Data Collection

All of the data elements needed for Earned Value Management come together in the control account. The control account manager analyzes data, trends and variances, and takes appropriate corrective actions. The principal data elements that reflect performance are **Budget**, **Earned Value (EV)** and **Actual Cost**. Earned value is the key element because it represents progress of work. When earned value is compared to the budget for that work, a **Schedule Variance** is derived. When it is compared to the actual costs incurred, a **Cost Variance** is derived. To be comparable, all three data elements must relate to the same work and the same time period. The control account planning sheet can be used to reflect ongoing performance based on work package accomplishments. The first meaningful variance analysis takes place at the control account level for several reasons:

1. Material cost information may not be available at the work package level
2. Earned value is determined at the control account level by accumulating completed work package and work-in-process budgets
3. The control account contains a large enough aggregation of work to make variance analysis meaningful
4. The control account manager is responsible for getting the work done and reporting to the program manager

At the conclusion of this lesson, you will be able to identify the impact of cost and schedule variances at the control account level.

Budget

Budget = Budgeted Cost for Work Scheduled (BCWS) or the planned cost of the effort

Earned Value (EV)

Earned Value (EV) = Budgeted Cost for Work Performed (BCWP) or the value assigned to that work that has been accomplished

Actual Cost

Actual Cost = Actual Cost of Work Performed (ACWP) or the accrued costs allocated to the work that has been accomplished

Schedule Variance

Schedule Variance (SV) is basically Earned Value taken for the work accomplished minus the budget planned for the work. In other words, the difference between Budgeted Cost for Work Performed (BCWP)and Budgeted Cost for Work Scheduled (BCWS).

$SV = BCWP - BCWS$

Note: a positive value indicates favorable performance (ahead of schedule) and a negative value indicates unfavorable performance (behind schedule).

Cost Variance
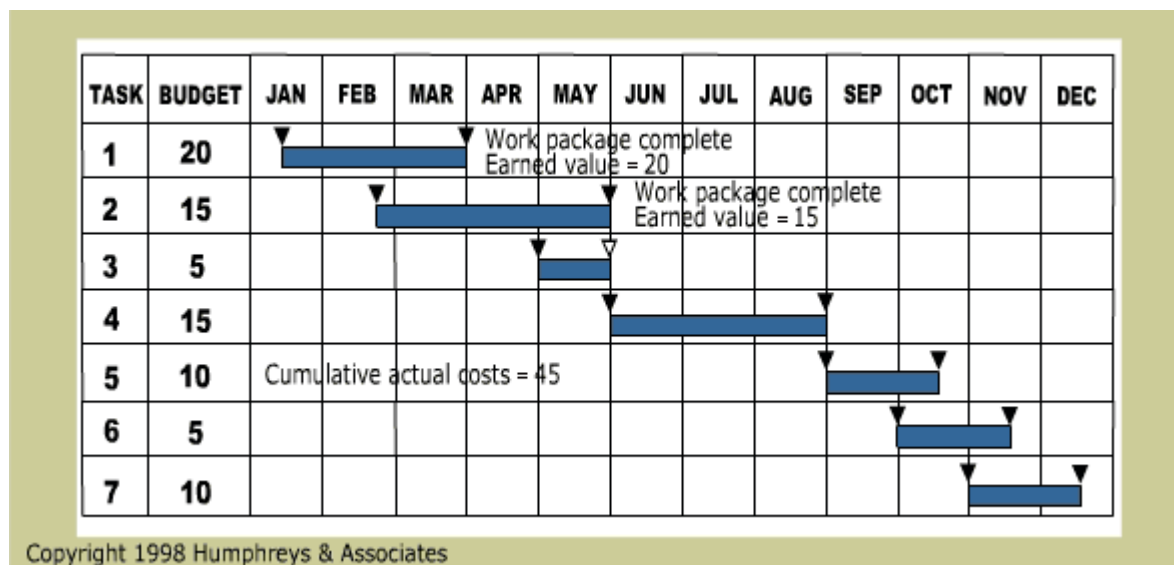
Cost Variance (CV) is the difference between earned value and actual costs derived by subtracting actual costs from earned value.

$CV = BCWP - ACWP$

Note: a positive value indicates favorable performance (under run) and a negative value indicates unfavorable performance (or overrun

Figure 10-1 : Control Account Status (as of the end of May)

TASK	BUDGET	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	20				Work package complete Earned value = 20								
2	15						Work package complete Earned value = 15						
3	5												
4	15												
5	10	Cumulative actual costs = 45											
6	5												
7	10												

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A control account status report is illustrated in **Figure 10-1**. It has seven work packages. Three wor packages were planned to be completed and the accumulated budget for that effort is 40. Two of the three work packages have been accomplished for an earned value of 35.

Long Description

Figure 10-1: Control Account Status is a sample spreadsheet showing two completed work packages. The first is on Row 1 (Jan through Mar), with an earned value of 20. The work package on Row 2 (Feb through May) shows an earned value of 15 for a combined earned value of 35. On Row 5 is a note showing cumulative actual costs of 4
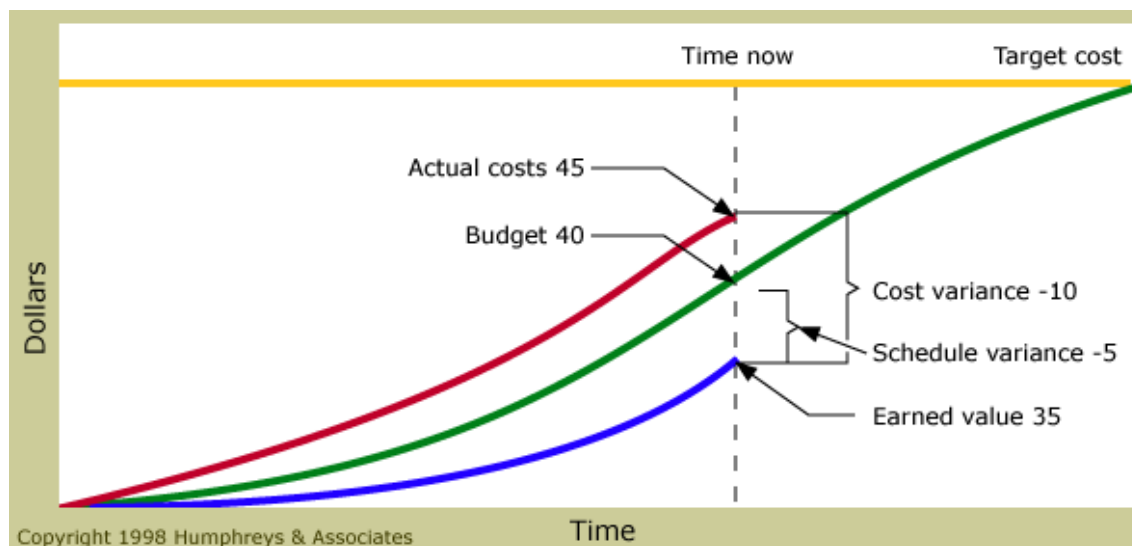
Figure 10-2: Cumulative Performance

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Figure 10-2 shows how cost and schedule variances are derived. Actual costs recorded against the control account were 45, so the work is behind schedule and over cost.

Long Description

Figure 10-2: Cumulative Performance graph plots cost over time, comparing a point labeled time now with the target cost. It presents three curves, the budget (40 at time now), actual costs (45 at time now, and earned value (35 at time now). The difference between actual cost and earned value (-10) is labeled as the cost variance, and the difference between the budget and the earned value (-5) is labeled as the schedule variance.

Cost and schedule variances

Cost Variance = Earned Value - Actuals incurred
CV = BCWP - ACWP
CV = $35 - $45 = -$10 (unfavorable; overrun)

Schedule Variance = Earned Value - Budgeted Value
SV = BCWP - BCWS
SV = $35 - $40 = -$5 (unfavorable; behind schedule)

Performance Reports and Dual Summarization

On the previous page, in terms of cumulative performance, **Figure 10-2** showed that the work is behind schedule and over cost.

The value of the work that did not get done (**schedule variance**) is -5 (earned value of 35 minus budget of 40) and the **cost variance** is -10 (earned value of 35 minus actual costs of 45).

Figure 10-3 (next page) shows a typical reporting format: five control accounts that make up the WBS element being reported. The bottom line shows the overall status, which is behind schedule (7) and overrunning cost (16). The cumulative cost and schedule variance columns indicate the control accounts that are encountering the most problems.

Control account #4 is having significant cost and schedule problems. The current period cost and schedule variances indicate that performance deteriorated considerably during the month.

This discussion continues on the following page.

Figure 10-3: Performance Report

WBS 1.347	Current period					Cumulative to data				
	Budget	Earned value	Actual costs	Variance		Budget	Earned value	Actual costs	Variance	
				Sched	Cost				Sched	Cost
CA 1	10	12	13	2	(1)	22	26	24	4	2
CA 2	8	7	8	(1)	(1)	40	38	42	(2)	(4)
CA 3	7	7	8	0	(1)	13	12	12	(1)	0
CA 4	10	6	12	(4)	(6)	46	40	51	(6)	(11)
CA 5	12	10	13	(2)	(3)	12	10	13	(2)	(3)
Total	47	42	54	(5)	(12)	133	126	142	(7)	(16)

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A typical reporting format is shown in **Figure 10-3**.

Long Description

Figure 10-3: Performance Report is a table showing a typical performance reporting format. Five rows, labeled CA 1 through CA 5 show data entries in ten columns, five for the current period and five showing cumulative data. The five columns in each of the two periods are labeled budget, earned value, actual costs, schedule variance, and cost variance. A WBS of 1.347 is shown at the top of the first column.

Figure 10-4: Summarization of Data

Control accounts

Budget

Earned Value   } Schedule Variance

Actual Costs   } Cost Variance

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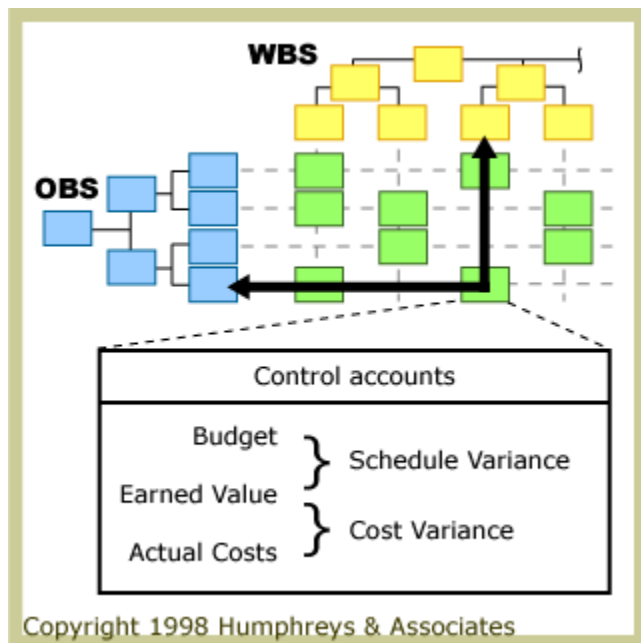
WBS element data can be summarized to any level desired for management reporting, although WBS level three is normally used. The same kind of information can also be accumulated through the OBS to obtain performance of individual organizations. **Figure 10-4** illustrates this dual summarization capability.

An important point is that all calculations are made at the control account level by the manager responsible for getting the work done. Performance calculations at higher levels are not necessary and variances can be easily traced from summary reports back to the responsible control accounts through either the WBS or the OBS.

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Long Description

Figure 10-4: Summarization of Data illustrates the dual summarization capability of the WBS and the OBS. All calculations are made at the control account level.

Figure 10-5: Interpretation of Data

Budget	Earned Value	Actual Cost	Interpretation
100	100	100	On schedule, on cost
100	120	120	Ahead of schedule, on cost
120	100	100	Behind schedule, on cost
100	100	120	On schedule, over cost
100	120	140	Ahead of schedule, over cost
120	100	120	Behind schedule, over cost
120	120	100	On schedule, under cost
100	120	100	Ahead of schedule, under cost
140	120	100	Behind schedule, under cost

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Nine different combinations of program status can be elicited from these data elements as shown in **Figure 10-5**.

Long Description

Figure 10-5: Interpretation of Data Page shows nine different combinations of program status that can be elicited from budget, earned value, and actual cost data elements: on schedule, on cost; ahead of schedule, on cost; behind schedule, on cost; on schedule, over cost; ahead of schedule, over cost; behind schedule, over cost; on schedule, under cost; ahead of schedule, under cost; and behind schedule, under cost.

Data Collection Knowledge Review

If the project budget is $40, the value of work completed (earned value) is $35, the actual cost incurred is $45, what is the status of the project?

○   Project is ahead of schedule and under-running cost.

○   Project is behind schedule and under-running cost.

◉   Project is behind schedule and over-running cost.

○   Project is ahead of schedule and over-running cost.

Correct.

Cost Variance = Earned Value - Actuals incurred
CV = BCWP - ACWP
CV = $35 - $45 = -$10 (unfavorable; overrun)

Schedule Variance = Earned Value - Budgeted Value
SV = BCWP - BCWS
SV = $35 - $40 = -$5 (unfavorable; behind schedule)

If the project budget is $40, the value of work completed (earned value) is $35, the actual cost incurred is $45, the project is behind schedule and over-running cost.

End of Lesson

You must click the **Next** button in order to receive credit for this lesson.