



Infer Analogy™

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InferAnalogy is a lightweight approach combining project management principles with Agile Development methodologies to provide high-quality cost-effective solutions.

Infer employs PMI philosophy of project management with emphasis on Earned Value Management integrated with eXtreme Programming (XP) principles.

EVMS/Agile Framework



Most software development methods, including Agile Methods, have a mechanism to measure progress to plan. But comparing actual cost with planned costs is simply measuring the “level of effort” consumed over a time period.

This measurement does not describe the “value” delivered by the invested effort. End – End value tracking Budget and Time Scalability Project performance at any given time.

Earned Value Management Systems (EVMS) are a tool to measure software development progress. Traditional project management techniques compare planned expenditures with actual

expenditures. EVMS adds a third measure of the actual work accomplished as a result of expenditure. This gives greater insight into potential project risks and provides leading performance indicators that allow project managers to identify and control problems in real time.

EVMS follow a “progress-to-plan” reporting requirement that measures performance (technical), resources (cost), and time (schedule). This is different from traditional cost- and schedule-only techniques. EVMS uses three leading variables to measure progress:

Budgeting Cost for Work Scheduled (BCWS)



- The Plan
 - How much do we plan to spend?
-

Budgeted Cost for Work Performed (BCWP)



- Performance or Earned Value
 - How much do we plan to spend?
-

Actual Cost for Work Performed



- Cost of Performance or the Investment
- How much did we actually spend to deliver the Earned Value?

These variables, once defined, can be utilized to measure many different performance benchmarks. These include:

Cost Variance (the difference between planned cost and actual cost)



- $CV = ACWP - BCWS$

Schedule Variance (the difference between invested cost and the returned value)



- $SV = BCWP - ACWP$

Cost Performance Index and Schedule Performance Index (normalized performance indices)

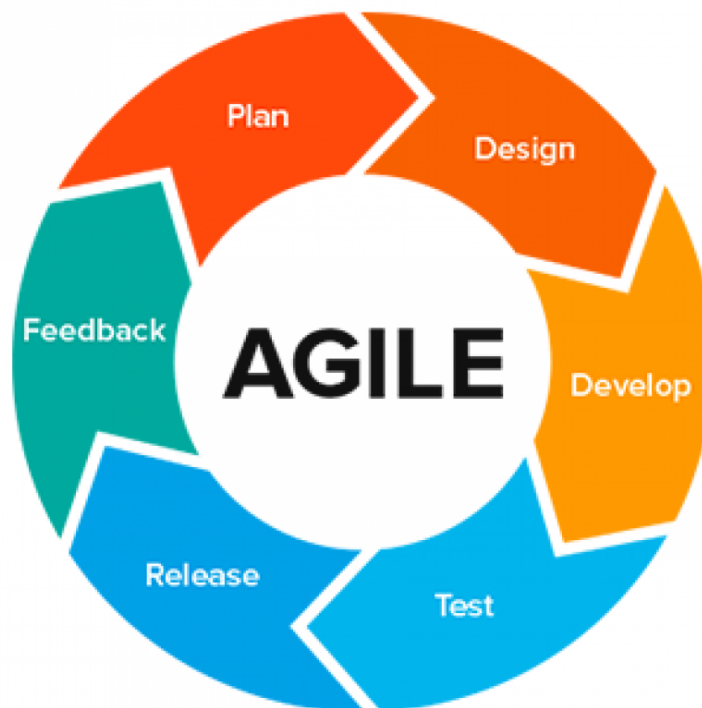


- $CPI = BCWP/ACWP$
- $SPI = BCWP/BCWS$

Estimate at Completion and Estimate to Completion (estimates of the total cost and cost to complete)



- $EAC = \text{cost to date} + \text{estimated cost of remaining work}$



Agile methods do have a mechanism to measure progress to plan by comparing the actual costs with planned costs. However, this measures only the level of effort consumed over a time period and does not describe the value delivered by the invested effort. The critical aspect of EV analysis is the determination of value delivered (BCWP) in exchange for hours or dollars invested (ACWP) for software projects. This Earned Value is the basis for determining the cost and schedule performance.

The integrity test for software management asks the question: How do we know that the software will behave as specified? If it does, the development phase is complete. If not, rework is needed. Other methods use binary events or subjective assessment of progress during the reporting period, which leads to failure of the integrity test. In EVMS, the budget for the tasks is used to

accrue value rather than the expected business value associated with the tasks' completion.

Agile has many shortcomings. It is unable to forecast the future cost and schedule of a project beyond the use of past metrics. The delivered value (for example, “velocity” in the case of XP) can be compared with the estimated value, but the difference of budget to actual cost results in a cost variance. No schedule variance process is directly available in XP.

Technical Performance Measurement is an accepted Earned Value process for assigning value to BCWP. The Technical Performance Measurement is the plan for expected technical achievement. The actual progress of the project is compared using periodic measurements or tests. The difference between planned progress and actual progress represents a technical variance.

Using EVMS, one can allot 0% to 100% of a task to BCWP and make the task durations sufficiently small. The EVMS value generating approach is similar to the Agile software development process with EVMS principles in place. In XP, velocity is the measure of effort invested to produce a software. BCWS and ACWP are acquired from the time dimension. BCWS is defined through Stories, Tasks, and Testable Requirements. Testable Requirements are verified using Unit and Functional tests. For EVMS and XP, these processes are normal, with the exception of fine-grained deliverables.

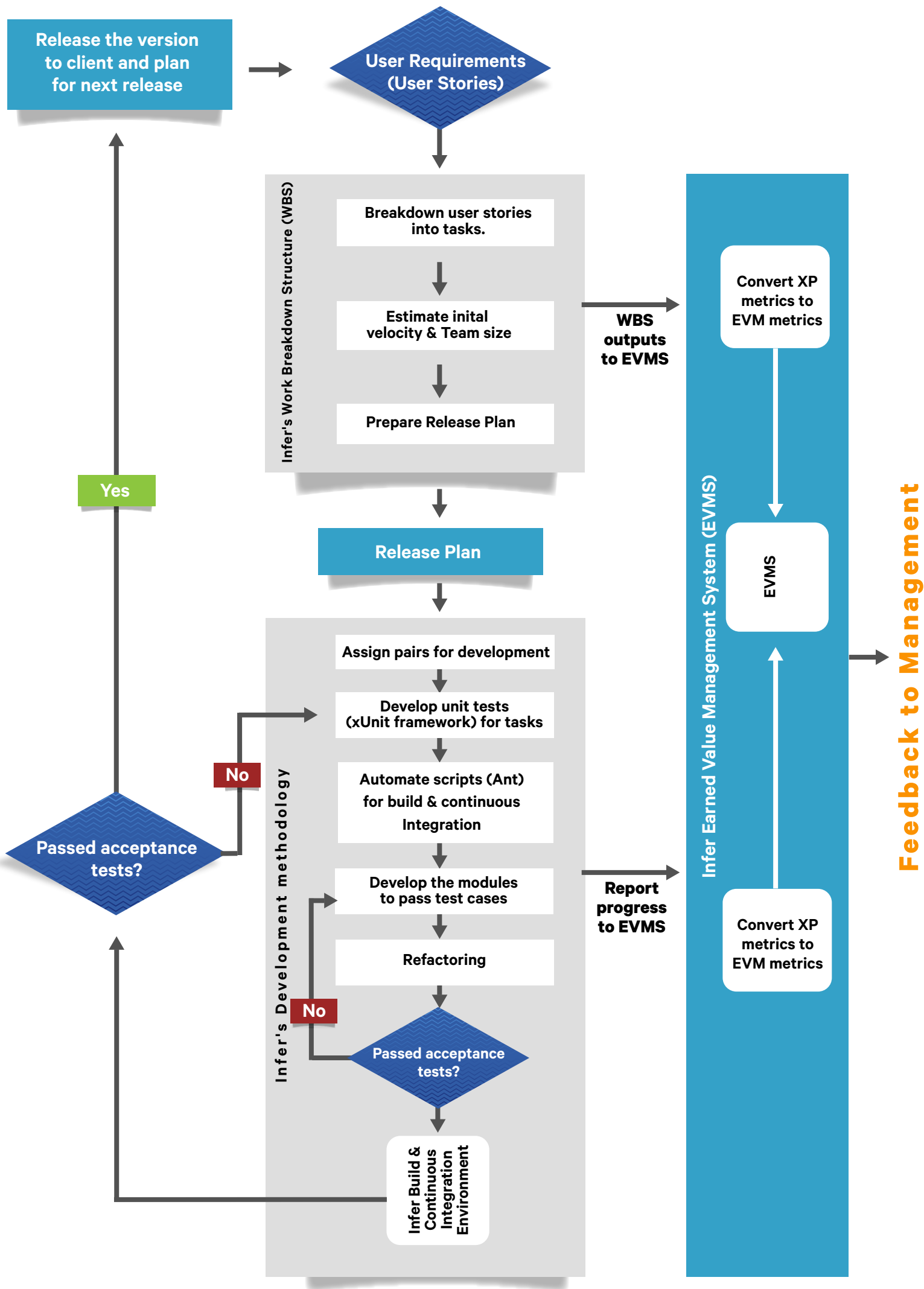
EVMS is not a reporting system, project administration, cost analysis, account, or a task management system. Rather, it is a measure of the value of physical progress in a project and adds additional effort to the work of managing a project. Beyond the additional effort of EVMS, care must be taken to avoid hindering the project team's ability to use its latent management systems.

Agile methods can still be used in an EVMS environment, as the two have many similarities:

EVMS

Agile

Define the scope of work	Scope defined in stories and tasks
Develop an integrated bottom-up estimate for performing the scope of work	Using stories, tasks, "velocity" estimate for completion and estimates at completion can be created
Assign resources for each task in the plan	Resources assigned during the bi-weekly planning session
Manage changes to the base line	Use stories and tasks in the planning session
Big picture view of the project software	Continuous production of usable software
Accurate estimate at completion	Prediction of the next iteration's effort
End-to-End value tracking	Iteration-to-Iteration tracking



Creating a development environment that performs many of the XP practices while maintaining reporting deliverables compliant with EIA (Electronic Industries Alliance)-748 B(2007) involves:

- Replacing XP with Earned Value metrics
- Creating fine-grained measures of BCWP using “testable requirements”
- Establishing the BCWS baseline at the beginning of each iteration
- Capturing ACWP through a time keeping system
- Computing Cost Variance and Schedule Variance from the three base Earned Value metrics
- Computing Estimate at Completion (EAC) and Estimate to Completion (ETC) from these base metrics
- Refactoring - High Cohesion and low coupling factor

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