

Earned Value

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Earned Value Management (EVM)

Definition: EVM is a technique used to integrate the project's scope, schedule, and resources and to report project performance from initiation to closeout

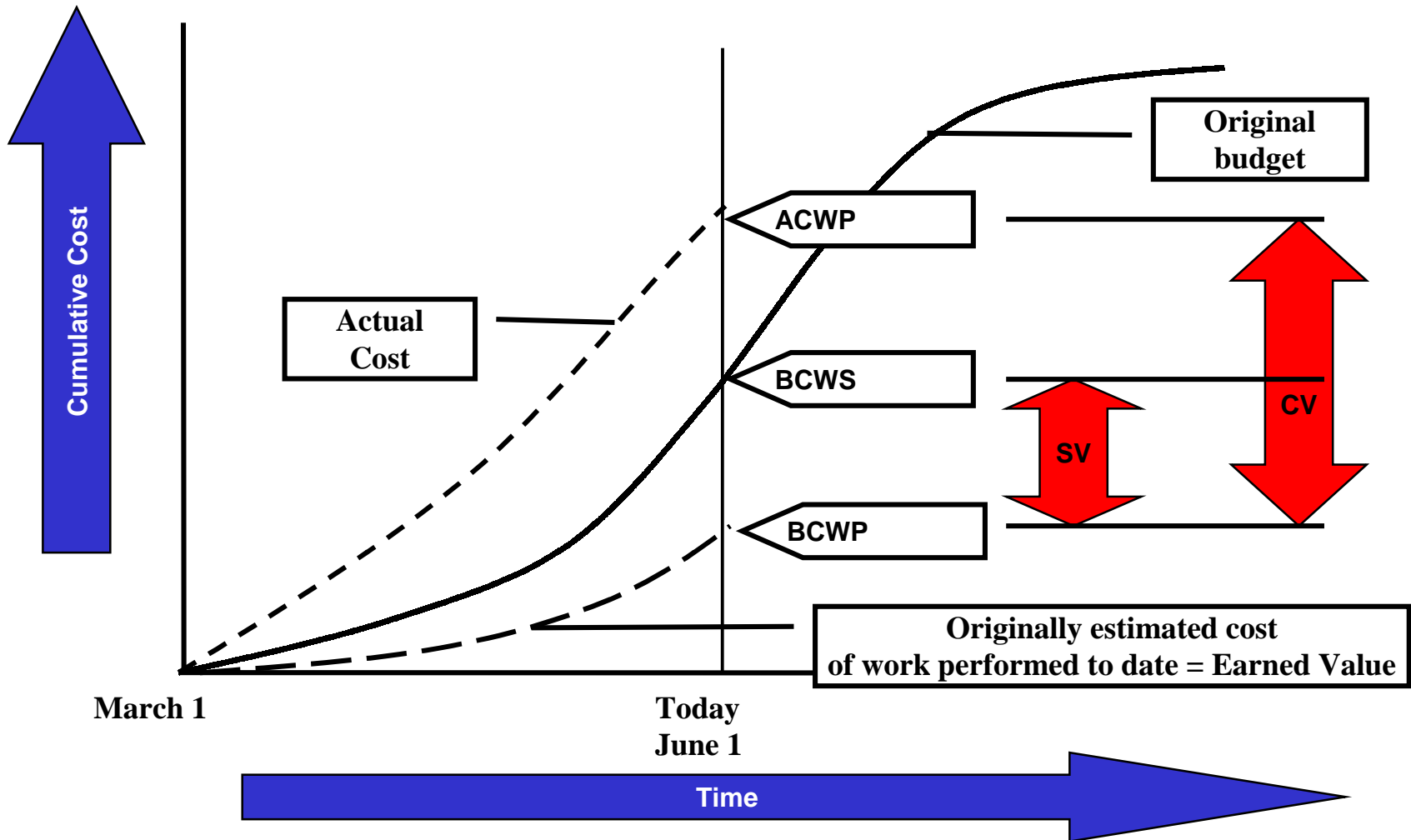
In short, EVM is a means of constantly tracking the cost and schedule performance of a project in order to detect cost and schedule issues as soon as possible.



Uses of Earned Value Management

- Monitors the budget
- Early detection of cost and/or schedule over-runs
- Enables early detection of a possible need for a change in project parameters, such as changes in:
 - Scope requirements
 - Quality requirements
 - Time requirements
 - Cost requirements
 - Resource assignments

Pictorial



- **BCWP** = Budgeted Cost of Work Performed (how much did you originally estimate for the work that has been done so far). Also called **Earned Value**
- **BCWS** = Budgeted Cost of Work Scheduled (how much did you originally estimate for the work that was supposed to be done so far)
- **ACWP** = Actual Cost of Work Performed (how much is the actual cost of the work actually done so far)



Plan

Task A 2 weeks \$1000	Task B 2 weeks \$1000	Task C 2 weeks \$1000
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A possible scenario:
Task A was completed
on time and on budget,
but Task B was delayed
and required more
resources than expected

↓ Today

Actual

Task A 2 weeks \$1000	Task B 4 weeks \$3000	Task C
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BCWP = \$2000 (Task A & B are completed, they were to cost \$2000)

BCWS = \$3000 (We were scheduled to have completed Tasks A, B & C at a cost of \$3000)

ACWP = \$4000 (We have actually spent \$4000)

Cost Variance (CV)

- The difference between earned value and actual costs derived by subtracting actual costs from earned value.

$$CV = BCWP - ACWP$$

A negative answer represents unfavorable cost performance

Cost Performance Index (CPI)

- The average cost efficiency with which work has been performed.
- The CPI is derived by dividing the earned value by the actual costs.

$$\text{CPI} = \text{BCWP} / \text{ACWP}$$

A value less than 1.0 indicates negative performance

Schedule Variance (SV)

- The difference between budget and earned value
- Derived by subtracting budget from earned value.

$$SV = BCWP - BCWS$$

A negative answer indicates that less work has been accomplished than was planned

Schedule Performance Index (SPI)

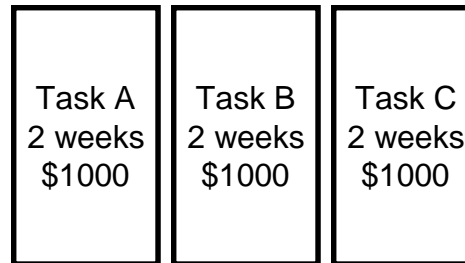
- A ration of the value of work performed to the value of work scheduled.
- The SPI is derived by dividing the earned value by the budget.

$$\text{SPI} = \text{BCWP} / \text{ACWS}$$

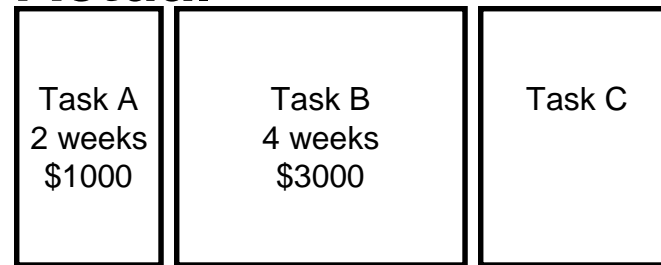
A value less than 1.0 indicates negative performance

Example

Plan



Actual



↓ Today

BCWP = \$2000

BCWS = \$3000

ACWP = \$4000

$$CV = BCWP - ACWP = \$2000 - \$4000 = -\$2000$$

$$CPI = BCWP / ACWP = \$2000 / \$4000 = 0.50$$

$$SV = BCWP - BCWS = \$2000 - \$3000 = -\$1000$$

$$SPI = BCWP / BCWS = \$2000 / \$3000 = 0.67$$

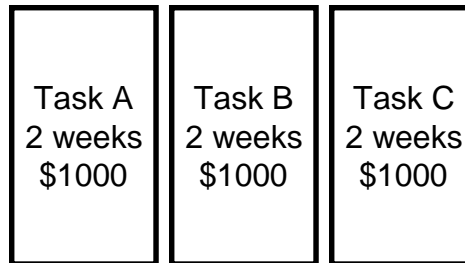
Estimates and Variance

- **BAC** = Budget at Completion (What the original estimate was for the whole project)
- **EAC** – Estimate at Completion = BAC/CPI (current estimate for whole project)
- **ETC** – Estimate to Complete = $EAC - ACWP$ (cost left to complete the project)
- **VAC** – Variance at Completion = $BAC - EAC$ (difference between original estimate and forecast for the whole project)

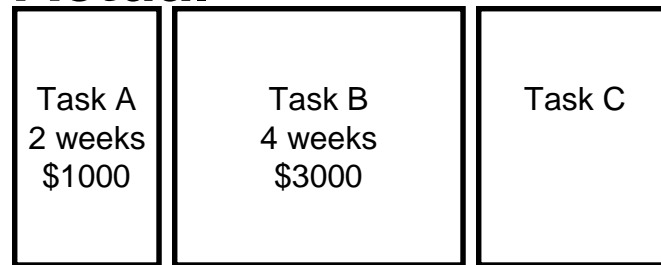


Example

Plan



Actual



BCWP = \$2000

BCWS = \$3000

ACWP = \$4000

$$BAC = \$3000$$

$$EAC = BAC/CPI = \$3000/0.50 = \$6000$$

$$ETC = EAC - ACWP = \$6000 - \$4000 = \$2000$$

$$VAC = BAC - EAC = \$3000 - \$6000 = -\$3000$$

Possible Ways to Fix this Situation:

Possible ways to fix this situation:

- Work with stakeholders to reduce scope
- Work overtime to catch up (if no extra cost for overtime)
- If extra work was due to increased scope, talk to stakeholders about a change request
- Adjust staffing on project

What About the Positive Scenarios?

- EVM can also indicate when a project is “ahead” of schedule and/or cost projections
- A positive outlook can be used as reserve to address future risks

Alternatives to EVM

- Some organizations track budgeted Vs. actual spending using a “burn rate,” but this method does not reflect true project status. “Burn rate” tracks only spending. The spending may be close to budget, but the effort expended may be less than budgeted. This may not be indicated by a “burn rate” report.

Further Information:

www.pmi.org

www.pminj.org

www.4pm.com

www.ganttthead.com

www.rmcpproject.com

Special Thanks

Special thanks to:

- **My family, for supporting me in my earlier quest to become a PMP and now that I am a PMP for patiently supporting me in my PMP endeavors (such as my participation in this symposium)**
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