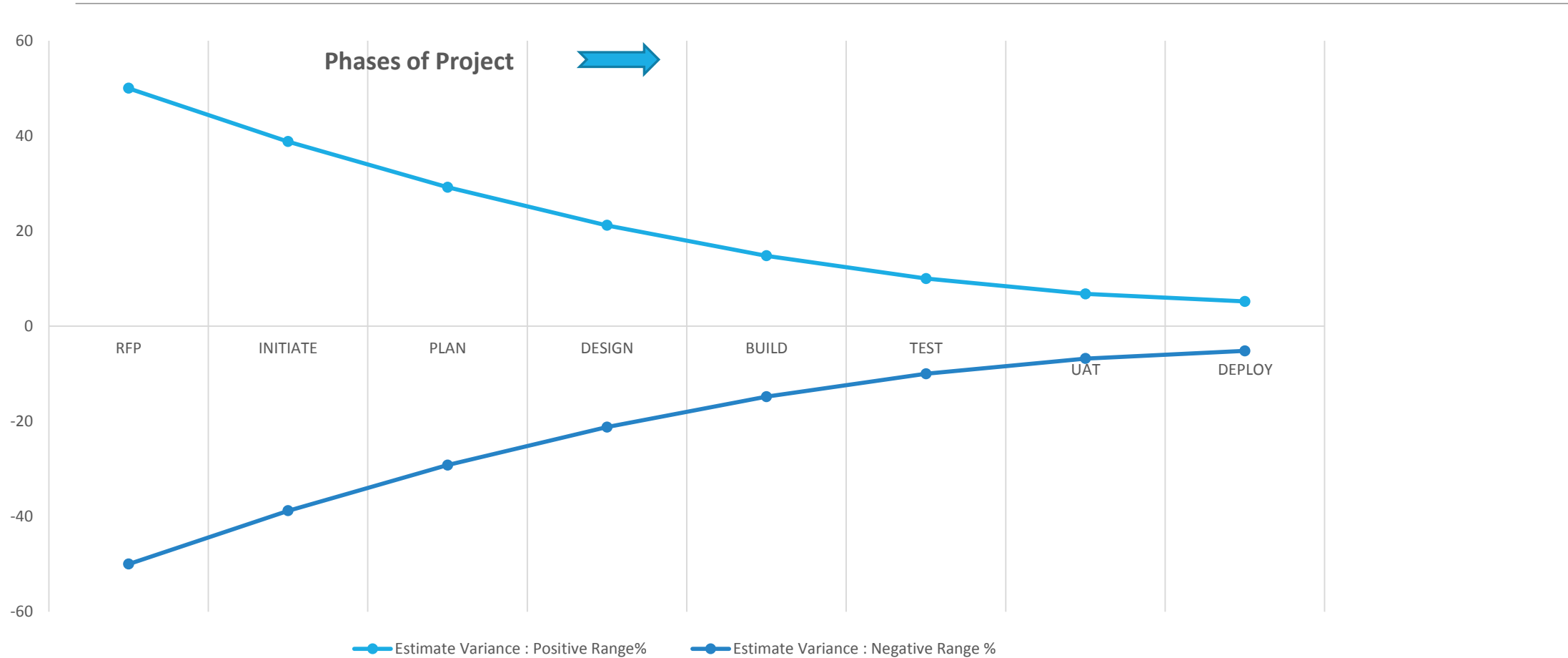# ESTIMATION

Principles of Estimation

- Estimate is an FORECAST of the Effort or Duration or Cost of a Project

- It is usually expressed as a point estimate with an percentage range of variance

- Lower the variance more the accuracy of the Estimate

- Rarely Estimate can be given with 100% Accuracy

- Example:
  i. Estimated Man-hours required to construct a house is 50000 hours +/- 20%
  ii. Estimated Duration to complete construction of a house is 12 months +/- 10%
  iii. Estimated Cost of constructing an house is 30 Lakhs +/- 15%

- To be able to Estimate Effort/Duration/Cost it is necessary to know the Size of the Project

- Size of Project is calculated based on Requirements

- Hence accuracy of Estimates depends on Clarity of Requirements

Cone of Uncertainty

Phases of Project

Chart axis values: 60, 40, 20, 0, -20, -40, -60

Phases: RFP, INITIATE, PLAN, DESIGN, BUILD, TEST, UAT, DEPLOY

Legend: Estimate Variance : Positive Range%   Estimate Variance : Negative Range %

Types of Estimates

Rough Order of Magnitude [ROM] Estimate
- Percentage Range of Variance of Estimate is -25% to +75%
- Such type of Estimate obtained when Clarity of Requirements is low.
- Estimates done during RFP phase of Project usually will turn out to be ROM.

Budget Estimate
- Percentage Range of Variance of Estimate is -10% to +25%
- Such type of Estimate obtained when there is moderate clarity of Requirements.
- Estimates done during Project Plan phase of Project usually will turn out to be Budget.

Definitive Estimate
- Percentage Range of Variance of Estimate is -5% to +10%
- Such type of Estimate obtained when Clarity of Requirements is high.
- Estimates done during Test phase of Project usually will turn out to be Definitive.

Estimation Techniques

Expert Judgement :
- Expert is an individual or a group with specialized knowledge.
- These Experts provide estimates for the current project based on their past experiences.
- This technique is less time consuming but can be subjective.
- Does not consider differences between current project and past experiences of Experts.

Analogous Estimation:
- This is an Top Down Estimation method.
- It directly uses the actual cost of previous similar project as the estimate for the current project.
- It is less costly and less time consuming than other techniques.
- But it is also less accurate than other techniques.
- It is useful at the beginning of the project when there is little clarity of requirements.

Estimation Techniques

Parametric Estimation:

- Uses Statistical techniques to build relationships between variables in historical data.
- These relationships are then used in mathematical calculations in the current project to derive estimates.
- Techniques like Function Points, COCOMO etc. are part of this category.
- Example : In the current project 4000 web pages need to be developed. In a previous project 1000 web pages were developed at a cost of 60 L Rupees. So 4000 web pages in the current project would cost how much ?

    4 times more which is 2.4 Cr Rupees.
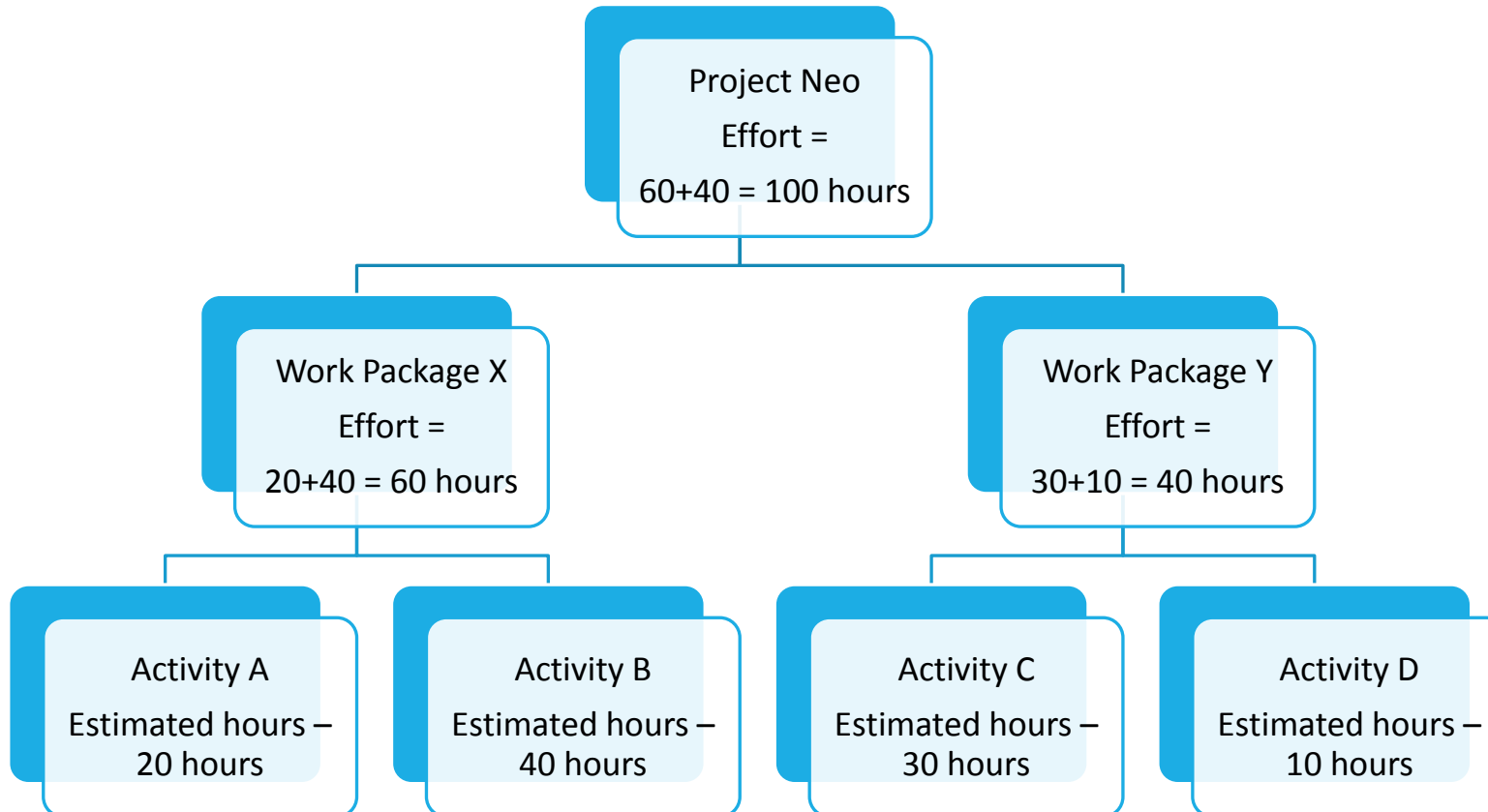
Group Decision Making Techniques:

- Involve the project team members in the estimation process.
- Use techniques like Brainstorming, Nominal Group and Delphi techniques.
- Another technique which can be used is called Wide band Delphi.
- Involving team members improves commitment of team members.
- Since team members are directly involved accuracy of estimates can be good.

Estimation Techniques

Bottom Up Estimation:
- Can be used when requirements are well defined.
- WBS is prepared for all requirements and work packages identified.
- Activities for all work packages are identified.
- Estimation is done for each activity of a work package with the greatest level of specified detail and then aggregated.
- Other Estimation techniques can also be used to estimate at activity level.
- The estimate for a work package is the cumulative effort of all activities of that work package.
- The estimates of all work packages are then "rolled up" to derive estimates of different phases of project as well as overall project.
- This is called as 100% Rule. The estimate of a parent node is equal to cumulative estimates of its child nodes.
- This technique is time consuming and costly. But also more accurate than other techniques.

Bottom Up Estimation - Example

Project Neo
Effort =
60+40 = 100 hours

Work Package X
Effort =
20+40 = 60 hours

Work Package Y
Effort =
30+10 = 40 hours

Activity A
Estimated hours –
20 hours

Activity B
Estimated hours –
40 hours

Activity C
Estimated hours –
30 hours

Activity D
Estimated hours –
10 hours

Estimation Techniques

Three Point Estimation:

- Used to improve the accuracy of estimates by using three values (Pessimistic [P], Optimistic [O] and Most Likely [M]) instead of one.

- The three values can be obtained by using the other estimation techniques.

- The common way to calculate a Three Point estimate is to use PERT [Program Evaluation and Review Technique]

- The formula for PERT is [P+4M+O]/6

- Example : calculate PERT for below Task

Task	Optimistic	Pessimistic	Most Likely
Task A	5 days	13 days	6 days

- PERT of Task A = [13 + 4 x 6 + 5]/6 = 7 days

Estimation Techniques - Contd

Reserve Analysis:

- Used to establish cost reserves for uncertain situations.
- Two types of Reserves are usually considered : Contingency and Management.
- Contingency Reserves are reserves to account for known project risks. These can show up on the WBS as activity contingency reserves or work package contingency reserves.
- Management Reserves are reserves to account for unforeseen risks. This will be placed only at the project level.

Exercise - 3

- In a previous project it took the cable vendor 2 hours to install 40 meters of cable. In the current project you need to install 1000 meters of cable. What will be your estimate in hours?

- Calculate PERT for the following activity

Task	Optimistic	Pessimistic	Most Likely
Task C	6 days	12 days	9 days

Exercise - 4

- You are asked to estimate for an RFP from a Travel Company to build a new website for online booking and reservation. Since there is very little information in the RFP, you decide to look at past completed projects in your organization to come up with an estimate. Which of the following project cost will be best to consider as your estimate?

Project Name	Project Cost
Build a new Travel Portal for TravelNow.com	1.25 million USD
Build a new Banking website for NO Bank	2.50 million USD