APPLICATION OF PRIMAVERA ENTERPRISE
IN ELECTRIC POWER DISTRIBUTION OF BELGRADE

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INTRODUCTION

This paper describes the implementation of Primavera Enterprise software for Project Management in Electric Power Distribution Company of Belgrade, Serbia (EDB - Elektrodistribucija Beograd) based on the real-life investment project examples from fiscal year 2003 and 2004.

Primavera Enterprise is comprehensive, multiproject planning and control software, built on SQL, Oracle, and InterBase server databases for enterprise – wide project management implementations.

EDB BUSINESS NEED AND PM IT SOLUTION PLATFORM

In today’s complex business environment in Serbia, electric utility organizations (like EDB in Belgrade) often have multiple projects underway at the same time, sharing the same resources. To ensure that projects are completed on time and within budget, executives, project managers, and other members of the project team need to be able to see both summary and detail information about all aspects of all projects in the enterprise - both planned and in progress.

For EDB Primavera Enterprise platform has provided the enterprise structure needed to manage multiple projects-from the highest levels of the organization to the individuals that perform specific tasks.

Primavera Enterprise Project Management Solution includes Primavera Project Planner for the Enterprise (abbreviated P3e), which can be used as stand alone for project and resource management, or it can be used with other PM companion products. For example, Primavera Progress Reporter enables Web-based team communication and time keeping, Primavera Portfolio Analyst provides project analysis across the enterprise, and Primavision allows users to access project management data via the Internet.

P3e is a multiuser, multiproject system with scheduling and resource control capabilities supporting complex project hierarchies, durations and scheduling in time units as small as minutes, resource scheduling with a focus on roles and skills, recording of actual data, customizable views, and user-definable data.

In EDB P3e was ideal IT solution because it fit the need to simultaneously manage multiple project and support multiuser access across a department or across the entire enterprise. It supports an enterprise project structure (EPS) with an unlimited number of project, activities, baselines, resources, work breakdown structures (WBS), organizational breakdown structure (OBS), user-defined codes, and critical-path-method scheduling and resource levelling.

On the other hand it also provides centralized resource management. This includes resource timesheet approval and ability to communicate with project resources who use Progress Reporter, Primavera Enterprise/s Web-based timesheet management, issue tracking, and management by threshold.

MANAGING CAPITAL PROJECTS IN EDB

Before implementing P3e to schedule projects, team members and other project participants were thoroughly trained to understand the processes involved in project management and the associated recommendations that help smooth implementation of the software that supports corporate mission.

Simply stated, all key stakeholders had to understand that project management is the process of achieving goals within the constraints of time, budget, and staffing restrictions and not some software tool reserved for IT managers or engineers.

The key point for putting project managers on the same page was the fact that project management allows project managers to get the most out of company available resources. For Top Executives company resources were easily defined as: People, Materials, Money, Equipment, Information, Facilities and Knowledge.

But the hardest thing to describe and prove was that Project Management across the enterprise factors in all of these variables across multiple projects, enabling project managers and company executives to see an accurate picture of how project/s resource use affects other projects. The process of project management in EDB was finally defined based on three key principles:

• Planning
• Controlling
• Managing
Planning a project

The first step in EDB capital project management process is to define a project. It includes the following questions and answers set:

- What is the scope of the project?
- What is the project duration?
- What resources are available to the project?
- Who will perform what tasks?
- How much will the project cost?
- What is the estimated budget?

The answers to these questions form the framework of a project to EDB managers.

Controlling a project

Once the management has built the project and estimated the budgeting needs, Project Manager provides to management detailed project plan and after his/her plan is approved saves his/her original plan as a baseline to help himself/herself control the project in the next phase.

A baseline provides a solid point of reference as project schedule changes over time. It allows project manager to compare the original schedule to the current one and identifies significant changes and develops contingency plans. EDB Project manager on weekly basis collect and compare all project actuals (time, scope, costs) in order to keep project heading in the right direction. Effective project control in EDB reaps many benefits. It allows Project Manager to keep a close eye on possible problems before they become critical (and costly). And it also enables the project team and senior management to view real-time cost and scheduling timeframes based on the reality of the actual schedule.

Managing a project

This process, as defined by EDB management, is the process of guiding a project from start to finish and this process is the shared responsibility of functional and project manager. A good project manager wears many hats, acting at various times as a motivator, communicator, coordinator, and advisor to the project team. On the other hand EDB functional manager is always there to help if resources became scarce or the specific knowledge and know-how becomes unavailable to the project team.

On the end of the day, as the project’s progress is being monitored weekly, it is the Project Manager’s job to keep the project team aware of changes to the schedule and scope. Effective project management also requires consistency on when to engage the upper management regarding the project details. This project communication issue has been resolved in EDB by regular daily on-line update based on Primavera software solution that includes baseline and progress of all major project values such as:

- Dates on which activities started or finished
- Quantities of resources consumed
- Changes to scope
- Unit price changes

EDB SINGLE PROJECT MANAGEMENT IMPLEMENTATION PROCESS

Utilization of Primavera Enterprise Project Management Solution in Sector for Capital Investments of EDB will be explained using the example of pilot project »District network in suburban area Borca Greda«. Definitions and explanations of this particular investment project, planned and executed in 2003, will be given simultaneously with definitions commonly used in Primavera Project Management software solution.

Enterprise Project Structure (EPS)

In EDB, typically top management users in an enterprise will have access to a large database that contains all the projects and project-related information from the field. The information this database contains must be structured in a way that allows individuals to access the project data they need, quickly and accurately. In P3e, database of projects is arranged in a hierarchy called the enterprise project structure (EPS). The EPS is further subdivided into 3 main levels or nodes as needed for efficient project analyses from the enterprise perspective. The 3 main EPS nodes are Projects Planned, Project in Execution and Project Completed. Part of the Enterprise Project Structure of EDB projects is shown in Fig. 1. It is not the complete EPS of EDB company’s projects but it rather represents the PM’s perspective of it. The seven projects in the first subdivision of EPS are in planned status, meaning that these projects are not in a progress state in a given instance of time.

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Organization Breakdown Structure (OBS)

Organizational Breakdown Structure (abbreviated OBS). In EDB, the organizational breakdown structure is a global hierarchy that represents the managers responsible for the projects in an enterprise. The OBS reflects the management structure of an organization, from top-level personnel down through the various levels constituting department managers. When specific responsible manager is associated with an EPS node, any project added to the branch of this EPS is assigned to that manager’s responsibility by default. OBS hierarchy is also used to grant user’s specific access privileges to project level data and project WBS level data.

Work Breakdown Structure (WBS)

A Work Breakdown Structure (WBS) is a hierarchical arrangement of the products and services produced during the project. The project is the highest level of the WBS while an individual activity required creating a product or service is the lowest level. Each project in the Enterprise Project Structure has its own WBS. When creating a project in P3e, the project manager typically develops the WBS first, assigns reference documents to each WBS element, and then defines activities for performing the element’s work.

As it can be seen from Figure 2, Work Breakdown Structure begins with the node of highest level. So, in the root of the tree is the name of the project. The WBS subdivision nodes on lower level are commonly used in EDB Company for TS 10/0.4 kV. This arrangement can also be available for some other type of projects. In the example of project which is considered in this paper only the Realization is subdivided in three parts on the lowest hierarchical level: Preliminary Activities, Building Activities and Final Activities.

For each hierarchical level (node) a Responsible Manager is defined. For example Goran Živadinović is the Responsible Manager at the root of the WBS, and Lidiija Stanković for WBS element called Prethodne aktivnosti, and so forth.

FIGURE 2 – An example of WBS

Activity network

A detailed list of activities can be added for each WBS element on the lowest hierarchical level. This process is shown on the left-hand side of Figure 3. Therefore, WBS element 4518.2.1 (Prethodne aktivnosti) is subdivided into 9 activities, each of them having Activity Code (»A2490x« for example) and Activity Name (»Revidovanje Projekta - Interno«). Original Duration Column shows the duration of each activity. So, original duration of A2490 activity is 1 day.

FIGURE 3 – Activity table and Gantt chart

The right-hand side of Fig. 3 graphically shows the duration of activities and Timescale. All activities have its planned start and planned finish, which are displayed with the Primary Baselines. So the planned finish of activity A2480 is 23 May 03. Actual finish of that activity is 26 May 03. Duration of an activity is separated on two parts: Actual Work and Remaining Work. For example the remaining duration of A2500 activity is 6 days. Gantt Chart shows the state of all activities at some particularly instant of time called Data Date. In our example Data Date is 04-June-03.

Activity Network is shown in Fig. 4. To create an activity network all relationships between activities must be first defined.

FIGURE 4 – The part of the activity network showing activities that belong to WBS-element “Gradenje objekta”
EDB ENTERPRISE WIDE PROJECT
MANAGEMENT IMPLEMENTATION PROCESS

Implementation of Primavera Enterprise software was started at the beginning of 2002. The team, whose members were engineers from Sector for Capital Investment, was formed in order to define and execute “The Project of Enterprise wide PM Implementation”. As a first result of this team work, two models of typical projects that are commonly managed in Sector for Investment were established. Although, the Activity Networks for different projects are not the same, it helped us in planning the particular projects. Thus, the project »District network in suburban area Borca Greda« differs from the Model of project of that type in some elements, but not completely.

After the PM Methodology training, CPM consulting team has also implemented Primavera software setup and training. When basic platform had been finished, Pilot-Project based on the previously defined model was introduced, and managing some of the projects of Sector for Investment has been started. Here are the most important experiences and considerations based on utilizing Enterprise wide Project Management in EDB.

Maturing the PM tools and the PM processes

Given the renewed EDB focus on project management as the delivery system for corporate capital and maintenance projects, it is natural for organizations to seek a method of ascertaining the maturity of their current project management processes. Therefore in the first phase of this project CPM consulting team and the authors have thoroughly analyzed a standard PMI Project Management Capability Maturity Model (PMCMM) and applied it within an EDB.

This process has gained the endorsement of the company’s management and “buy-in” by the rank and file employees. Even more to the point and used in conjunction with the requisite training and reinforcement, the CPM team has help EDB management to produce significant positive results within only a few months after initial application. This section will therefore focus on the following:

1. Outline the development of PM tools that the authors have recently employed to help organizations assess their project status,
2. Indicate how “go-forward” plans were developed and reviewed
3. Indicate the potential application of PM tools toward other projects in the region.

First, we would like to describe the experience in utilizing PM tools from the management point of view. Utilizing specific PM tools affects the following items:

1. Procedures applying in process of execution of projects have become transparent to all project participants,
2. Project Management process is now comprehensively defined for all users,
3. Enterprise wide PM tools support “a big picture” in managing projects from top management perspective, that is allows top managers to view the project details all at once in on-line manner,
4. Teamwork in planning and responsibility in controlling and managing project activities needs to be established and supported at the Department level and generally in a Company as a whole.

In the past for many EDB projects, project-team was commonly not been formed. Thus the WBS elements and corresponding Activity Networks were not planned by the responsible managers (PM) or the members of the team but usually only one man has acted all the roles. The project planning was a typical “One man show”. For many companies in utility sector in Serbia this is a serious problem that can dramatically reduce all other benefits of using PM tools enterprise wide.

Here are some of the best practice experiences of CPM consulting team that helped implementation of PM tools in EDB. The initial task list for the consulting team supporting the implementation of PM tools is as follows:

1. To fully understand the organizational culture and processes of the client.
2. To educate the core management team.
3. To use PM maturity tools to objectively evaluate the client’s project management processes and IT infrastructure against measurable criteria.
4. To provide a written report and review with the client’s top management level.
5. To recommend changes to both IT infrastructure and PM processes “To get the Project Management Maturity to the next level,”

From Author’s working experience on several similar projects, these initial methodology steps provide the most accurate and useful information basis regarding both the PM processes and the organizational PM maturity with the least risk of significant implementation errors in the future (delays, budget changes, unsatisfied client, scope creep etc.). Learning about the existing PM norms and skills before implementing any new PM software tools authors have improved understanding of EDB’s existing PM maturity and therefore enabled successful project implementation.
LESSONS LEARNED

During the course of this project Top Management was kept totally involved and engaged, first by presentation and approval of a proposed consultation scope of work, and later by a constantly updated WBS and a schedule (yes, there was considerable “scope creep”) with Earned Value criteria so that the client always knew where it had been, where it was going, and (more to the point!) how much the consulting project was going to cost.

The initial report of the “preliminary” interview/survey was reviewed with the client and it was explained where differences existed between “what was designed” (client’s designed process) and “what existed” (what the client’s PMO and supporting personnel actually thought and were doing).

These differences were further explained in terms of improvement goals that were achievable at various levels. Since CPM had also performed a statistical analysis, we were also able to present the degree of correlation achieved for each individual survey question and for the survey process overall. The client comments (or “push back”) were then analyzed, responded to, and (where applicable) integrated into the “final” or formal report.

One of the most striking benefits of this overall PM implementation process was the change in corporate culture. Although the project managers were defined by the effective process as “accountable” for costs (generally defined as both “being responsible” and “possessing requisite authority”), there was no infrastructure to provide cost reporting and forecasting, nor did they possess or exercise any significant control over project expenditures.

There are many more such examples that could be cited of an observed “delta” between “designed” and “actual” processes, but these will suffice to convey the degree of change in attitude and corporate culture that was required and is even now progressing in EDB. In general, the overall results of the more specific recommendations have been positive and particularly very positive in the areas as follows:

1. In the area of team building and communication.
2. The client has revamped their old paper-based scheduling system and upgraded to a more robust enterprise scheduling tool (P3e) that provides the requisite level of response.
3. An automated cost tracking, reporting, and forecasting system has been developed and is being implemented.
4. Material expediting and tracking, once a function belonging almost solely to the overworked field construction engineers, has been taken over by a new “material tracking and expediting” functionality over to the EDB from the Resource manager.

REFERENCES

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