s. Although these mainframe systems were text based and were clumsy, difficult and expensive to operate, there was a belief in those days that better computer software was the answer to improved project management.

At one of the first project management conferences held in 1972 - the soft techniques were not mentioned at all. They did not exist and nobody even imagined their existence. Delegates discussed project planning by network analysis and nothing else. During the 1970s and 1980s the science of project management developed only by adding more features to network analysis (resource levelling, for example) and using better computer programmes. The science was quite seriously mathematical in those early days. Resource levelling algorithms occupied some of the finest minds in universities and software companies. But it never caught on with real project managers. (Barnes 2002)

### Development of PM Software *(Figure 1)*

In the mid 1980s micro computer project management software started to become more popular. Software from mainframe systems were soon ported to the microcomputer to run on DOS. These systems, such as *Primavera* and *Artemis* relied on text input and were able to manage very large projects, but were not easy to use.

- Early low end system concentrated on a single project and were limited to the number of tasks and resources that could be handled. *Microsoft Project* was one of the first low end products aimed at smaller projects, but soon experienced strong competition from products such as *Super Project*, *Hornet*, *Project Scheduler 4* (*PS4*) to name a few. Two South African products included *Comis* and *CS Project*. Although running on DOS, *Project Schedule 4* was the first product with GUI (Graphics User Interface). However, each release showed further improvements and the competition intensified. Some names fell by he wayside, such as *Hornet, Comis* and many others. The software became feature rich and easy to use. Projects were stored in files.
- With the shift to enterprise project management, we saw a change in the project management tools to support multiple projects and multiple users. By the second half of the 1990s, microcomputer PM software had all the features, and much more, needed for the average project manager. *Project Scheduler 7* was able to handle an unlimited number user-defined fields and quite complex customisation. *Microsoft Project 98* incorporated many ease-of-use features such as predefined project templates for novice project managers.
- By the year 2000, in some cases, these desktop tools became so powerful, they were able to provide a repository-based, client/server environment, that consolidated individual projects and

added multi-project, multi-user time entry, cross-project resource loading and analysis, and cross-project roll-up & reporting. An example of this is Sciforma's *Project Scheduler 8* (*PS8*).

- Anybody who thought that PM software had reached the pinnacle were very wrong. Large scale changes were about to happen. Some tools developed further into full blown Enterprise Project Portfolio Management Systems. Examples are *Microsoft Project 2003 EPM*, Sciforma's *PSNext* and *Primavera*.

In parallel with this trend, the development of Project Portfolio Management tools took place, using built-in multi-project scheduling engines, resource management, and a host of other features. An example of his is *Project Office* from Pacific Edge.

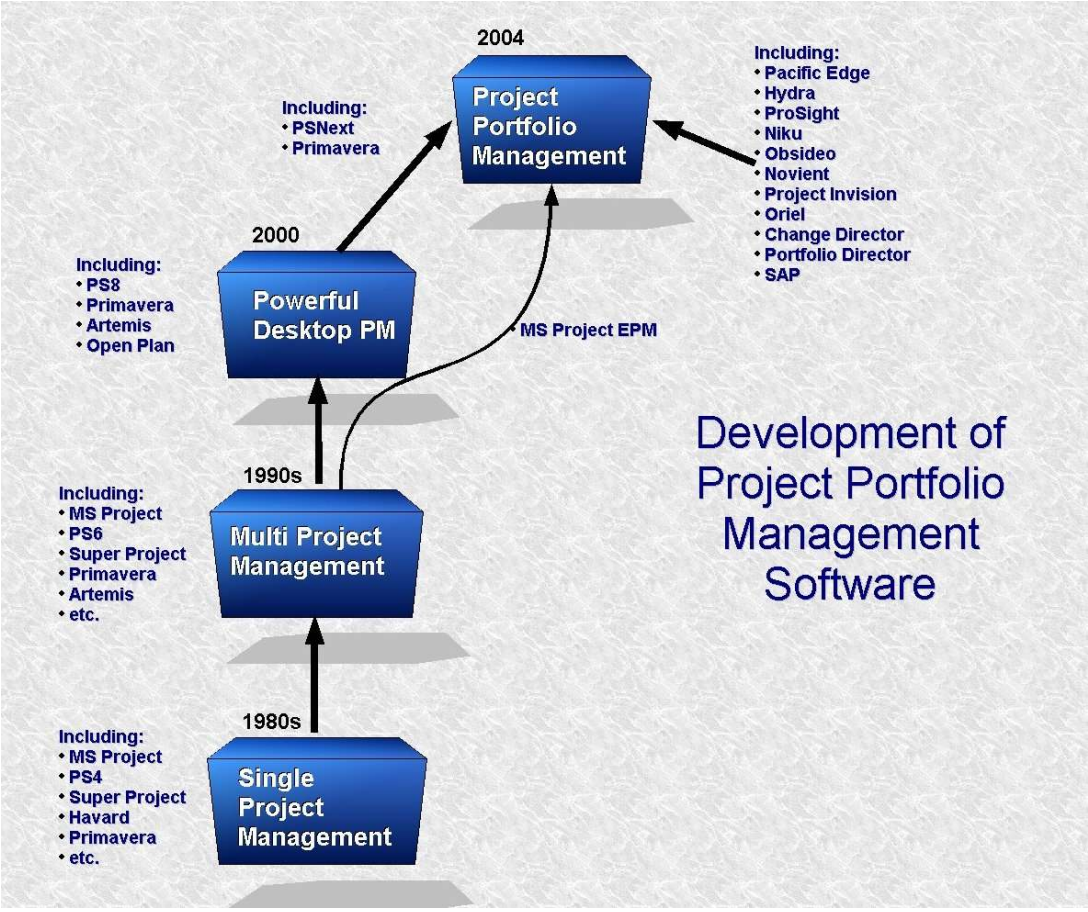


*Figure Number range Figure : Development of Project Portfolio Management (PPM) Software.*

## RECENT DEVELOPMENTS

New Methodologies

- Critical Chain.
- Project Portfolio Management.

Collaboration

- E-mail notification. Users are notified when assigned to new tasks, issues are allocated, warning that due dates are due, timesheets are rejected, tasks are due, etc.
- Document management. A document management system ensures that all users can easily access the correct version of a document. These systems contain security as well as history of previous versions of documents. Documents may also be linked to tasks, departments, projects, timesheets, issues, etc.
- Issue management. Also known as problem tracking. Used to keep track of issues related to Projects or Work Packages or Tasks. Somebody is responsible for resolving an issue with a due date.
- Discussion streams. Allows team members to communicate on a particular topic. Documents and pictures can be included.

Features

- Project Initiation control. For example, only certain people may create a new project.
- Risk management. Allows all risk related information, including affected tasks, mitigating actions and preventative actions. *MS Project 2003 EPM* has a particularly powerful Risk Management System.
- Resource skills management. Allows the planning of skills or generic resources. Sciforma's *PSNext* has strong features to search for suitable available resources with the right skills.
- Role based views of the software. Roles form the basis of *PSNext*. A person with a particular role will only see functions that role requires.
- Sophisticated reporting and data analysis. *MS Project 2003 EPM* uses an a feature called the OLAP Cube which allows management to instantly and graphically view data from any dimension.
- Sophisticated security based on Roles and Organisational structures.
- Unpublished vs Published versions of projects and resources.
- E-mail notification. *Project Office* from Pacific Edge contains an Alerts system which is able to notify users if any value crosses a threshold.
- And of course, the Web. All systems are Web enabled today, some more than others. *PSNext* is fully web enabled is able to run on any platform.
- Client Server database able to quickly handle large volumes of data.

## CRITICAL CHAIN SOFTWARE

Ever since the publication in 1997 of the seminal book by Eliyahu Goldratt called "Critical Chain" (Goldratt 1997), there has been growing interest in his concepts. Some people are of the opinion that Critical Chain represents the biggest breakthrough in project management since PERT and CPM the 1950s. (Baker 2002)

In short, Critical Chain (CC) is based on the concept that whenever anybody estimates a task, it is human nature to build safety into the task. Eg. nobody will knowingly give you an task estimate that has a 50% chance of being late. Thus, tasks contain safety. However, the safety is wasted due to various factors such as **a)** the student syndrome, **b)** work expands to fill the time available (Parkinson's Law) and **c)** the fact that people are not motivated to finish tasks early. The worst offender is **d)** bad multi-tasking, which causes people to interrupt one task to work on another, which in turn is interrupted to work on a third task. With bad multi-asking, projects take much longer to complete with low productivity and low morale.

### The CC Solution

Goldratt proposed that the safety be cut out of the tasks and some of the safety be put back in the form of a buffer at the end of the project. This would be meaningless if people did not also change their work habits. People had to start working like a relay race. When a person finishes a task, the next person must be fully charged and ready to continue immediately, irrespective of scheduled start dates on the project plan. This is only possible if a serious attempt is made to eliminate bad multi-tasking.

IGoldratt suggested that ALL tasks which affect the project end date be called Critical Chain tasks. This includes non-critical path tasks which use key resources thus drawing the resource away from critical tasks. Thus Critical Chain is based not only on network links, but also on resource availability.

Critical Chain promises significant reduction in project duration and better morale. However, practical implementations are not always successful due to the significant cultural adjustments that are needed.

### The Critical Chain Software

Conventional PM software cannot handle the specialized requirements of CC. These include:

- Automatic creating of Project and Feeding buffers based on the amount of safety removed.
- Reverse scheduling during planning to improve cash-flow.
- Identification of the Critical Chain. On a more complex multi-disciplinary project, it is extremely difficult to manually identify the CC.
- Multi-project synchronization using the concept of a Drum resource.
- During tracking, any slippage will result in buffer penetration. Thus buffers need to be locked.
- Linking the CC tasks with special links. There is no need to run the resource leveller to see buffer penetration.

Two Critical Chain toolsets are popular in South Africa:

- *Project Scheduler 8* (*PS8*) which has a very good CC implementation. The strength of PS8 is that it is an integrated system from one vendor with good CC functionality built in. Reporting is also very good.
- *ProChain* is a specialized CC add-on to *MS Project* with some excellent CC features and good reports.

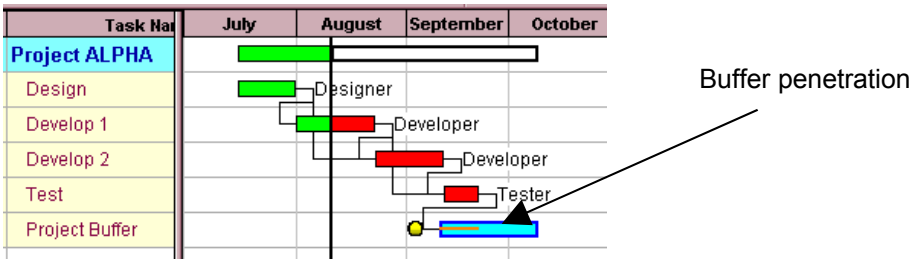


*Figure 1 : Example of a PS8 generated Critical Chain project showing project buffer penetration. A robot (green, yellow, red) is related to the amount of buffer penetration.*

## PORTFOLIO MANAGEMENT and PROJECT PORTFOLIO MANAGEMENT

Another big change in the last 5 years was the development of Portfolio Management. This has become a hot topic.

### What is Portfolio Management ?

There are many definitions for Portfolio Management :

- Portfolio Management is the process of turning a list of initiatives that come from a strategy into a prioritised collection of projects. (Patrick 2003)
- A method of aligning IT with business goals by prioritising IT projects. (CIO 2003)
- A systematic approach to achieving organizational goals through a continual nucleus of projects. (Microsoft, 2003)
- Portfolio Management is the management of the project portfolio so as to maximize the contribution of projects to the overall welfare and success of the enterprise. (Levine 2003A)

All these definitions relate business objectives to projects. Portfolio Management is used to choose the right projects to satisfy a business objective (ie. “doing the right things”), while Project Management (PM) is aimed at executing the projects correctly (ie. “doing things right”)

Perhaps Portfolio Management will become clearer if we look at what it is not. Portfolio Management is not the management of multiple projects. The big mistake to think that Portfolio Management is merely an extension of Project Management. Portfolio Management and PM are not alike at all. Likewise, making the Project Office manager also the Project Portfolio manager, would also be a mistake. (Levine 2003A).

### What is a Project Portfolio Management (PPM) System?

We regard a Project Portfolio Management (PPM) system as a software based system that combines Portfolio Management with Programme and Project Management. Thus a PPM system must be able to link project objectives with strategic objectives, as well as be able to manage programmes and projects.

Project Portfolio Management is the way to go. Suitable tools are essential. However, what is more important than selecting the right tool, is that a proper support structure must be in position. Once the decision is made to implement Project Portfolio Management, and once the proper support structure is in place, the team will want to find tools that adequately support their new way of life.

## SOUTH AFRICAN PPM SYSTEMS

Three PPM tools are popular in South Africa. **Microsoft Project 2003 EPM**, **Sciforma’s PSNext** and **Pacific Edge’s Project Office**. Other PPM systems are in use in South Africa but, we suspect, in such small numbers that we decided not to include them in this evaluation. Although Primavera is a popular tool for most capital projects, it was not included in this study as this product is not known as a PPM system in South Africa.

### Microsoft Project 2003 EPM

Microsoft entered the PPM arena in 2002 with the release of the *Microsoft Office Enterprise Project Management (EPM) Solution* (referred to as *MS Project 2002 EPM*). Late 2003, *MS Project 2003 EPM* was released, containing numerous improvements. *MS Project 2003 EPM* contain various components to fulfil the various functions that make up their EPM solution. See *Figure 2*.

*Microsoft Project 2003 EPM* Components:

- ***Project Professional 2003*** is the latest version of a long line of versions starting with a DOS version in 1988. Other versions include *MS Project V4* (1994)*, MS Project 98, MS Project 2000* and *MS Project 2002*. *MS Project Professional 2003* is the client portion of the EPM solution which is installed locally on a Windows computer. (A lower priced *Project Standard 2003* is available as stand-alone product, but is unable to exchange data with *Project Server 2003*).
- ***Project Server 2003*** This is the server on which various server-based programs run (also called an application server). These programs include Reporting, Portfolio management, Resource management, and Collaboration capabilities. *Project Server 2003* links to the database which is *Microsoft SQL Server*. When opening a project using *Project Professional 2003,* the *Project Server 2003* retrieves the project from the database and passes it to *Project Professional 2003.* See Figure 2.
- ***Project Web Access (PWA)*** is the Web server that enables people to connect to the *Project Server 2003* via *Internet Explorer*. When viewing Timesheets, Reports or Resource data, *Project Server 2003* retrieves the data from the database and passes via *PWA* to the browser. A *Client Access License* (CAL) is required to use *PWA*. (All Web access from any system requires a Web server.)
- ***Windows SharePoint Services (WSS)*** is a component of *Microsoft Windows Server™ 2003* that enables users to share information such as Documents, Issues and Risks. To enable the *WSS*, *Project Server 2003* requires *Windows Server 2003*.
- ***SQL Sever 2000*** is the database used to store the data.

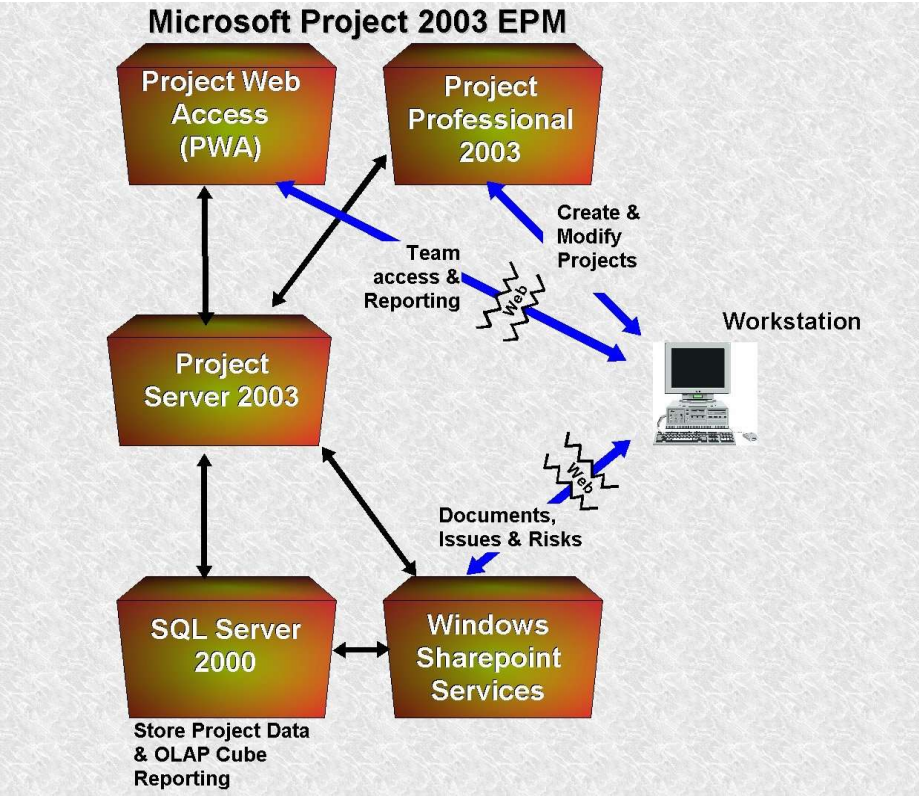


*Figure Number range Figure : Microsoft Project 2003 EPM Components*

Significant Features of *Microsoft Project 2003 EPM* over and above Competitive Systems

- Customisable project guides which simplify the creation of new projects. For example user can hyperlink on steps, such as 'Define the project'; 'List the tasks in the project'; 'Link more task information'; 'Identify risks'; 'Publish to the web' to name a few.
- Powerful Portfolio Analysis using an OLAP Cube. Management is able to slice and dice project information quickly and view the results graphically or in pivot table format.
- Links to Outlook. Users are able to update project tasks in Outlook.
- Customised fields may be marked as obligatory, thus forcing data entry.
- Excellent documentation covering all aspects of the system.

Summary

MS Project 2003 EPM is a fully featured system containing all the components required by an PPM system. Weaknesses include limited flexibility in reports and customisation. Users have to work with three separate

products for different functions. Also (still) only one undo, and weak materials management. Backed by Microsoft, MS Project 2003 EPM will probably become the most widely known PPM system in South Africa. A word of warning though. Implementation is complex and will require considerable input from the implementation partner. Some users who have implemented MS Project EPM suggest that you budget a similar amount for implementation compared to the cost of the software. According to PC Magazine (2003) "People familiar with previous versions of MS Project may be surprised at the complexity of deploying all the components, especially on an enterprise-wide basis.".

## PSNext from Sciforma

Sciforma's *PSNext* is the latest of a long line of project management software versions starting with *PS4* (*Project Scheduler 4*) in the late 1980s, *PS5* in 1990, *PS6* in 1994, *PS7* in 1997 and *PS8* in 2000. According to Sciforma, *PSNext*, released in February 2004, is their most significant offering yet. It does not replace *PS8,* which continues to be Sciforma's desktop PM solution.

*PSNext* Components See *Figure 3.*

PSNext consists of a simple architecture consisting of a Web Server, a Java Application server and a Database. The Java Application Server runs the server based *PSNext* programs and retrieves or stores data on the database. Currently, three database formats are supported, *MS SQL Server, Oracle* and *DB2*.

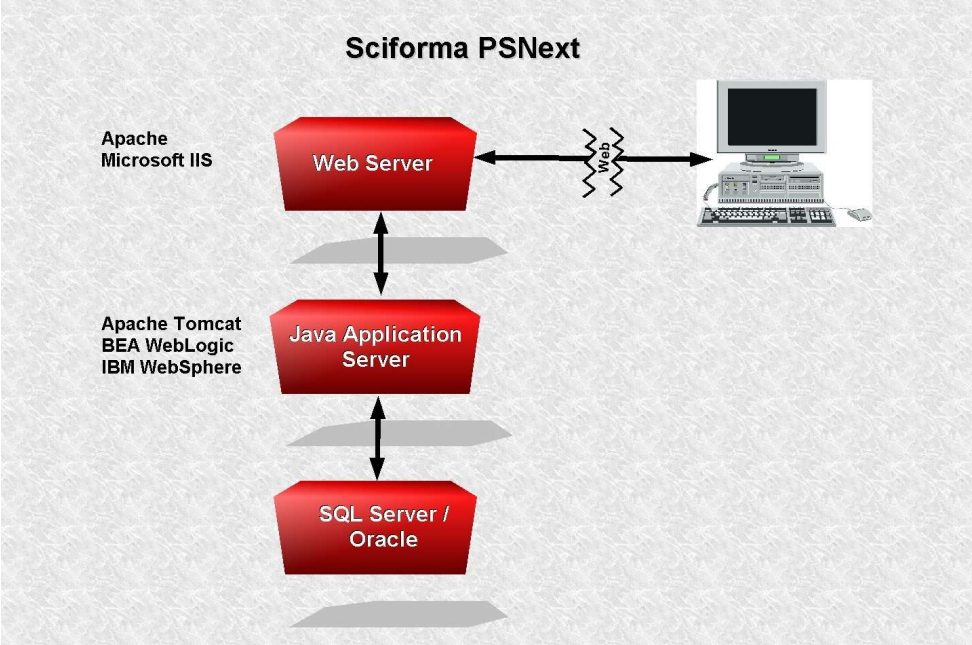


*Figure Number range Figure : PSNext from Sciforma Corp.*

Significant Features of *PSNext* over and above Competitive Systems

- Role Based. *PSNext* is structured around Roles. Various roles are provided, such as Resource management, Cost management, Project initiation, Project planning, Approvals, Team member, etc. When a user is allocated a role, he/she will only see the functions that the role requires.
- *J2EE*. *PSNext* was developed using *Java 2 Enterprise Edition*. This allows PSNext to run on a wide variety of platforms, including Windows, Unix, Linux, etc. *PSNext* is totally Web based and does not contain a mixture of client and web systems.
- Users are faced with a single unified system.
- Working vs. Publish. *PSNext* allows working versions of Resources and Projects. This implies that changes can be made to a resource or a project, without affecting the published version. Timesheets and updates are captured on the published version.
- Work Packages (WPs). A project may consist of many WPs, each of which could be the responsibility of a different person. WPs are subject to security. Network links cross WP boundaries.
- Good Materials management.
- Excellent customisation. PSNext supports an unlimited number of user-defined fields on a wide variety of data tables. A rich variety of field types are provided. Formulas are able to reference data from other data tables.
- Strong Reporting. An object oriented report writer is able to quickly create a mixture of graphic, text and Gantt objects on the same report. Summarisation and Drill down to any number of levels is supported

with little effort. Graphic objects include Gantt, Network, WBS, line, pie, bubble, radar and histogram charts.
- Good Security. Supports field level security.
- Unique pricing system. Each role is assigned one or more Tokens. A company will purchase a number of tokens (minimum 100) which are then consumed as people are assigned roles.

Summary
*PSNext* is a fully featured PPM system. All functions are contained in a unified, well designed product. Users only require a browser in order to run *PSNext*. Weaknesses include no user-defined Outline-code fields (ie. hierarchical fields). No links to Outlook (only available via 3rd party vendors). *PSNext* will appeal to matrix organisations who like its unique features (such as Work Packages) or who need to run on Open Source Software, or who require strong customisation.

## Project Office from Pacific Edge

Pacific Edge's *Project Office* was first launched in 1997. Two main products make up the stable. *Portfolio Edge* operates at the strategic level in the organisation, while *Project Office* operates at the PPM level. *Portfolio Edge* allows full investment life-cycle management by providing sophisticated financial analysis tools and scenario planning. However, we shall concentrate on *Project Office.*

*Project Office* Components (See *Figure 4*)
*Project Office* has a Windows client installation, the *Edge Server*, which is used for setting up the system and communication with *MS Project*. Regular updates and timesheets are performed using the *Project Office Web Server* (in *Figure 4*, the Web Server (IIS) and Application Server is combined in one box on the diagram.) The *Project Office Alerts Web Server* is used to send out alert messages via e-mail.

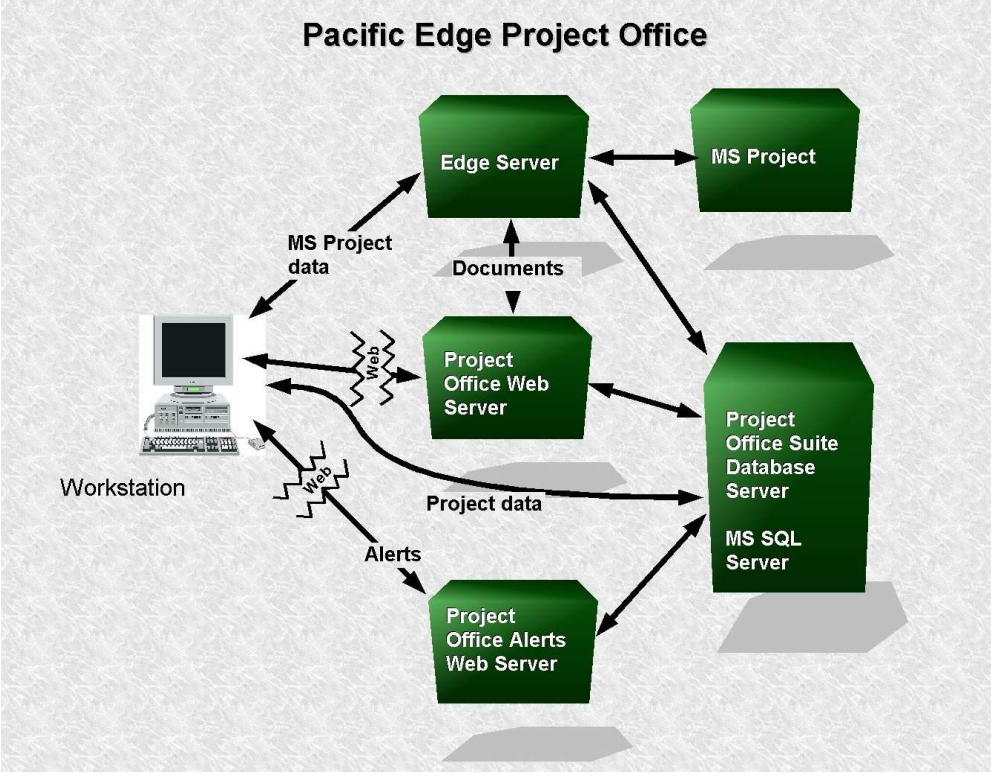


*Figure Number range Figure : Project Office from Pacific Edge*

Significant Features of *Project Office* over and above Competitive Systems
- Ease of implementation and customisation. Pacific Edge claim this as one of the major benefits of their product. For example a number of templates are provided (IT, Product development, Sales, etc) that allow users to quickly implement the project life cycle process.
- Ability to include product life cycles.
- Ability to have different project capture screens depending on the type of project. Ie. a large project require more information than a small project.
- Strong *MS Project* links. Allows easy bi-directional transfer of information between *Project Office* and *MS Project.*
- A top-down planning approach is supported. When doing top-down planning, *MS Project* is not required.

- Alerts system. Any data item may be included in the alerts system which will trigger an e-mail when threshold values are exceeded.
- Change log. Able to capture and track changes to the project.
- Uses *Crystal Decisions* (the enterprise version of *Crystal Reports*) for reporting. This provides powerful graphic and text web reports with robots and drill-down facilities. Many consultants are available to provide customisation.

Summary
*Project Office* has all the features required by a PPM system, except for scheduling and reporting (which is taken care of by the strong link to *MS Project* and the use of *Crystal Decisions*). Weaknesses include an environment limited to the Microsoft operating system environment, not easy customisation of using *Crystal Decisions* (compared to *PSNext*), weak skills management, robots status symbols not available inside the application (only in reports), does not support multiple project versions (ie. working, published, archived, etc.) Project Office will appeal to companies who wish to continue using *MS Project* and install a strong PPM system that can be implemented quickly and affordably.

## SPECIFIC REQUIREMENS OF PPM TOOLS

Levine (2003B) has identified ten capabilities and features that PPM tools should be able to provide, over and above traditional project management software functions. The three products discussed above are rated according to the Levine's requirements.

| Description of PPM Requirement | Microsoft Project 2003 EPM | Sciforma's PSNext | Pacific Edge's Project Office |
|---|---|---|---|
| **Timesheets**<br>Must contain electronic time sheets.<br>Must also allow progress entry, such as revised estimate-to-complete data.<br>Remote time capture via e-mail or via the web.<br>Should also provide for management review and approval. | Yes to all. Resource assignment fields are updated. | Yes to all. PSNext provide flexible update options including Task updates. | Yes to all. |
| **Client Server Database**. Posting and retention of project data in an open database. This database acts as a repository for the data produced by various PM tools, as well as connectivity to other data of the enterprise. | Microsoft SQL Server 2000 and later is supported. | Microsoft SQL Server 2000, Oracle 8, Oracle 9. and DB2. | Microsoft SQL Server or Oracle. |
| **Financial Integration.** (For some applications) integration with corporate accounting systems. This will allow project managers and executives to view not only project schedules and budgets, but actual cost as well. | Published APIs (Application Programming Interface) are available to allow linking with other systems in the enterprise. | Published APIs (Application Programming Interface) are available to allow linking with other systems in the enterprise. | APIs not available. Uses XML technology for linking. |

| Description of PPM Requirement (cont.) | Microsoft Project 2003 EPM | Sciforma's PSNext | Pacific Edge's Project Office |
|---|---|---|---|
| **Earned value** computation to support schedule and cost variance analysis. | Full support. | Full support. | Supported. |
| **High level resource loading.** Mid and high level resource loading and budgeting, with discrete spreading capabilities, to allow analysis of proposed projects without requiring planning at the detailed level. | No particular features to achieve this. However, the same result can achieved by assigning resources to a high level task in a project. | No particular features to achieve this. However, the same result can achieved by assigning resources to a high level task in a project. | The application allows for a top-down tasks planning and budgeting. The top-down plan may then be exported to scheduling software for detailed scheduling and resource loading. |
| **Risk Assessment**, including ranking of project risks, determination of risk possibility and impact of the risk event. Good risk management practice supports the inclusion of proposed mitigation plans and the appraisal of the cost effect of taking mitigation action as opposed to cost of the risk event. | Contains a well developed risk management system including information such as responsible persons, category, probability, cost, due date, impact, mitigation plan, contingency plan, affected tasks and trigger events. A risk may also be linked to documents, issues or other risks. | User-defined fields are used to capture risk-related information. Issues are also able to handle risks.<br><br>Bubble charts allow comparison of project risks. | A risk matrix may be included that will allow for ranking of risks based on probability and impact calculations. Appraisal of actions may take place through the modeling of different scenarios, e.g. aggressive, cautious, etc. |
| **Objectives management.** The capability to define, display and communicate the enterprise objectives and to relate them to the supporting projects. | Projects may be grouped in a hierarchy which correspond to enterprise objectives (using an Outline code field). | Projects may be grouped according to enterprise objectives. Status robots may be displayed at group level (or any other level) | Projects may be linked to an strategic objective. A graphic display shows investment in projects and project contribution to the organisations objectives. |
| **Web enabled.** An operating environment that encourages access by a wide variety of personnel, from dispersed locations, via networked and web-based protocols. | The Project Web Access module allows for access to timesheets, tasks, reports, issues and risks. The options on this Web portal may be customized to suit the requirements of the people involved. The Web components are developed in .NET<br><br>Project planning is not Web-based (uses MS Project Professional 2003). | PSNext was developed using Java 2 Enterprise Edition (J2EE) thus making the product fully Web enabled. It is also able to run on a variety of platforms, including Open Source Software. | The user interface is web-based and can be customised for individual groups.<br><br>Setting up not Web-based (uses a Windows client).<br><br>The Web components are developed in .NET |

## LIFECYCLE OF SUCCESSFUL SOFTWARE PRODUCTS (adapted from Morendil 2003)

In order to better evaluate software tools, it is useful to understand the typical lifecycle of a successful software product.

1. The product is initially released with basic functionality, containing new ideas supported by a solid design and with few defects.
2. Due to the success of the product, the vendor is able to afford adding features (and some defects), often not directly related to the product's core objectives. Many features are requested by a small, but vocal, percentage of users, thus contributing to the feature-richness of the product, however features that are not required by the majority of users.
3. As the design deteriorates under the conflicting tensions imposed by unrelated feature areas, the product becomes harder and harder to modify without generating large numbers of defects. In addition, the vendor continues to respond to user requests. However, users do not have strategic vision and are not asking the vendor to prepare for the-next-big-thing. (Examples of the-next-big-thing is conversion from DOS to Windows, conversion to the Web, the popularity of PPM, etc. )
4. Eventually, this "software entropy" reaches a critical mass, where each defect fixed engenders new defects as a side-effect. In addition, the vendor is saddled by a feature-rich product which suddenly is not selling due to the arrival of the-next-big-thing.
5. The product dies, and perhaps the vendor as well - unless the vendor has taken the right strategic steps early on in the product lifecycle.

There are at least two strategies that would reduce the risks of the product dying and increase overall revenue over longer periods.

1. As soon as the initial product generates sufficient revenue to do so, the vendor should invest a small portion of income to work on a new product. The vendor must scan the environment to try and identify the-next-big-thing. By the time the main product runs out of steam, a new offering will be ready to take up the slack. This is the strategy that has been followed by Sciforma for many years, thus ensuring the continued success of the Project Scheduler series. Sciforma has done a total redevelopment at least three times : for Windows 3.1 (*PS6*), Windows 95 (*PS7*) and recently for the Web (*PSNext*).
2. A second strategy is piecemeal replacement - break up the product into portions which can evolve independently of each other. This is the strategy that has been followed by Microsoft. The current *Project 2003 EPM* product is a mixture of old technology (ie. *MS Project Professional*) and new technology (ie. *Project Web Access* and *Project Server*). It is likely that a future version will be fully web enabled.

Many other products who did not follow one of these strategies have died along the way.

## SUMMARY

The growth of enterprise project management have stimulated the development of a new generation of Project Portfolio Management (PPM) software systems. PPM systems of today show little resemblance to project management software of the 1990s. Today PPM system contain a host of features for collaboration, project initiation, version control, security, roles, issues, documentation, reporting, web based updates and e-mail notification. All modern PPM systems are based on a client server database (as opposed to file based storage). Three systems popular in the South African context are *Microsoft Project 2003 EPM*, Sciforma's *PSNext* and Pacific Edge's *Project Office*. Each system has particular strengths which will appeal to users who need those features.

Although the emphasis of this paper has been software technology, it must be noted that the biggest challenge in implementing a PPM system is the lack of a project management culture in many organisations.

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