

## Definition of PERT

Program Evaluation Review Technique (PERT) is a project management planning tool used to calculate the amount of time it will take to realistically finish a project. PERT charts are used to plan tasks within a project making it easier to schedule deliverable and coordinate with team members.

PERT charts were created in the 1950s to manage the creation of weapons and defense projects for the US Navy. While PERT was being introduced in the Navy, the private sector simultaneously gave rise to a similar method called critical path.

## Terminology

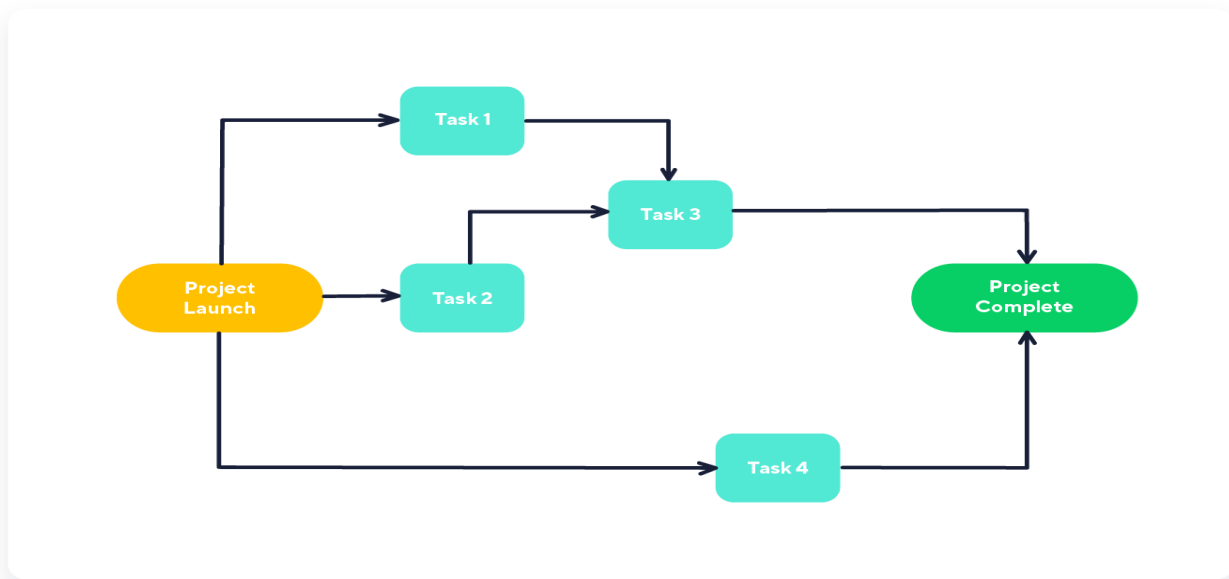
Here is a list of terms associated with PERT charts:

- 1) **Nodes** are visual representations of milestones or events within the project. They are drawn as either numbered boxes or numbered circles.
- 2) **Arrows** are visual representations of the tasks that occur throughout the project. The direction of the arrow indicates the sequence of the task. Diverging arrows show that various tasks can be completed at the same time.
- 3) **Fast tracking** is when tasks and activities are performed simultaneously.
- 4) A **PERT event** is the point at which one or more tasks are started or completed.
- 5) A **predecessor event** occurs immediately before some events. A **successor event** naturally occurs after events.
- 6) **Slack** is the amount of time a single task can be delayed without harming other tasks or the project as a whole.
- 7) The **critical path** is the longest -- or most time-consuming -- path from the start to the completion of an event or task.
- 8) **Critical path activity** refers to a task that does not experience slack.
- 9) **Crashing critical path** is when the completion time of a task is shortened.
- 10) **Lag time** refers to the earliest point at which a task can follow another.
- 11) **Lead time** is the amount of time it should take to complete a task without impacting the following activities.
- 12) **Expected time** is the best estimation of how long a task will take to complete, taking into consideration any problems or obstacles that might arise.
- 13) **Optimistic time** refers to the minimum amount of time it will take to complete a task.
- 14) **Pessimistic time** is the maximum amount of time it will take to finish a task.
- 15) **Most likely time** is the best guess of how long a task will take, assuming no problems arise.

## What does a PERT chart contain?

PERT is similar to critical path in that they are both used to visualize the timeline and the work that must be done for a project. However with PERT, you create three different time estimates for the project:

- The shortest possible amount of time each task will take
- The most probable amount of time
- The longest amount of time tasks might take if things don't go as planned



## When to use a PERT chart

PERT charts should be used when a project manager needs to:

- determine the project's critical path in order to guarantee all deadlines are met;
- display the various inter-dependencies of tasks;
- estimate the amount of time needed to complete the project; and
- prepare for more complex and larger projects.

## Advantages of PERT charts

Project managers use PERT charts to gain these benefits:

- 1) The PERT technique provides the ability to evaluate the time and resources necessary to a project by tracking required assets at each stage of the process, as well as throughout the course of the project.
- 2) PERT charts are useful in what-if analyses, helping companies understand all possible workflows and choose the most efficient and beneficial path.
- 3) The analysis of the PERT chart includes data from various departments within an organization. Combining all of the information helps identify each responsible team within the company, while facilitating an environment where each department takes responsibility for its work.
- 4) The process of creating a PERT chart also improves communication and enables an organization to invest energy in projects that will enhance its strategic positioning.
- 5) PERT charts make unclear deadlines more predictable, clarify dependencies between tasks and establish a clear order for completing the tasks.

## Disadvantages of PERT charts

Disadvantages of the PERT chart include the following:

- 1) A strict focus on deadlines may not enable managers to see the full financial positioning of the project.
- 2) PERT charts lack the flexibility to adapt to small changes that occur when confronted with a roadblock.
- 3) If any calculations are inaccurate in the creation of the chart, delays could occur, causing bottlenecks and negatively impacting the final delivery date.
- 4) PERT charts are subjective; their success depends on the experience of the project manager. Consequently, some charts may include unreliable data or unrealistic expectations for the cost and time frame of the project.
- 5) Creating a PERT chart is labor-intensive, requiring additional time and resources. Also, in order for the chart to remain valuable, it must be consistently reviewed and maintained.

## Definition of CPM

Critical Path Method or CPM is a well-known project modelling technique in project management. It is a resource utilizing algorithm that was developed in the 1950s by James Kelly and Morgan Walker.

CPM is mainly used in projects to determine critical as well as non-critical tasks that will help in preventing conflicts and reduce bottlenecks.

In essence, CPM is about choosing the path in a project that will help in calculating the least amount of time that is required to complete a task with the least amount of wastage.

The Critical Path Method or CPM has been used in many industries starting from defence, construction, software, aerospace, etc.

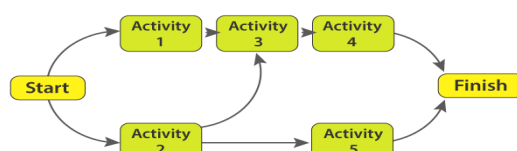
## Advantages of CPM

- Provides an outline for long term coordination and planning of a project
- Recognizes critical activities
- Easy to plan, schedule and control project
- It improves productivity
- Manages the resource needed

## Disadvantages of CPM

- For beginners its difficult to understand
- Software too expensive
- Sometimes, to structure CPM is too time-consuming
- It cannot control and form the schedule of a person involved in the project
- Allocation of resources cannot be monitored properly

## CPM Example



## CPM in Project Management

The Critical Path Method in project management is a step-by-step technique used in the planning process that explains the critical and non-critical activities of a project. CPM goals are to check time-bound issues and process that causes blockage in the project. The CPM is preferably applicable to projects that involve various activities that are associated with a complex method. Once CPM is applied, it will help you keep your projects on track.

- Helps you recognize the action that needs to be performed on time so that the whole project is completed on time.
- Indicates which responsibilities can be delayed and for how long without affecting the overall project plan.
- Determines the least amount of time it will take to accomplish the project.
- Tells you the newest and latest time each activity can start on in order to manage the schedule.

## Difference between PERT and CPM

| S.No. | PERT                                                                                                                                | CPM                                                                                                                               |
|-------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1.    | PERT is that technique of project management which is used to manage uncertain (i.e., time is not known) activities of any project. | CPM is that technique of project management which is used to manage only certain (i.e., time is known) activities of any project. |
| 2.    | It is event oriented technique which means that network is constructed on the basis of event.                                       | It is activity oriented technique which means that network is constructed on the basis of activities.                             |
| 3.    | It is a probability model.                                                                                                          | It is a deterministic model.                                                                                                      |
| 4.    | It majorly focuses on time as meeting time target or estimation of percent completion is more important.                            | It majorly focuses on Time-cost trade off as minimizing cost is more important.                                                   |
| 5.    | It is appropriate for high precision time estimation.                                                                               | It is appropriate for reasonable time estimation.                                                                                 |
| 6.    | It has Non-repetitive nature of job.                                                                                                | It has repetitive nature of job.                                                                                                  |
| 7.    | There is no chance of crashing as there is no certainty of time.                                                                    | There may be crashing because of certain time boundation.                                                                         |
| 8.    | It doesn't use any dummy activities.                                                                                                | It uses dummy activities for representing sequence of activities.                                                                 |
| 9.    | It is suitable for projects which required research and development.                                                                | It is suitable for construction projects.                                                                                         |