PROJECT COST MANAGEMENT

• **Cost Estimating** - Developing an approximation (estimate) of the costs of the resources needed to complete project activities.

• **Cost Budgeting** – Aggregating the estimated costs of individual activities or work packages to complete project activities

• **Cost Control -** Controlling changes to the project budget and influencing the factors that causes cost variance.

Tracking Progress Using Earned Value Management

• As you manage requirements, product complexity, and defects, you will simultaneously be tracking closely the progress of work and the costs associated with that progress.

Tracking Progress Using Earned Value Management

- PM needs to decompose the work to a sufficiently small time period where, for any given lowest level box.
- Work units (boxes) should be small enough that all you need to know is whether or not the work unit is finished.
- As PM, three of the most important items you need to monitor are:
 - value of the product built to date,
 - cost of the product built to date,
 - project's performance against the "intended/proposed" schedule.

What is Earned Value

• Simply, it is a <u>project monitoring and</u> <u>measurement system</u> that:

1. establishes a clear relationship between **planned** accomplishments and **actual** accomplishments

Earned Value

- Basic concepts of Earned Value Management (EVM)
 - Each task in a project earns value as <u>planned work</u> is completed
 - Earned value can be compared to actual cost and budgeted cost to determine variance and predict future performance

Earned Value Components

- Planned Value (a.k.a. <u>BCWS</u>)
 - How much work (person-hours) you planned to have accomplished at a given point in time (this is from the WBS in your plan)
- Actual Cost (a.k.a. <u>ACWP</u>)
 - How much work (person-hours) you have actually spent at a given point in time
- Earned Value (a.k.a. <u>BCWP</u>)
 - The value (person-hours) in terms of your base budget of what you have accomplished at a given point in time (or, % complete X Planned Value)

Earned Value: Example



On Day X:

- PLANNED VALUE (Budgeted cost of the work scheduled, BCWS) = 18 + 10 + 16 + 6 = 50
- EARNED VALUE (Budgeted cost of the work performed, BCWP) = 18 + 8 + 14 + 0 = 40
- ACTUAL COST (of the work performed , ACWP) =

45 (from your project tracking - not evident in above chart)

Earned Value: Example



Time (Date)

Earned Value: Example



Time (Date)

Variance

- Any schedule or cost deviation from a specific plan.
- Used within an organization to verify the budget and schedule for a project
- Frequently used as a key component of plan reviews and performance measurement

Variance

- Must compare scheduling and budget variance at the same time
 - Schedule variance: deviations from work planned not a measure of changes in cost
 - Cost variance: deviations from the budget – not a measure of work scheduled vs. work completed

Earned Value & Variance:



On Day X:

- PLANNED VALUE (BCWS) = 18 + 10 + 16 + 6 = 50
- EARNED VALUE (BCWP) = 18 + 8 + 14 + 0 = 40
- ACTUAL COST (ACWP) = 45 (from your project tracking)

Therefore:

- Schedule Variance = BCWP BCWS = 40 50 = -10 (behind schedule)
- Schedule Performance Index = 40 / 50 = 0.8, or 80% of plan (a B-, at best)
- Cost Variance = BCWP ACWP = 40 45 = -5
- Cost Performance Index = 40/45 = .89, or your getting an 89¢ return on every \$ (person-hour) spent on this project

Tracking Progress Using Earned Value Management

- Earned value management is based on tracking three values:
 - budgeted cost of work scheduled (BCWS),
 - budgeted cost of work performed (BCWP), and
 - actual cost of work performed (ACWP).

Tracking Progress Using Earned Value Management

- To calculate the <u>BCWS</u>, sum all the budgeted costs for work packages that were <u>planned</u> to have been completed by a given moment in <u>time</u> (regardless of whether or not the work was actually done).
- To calculate the <u>BCWP</u>—also known as the <u>earned</u> value— sum all the budgeted costs for <u>all completed</u> work packages. Again, <u>do not include partially</u> completed work packages.
- To calculate the <u>ACWP</u>, sum all the actual costs associated with <u>all completed</u> work packages.
- As a result of calculating these values, you can now determine your project's:
 - cost variance
 - schedule variance

<u>Tracking Progress Using Earned Value</u> <u>Management</u>

• The <u>cost variance</u> is the difference between the BCWP and the ACWP.

Cost variance = BCWP-ACWP

• To determine the <u>percent of the variance</u>, simply subtract the BCWP from the ACWP and divide the difference by the BCWP. Positive numbers represent cost overruns.

% OF Cost variance = BCWP-ACWP / BCWP

• Similarly, <u>schedule variance</u> is the difference between the BCWS and the BCWP.

• schedule variance= BCWS-BCWP

Identical to the steps taken in determining cost variance percentage, the <u>schedule variation</u>
<u>percentage</u> is the schedule variance divided by the BCWS.

• % OF schedule variance= BCWS-BCWP/ BCWS

Q. In a software project a task is scheduled to take 5 days to complete and each of the 5 days are equal. Each day of the 5-day task is scheduled to cost \$100. At the end of the 5 days, you determine that only 3 days of the task are complete. A report tells you that he actual cost for the 5 days of effort but only 3 completed days of work was \$400. Calculate the values in the following table using the given data of the project.

•	The budget cost of the work scheduled (BCWS)	\$500
•	The budget cost of the work performed (BCWP)	\$300
•	The actual cost of the work performed (ACWP)	\$400
•	The cost variance	\$100
•	The cost variance percent	33.34 %
•	The scheduled variance	\$200
•	The schedule variance percent	40%

At the current rate of progress, the task will complete at about8.5 daysThe estimated cost at completion (ECAC)\$667

Q. In a software project a task is scheduled to take 5 days to complete and each of the 5 days are equal. Each day of the 5-day task is scheduled to cost \$100. At the end of the 5 days, you determine that only 2 days of the task are complete. A report tells you that he actual cost for the 5 days of effort but only 2 completed days of work was \$300. Calculate the values in the following table using the given data of the project.

•	The budget cost of the work scheduled (BCWS)	\$
•	The budget cost of the work performed (BCWP)	\$
•	The actual cost of the work performed (ACWP)	\$
•	The cost variance	\$
•	The cost variance percent	%
•	The scheduled variance	\$
•	The schedule variance percent	%

- At the current rate of progress, the task will complete at about ? days
- The estimated cost at completion (ECAC)

? \$