

# **Rational Unified Process Project Management Workflow**

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# Plan

- This lecture introduces two key concepts in project management:
  - Risk: this is used to assess the potential of a project to fail to deliver the required product.
  - Metrics: these are the measurements we make of a development process in an attempt to assess and control risk through the planning process.

# Purpose of Project Management

- To provide a framework for managing project risk, through
- The provision of practical guidance on how to plan, execute and monitor projects within,
- A framework of planning structured around the coordination of the RUP workflows and phases oriented to generating a flexible plan exploiting the strengths of the iterative approach.

# Iterative Process

- Iteration is valuable because it keeps contact between projects and objective but raises issues like:
  - How many iterations should be planned?
  - How long should each iteration last?
  - What are the aims, objectives and deliverables of each iteration?
  - How should an iteration be monitored?

# Project Plan

- The project plan encapsulates the process the project should follow. In particular it:
  - Expresses:
    - The decomposition of the overall task into sub-tasks.
    - The allocation of tasks to people/teams
    - The setting of timescales for the task

## Project Plan Ctd

- Evolves through the lifetime of the project:
  - To reflect changes in the desired outcome of the project.
  - To take account of earlier deviations from the plan.
  - In response to monitoring and measurement of the process and product.

## Two-Level Plans

- It is often impossible to plan at the same level of detail across all iterations (because we don't know what a particular iteration will address.)
- The usual approach is to take a two level approach:
  - The coarse-grained *phase plan* looks at the project across the four main phases of the RUP
  - detailed *iteration plans* for each iteration undertaken on the project.

# Phase Plans

- The phase plan is very rough and consists of the outline for the whole project. It should include at least:
  - Dates of the major milestones, i.e. the move from one phase to another.
  - Staffing estimates for each phase (this is usually based on historical evidence).
  - An idea of the number of iterations included in each phase and rough dates for the end of each iteration. The number of iterations for each phase is reasonably closely related to the size of the system. Larger systems require more iterations.

# Iteration Plans

- Iteration plans usually include:
  - the current plan that is being used to manage the current iteration.
  - Each iteration includes: Requirements, analysis and design, implementation, deployment, test, and evaluation so milestones for each activity should be established and decomposition of larger tasks into sub-tasks
  - In addition, there should be at least a plan under development for the next iteration and possibly some scheduling of particular tasks into later iterations.

## Iteration Plans

- Identify tasks and sub tasks:
  - Identify dependencies between tasks
  - make effort estimates for each task
- Establish start and end dates for each task that respects the resource requirements we have and the dependency between tasks.
- This plan is usually captured by a Gantt chart showing when each task starts and ends.

# Project Risk

- A risk comprises three elements:
  - an undesirable event,
  - an estimate of the severity of the consequences of the event,
  - and a likelihood that the event will occur.
- The amount of risk a project is exposed to is a good measure of the viability of the project.

# Classes of Risk

- Risk is classified into:
  - Direct risk that the manager can control to some extent
  - Indirect risk that the manager cannot influence.
- In managing a project the aim is to control risk so we try to avoid Indirect Risk where possible.

# Risk Control

- Risk control involves three strategies:
  - Risk avoidance involves reorganizing the project so you are not exposed to the risk.
  - Risk transfer involves finding other stakeholders to share the risk with.
  - Risk acceptance involves deciding to live with the risk and to take the occurrence of the risk as a possible contingency to be taken account of in the planning process.

# Risk Acceptance

- Risk Acceptance involves:
  - Risk mitigation where we try to reduce the likelihood or the impact of a risk. E.g. if we decide to choose a particular supplier for a component we can identify an alternative supplier with a similar product that could be used if the original supplier fails to deliver.
  - Contingency planning - construct “what if” plans on the basis of the risk occurring.

# Metrics

- A metric is some measurement we can make of a product or process in the overall development process. Metrics are split into two broad categories:
  - Knowledge oriented metrics: these are oriented to tracking the process to evaluate, predict or monitor some part of the process.
  - Achievement oriented metrics: these are often oriented to measuring some product aspect, often related to some overall measure of quality of the product.

# Issues with Metrics

- Without gathering some metrics we cannot expect adequately to control a process. However:
  - It can be very expensive to gather metric data - we should only gather the necessary data and no more. What we need to measure may change through the different process phases.
  - We should be modest about what metrics we can measure - E.g. measuring attributes like “usability” can only be very crude.

# Artifacts Generated in Planning

- The Project management workflow aims to create a number of key artifacts for the management of the project. These are:
  - The software development plan that comprises:
    - Product acceptance plan
    - Risk list and risk management plan
    - Problem resolution plan
    - Metric list and measurement plan
  - Business case
  - Detailed plan for each iteration
  - Assessment of each iteration
  - Periodic status assessment
  - Work schedule
  - Project measurement database.

# Project Management Workflow

- At project inception on the first iteration we require to carry out three workflow items
  - Conceive new project: This provides a preliminary business case and identifies some of the risks and begins assessment.
  - Evaluate project scope and risk: This carries out more detailed development of the business case and the associated risks.

# Project Management Workflow

- Develop software development plan:  
This develops much of the detailed plan by developing the:
  - measurement plan
  - risk management plan
  - product acceptance plan
  - problem resolution plan
  - project organisation and staffing
  - monitoring and control processes
  - plan phases and iterations

# Project Management Workflow

- During each iteration, we have three further workflow items:
  - Monitor and Control Project: This work item continually checks the project is on plan by monitoring the process and checking the monitoring results against the plan.
  - Plan for next iteration: This workitem develops the plan for the next iteration, taking into account progress on the current iteration and the overall plan.
  - Manage iteration: This work item monitors progress and next iterations planning to inform decision making on whether to transfer to the next iteration or abandon the project because risks or cost estimates have become unacceptable.

# Summary

- We have:
  - Seen how planning uses two levels of plan
  - Considered how the planning process is risk driven
  - Seen how measurement and metrics are used to assess progress and modify plans