The IT Project Management

Lesson 4

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Set Up the Project

We have obtained all the elements of our project:

- WBS, with all the required WBE/WP
- Costs
- Time
- Risks

We can now start the basic activities of a PM:

- the **SCHEDULE** of the project
- The **DRAFTING** of the **Project Management Plan (PMP)**

SCHEDULING A PROJECT

A Project is the «sum» of some (few or many) activities (WBE) linked each others in a time sequence, that starts when the Project is launched and ends when the Project achieves its objectives.

It is VITAL to have a full and realistic «picture» of how the activities are put in a timed chain.

Scheduling the project activities is highly important, as it allows to both visualize in advance the project evolution in the time, and check its progress, veryfying the deviations from the original planning.

Milestones

A milestone is a marker in a project that signifies a change or stage in development. Milestones are powerful components in project management because they show key events and map forward movement in your project plan.

Milestones act as signposts through the course of the project, helping ensure we stay on track. Without project milestone tracking, you're just monitoring tasks and not necessarily following the right path in your project.

Essentially, we make the most important events of the project milestones so they can be easily seen and mapped by the project team. Milestones are given additional significance over tasks in a plan so the project manager can track the tasks while the team and stakeholders focus on forward progress.

Milestones/2

Principali Milestones

20 Settembre 2002: firma del contratto

29 Novembre 2002: Completamento del Detailed Technical Design

Successive Milestones per Sito (cui sono legate le penali per ritardi):

New Airport		**Attica**	
15 Settembre 2003	Fine costruzione		
		24 Ottobre 2003	Fine costruzione
14 Novembre 2003	Fine Installazione		
7 Marzo 2004	Consegna della Fornitura		
		15 Aprile 2004	Fine Installazione
2 Novembre 2004	Accettazione Finale		
		9 Febbraio 2005	Consegna della Fornitura
		7 Ottobre 2005	Accettazione Finale
1 Novembre 2005	Fine Garanzia		
2 Novembre 2005	Inizio periodo di Assistenza Tecnica		
		6 Ottobre 2006	Fine Garanzia
		7 Ottobre 2006	Inizio periodo di Assistenza Tecnica

Scheduling

There are many tools used to visualize the time schedule of a project. Two are the most diffused:

- **GANTT Chart**, introduced by Mr. Henry Gantt in 1917, named sometimes as BAR Chart
- **PERT** (Program Evaluation and Review Technique), introduced by US Navy and Lockheed in 1958

GANTT Chart

A GANTT chart, commonly used in project management, is one of the most popular and useful ways of showing activities (the WP/WBE) displayed against time. On the left of the chart is a list of the activities and along the top is a suitable time scale. Each activity is represented by a bar; the position and length of the bar reflects the start date, duration and end date of the activity. This allows you to see at a glance:

- What the various activities are
- When each activity begins and ends
- How long each activity is scheduled to last
- Where activities overlap with other activities, and by how much
- The Milestones
- The start and end date of the whole project

GANTT Chart/2

In a GANTT Chart, the WBE/WP name is on the left of the diagram, while each bar is its graphical representation put on a time grid, highligthing its duration.

To draft a GANTT Chart several tools can be used

- EXCEL: usefull for small/medium size project. A nice tool to communicate the basics of a project, as EXCEL is widely available everywhere in the world
- Commercial tools: MS -Project, Primavera (now in ORACLE suite), SAP-ERP, and a lot of others, more or less sophisticated

GANTT Chart/3

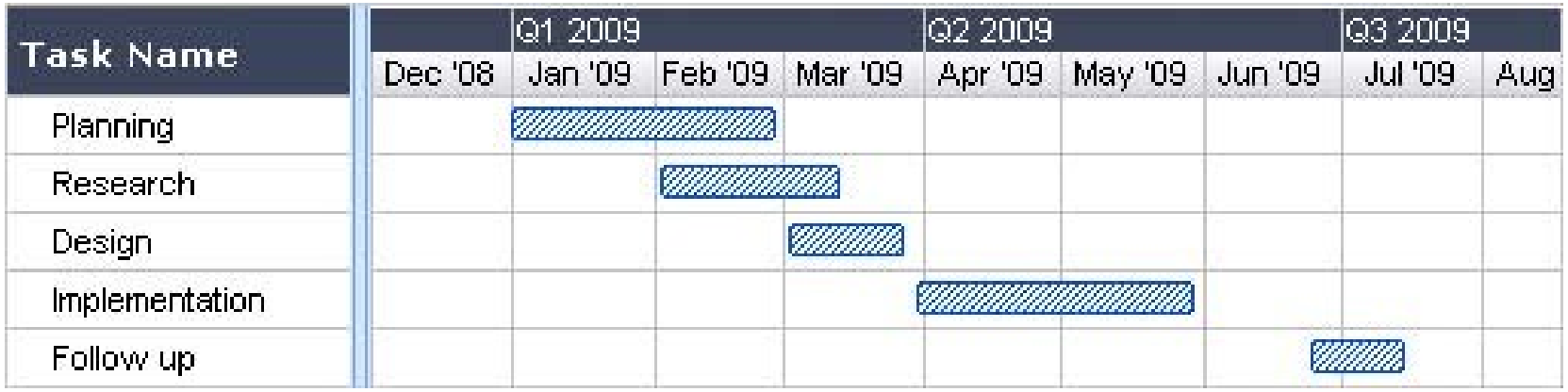
Some commercial tools, as the widely used MS – Project, allow to add a sheet to each bar, containing all the other information for the WP/ WBE:

- Dependencies to other WBE/tasks (predecessors, successors)
- Required Resources (people)
- Costs (manpower, supplies)

The data contained in the sheets form the complete Data Base of the project, on which you can work to obtain all you need to manage the project.

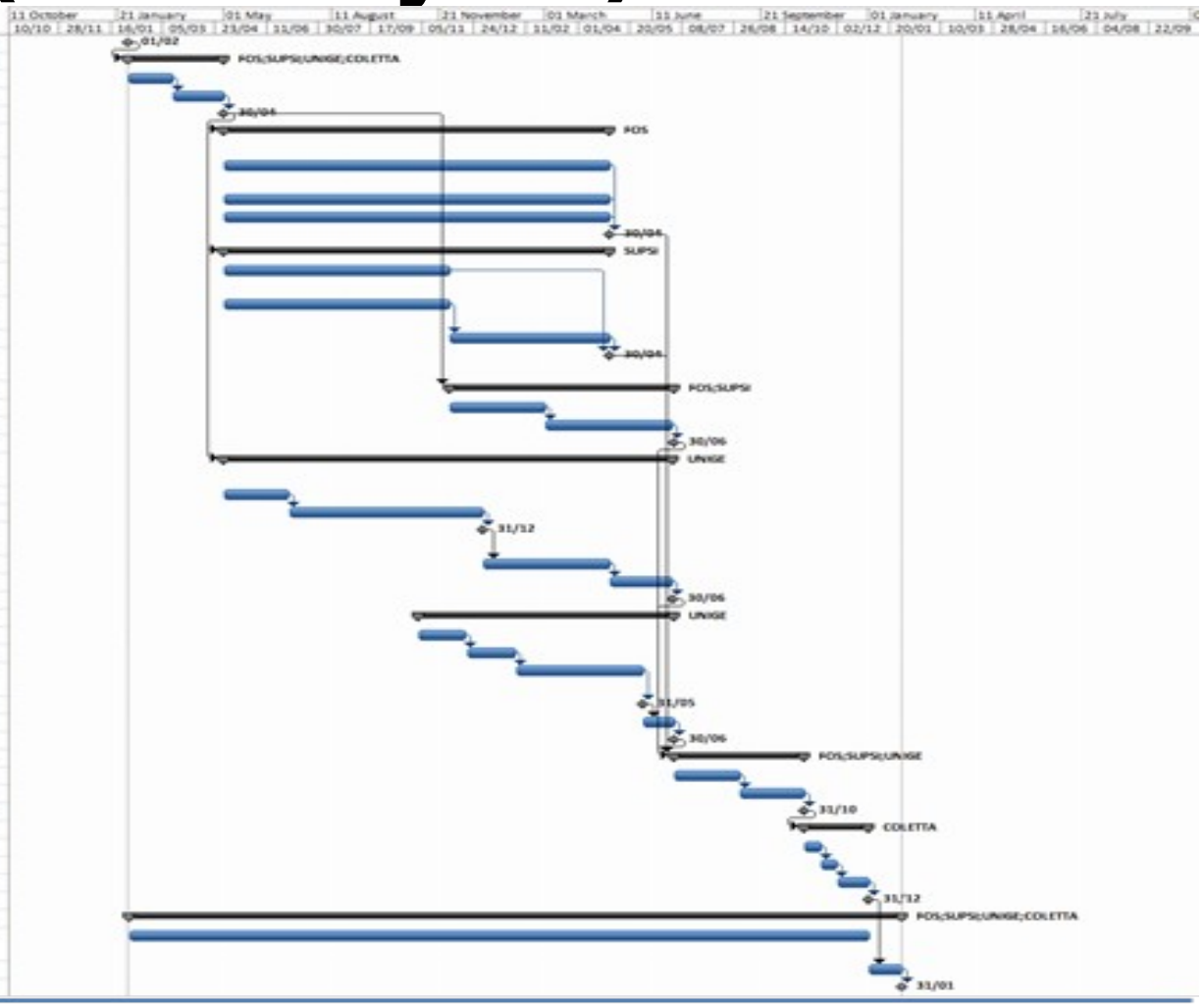
GANTT Chart/4

A simple GANTT Chart

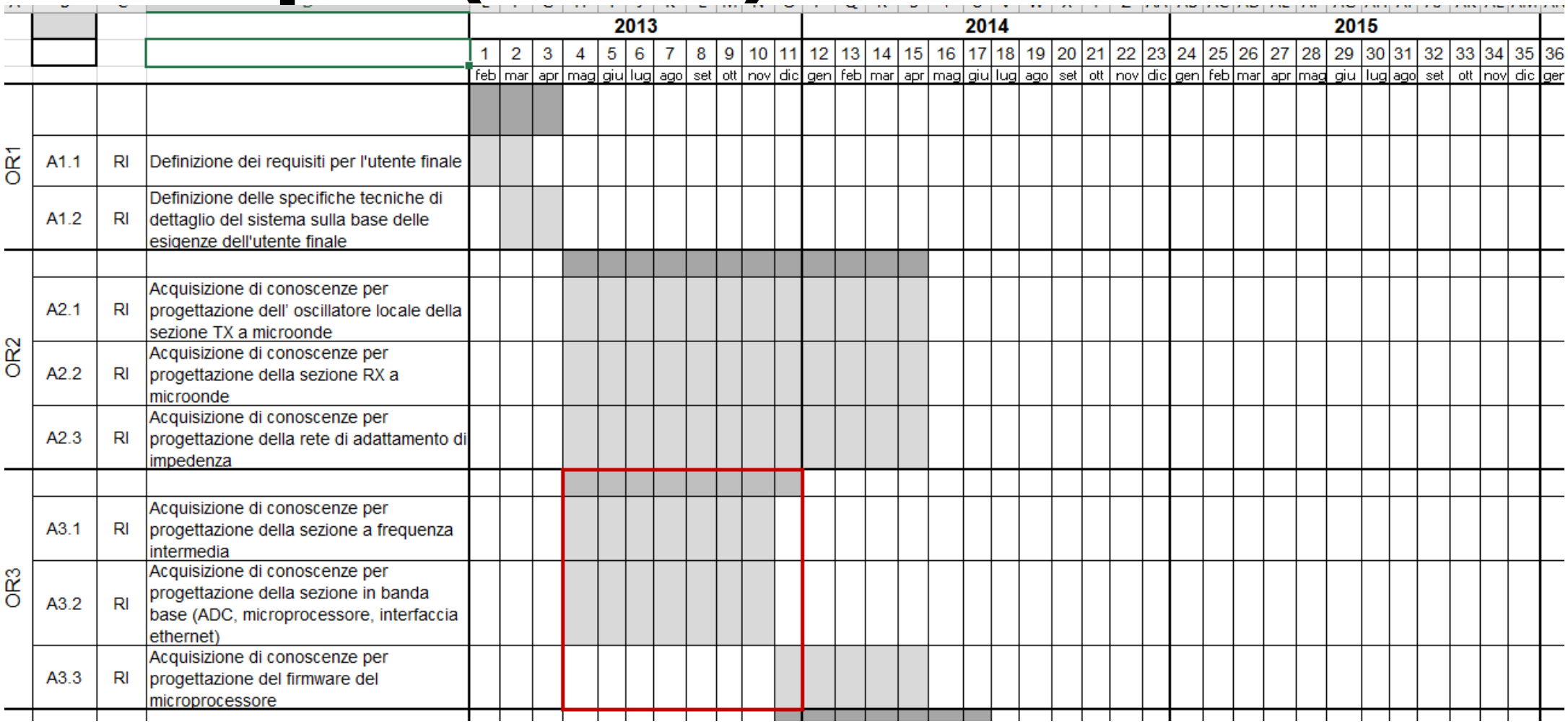


GANTT Chart: A more complex example (MS-Project)

ID	Task Name	Duration	Start
1	Project start	0 days	Wed 01/02/12
2	**WP1: Use Cases and Project Specifications**	**64 days**	**Wed 01/02/12**
3	End User Requirements definition	30 days	Wed 01/02/12
4	Technical Specifications	34 days	Wed 14/03/12
5	Detailed Technical Specifications available	0 days	Mon 30/04/12
6	**WP2: Hardware subsystem 1: RF amplifiers, 1st up/down converter (mixer, local oscillator)**	**262 days**	**Tue 01/05/12**
7	Design and implementation of Local Oscillator and TX Microwave section	262 days	Tue 01/05/12
8	Design and implementation of RX Microwave Section	262 days	Tue 01/05/12
9	Design of Antenna matching network	262 days	Tue 01/05/12
10	Engineering prototype (hardware), operational	0 days	Tue 30/04/13
11	**WP3: Hardware subsystem 2**	**262 days**	**Tue 01/05/12**
12	Design of the high frequency section (intermediate frequency, second mixer,	154 days	Tue 01/05/12
13	Design of the base band section (ADC, microprocessor, ethernet interface)	154 days	Tue 01/05/12
14	Design of the microprocessor's firmware	108 days	Sat 01/12/12
15	Engineering prototype (hardware+firmware), operational	0 days	Tue 30/04/13
16	**WP4: Antennas**	**153 days**	**Sat 01/12/12**
17	Design of single TX and RX antenna pair	65 days	Sat 01/12/12
18	Design of the electrically switchable antenna array	87 days	Fri 01/03/13
19	Antenna array tested and operational	0 days	Sun 30/06/13
20	**WP5: PC Software: Image reconstruction (data inversion) algorithms**	**306 days**	**Tue 01/05/12**
21	Modeling and simulation of the direct problem	44 days	Tue 01/05/12
22	Definition of the data invertion method	132 days	Mon 02/07/12
23	Scattering problem model and method for data inversion	0 days	Mon 31/12/12
24	Development of the data inversion code	86 days	Tue 01/01/13
25	Testing of the inversion method	44 days	Wed 01/05/13
26	Inversion algorithm developed and tested	0 days	Sun 30/06/13
27	**WP6: PC Software: User interface**	**175 days**	**Thu 01/11/12**
28	GUI mockup preparation	33 days	Thu 01/11/12
29	Design and implement of the GUI software	33 days	Mon 17/12/12
30	Test and revision of the GUI on the basis of user feedbacks	86 days	Fri 01/02/13
31	GUI program available	0 days	Fri 31/05/13
32	User Manual preparation	22 days	Sat 01/06/13
33	GUI User Manual available	0 days	Sun 30/06/13
34	**WP7: System Integration**	**91 days**	**Mon 01/07/13**
35	Hardware integration	45 days	Mon 01/07/13
36	Hardware-software integration	46 days	Sun 01/09/13
37	Tomograph operational	0 days	Thu 31/10/13
38	**WP8: Infrastructure test**	**46 days**	**Fri 01/11/13**
39	Laboratory test	11 days	Fri 01/11/13
40	Open-field test	12 days	Sat 16/11/13
41	Field test	23 days	Mon 02/12/13
42	Field Tests completed. System validated.	0 days	Tue 31/12/13
43	**WP9: Project management**	**530 days**	**Thu 02/02/12**
44	Resource allocation, Project control, and Task Coordination	507 days	Thu 02/02/12
45	Closing Project report	23 days	Wed 01/01/14
46	Project ends	0 days	Fri 31/01/14



GANTT Chart: A more complex example (Excel)



				2013											2014												2015												
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
				feb	mar	apr	mag	giu	lug	ago	set	ott	nov	dic	gen	feb	mar	apr	mag	giu	lug	ago	set	ott	nov	dic	gen	feb	mar	apr	mag	giu	lug	ago	set	ott	nov	dic	ger
OR1	A1.1	RI	Definizione dei requisiti per l'utente finale																																			
	A1.2	RI	Definizione delle specifiche tecniche di dettaglio del sistema sulla base delle esigenze dell'utente finale																																			
OR2																																						
	A2.1	RI	Acquisizione di conoscenze per progettazione dell' oscillatore locale della sezione TX a microonde																																			
	A2.2	RI	Acquisizione di conoscenze per progettazione della sezione RX a microonde																																			
	A2.3	RI	Acquisizione di conoscenze per progettazione della rete di adattamento di impedenza																																			
OR3																																						
	A3.1	RI	Acquisizione di conoscenze per progettazione della sezione a frequenza intermedia																																			
	A3.2	RI	Acquisizione di conoscenze per progettazione della sezione in banda base (ADC, microprocessore, interfaccia ethernet)																																			
	A3.3	RI	Acquisizione di conoscenze per progettazione del firmware del microprocessore																																			

PERT

PERT (Program Evaluation and Review Technique) was introduced by the US Navy and Lockeed in 1958 for managing the Polaris Missiles program.

PERT is based on reticular diagrams, where:

- The activities (WP/WBE) are represented by blocks with: name, start date, end date
- The blocks are connected by vectors which represent the SEQUENCE of the activities

PERT is useful to immediately understand the dependencies of the activities and the project duration.

PERT/2

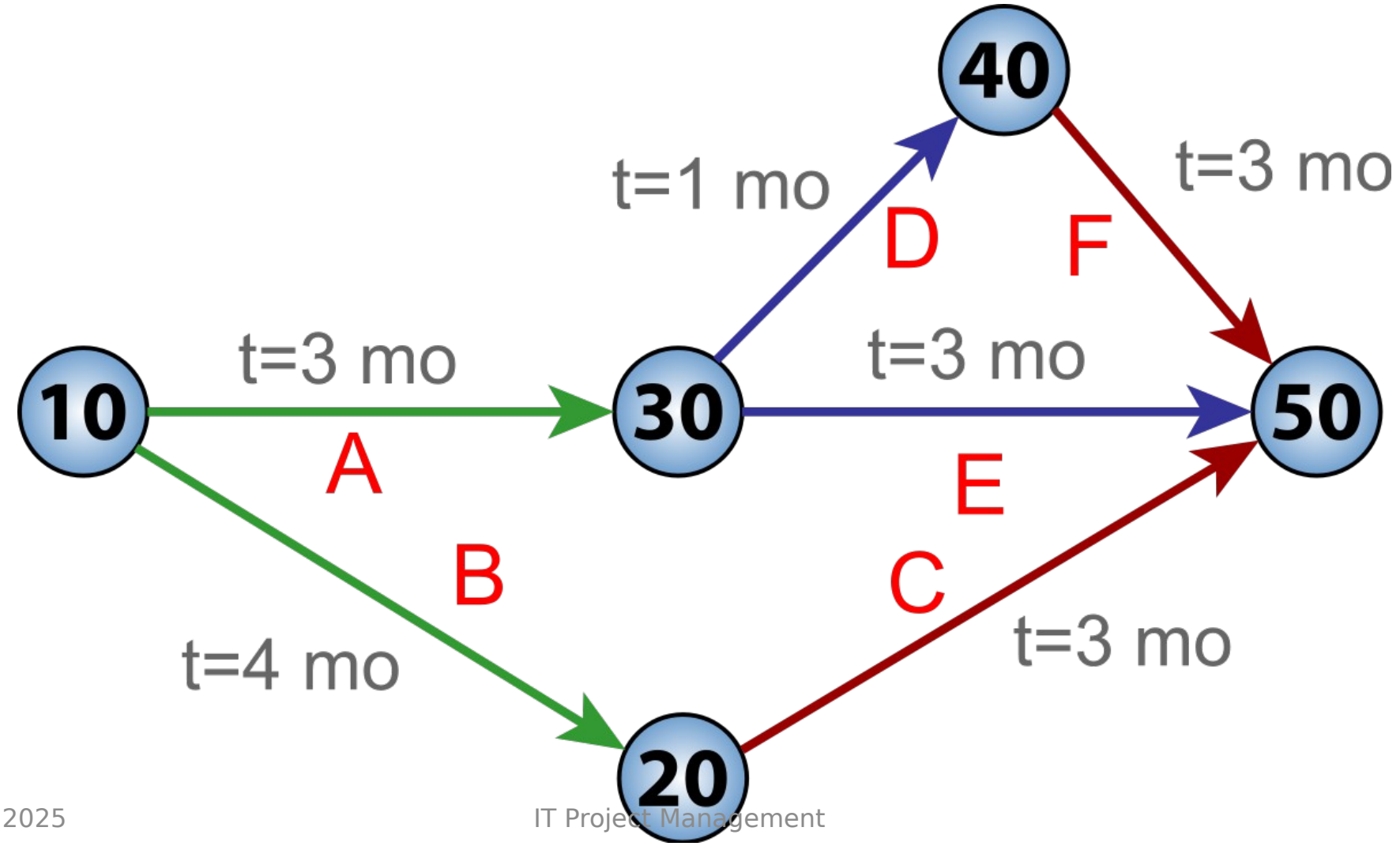
PERT is a statistical method: the duration of each activity is not fixed, but estimated with three values:

- Best (optimistic)
- Realistic (more likely)
- Worst (pessimistic)

Mixing the three values, the average duration is obtained, to be considered as the official duration of the project

PERT is useful to define the **Critical Path**: the activities that are critical to get the final result.

PERT/3



GANTT vs PERT

The PERT diagram and the GANTT Chart are both usefull tools to manage a project.

For better understanding the dependencies from each other of the activities, PERT is more usefull: they are evident at a glance

The time flow of the project is better understandable with GANTT chart: you «see» the timing of the project and the duration of each task. Less evident the dependencies: some tools, as MS-Project, introduced the concept of predecessor/successor in a graphical way.

The activities data (duration, costs, etc.) are included in the task sheet available in both methodologies.

Critical Path Method

The CPM (Critical Path Method) is another methodology to manage a project.

Introduced in 1950, it is defined as:

The sequence of the activities included in the logical net of a project which sets the project duration.

It is the longest sequence of the activities included in logical net which must be completed on time to achieve the (contractual) timing.

PERT is an evolution of the Critical Path Method.

CPM/2

The basic steps:

- For each activity (remember the WBS) define the *earliest start date* (as soon as possible) and the *earliest finish date* (depending of the duration), this being the earliest date your task can be completed.
- Figure out what the *latest start date* is for each activity. This is the very last minute in which you can start a task before it threatens to upset your project schedule. And you need to calculate what the *latest finish date* is for the same reason.
- Define, for each activity, a *slack,* how long a task can be delayed before it impacts the planned schedule and threatens the project's deadline.

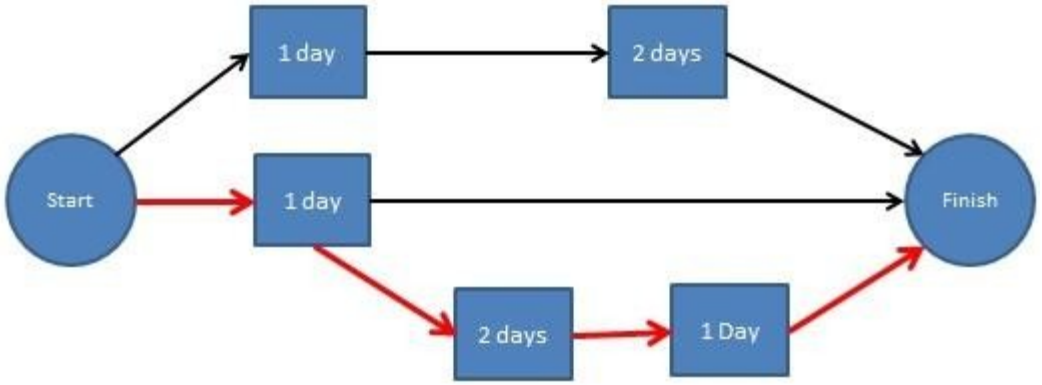
CPM/3

The definition of the Critical path can now be done:

- By hand, using paper and pencil: possible for short and simple projects.
- Using a commercial tool: better to avoid mistakes in large and complex projects.

The CPM is usefull to identify the critical tasks: a particular care shall be devoted to them.

CPM/4: a (simple) example



Critical Path = 4 Days

MS Project

A few words about one of the most popular tools used to schedule a project **MS Project**, a part of the MS Office suite.

This application is a combination of the three different methodolgies we approached above

It starts as a BAR chart (Gantt), to which several information typical of PERT/CPM can be added: the Arrows that give the predecessor/successor info and the possibility to immediately identify the Critical Path of a project.

Some other commercial product offer the same cacteristics, as Primavera.