Schedule Development Methods

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Many projects fail to meet schedule expectations. For that there are two which are used for project schedule.

1. Critical path method (CPM)

   Critical path method also known as critical path analysis is a network diagram technique used to estimate total project duration. The network diagram will have the node structure for the purpose of forward pass and backward pass. This tool will help you reduce project schedule overruns.

   A critical path for a project is the series of activities that determine the earliest time by which the project can be completed. There are normally several tasks done in parallel on projects, and most projects have multiple paths through a network diagram. The longest path or path containing the critical tasks is what is driving the completion date for the project. You are not finished with the project until you have finished all the tasks.

   For calculating the Critical Path for a project, you must:

   First create a network diagram, which, in turn, requires a good activity list based on the WBS. Once you create a network diagram, you must also estimate the duration of each activity to determine the critical path. Calculating the critical path involves adding the durations for all activities on each path through the network diagram. The longest path is the critical path.

   For example:

   The critical path is the sequence of activities with the longest duration. A delay in any of these activities will result in a delay for the whole project. Below are some critical path examples to help you understand the key elements.

   Using the Critical Path Method (CPM)

   The duration of each activity is listed above each node in the diagram. For each path, add the duration of each node to determine its total duration. The critical path is the one

with the longest duration.

There are three paths through this project.

Start -> Activity1->Activity3->Activity4->finish 3+7+2=12

Start -> Activity2->Activity3->Activity4->finish 5+7+2=14 (Critical Path)

Start -> Activity2->Activity5-> finish 5+4=9

Advantages of CPM

- Makes dependencies visible between the project activities
- Increases visibility of impact of schedule revisions
- Enables the Project Manager to optimize efficiency

Disadvantages of CPM

- For large and complex projects, there'll be thousands of activities and dependency relationship
- The Critical Path Method does not account for resource and resource allocation

2. Program Evaluation and Review Technique (PERT)

Another project time management technique is the Program Evaluation and Review Technique (PERT)

PERT was initially used by Navy in their Polaris project .In this method, the activities duration is found using following formula:

Duration =

And,

Standard Devation =

A network analysis technique used to estimate project duration when there is a uncertainty about the individual activity duration estimates. PERT applies the critical path method (CPM) to a weighted average duration estimate. This approach was developed about the same time as CPM, in the late 1950s, and also uses network diagrams, which are still sometimes referred to as PERT charts. PERT uses probabilistic time estimates duration estimates based on using optimistic, most likely, and pessimistic

estimates of activity durations instead of one specific or discrete duration estimate, as CPM does .By using the PERT weighted average for each activity duration estimate, the total project duration estimate takes into account the risk or uncertainty in the individual activity estimates.

For example:

Suppose A project team in the project case used PERT to determine the schedule for the online application registration system project. They would have to collect data for the optimistic, most likely, and pessimistic duration estimates for each project activity. Suppose one of the activities was to design an input screen for the system. Someone might estimate that it would take about two weeks or 10 workdays to do this activity. Without using PERT, the duration estimate for that activity would be 10 workdays. Using PERT, the project team would also need to estimate the pessimistic and optimistic times for completing this activity. Suppose an optimistic estimate is that the input screen can be designed in eight workdays, and a pessimistic time estimate is 24 workdays.

Applying the PERT formula:

PERT weighted average = = 12

Instead of using the most likely duration estimate of 10 workdays, the project team would use 12 workdays These additional two days could really help the project team in getting the work completed on time.

Advantage of PERT

- A PERT chart makes planning large projects easier
- PERT is a good way of making these relationships visible in a diagram
- PERT makes the critical path visible

Disadvantage of PERT

- PERT charts can be complicated and confusing, with hundreds or even thousands of tasks and dependency relationships
- PERT diagrams can be expensive to develop, update and maintain.
- PERT charts depend on the ability to predict precise time frames for multitudes of tasks