Project Management

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Outline

- The 4 Ps in Project Management
- Detailed Insight of each P

4P's in Project Management Spectrum

- People
- Product
- Process
- Project

People

People

- The most important factor in success of software project
- “Companies That sensibly Manage their investment in people will prosper in the long run” Tim & Tom

PM-CMM People Management Capability Maturity Model

- Developed by Software Engineering Institute to enhance their Capability through personnel development.
- Key Practice Areas
  - Recruiting
  - Selection
  - Performance Management
  - Training
  - Compensation
  - Career development
  - Organization and work design
  - Team/culture development

People Involved in Software Process

- Stakeholders
- Team Leaders
- Software Team
- Agile Teams

The Players/Stakeholders

- They can be categorized into one of the following
  - Senior Managers
    - they define business issues that often have significant influence on business
  - Project (technical) managers
    - they must plan, motivate, organize and control the practitioners who do software work
  - Practitioners
    - They deliver the technical skills necessary to engineer a product or application
  - Customers
    - They specify the requirements for the software to be engineered
  - End Users
    - They interact with the software after it is released for production use

Team Leaders

- Competent Practitioners often make poor tem leaders as they lack the right mix of skills
- In his excellent book of technical leadership, Jerry Weinberg suggests a MOI model of leadership MOI Model of Leadership
  - Motivation
    - encourage technical people (by “push” or “pull”) to produce
  - Organization
    - Apply , improve processes efficiently
  - Ideas or Innovation
    - Make people feel creative
    - Be Creative

Four Characteristics that define Software manager

- Problem Solving
  - Diagnostic
  - Skill to solve
  - Ability to design solution
- Managerial Identity
  - Control the project
- Achievement
  - Reward Initiative
  - Encourage Controlled risk taking
- Influence the team Building
  - Influence the team
  - Read people's mind and respond according to their needs
  - Be controlled in stress situations

Options for applying Human Resources

- N people assigned to m tasks , no combined work, Coordinated by SPMr
- N people assigned to M tasks , Make teams,
- N people organized in T teams, team has a defined structure

Software Team Organizations

- Democratic decentralized
  - No permanent leader
  - Communication is horizontal
- Controlled decentralized
  - Defined Leader
  - Horizontal communication
  - Problem solving is a group activity
- Controlled centralized
  - Defined team leader
  - Problem solving , communication and management by team leader
  - Communication is vertical

7 Factors affecting team Structure

- Difficulty of task
- Size of resultant code (no. of lines)
- Time to stay together
- Degree of modularization
- Required Quality and reliability
- Rigidity of schedule
- Degree of communication

Communication & coordination techniques

- Formal ,impersonal approaches
  - SE documentation, Tools, Customer requests
- Formal , interpersonal approaches
  - Status review meetings
  - Design and code inspections
- Informal , interpersonal approaches

- Electronic communication
  - E-mail, electronic bulletin boards, video conferencing
- Interpersonal networking
  - Team members and people outside the project that can assist in project

The Product

Software scope (stage1)

- **Context** (1st step in scope determination)
  - Functional location of the software product into a large system, product or business context
  - Constraints involved
- **Information Objectives** (2nd step)
  - What data objects are required as i/p or o/p
- **Function and Performance** (3rd step)
  - What function does the software system perform on i/p to produce o/p
  - What level of performance is required

Problem Decomposition (stage 2)

- Also called partitioning OR problem elaboration
- This activity is at core of requirements analysis
- Divide and conquer policy for complex problems
  - Decompose problem in tasks
  - Decomposition in 2 major areas
    - Functionality to be delivered
    - Process to be used

The Process

Common Process Framework Activities

- These characterize a software process and are applicable to all software projects
  - Communication
  - Planning
  - Modeling
  - Construction
  - Deployment
- These are applied to software engineering work tasks (e.g., different product functions)
  - Refer to book page 640 – fig. 21.1

The Process Models

- Different process models:
  - Linear sequential, Prototyping, RAD, Spiral, Formal …
- Project manager must decide about which model to use depending on
  - Customers who have requested the product
  - People who would work on project
  - Product characteristics
  - Project environment
- Project planning begins once model is selected

Process decomposition

- The way a process is decomposed depends on project complexity
- Decomposition involves outlining of work tasks involved in each process framework activity

The Project

Signs of Projects Risk

- Software people don’t understand customer needs
- Product scope is poorly defined
- Changes are managed poorly
- The chosen technology changes
- Business needs change
- Deadlines are unrealistic

Signs of Projects Risk (Cont…)

- Users are resistant
- Sponsorship is lost
- Team lacks skills
- Managers avoid best practices

How to avoid problems?

- Start on the right foot
  - Involves detailed understanding of project
  - setting realistic objectives & expectations
  - Selecting the right team
  - Facilitating the team
- Maintain Momentum
  - Provide incentives
  - Reduce bureaucracy and give autonomy to team members but with supervision
- Track Progress
  - Assess progress as work products are produced

How to avoid problems? (Contd..)

- Make smart decisions
  - When possible, use existing software components / COTS software
  - Choose standard approaches and keep it simple
  - Avoid risks and allocate more time than needed for complex/risky tasks
- Conduct a postmortem analysis
  - Compare planned and actual schedule
  - Collect and analyze project metrics (standards)
  - Get feedback from team and customers
  - Establish record of lessons learnt for each project

W^5HH Principle

About the principle

- Suggested by Barry Boehm in his paper
- Excellent planning outline for project managers and software team
- Applicable to all sizes of software projects
- It is an approach to address
  - project objectives
  - Milestones & schedule
  - Responsibilities
  - Management & technical approaches
  - Required resources

W^5HH principle

- Why is the system being develop?
- What will be done and when?
- Who is responsible for a function ?
- Where are the team members ? organizationally located ?
- How will be job done technically and managerially ?
- How much of each resources needed ?

Step Of Project Mgmt Life Cycle

- Negotiate Scope,
- Identify Tasks,
- Estimate task Duration,
- Specify inter-task Dependences, Activity
- Assign Resources,
- Direct the Team Effort, Activity
- Monitor and Control Progress,
- Assess Project Result and Experiences.