
CAPM® Certification
Premium Study Guide

Domain 2

**Predictive, Plan-Based
Methodologies**

17% of the CAPM Exam

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Domain 2: Predictive, Plan-Based Methodologies

This domain represents approximately 17% of the CAPM exam. It covers the traditional waterfall approach to project management, including schedule and cost management, earned value analysis, work breakdown structures, and quality management.

2.1 When to Use a Predictive Approach

A **predictive (plan-based or waterfall) approach** is best suited for projects where requirements are well-defined and stable, the technology is well-understood, and changes are expected to be minimal.

Organizational Structures and Their Impact:

Structure	PM Authority & Notes
Functional	Resources are grouped by specialty (IT, Finance, HR). PM has little authority. Team members report to functional manager.
Weak Matrix	PM has limited authority. Functional manager retains control over resources and budget.
Balanced Matrix	PM and functional manager share authority equally.
Strong Matrix	PM has more authority than the functional manager over resources and budget.
Projectized	PM has full authority. Team members are dedicated to the project. Most suitable for predictive approach.
Virtual	Team members work remotely from different locations.
Co-located	All team members work in the same physical location (war room). Improves communication.

2.2 The Five Process Groups in Predictive Projects

In a predictive project, work flows through five process groups in a structured sequence. Each process group has defined inputs, tools, techniques, and outputs (ITTOs).

Process Group	Key Outputs	Purpose
Initiating	Project Charter, Stakeholder Register	Formally authorizes the project and identifies key stakeholders.
Planning	Project Management Plan (all subsidiary plans)	Defines scope, schedule, cost, quality, resources, communications, risk, and procurement.
Executing	Deliverables, Work Performance Data	Carries out the project plan. Manages quality, teams, communication, and stakeholder engagement.
Monitoring & Controlling	Change Requests, Work Performance Reports	Monitors performance against the plan. Manages changes through the integrated change control process.
Closing	Final Product/Service/Result, Lessons Learned	Formally closes the project. Obtains acceptance, archives documents, and releases resources.

2.3 Work Breakdown Structure (WBS)

The **Work Breakdown Structure (WBS)** is a hierarchical decomposition of the total scope of work to be carried out by the project team. It organizes deliverables into manageable components.

- **Work Package:** The lowest level of the WBS. The smallest deliverable that can be estimated, scheduled, and assigned.
- **WBS Dictionary:** Describes each WBS element in detail, including scope, deliverables, responsible party, and acceptance criteria.

- **100% Rule:** The WBS must capture 100% of the work defined in the project scope. Nothing more, nothing less.
- **Decomposition:** The technique of breaking down deliverables into smaller, more manageable components.

2.4 Schedule Management and Critical Path Method

Schedule management involves defining activities, sequencing them, estimating durations, and developing and controlling the project schedule.

Critical Path Method (CPM):

- **Critical Path:** The longest sequence of dependent activities from project start to finish. Determines the minimum project duration.
- **Float (Slack):** The amount of time an activity can be delayed without delaying the project end date. Activities on the critical path have zero float.
- **Forward Pass:** Calculates the Early Start (ES) and Early Finish (EF) of each activity.
- **Backward Pass:** Calculates the Late Start (LS) and Late Finish (LF) of each activity.
- **Total Float = LS - ES = LF - EF**

Schedule Compression Techniques:

- **Crashing:** Adding resources to critical path activities to shorten duration. Increases cost.
- **Fast-Tracking:** Performing activities in parallel that were originally planned sequentially. Increases risk.

2.5 Earned Value Management (EVM)

Earned Value Management (EVM) is an objective method of measuring project performance and progress. It integrates scope, schedule, and cost measurements.

Core EVM Terms:

Acronym	Term	Definition
PV	Planned Value	The budgeted cost of work scheduled to be done by a specific date.
EV	Earned Value	The budgeted cost of work actually completed by a specific date.
AC	Actual Cost	The actual cost incurred for work completed by a specific date.
BAC	Budget at Completion	The total approved budget for the project.

EVM Formulas — Memorize These:

Metric	Formula	Interpretation
CV (Cost Variance)	EV - AC	Positive = under budget. Negative = over budget.
SV (Schedule Variance)	EV - PV	Positive = ahead of schedule. Negative = behind schedule.
CPI (Cost Performance Index)	EV / AC	>1.0 = under budget. <1.0 = over budget.
SPI (Schedule Performance Index)	EV / PV	>1.0 = ahead of schedule. <1.0 = behind schedule.

EAC (Estimate at Completion)	BAC / CPI	Assumes current CPI continues for remainder.
ETC (Estimate to Complete)	EAC - AC	How much more will it cost to finish?
VAC (Variance at Completion)	BAC - EAC	Expected over/under budget at completion.
TCPI (To-Complete Perf. Index)	$(BAC - EV) / (BAC - AC)$	Efficiency needed to meet BAC.

2.6 Quality Management

Quality management ensures the project satisfies the needs for which it was undertaken. It includes quality planning, quality assurance, and quality control.

Quality Planning

Identifying quality standards and determining how to satisfy them. Output: Quality Management Plan.

Quality Assurance (QA)

Prevention-driven. Auditing quality processes to ensure standards are being followed. Focuses on HOW work is done.

Quality Control (QC)

Inspection-driven. Monitoring specific deliverables to verify they meet quality standards. Focuses on WHAT was produced.

2.7 Integration Management and Change Control

Integration management coordinates all project management knowledge areas. It ensures all project components work together effectively.

- **Integrated Change Control:** The process of reviewing all change requests, approving changes, and managing changes to deliverables, organizational process assets, project documents, and the project management plan.
- **Change Control Board (CCB):** A formally chartered group responsible for reviewing, evaluating, approving, deferring, or rejecting changes to the project.
- **Change Request:** A formal proposal to modify any document, deliverable, or baseline. Must go through the change control process.
- **Corrective Action:** An intentional activity that realigns the performance of the project work with the project management plan.
- **Preventive Action:** An intentional activity that ensures future performance of the project work is aligned with the project management plan.

Exam Tips for Domain 2

- ✓ CV and SV: positive is always good (under budget / ahead of schedule).
- ✓ CPI and SPI: greater than 1.0 is always good.
- ✓ $EAC = BAC / CPI$ assumes current efficiency continues. This is the most common EAC formula on the exam.
- ✓ Activities on the critical path have ZERO float.
- ✓ Crashing adds cost; fast-tracking adds risk.
- ✓ QA is about processes (prevention); QC is about products (inspection).

- ✓ All changes must go through Integrated Change Control — never make unauthorized changes.
- ✓ The WBS must capture 100% of the project scope (100% Rule).