Computers & Project Management CMI

Part 1: Topic: Overview of Computers in a Project Management context

Overview: To gain an overview of when, how and where Computers are used in Project Management. We will look at some examples of use, some of the products available and will also take a brief look at the history of Computers in Project Management.

Objectives: The student will learn the basics of why and how IT systems / applications are used in the Project Management life cycle. Areas covered are as follows:

- Understanding the basic role of software systems and tools in project management
- A brief history of the use of computers in project management
- Distinguishing between project, programme and portfolio management tools
- The benefits of using Computers in Project Management
- Common components of Project Management Tools
- An introduction to some of the project management tools available today

Introduction

Regardless of the project type or the project stage, a project manager is completely reliant on information to successfully manage and deliver his / her project. This is the case throughout project concept, planning, implementation, completion and closure.

Today, computers and more specifically project management applications or systems are the tools used to store, process and output much of this information. Project management tools vary in complexity from simple calendars to sophisticated project portfolio and programme management suites.

In simple terms, project data should be organised to allow project managers and project teams understand the when, what, who, why and where of their projects.

Software utilities, systems and tools have been developed to specifically service and suit the project management profession. In historical terms, many of the old manual and mathematical functions and features of Project Management have now been computerised and in many cases, integrated into single applications or "suites" of applications. In addition, may specialised utilities have been built to serve high-end, specialised needs such as probability (scheduling and cost) analysis – to gauge the certainty with which a cost or a schedule for a project can be expressed.

A brief history

"Management science" entered the business lexicon in the early 20th century. Pioneers in industry such as Henry Ford and theorists like Frederick Winslow Taylor recognised the repetitive nature of work. This was later refined by the Japanese concept of "kaizen" or continuous improvement. In the same period, Henry Gantt introduced his charts to the world and Gantt Charts remain a standard element of project plans to this day.

Project management only really emerged as a specific discipline in the 1950s. As project management itself advanced in sophistication and in recognition so too did the systems and applications available to support it. It is no coincidence that many project management tools still retain the look and feel of an engineer's diagrams. Many Project Management professionals were IT and engineering literate and used powerful mainframes to run specially

designed software to assist in the management of highly complex projects. As with many of the IT innovations of the mid-20th century, the U.S. Pentagon was at the forefront - along with some of world's leading corporations such as Du Pont, Motorola and IBM, to mention a few.

The arrival of the personal computer opened up much of the technology previously only available to large corporations. Project management software for desktop computers, such as *Primavera* and *Rational Project Manager*, began to emerge during this time. Most project management applications now tend to be compatible with *Microsoft Windows*, the dominant operating system. This dominance now also extends to project management applications as *MS Project* is the most commonly used tool in the world, with the Gantt chart at the heart of it. The advent of computer networks and file-sharing has allowed these applications to be become collaborative tools that can be used in multi-disciplinary, multi-location and culturally diverse organisations.

Project, Programme and Portfolio Management

There are a number of definitions for projects, from the PMI's Project Management Body of Knowledge (PMBOK):

- "a temporary endeavour undertaken to create a unique product, service or result"

And PRINCE2:

- "an unique set of co-ordinated activities, with definite starting and finishing points, undertaken by an individual or team to meet specific objectives within defined time, cost and performance parameters".

There are many applications available to facilitate the management of individual projects. This does not necessarily mean that everyone should rush out to purchase one of these tools. In many cases, existing Microsoft *Office* applications including *Excel*, *Word* and *Outlook* can get the job done. It can be simply a matter of retaining existing project plans etc. as templates for re-use on similar projects.

Of those applications that are available for the management of individual projects, *MS Project* is the most common. It is reasonably cheap and is relatively easy to use. Other similar applications include *Primavera* and *Project-in-a-Box*, the latter of which provides free downloadable versions.
Projects rarely exist in isolation within an organisation. Projects that are obviously related may be managed in a programme structure. Organisations with a more mature approach to project management will also recognise the existence of a project portfolio and the need for Project Portfolio Management (PPM).

It is in the management of programmes and the application of PPM that the more advanced project management applications come to the fore. These will be referred to as PPM tools. Microsoft has an offering called Enterprise Project Manager which uses information and data fed from multiple MS Project files. Other applications include CA's *Clarity*, IBM's *Rational Project Manager* and *Planview*.

All PPM tools include the functionality required to manage individual projects and then take the information from those individual projects to provide a more holistic view of the overall

projects portfolio or programme. This allows a more complete view of workload for individual resources, budget expenditure, schedule variance, integrated critical path etc. which in turn allows the organisation to plan for shortfalls in advance.

Many PPM tools also provide for the period before a piece of work actually becomes a project – this is generally referred to as "demand management". An example of a known demand is the notification that legislation relating to the selling of a company's products is to be changed in the following year. In this example, the company is made aware that there will be changes but is as yet unaware of any detail.

A demand management function within the tool allows the company to factor in the likely need for a project in the next year as early as possible. The addition of further work for the relevant resources can be made early; in this case the Legal Department and Marketing are likely to be involved for instance.

Benefits of Project Management Software

When the correct project management solution has been implemented and staff are appropriately trained to use the software, the likelihood that important deadlines are meet and budgets are not exceed greatly increases, which potentially leads to a greater return on investment. There are several benefits of using project management software including:

- Team members can manage their timelines and calendars in a single application.
- Project managers can easily prioritise tasks, set new tasks and assign tasks to others.
- All budgeting information can be maintained within the application.
- Team members can have access to lists of tasks that have been assigned to themselves and to all other members.
- Reports, such as budget and timeline reports, can be compiled from the data and used to communicate status.
- Assessment of planned vs. actual instantly available on newly delivered items.
- Increased efficiency, productivity, and transparency by giving team members access to a single tool which allows them to manage and track their progress.
- What-if scenario capability can be used to determine the effect of different variables on the project schedule and costs.
- Integrated functionality can offer added control and also increase efficiency.

Of course project management software cannot and will never replace the need for dedicated and experienced project managers.

Possible Downfalls of Project Management Software

While the use of PM software can make the job of a PM much easier, there are also downfalls to be considered especially if the software choose is not the best fit for the PM and the organisation:

- PM software too complicated.
  The software may be far too complicated for the types of projects that are being

undertaken. Too much time can be spent on figuring out the program than on the project itself.

- Too costly.
  Purchasing a PM software tool may be costly and the organisation may not see the benefits of a complicated package that requires training and support.

- May not adapt to the culture of the team.
  It is important to adapt to the composition of the team and to the work-styles of the team. Contractors may for example have their own method of tracking projects already established.

- Over reliance on the PM software.
  It can happen that too much emphasis is placed on the software and the PM becomes over reliant on the tool, losing the personal touch of face to face meetings and the knowledge gained from being on the ground and engaged.

Common components of Project Management Tools

Some of the common components of project management tools are listed below. These will be assessed in more detail in the coming weeks.

- Gantt Charts – calendar layouts in use since early 1900s
- Work or Product Breakdown Structures – task, work package or product specific breakdown of project work
- Critical Path Diagrams – logical start to finish diagrams of the work to be completed
- Resource allocation – resource pools / resource levelling
- Organisation Structure – outline of project teams
- Cost loading – attaching costs to items of work (tasks)
- Network diagrams – logic checking leads and lags in schedule tasks
- Budget Tracking / Cash Flow – expenditure on the project

Risk and Issue logs – often maintained in Excel and / or specialist applications:

- Risk Log – record of all risks identified
- Issue Log – record of all issues identified

Most also support the concept of "baselining". This is where you agree and approve a plan for costs, schedule, resources etc. and then start the project. As the project is executed, actual costs and progress etc. is compared back against the baseline and differences (+/-) are notes, reviewed and reported on.

Project Management tools available today

The table below shows some of the Project Management software tools available on the market today. The selection includes a representation of tools from all levels of the spectrum – simple individual project management to advanced project portfolio management. Searches on the internet will uncover a vast array of tools and utilities, so organisations much carefully select the appropriate tool for their context.

Many software vendors now offer modular suites of applications for Project Management. Each module integrates to a central or "core" module. This allows you to buy only those components and functions that your business (and project) needs.

Product Name	Level	Brief Description
MS Project	Desktop application for individual projects.	Dominant product, cheap and easy to use. Does have limitations.
MS Enterprise Project Manager	PPM tools using MS Project as the base.	Require hardware, suffers from limitations of MS Project.
Project in a Box	Various levels available from simple projects to advanced PPM.	PRINCE2 focussed, free for less advanced versions.
Primavera	Advanced PPM tool.	Claim to be world leader in area, major player in construction projects.
Clarity (CA)	Advanced PPM tool.	Frequently top of Gartner matrix, marginally ahead of Primavera. Subject to "leap-frog".
HP Project & Portfolio	Advanced PPM tool.	Another leading product.
Rational Project Manager (IBM)	Advanced PPM tool.	IBM offering, interoperable with Rational suite of products.
Hydra (Project Management Group)	Advanced PPM tool.	UK developed, well used in UK public sector.
Planview	Advanced PPM tool.	Well respected, features on Gartner.
PAT	Advanced PPM tool.	Another PRINCE2 focussed product.
Project.net	PPM tool.	Open-source product.

Conclusion / Summary

We have taken a high level look at the context in which Software is used in Project Management. The key consideration in today's Project Management world is that very few projects that are undertaken these days, do not make use of Computers to some extent. The more complex a project is, the more likely it is that the sponsoring organisation (and contractors) will use specialist project management software and related IT systems.

Student preparation (informal):

To prepare yourself for the class, try having a look on the Internet for information in the subject area. Searches such as: "Project Portfolio Management Software"; "Project Management Software" will yield a large array of feedback and will provide you with some interesting insights into how broad this area can be.

Further Reading /Reference:

Books / reference:

- Project Management, 9th Edition – Dennis Lock (Gower)
- Guide to the Project Management Body of Knowledge (PMBOK), 5th edition, PMI.
- Managing Successful Projects with PRINCE2, OGC 2005.

Internet:

www.prince-officialsite.com – PRINCE2 website
www.pmi.org – Project Management Institute
www.ipma.ch – International Project Management Association
www.Gartner.com – Gartner website, IT consultancy
www.brighthubpm.com – Bright Hub PM Project Management