



# Project Planning and Activities

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# Let's put the pieces together

Short recap of what we have seen so far:

- **People Management:** how and what to consider to build the team that will develop the project
- **Costs assessment:** how to get rough estimates of the total cost for a software to be developed
- **Process models:** how to organize and run the project so to reach the final objectives

# Phases in SPM

At the macro level the management of a software project typically requires to go through the following phases:

- Feasibility study
- Planning
- Execution

# Feasibility

Is it worth starting the project?

- Identification of a business case
- Market analysis and strategies (Luca Scali's module)
- Cost assessment (accuracy at this level cannot be high)

A small prototype could be developed to clarify project needs

Different situations can change the recipe

- You act as the Contractor
- In house software software (build or buy): software that you need to run your business
- Participation to research and innovation proposals
  - Feasibility is "somehow assumed" once you deliver the proposal
  - the proposal generally includes detailed planning

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# Feasibility study result

A document reporting the effort of feasibility study generally include:

- Introduction and background
- The proposed project
- The market
- Organizational and operational infrastructure
- The benefits
- Outline of the implementation plan
- Costs assessment
- The financial case
- Risk analysis
- Management plan

# Project Execution

Project execution refer to the real performance of the activities foreseen in the plan and it includes the activities of **monitoring** and **control**

# Project planning

## Planning

Thinking **carefully** about something before you do it - even with uncertain projects this is worth doing as long as plans are **seen as provisional**

Planning requires to define at **best the work** to be performed by teams in order to reach the **project objectives** in minimum time and cost

- express objectives as kind of “**post conditions**” - e.g. “*customers should be able to get hot drinks*” is better than “*develop a coffee machine*”
- objectives are detailed in sub-objectives. Well defined objectives are “**SMART**”
  - Specific
  - Measurable
  - Achievable
  - Relevant
  - Time Constrained



# Step Wise method

The **Step Wise** method is a PM method covering the planning of a project that is compatible with Prince2:



Bob Hughes and Mike Cotterell

*Software Project Management, 5th Ed.*

McGraw-Hill, 2009

# Steps in Step Wise

The method foresees the following steps:

- 0 Select Project
- 1 Identify project scope and objectives
- 2 Identify project infrastructure
- 3 Analyse project characteristics
- 4 Identify project products and activities
- 5 Estimate effort of each activity
- 6 Identify activity risks
- 7 Allocate resources
- 8 Review/publicize plan
- 9 Execute plan

# Step 1: Identify project scope and objectives

- 1 Identify objectives and practical measures of the effectiveness in meeting those objectives
- 2 Establish a project authority
- 3 Stakeholder analysis - identify all stakeholders in the project and their interests
- 4 Modify objectives in the light of stakeholder analysis
- 5 Establish methods of communication with all parties
  - external parties need to be involved

## Step 2: Identify project infrastructure

- 1 Identify relationship between the project and strategic planning
- 2 Identify installation standards and procedures
- 3 Identify project team organization

## Step 3: Analyse project characteristics

- 1 Distinguish the project as either objective or product driven
- 2 Analyse other project characteristics
- 3 Identify high level project risks - e.g. acceptance from users
- 4 Take into account user requirements concerning implementation
- 5 **Select development methodology and life-cycle approach**
- 6 Review overall resource estimates

## Step 4: Identify project product and activities

- 1 Identify and describe project products (or deliverables)
  - work will produce intermediate products - documents, software, test suites, etc . . .
  - Product Breakdown Structure (PBS)
  - to each product should be described with a name, purpose, derivation, composition, form, standards, quality criteria to decide if it is acceptable
- 2 Document generic product flows - relations to be described with Product Flow Diagram (PFD)
- 3 Recognize product instances
- 4 Produce ideal activity network
- 5 Modify the ideal to take into account need for stages and checkpoints

## Step 5: Estimate effort for each activity

- 1 Carry out bottom up estimates
- 2 Revise plan to create controllable activities
  - long activities make project control difficult
  - activities should not be running when checkpoints have been defined

## Step 6: Identify activity risks

- 1 Identify and quantify activity based risks
- 2 Plan risk reduction and contingency measures where appropriate
- 3 Adjust overall plans and estimate to take account of risks



## Step 7: Allocate resources

- 1 Identify and allocate resources
- 2 Revise plans and estimate to take into account resource constraints

## Step 8: Review publicize plan

- 1 Review quality aspects of the project plan
- 2 Document plans and obtain agreement

# Project management in open communities

SPM is quite different if you would like to establish a community for a FOSS ... more to come

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# Activity Planning

# Detailed planning

A detailed project planning requires to precisely define start and end of activities. This will permit to:

- ensure that the appropriate resources are available when required
- avoiding activities competing for the same resources at the same time
- produce a detailed schedule showing which staff carry out each activity
- produce a detailed plan against which actual achievement may be measured
- produce a timed cash flow forecast
- replan the project in case of drift from the plan

Planning generally aims at shortening project duration. One strategy, when possible, is to put activities in parallel

# Project schedules

Before the start of the project (project execution) the **plan should define when each activity will start and end, and when and how much each resource will be required**. Then the scheduling proceed in 4 consecutive steps:

- what activities need to be carried on, and build an **ideal activity plan** - infinite resources
- Consider for each activity the **associated risks**, and then revise the plan
- Now consider the **real resources that will be available** to run the project, and put **constraints related to their availability**. The result constitute the scheduling of the project

# Defining activities

General recommendations:

- Project can start when at least one activity is ready to start and finish when all activities are declared completed
- Activities start could depend on the **availability of specific artefacts and/or dependencies from other activities**

Three approaches to activity identification:

- **Activity based**
- **Product based**
- **Hybrid**



# Activity identification approaches

## Activity based approach

- Create a **list of activities** that the project is thought to require
  - studying, reporting, market research, ...
- with large project could be helpful to consider a **breakdown structure for general project life-cycle**

## Product based approach

The activities are related to the product transformation they produce. List product and sub-product and **analyse how they can be produced** from each other

## Hybrid based approach

Results as a clear mix

# Network planning models

Activities and relations are modeled as a network – the “**Critical Path Method**” can then applied.

Network characteristics:

- one start and one end
- nodes have a duration
- links have no duration
- An arrows originating in A and ending in B affirm that B cannot start until A has not finished
- no loop
- no dangling activities

Earliest Start	Duration	Earliest Finish
Activity label, activity description		
Latest Start	Float	Latest Finish

# Project duration and definition of activities start/end

	<b>Activity</b>	<b>Duration (weeks)</b>	<b>Precedents</b>
A	Hardware selection	6	
B	System Configuration	4	
C	Install Hardware	4	A
D	Data Migration	4	B
E	Draft Office Procedures	3	B
F	Recruit Staff	10	
G	User Training	3	E,F
H	Install and Test System	2	C,D

In order you can apply:

- Forward pass
- Backward pass
- Critical path identification
- Activity float identification - free float and interfering float
- Shortening project duration and conflicts handling

# Arrow based approaches

It is possible to use alternative representations where **activities are used to mark arcs**. Nodes are now representing start/end of activities. Similar analysis can be carried on

- carefully consider unnecessary constraints introduced by the representation and use dummy activities