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Applying Earned Schedule Principles in a Non-EVM Environment (a.k.a. The “Baseline Execution” Concept)

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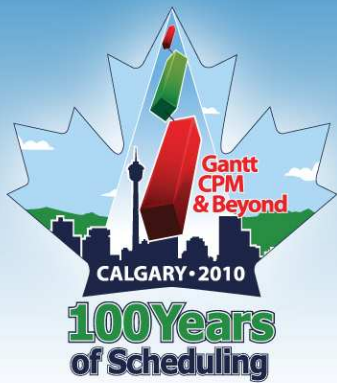


Agenda

- **Earned Schedule enhances schedule analysis in Earned Value**
 - Turns focus on time (not dollars)
- **Event Curves are similar to Earned Value Plots**
 - BCWS and BCWP vs. Planned and Actual Completions
- **Enhancing schedule analysis in Event Curves**
 - “Baseline Execution” concept turns focus on time (not events)
- **Summary of conclusions**
 - Advantages and preferences

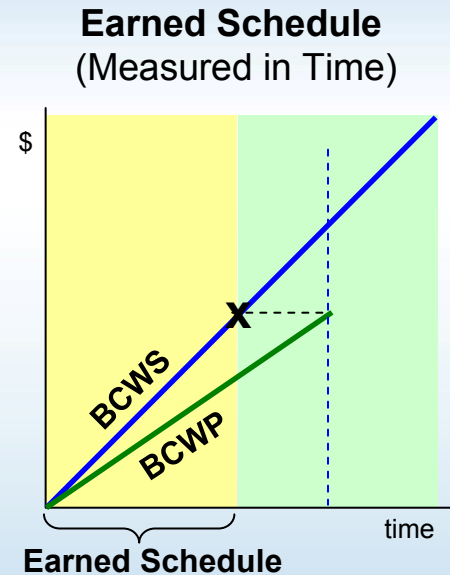
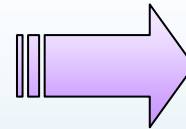
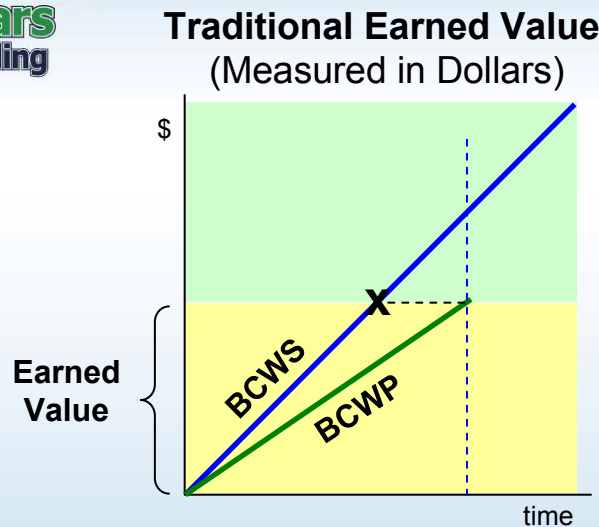


Using Earned Schedule to Enhance Earned Value



Earned Schedule

Turning Earned Value on its ear



● Earned Value

- Most indices originate with BCWS and BCWP plots
- Measured in \$\$\$ (y-axis)

● Earned Schedule

- Same BCWS and BCWP plots
- Measured in time (x-axis)

**Earned Schedule analysis is essentially
Earned Value turned on its side**



Earned Schedule

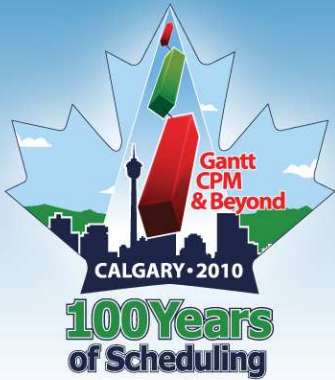
Adding value to Earned Value

Earned Schedule Advantages

- **Variance to schedule discussed in terms of time**
 - Measuring SV using dollars is unintuitive
- **Schedule efficiency is valid throughout the project**
 - Traditional SPI returns to 1.0 at project completion
- **Projected efficiency calculations made possible**
 - Changes to project ECD have no effect on traditional EV scheduling metrics



Similarities Between Earned Value Plots and Event Curves

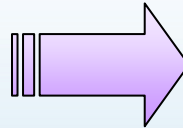
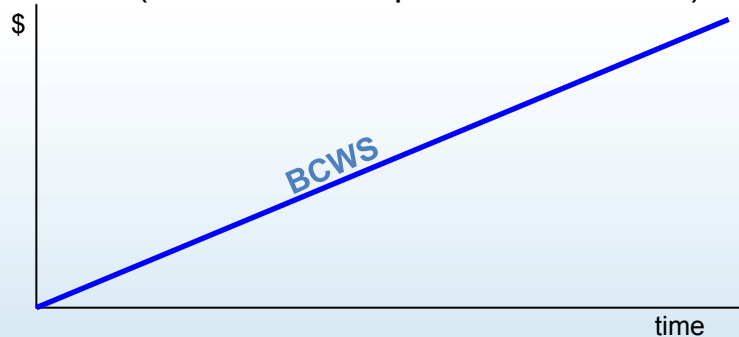


Schedule Event Curves

Similarity of BCWS to Planned Completions

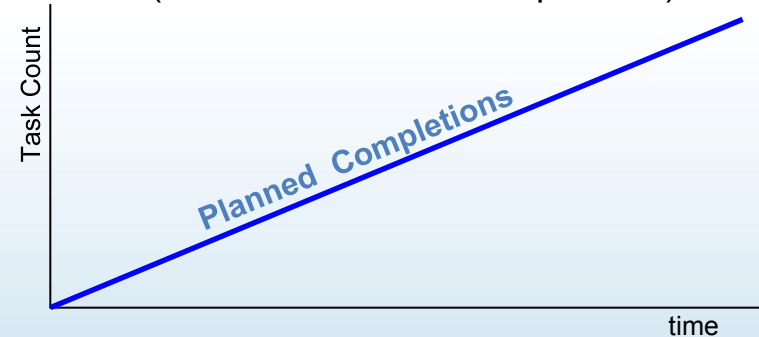
Earned Value Plot

(based on time-phased resources)



Event Curve

(based on the task completions)



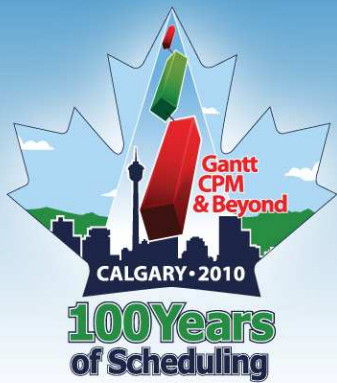
BCWS

- Cumulative budget (\$)
 - Spread over entire project duration
- Tasks weighted individually
 - Weight spread over entire task

Planned Completions

- Cumulative baseline completions
 - Uses same EV timeline
- All tasks weighted equally
 - Weight generally on task finish

While BCWS will generally be a more finite representation of the planned effort on a project, BCWS and Planned Completions perform the same role

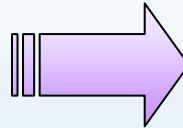
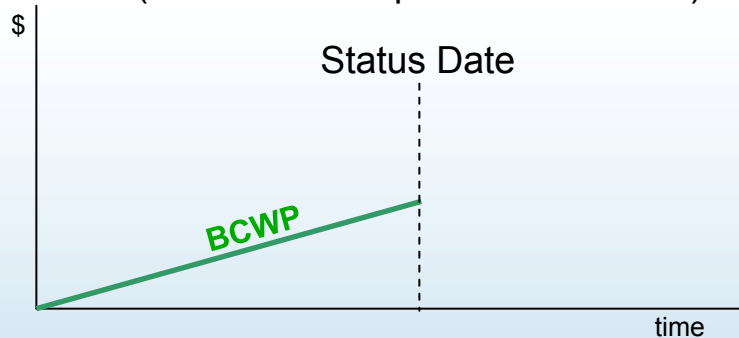


Schedule Event Curves

Similarity of BCWP to Actual Completions

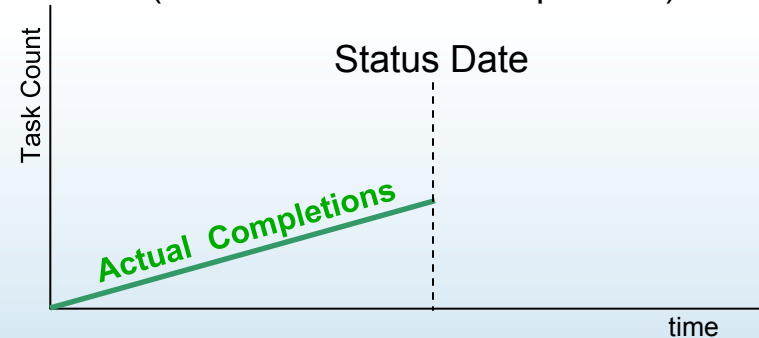
Earned Value Plot

(based on time-phased resources)



Event Curve

(based on the task completions)



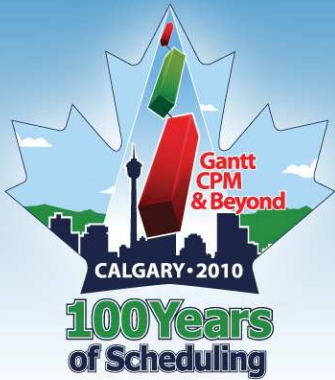
BCWP

- Cumulative Performance (EV)
 - From project start to status date
- Tasks weighted individually
 - Weight spread over entire task

Planned Completions

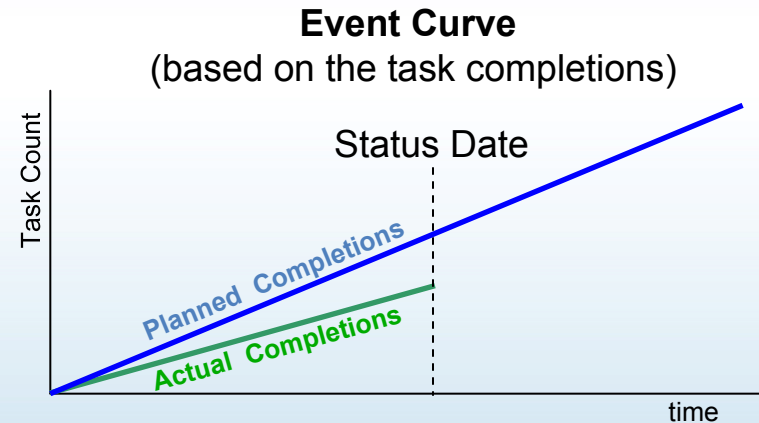
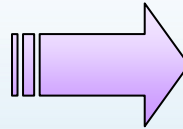
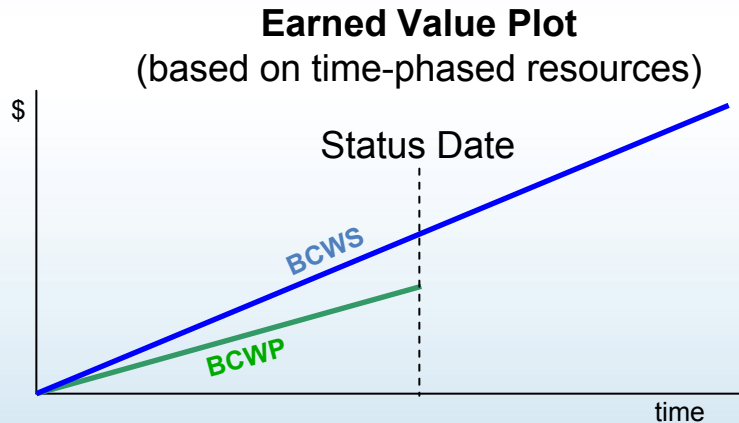
- Cumulative task completions
 - Uses same EV timeline
- All tasks weighted equally
 - Weight generally on task finish

The Actual Completions plot on an Event Curve is essentially a simplified version of BCWP on an EV plot



Schedule Event Curves

Similarity to traditional EV plots



● EV Plots and Event Curves

- Both track cumulative execution plan
- Both measure performance to date

While an EV Plot and an Event Curve for the same project may not yield identically shaped spreads, they have the same in form and function



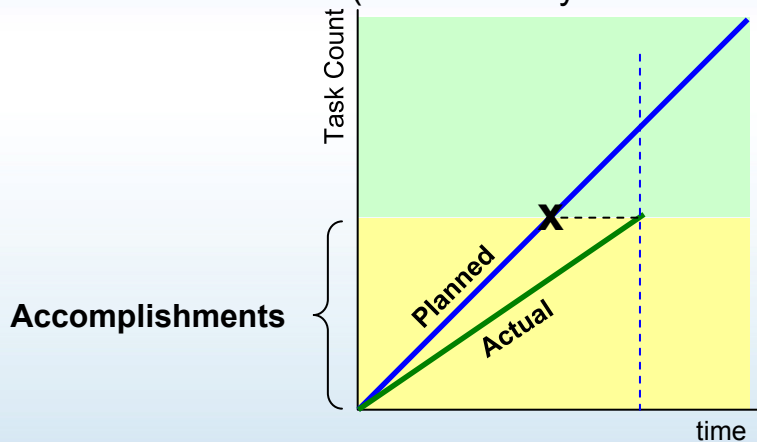
Using the “Baseline Execution” Concept to Enhance Event Curves



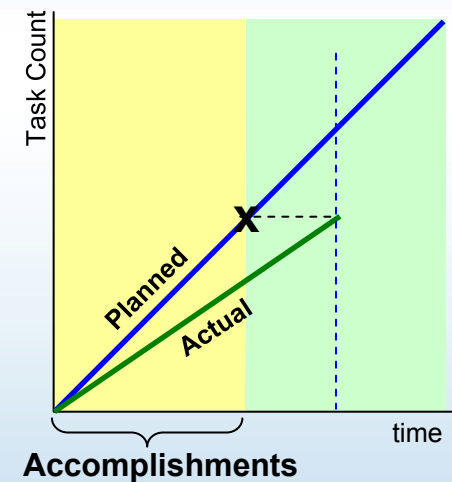
Baseline Execution

Turning Event Curves on their ear

Traditional Event Curve
(Measured by task count)



Baseline Execution
(Measured in Time)



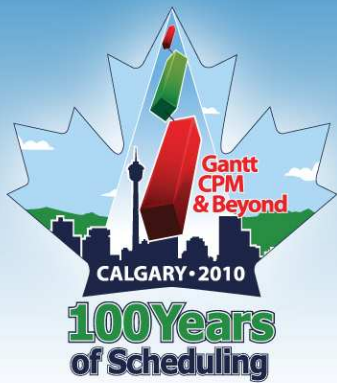
● Event Curves

- Most indices use plots of Planned and Actual Completions
- Measured by Task Count (y-axis)

● Baseline Executed

- Same Planned and Actual Completion
- Measured in time (x-axis)

**Baseline Execution analysis is essentially
Event Curve measurements turned on their side**



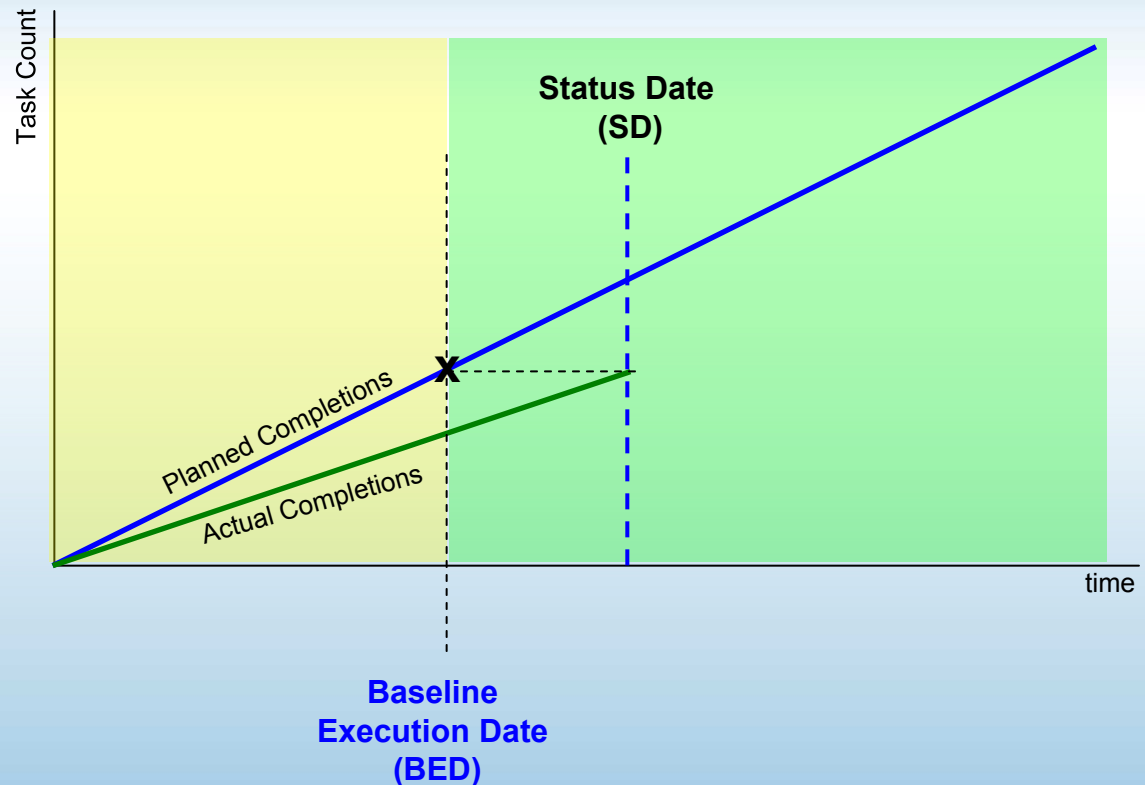
Planned Progress Date

Baseline Execution Date – BED

Baseline Execution Date - BED

The date at which the project should have completed the number of tasks that have actually been completed to date.

Found by tracing left or right from the end of the Actual Completions line to the Planned Completions line. The date of this intersection is the **BED**.



**Date we should have been
where we currently are...**

Earned Schedule counterpart: Earned Schedule Date



Variance to Schedule

Time-Based Baseline Execution Variance – BEV(t)

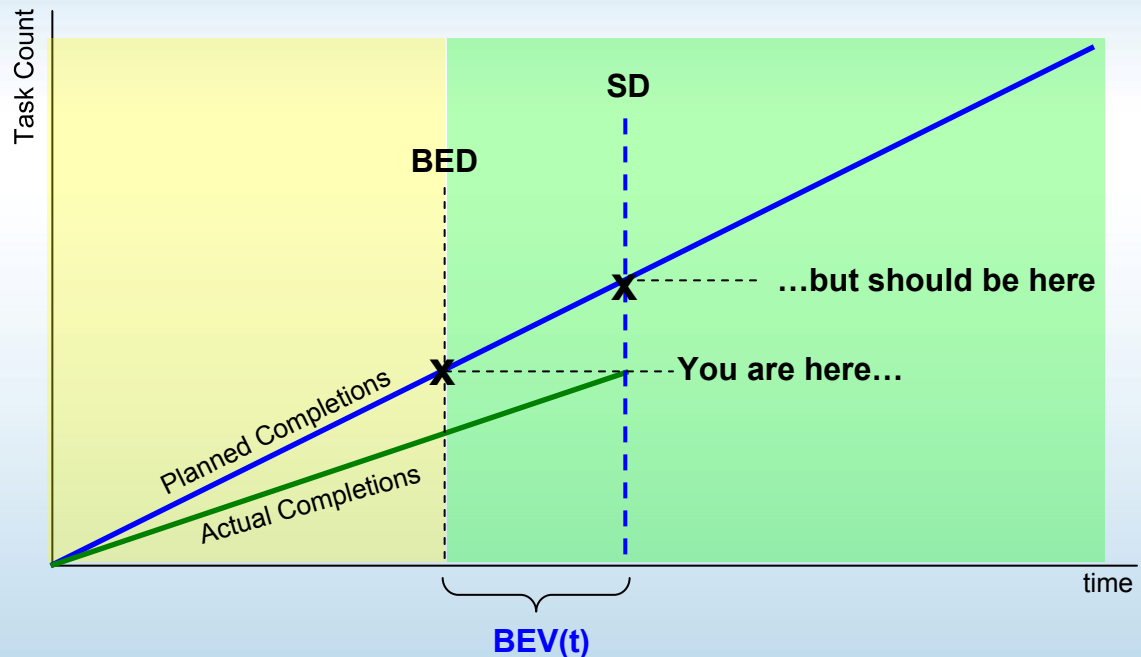
BEV(t)

The span of time between the current Status Date and the Baseline Execution Date.

Indicates on average how far ahead or behind the project is from the original plan.

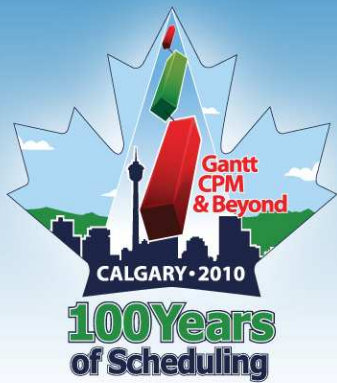
Caution:

BEV(t) is a project average, and should supplement (not replace) sound critical path analysis



$$BEV(t) = BED - SD$$

BEV(t) is the amount of time between where we are...and where we should be
Earned Schedule counterpart: SV(t)

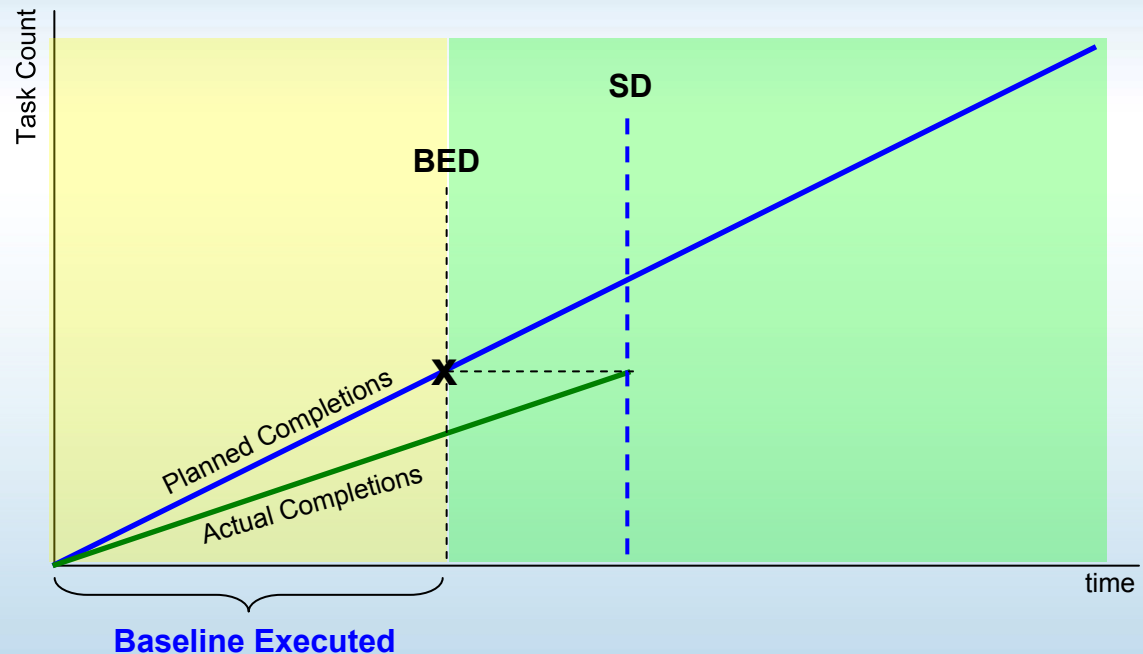


Progress to Plan

Baseline Executed – BE

Baseline Executed - BE

The amount of time it should have taken to achieve the total number of tasks actually completed to date.



$$BE = BED - \text{Planned Project Start}$$

Baseline Executed is the duration we planned to take to get where we are now

Earned Schedule counterpart: Earned Schedule



Demonstrated Schedule Efficiency

Time-Based Baseline Execution Index – BEI(t)

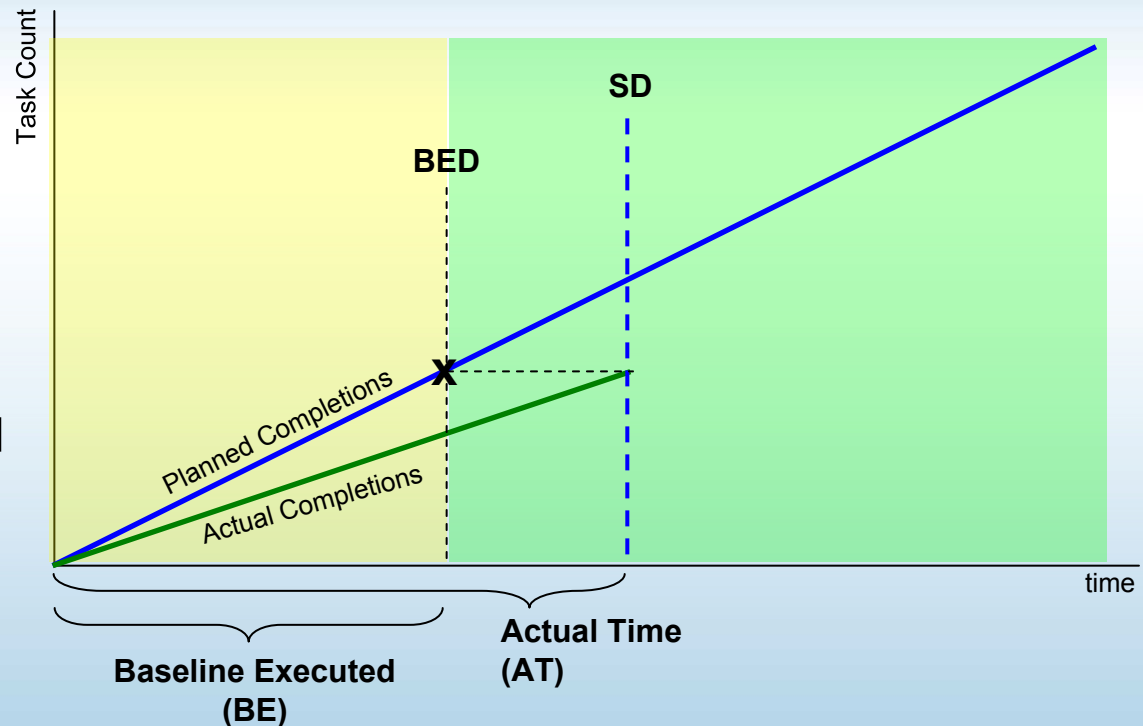
BEI(t)

The efficiency at which the schedule has been accomplished to date.

Calculated as a ratio of planned duration to actual duration.

Like most EV ratios:

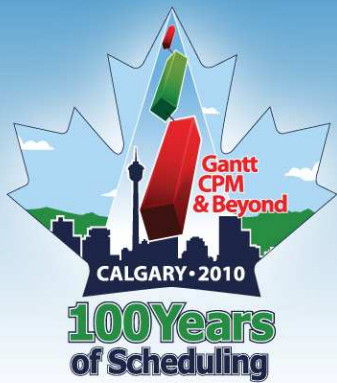
- 1.0 is on track
- > 1.0 is good
- < 1.0 is poor



$$BEI(t) = \frac{\text{Baseline Executed}}{\text{Actual Time}}$$

**Proven efficiency at which tasks
have been performed to date...**

Earned Schedule counterpart: SPI(t)



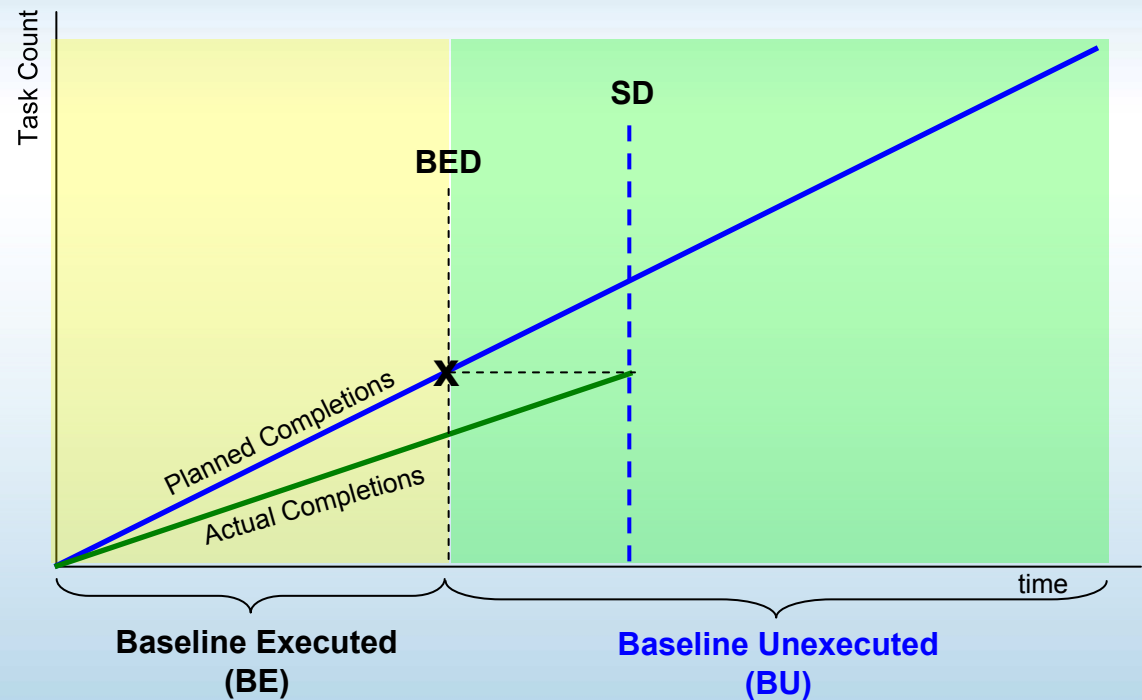
Progress Remaining

Baseline Unexecuted – BU

Baseline Unexecuted - BU

The amount of time originally planned to accomplish the number of tasks currently remaining uncompleted.

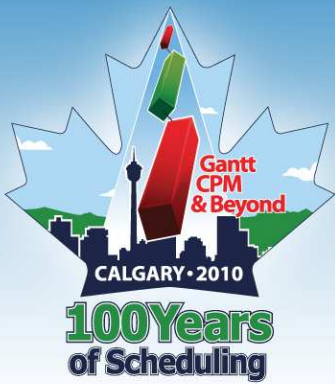
This is the amount of time between the Baseline Execution Date and the end of the project.



$$BE = BED - \text{Planned Project Start}$$

**Duration planned to complete
the number of tasks currently remaining...**

Earned Schedule counterpart: Unearned Schedule (PDWR)



Projected Schedule Efficiency

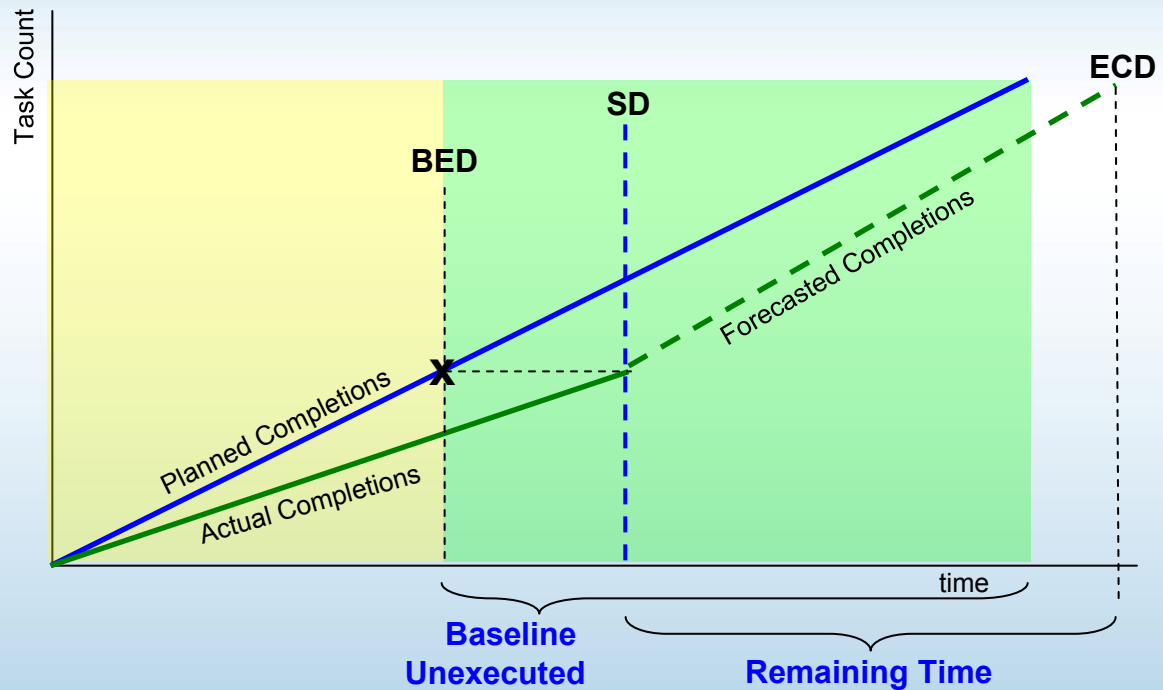
Time-Based To-complete Baseline Execution Index - TBEI(t)

TBEI(t)

The efficiency at which the uncompleted tasks need to be finished to achieve the project's estimated completion date (ECD).

Calculated as a ratio of planned duration to remaining duration.

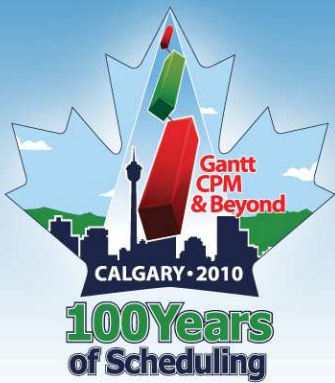
- 1.0 (original efficiency)
- > 1.0 (increased efficiency)
- < 1.0 (decreased efficiency)



$$TBEI(t) = \frac{\text{Baseline Unexecuted}}{\text{Remaining Time}}$$

Efficiency that will need to be maintained in order to complete the project per the current forecast

Earned Schedule counterpart: TSPI(t)



BEI(t) vs. TBEI(t)

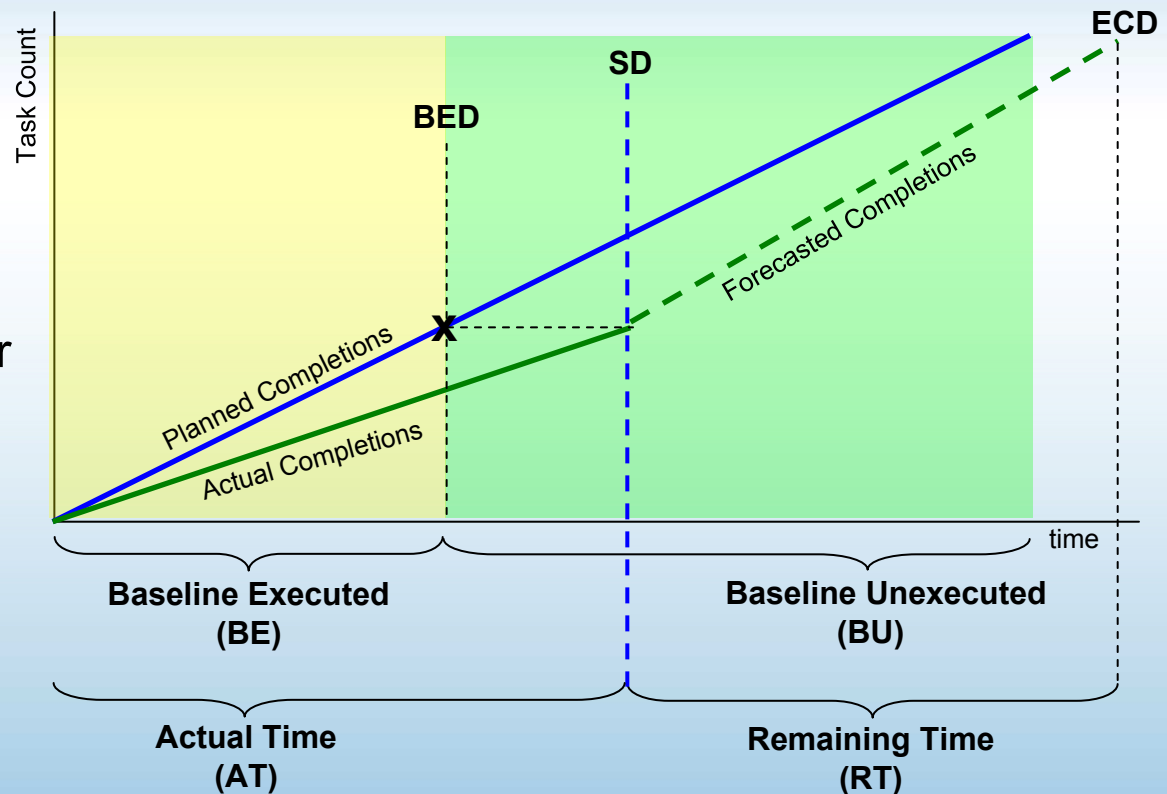
Demonstrated vs. Projected schedule efficiency

BEI(t) vs. TBEI(t)

Generally the efficiency that is being projected - TBEI(t) – should be expected to be similar to the efficiency that has been demonstrated to date – BEI(t).

$$BEI(t) = \frac{BE}{AT}$$

$$TBEI(t) = \frac{BU}{RT}$$

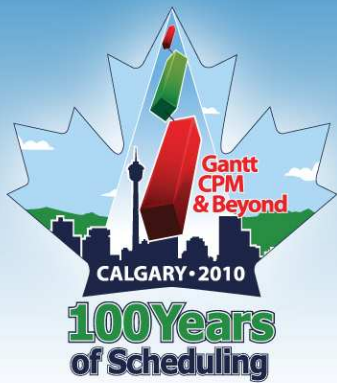


While vastly different BEI(t) and TBEI(t) values may be appropriate, there is often just cause for suspicion...

Earned Schedule counterpart: SPI(t) vs. TSPI(t)



In Conclusion



In Conclusion

Advantages

**Earned
Schedule**

**Baseline
Execution**

Accuracy	Fidelity	Simplicity	Timeliness
✓	✓		
		✓	✓

● Earned Schedule

- Accuracy
 - Individual weighting of activities
- Fidelity
 - Value earned throughout task span

● Baseline Execution

- Simplicity
 - No EVM required
- Timeliness
 - Not tied to accounting calendar

Earned Schedule provides a superior set of schedule analysis tools. However, in the absence of EVM, Baseline Execution can supply an advanced schedule analysis mechanism quickly and easily.



In Conclusion

A mathematical proof of Baseline Execution

IF

Earned Value
(measured in \$\$\$) **+** **Earned Schedule**
(measured in Time) **=** **Enhanced Schedule
Analysis Capability**

AND

Earned Value Plot
(with resources) **≈** **Event Curve**
(without resources)

THEN

Event Curve
(measured in tasks) **+** **Baseline Execution**
(measured in Time) **=** **Enhanced Schedule
Analysis Capability**



May the Force Be With You!