PMango

# TaskBox Notation

**Ver. 1.00, 2009.11.12, Giovanni A. Cignoni**

Taskboxes are graphical representations of tasks. The proposed notation aims to be as much coherent as possible across different types of project diagrams: *Gantt*, *WBS* and *Task Networks*. This document gives an overview of the notation and discusses the most important characteristics.

## 1. Taskboxes for Gantt's

A *basic task*, i.e. a no further decomposed task, is represented by a white box depicting the *planned time span* of the task.

Below the white box, a thin white box depicts the *actual time span*. Inside the actual time span, a gray bar proportionally shows the *completion percentage* of the task.

Figure 1 shows some examples of basic tasks. From top: started late with poor progress, started very late and very poor progress (the line that joins the otherwise splitted planned and actual boxes is required), timely started and timely carried out, started early and early completed, not yet started and late, not yet started.

As consequences of the notation we have that:

- the actual time span bar can never go beyond the *today date line;*
- the actual time span bar cannot stop before the today date line if the task is not completed (i.e. the gray bar shows 100% completion fulfilling the actual time span box);

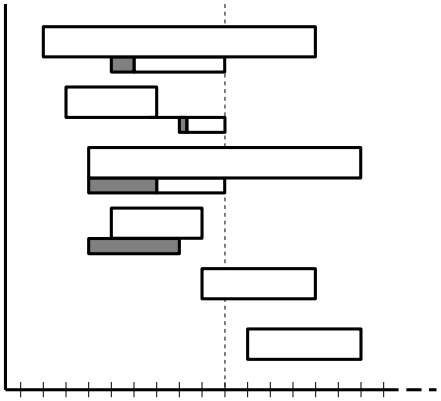

**Fig. 1.** Basic tasks in a Gantt diagram

Following the Gantt tradition, a *composed task*, i.e. a task detailed in the WBS by subtasks, is represented by a thick black line that highlight the task coverage using a bracket like notation. Actual timespan and completion are added below the thick line. Bracket like ends encompass the union of planned and actual timespans. Figure 2 shows some examples of composed tasks.

Taskboxes in a Gantt diagram can be decorated with textual information. In particular:

- as usual, on the left side of the whole diagram are shown the task WBS identifiers and (user option) the task names; text width is fixed, it is calculated to allow room for the lowest level WBS identifier; if task name is shown, width is extended up to 1/6 of the whole diagram width; if needed, the task name is truncated and marked by "...";
- on the right side (user option) of taskboxes are shown information about task effort; for composed tasks information is shown in the form actual/planned effort; for basic tasks information include also detailed data for each resource assigned to the task (text is the same of resource field of Taskboxes for WBS, see § 2, but all on the same line); text width is fixed, it must allow room for the global information and, for basic tasks, must not exceed 1/6 of the whole diagram width; if needed, resource names are truncated and marked by "...", if needed the list is truncated too;

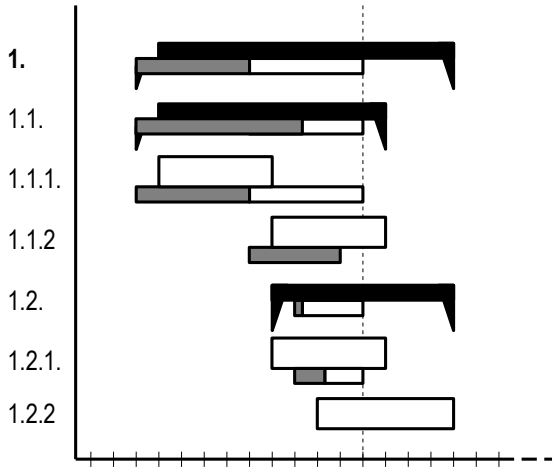


**Fig. 2.** Composed tasks in a Gantt diagram

## 2. Taskboxes for WBS's and Task Networks

A *taskbox* represents a task at a given level of abstraction in the WBS. A taskbox may have several *fields* that show information about the task.

The minimal taskbox has only the *header field*, which shows just the *WBS task identifier*, this may be useful for drawing chart of huge projects at a very fine grained task level. The header field may also contain the *task name* (user option).

Other (user options) fields in a taskbox may be:

- *planned data*: *duration*, *effort* and *cost*; each numerical value is always shown with the appropriate unit of measure;
- *planned timeframe*: *start date* and *end date*, ISO format;
- *resources*: *personal effort*, *person*, *role*; effort is always shown with the appropriate unit of measure;
- *actual timeframe*: *actual start date* and *actual end date*, ISO format.
- *actual data*: *actual duration*, *actual effort*, *actual cost*, each numerical value is shown with the appropriate unit of measure; the actual data field shows also a *completion bar*; when the bar does not reach is full lenght, each info has to be interpreted as the

partial data available at the date the taskbox is drawn; when the actual data field is shown the personal effort in the resources field is shown in the form actual/planned;

When actual data are not available they are replaced by the "NA" keyword. In particular the actual end date is available only if the task is at 100% completion (when the task is started, a possible choice is "today", but seems less meaningfull).

An *alert mark* may be (user option) shown in the top-left corner of the taskbox. The alert mark highlight differences between planned and actual data (useful in particular when the details ar not shown). When actual values differ from planned ones a "Δ" mark is placed. When at least one difference implies bad news (start or end delayed, effort or cost exceeded) the mark shown is "Δ!".

All fields use the same font in the same size, the header field text is bold. Actual data values are underlined.

The size of the task box is fixed for all the taskboxes in a chart. Each row has the same height that depends on the font size. Height of the taskboxs depends on the fields shown. Among taskboxes of the same chart height can vary only if the resource field is shown.

Width depends on the font size and is calculated to allow room for the information to be shown, but is the same for all taskboxes of the same chart. In particular:

- for minimal taskboxes, width must allow room for the lowest level WBS identifier; if task name is shown, width is extended by 200%; if needed, the task name is truncated and marked by "...";
- if data or timeframe fields are shown, width must allow room for the values (the needed number of digits depends from project data); subfields in the same row must have equal width;
- if resource field is shown, width is inherited from other shown fields, doubled if the header field shown only the WBS task identifier; if needed, person and role are truncated and marked by "..." (person and role in the same way, to show at least the first letters of both).

Refer to fig. 3 for examples of valid taskboxes.

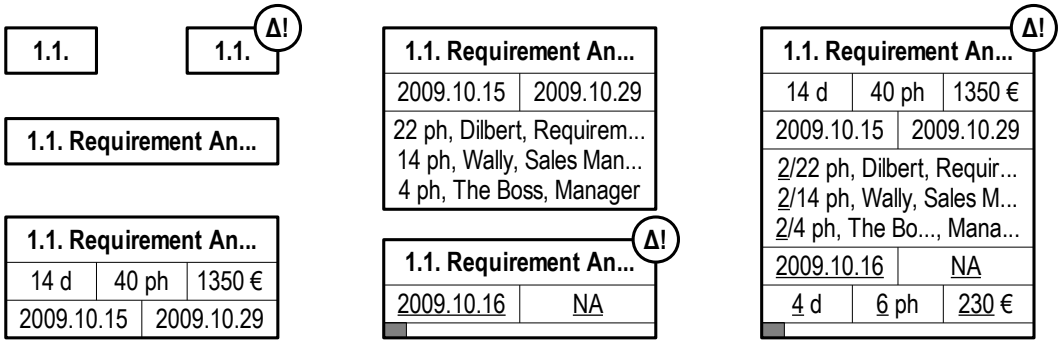


**Fig. 3.** Examples of taskboxes showing different levels of detail.

## 3. Composition relation

Composition relations are shown only in WBS diagrams.

A composition relation is represented by a line starting from the middle of the bottom side of the composed task and ending in the middle of the top side of the subtask.

Only one composition line exits from the bottom side of a taskbox and then divides itself in the needed number of lines toward the subtaskboxes.

Only straight vertical or orizontal lines are used. Lines never cross. Lines must be equally spaced. Refer to fig. 4 for an example of a WBS diagram. Note that task 1. is a level 1 collapsed (see § 7) composed task while task 3. is a level 1 basic task.

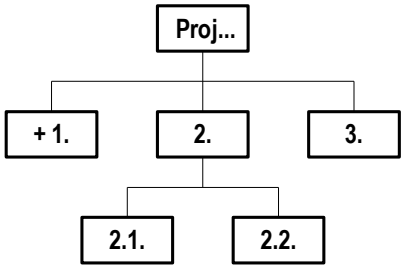


**Fig. 4.** An example of a WBS diagram.

## 4. Dependencies and critical paths

Dependencies are shown only in Gantt (user option) and in Task Network diagrams.

Dependencies should be defined only on basic tasks. A composed tasks should not have direct dependencies. It however inherits dependences from its subtasks: such dependencies are shown only if the task is collapsed.

A *finish to start dependence* is represented by an arrow line exiting from the middle of the right side of the *needed task* and entering in the middle of the left side of the *dependent task*.

Inner dependances between subtasks of the same collapsed task are not shown.

If the needed task is an inner subtask (not an ending one) of a collapsed task, the arrow line exits from the middle of the bottom side of the collapsed task.

If the dependant task is an inner subtask (not of a starting one) of a collapsed task, the arrow line enters in the middle of the top side of the collapsed task.

Both bottom/top and right/left sides of a collapsed task may have exiting/entering lines/arrows when needed.

Only one line/arrow may exit/enter from/in a side of a taskbox. When multiple dependences are present, lines depart/join after/before exiting/entering the needed/dependant taskbox. For better readability (user option), arrows may be replicated at the joining points.

Only straight vertical or orizontal lines are used. Lines must be equally spaced. Crossing should be minimized, and (user option) drawn in a different way with respect to line departures.

The *critical path* is the path across the task network which, going from start to end and counting duration of the tasks, sums the maximum result.

For each dependence, the *time gap* is the time between the end of the needed task and the start of the dependent task. A time gap cannot be negative.

When two (or more) paths have maximum duration, the critical path is decided by considering first the maximum total effort, then the maximum total cost and then the minimal last gap (the gap between the last activity and the end of the project).

Dependencies on the critical path(s) are shown by thick lines. Critical path is always calculated referring to the basic tasks, but is shown according to the currently specified diagram detail.

Time gaps may be shown (user option) in the Task Network diagram.

Figure 5 shows two examples of Task Network diagrams. Both are wievs of the same simple project. The above diagram shows a WBS level 1 collapsed task, the below one shows all the tasks at the lowest level of the WBS. Critical path is calculated and shown. All helpers for better readability are active.

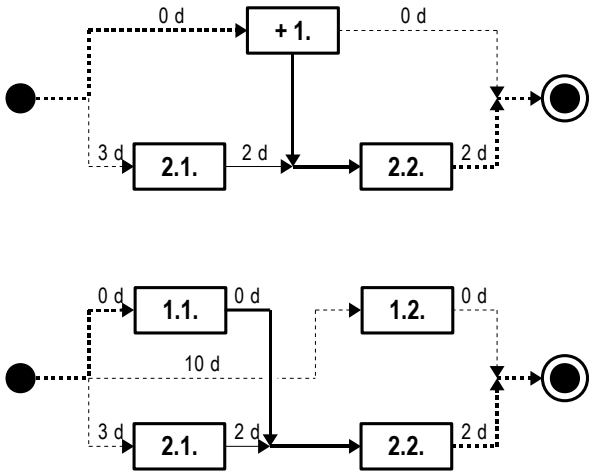


**Fig. 5.** Examples of Task Network diagrams.

## 5. Diagram completion

WBS diagram are always completed by a 0 level task representing the *project*. Level 1 tasks are, by definition, subtasks of the project.

Task Network diagrams are always completed by the *start project* and *end project* milestones. All tasks that do not depend on other tasks depend by definition by the start project milestone. All tasks that are not needed by other tasks are by definition needed by the end project milestone.

Dependecies added to complete the network may be (user opion) differently drawn by using a dotted line.

## 6. Not well formed projects

Some of the constraints here discussed are part of the well formed check (like negative time gaps), some are not (like dependeces defined on composed tasks).

However, diagrams have always to be consistently drawn. Diagrams of not well formed projects are often useful, in particular during the initial steps of the planning process.

## 7. Detail level of diagrams

Any diagram can be shown at a given WBS level (user option) or following a detailed user specification about collapsed/exploded tasks. In particular:

- in a Gantt diagram, all tasks up to the given WBS level/specification are shown; composed tasks that happen to be collapsed are still shown as composed tasks;
- in a WBS diagram, all tasks up to the given WBS level/specification are shown; composed tasks that happen to be collapsed are marked by a "+" before the WBS identifier; no mark is shown for parent task that have their component subtask shown;
- in a Task Network diagram, only the tasks at the lower WBS level/specification are shown (no upper levels); composed tasks that happen to be collapsed are marked by a "+" before the WBS identifier.

 