Software Project Management

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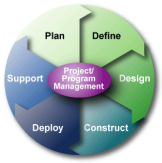
Objectives

- To present *what* is software project management
- To present *basic concepts* of software project management
- To monitor and track development *progress*
- To control project *changes*
- To report project *status*
- To evaluate project *result*

References

1. Roger S. Pressman. Software Engineering -- A Practitioner's Approach. 7th Edition. McGraw-Hill. 2010.
2. Project Management Institute. A Guide to the Project Management Body of Knowledge. 4rd Edition. Project Management Institute. 2008.
3. Project Management Institute. *Practice Standard for Earned Value Management*. 2005.
4. Jennifer Greene and Andrew Stellman. *Applied Software Project Management*. 2005.
5. http://spectrum.ieee.org/computing/software/why-software-fails/3

Software Project Management



Project management is the discipline of planning, organizing, securing and managing resources to bring about the successful completion of specific project goals and objectives. [Longman Dictionary of Business English, 1996]

- Define the *scope* and analyze the *feasibility* of your project
- Estimate the *effort* required to do the work and schedule your project
- Manage the *requirements*, specifications, design, programming, and testing of the software or items purchases
- Manage the *development process* of project
- Liaison with *customer* and management about the project
- Provide *guidance* if your project runs into quality problems
- Make *effective changes* to the way projects are run in your organization

Who are interested in Project Management?

Project manager

Programmer, designer, business analyst, architect, tester, or other member of a software team

Researcher, consultant or quality assurance manager

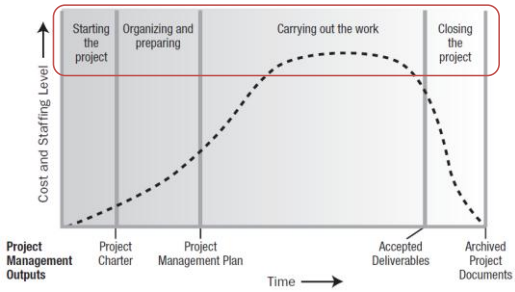
What is the Input? [1]

- *A project plan* is produced as management activities commence.
- The plan defines
  - *the process* and *tasks* to be conducted,
  - *the people* who will do the work, and
  - the mechanisms for *assessing risks*, *controlling change*, and *evaluating quality*.

What are the Steps?

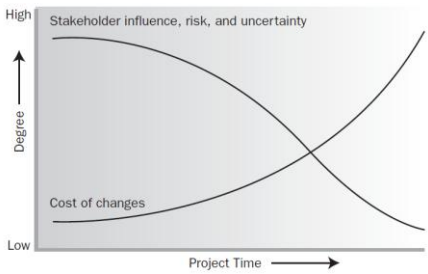
- Understand the four P's— *people*, *product*, *process*, and *project*.
- *People must be organized* to perform software work effectively.
- *Communication with the customer* and other stakeholders must occur so that product scope and requirements are understood.
- *A process that is appropriate* for the people and the product should be selected.
- *The project must be planned* by estimating effort and calendar time to accomplish work tasks: defining work products, establishing quality checkpoints, and identifying mechanisms to monitor and control work defined by the plan.

The Project Life Cycle [2]



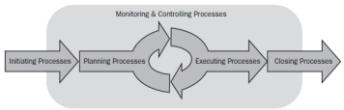
Typical Cost and Staffing Levels Across the Project Life Cycle

Impact of Variable Based on Project Time



Project Phases

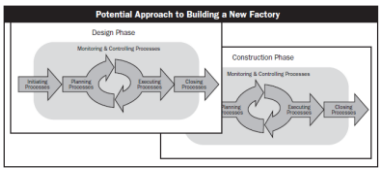
- *Project phases are* divisions within a project where extra control is needed to effectively manage the completion of a major deliverable.
- Project phases are typically completed *sequentially*, but can *overlap* in some project situations.
- The high level nature of project phases makes them *an element of the project life cycle*.



Example of a Single-Phase Project

How Many Phases?

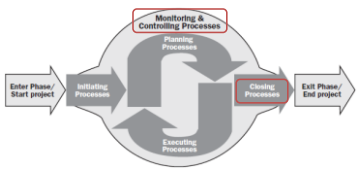
- The phase structure allows the project to be segmented into logical subsets for *ease of management, planning, and control*.
- The number of phases, the need for phases, and the degree of control applied *depend on the size, complexity, and potential impact* of the project.



A Project with Overlapping Phases

Project Management Process Groups

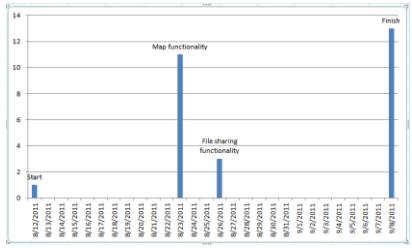
- *Project management is* the application of knowledge, skills, tools, and techniques to project activities to meet project requirements.
- *This application of knowledge requires* the effective management of appropriate processes.
- *Project management processes are grouped* into five categories known as Project Management Process Groups (or Process Groups)



How Do We Do It?

Project Timeline

Establish the timeline for deliverables and tasks for each phase of the project.



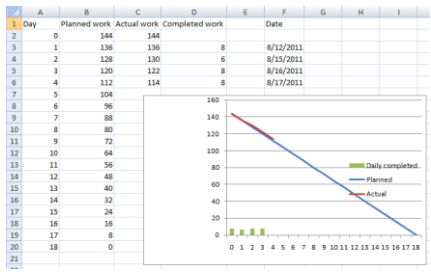
Task Monitoring & Time Tracking

Completion | Status | Priority | Due date | Assignee

Planned effort | Actual effort | Comment | Notification

Burn down Chart

A burn down chart is graphical representation of work left to do versus time.



How Is The Project Going? [3]

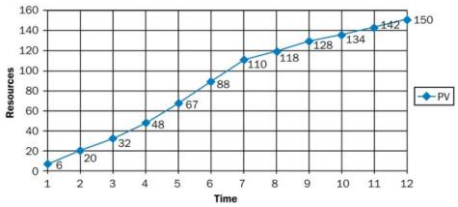
Good metrics let us see if we are doing the right things and doing them well.

By this reporting date:

- Are we ahead of or behind schedule?
- How efficiently are we using our time?
- When is the project likely to be completed?
- Are we currently under or over our budget?
- How efficiently are we using our resources?
- What is the remaining work likely to cost?
- What is the entire project likely to cost?
- How much will we be under or over budget at the end?

Earned Value Management

Earned value management (EVM) is a project management technique for measuring project performance and progress in an objective manner.

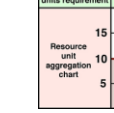


Planned Value (PV) describes how far along project work is supposed to be at any given point in the project schedule. It is a numeric reflection of the budgeted work that is scheduled to be performed ($). Also known as the Budgeted Cost of Work Scheduled (BCWS).

Example

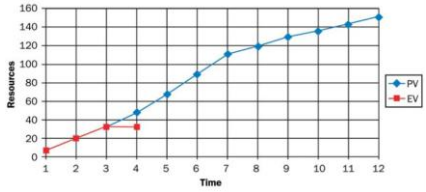
Activity \ Week	1	2	3	4	5	6	7	8	9
A	10	10							
B		8	8	6					
C				2	6				
D				2	6	10	10	8	
E								6	6
Total resource units requirement	10	18	8	10	12	10	10	14	6

Resource unit aggregation chart



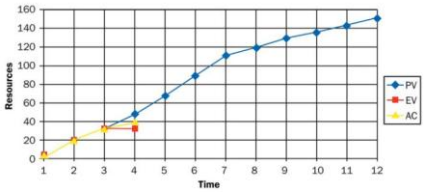
Earned Value

Earned Value (EV) is a snapshot of work progress at a given point in time. Also known as the Budgeted Cost of Work Performed (BCWP)

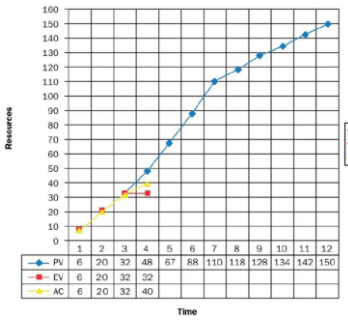


Actual Cost

Actual Cost (AC), also known as the Actual Cost of Work Performed (ACWP), is an indication of the level of resources that have been expended to achieve the actual work performed to date (or in a given time period).



Schedule Variance

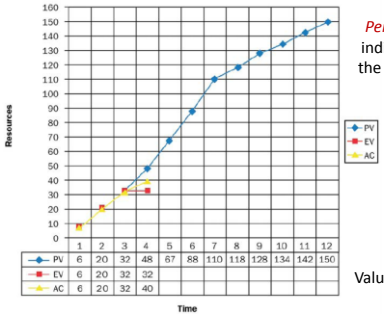


	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

The Schedule Variance (SV) determines whether a project is ahead of or behind schedule.

SV = EV – PV
= 32 – 48
= – 16

Schedule Performance Index



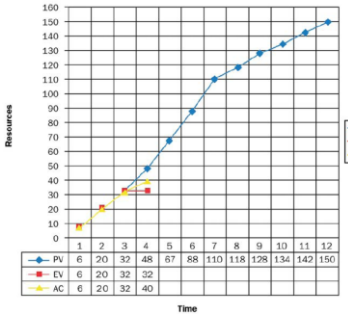
	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

The Schedule Performance Index (SPI) indicates how efficiently the project team is using its time.

SPI= EV/PV
= 32/48
= 0.67

SPI is calculated by dividing the Earned Value(EV) by the Planned Value (PV).

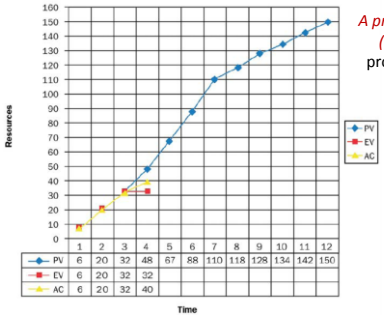
Time Estimate at Completion



	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

Time Estimate at Completion
= Total Time/SPI
= 12/0.67
= 18 months

Cost Variance

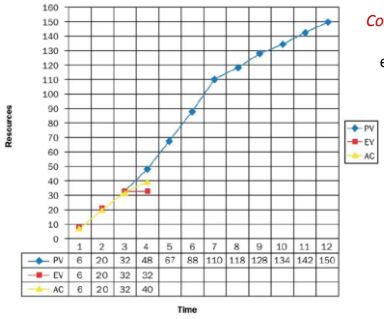


	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

A project's Cost Variance (CV) shows whether a project is under or over budget.

CV = EV – AC
= 32 – 40
= – 8

Cost Performance Index

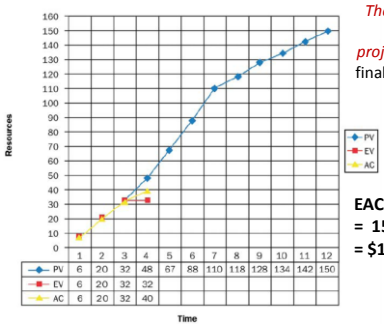


	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

Cost Performance Index (CPI) gauges how efficiently the team is using its resources.

CPI = EV/AC
= 32/40
= 0.8

Estimate at Completion



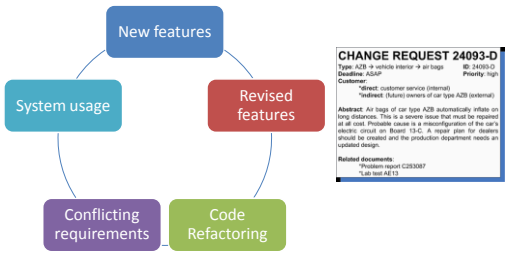
	1	2	3	4	5	6	7	8	9	10	11	12
PV	6	20	32	48	67	88	110	118	128	134	142	150
EV	6	20	32	32								
AC	6	20	32	40								

The calculated Estimate at Completion (EAC) projects for the team the final cost of the project if current performance trends continue.

EAC = BAC/CPI
= 150/0.8
= $187.5

Software Changes [4]

Software changes are the modifications of system for a specific purpose.

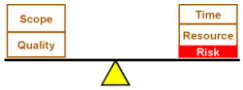


Five Basic Principles

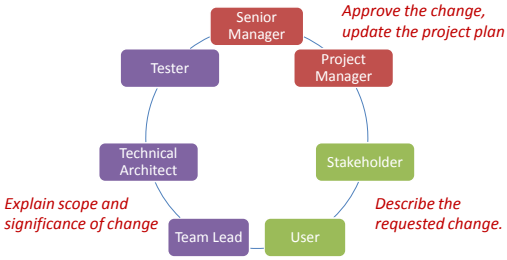
- Different people *react* differently to change
- Everyone has *fundamental needs* that have to be met
- Change often involves a loss, and people go through the "loss curve" (*SARAH* - Shock, Anger, Rejection, Acceptance, Healing)
- Expectations need to be managed *realistically*
- *Fears* have to be dealt with
- Give people *information*
- Give people *choices* to make, and be honest about the possible consequences of those choices
- Give people *time*, to express their views, and support their decision making, providing coaching, counseling or information as appropriate
- Provide *reassurances*
- Make time for *informal discussion* and feedback

Scope Creep

Scope creep refers to uncontrolled changes in a project's scope.



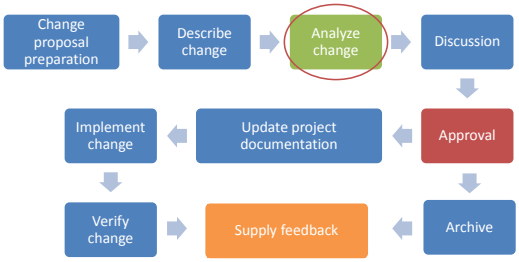
Change Control Board



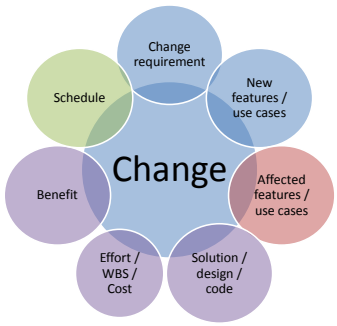
1. *Before* the project begins, the list of CCB members should be written down and agreed upon.
2. Each CCB member should understand why the change control process is needed and what her *role* will be in it.

Change Control Process

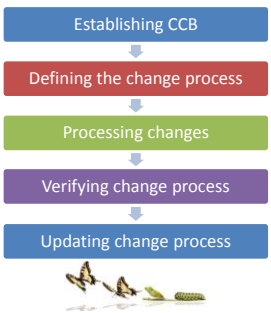
Change control is a method for implementing only those changes that are worth pursuing, and for preventing unnecessary or overly costly changes from derailing the project.



Change Analysis



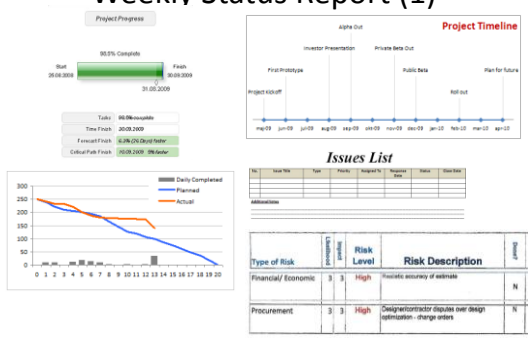
Change Control Process Improvement



Why Change Control Process?

Minimizes the risks involved

Weekly Status Report (1)



Weekly Status Report (2)

- Project: ....
- *Start*: MM/DD/YYYYY. *Finish*: MM/DD/YYYY.
- *Total effort*: N man-day.
- *Week ending*: MM/DD/YYYY. Planned value: X. Earned value: Y.
- *Schedule status*: P% completed. See attached schedule for details.
- *Issues*: .... Resolution:....
- *Changes*: ....
- *Next milestone*: MM/DD/YYYY – Goal: P% completed.
- *Activities for next week*: ....
- *Risks*: .... Resolution:...

Projects Success and Failure

- *Success*: The project is completed on time and on budget, with all features and functions originally specified.
- *Challenged*: The project is completed and operational, but over budget, late, and with fewer features and functions than initially specified.
- *Failure*: The project is canceled before completion, or never implemented.

Causes of Projects Failures

Why Do Projects Fail? [5]

- Unrealistic or unarticulated project *goals*
- Badly defined system *requirements*
- Inaccurate *estimates* of needed resources
- Poor *reporting* of the project's status
- Poor *communication* among customers, developers, and users
- Use of immature *technology*
- Inability to handle the project's *complexity*
- Sloppy development *practices*
- Unmanaged *risks*
- Constant *change* of requirements
- Poor project *management*
- Stakeholder *politics*
- Commercial *pressures*

Project Manager Hiring

- Education: Bachelor of IT/Software Engineering or Information System.
- *Language*: Excellent in English (4 skills) & all communication skills.
- Have *knowledge and experience* in Web development and some technologies (.NET or PHP or JAVA).
- Strong knowledge in *software engineering process* (such as Agile, XP, and/or CMMi) and tools (MS project).
- Strong and confident in problem solving, conflict resolution, negotiation and customer *management skills*.
- Personality: Dedicated, confident, *business-minded*, pro-active, self-organized, hard-working.

Thank You For Your Time