Preparación certificación PMP®

1 ene 2021

PMBOK® Guide, **6**th ed.

Avanza REP 3407

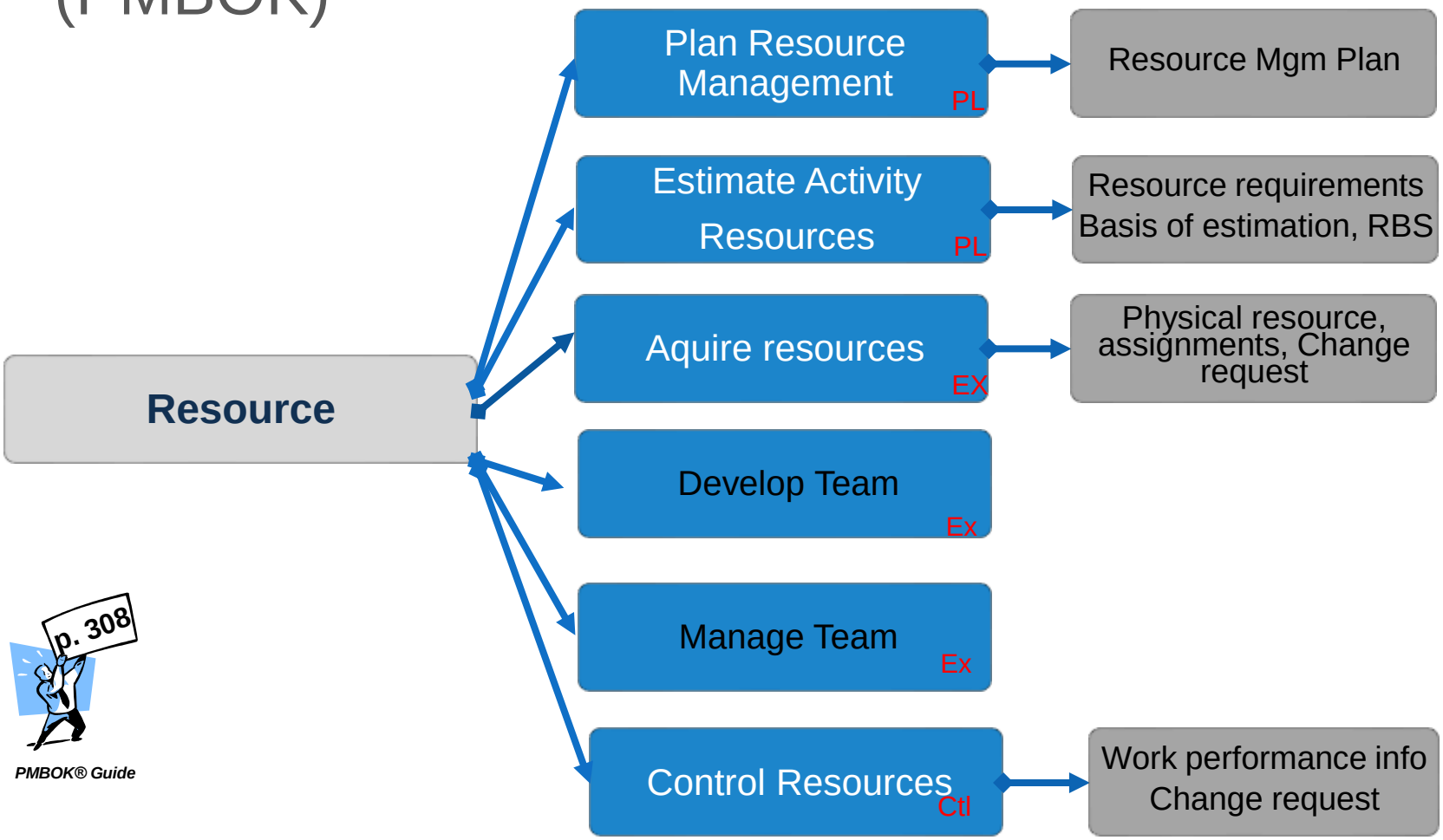
2

6. Cost, Resource

7. Leadership, RoI of PM
8. Disciplined Agile
9. Quality Mgm
10. Risk Mgm

9. Resource Management

(PMBOK)



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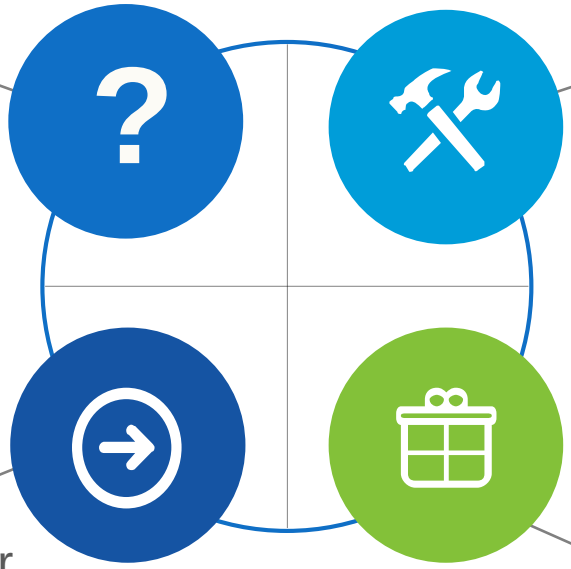
Difficulty	Time to study	Exam Importance	Amount of Data
Low	Medium	High	Medium

9.1 Plan Resource Management

What is it?

Estimate, acquire, manage, and use team and physical resources.



Tools and Techniques

- Expert judgment
- Data representation: Hierarchical charts, RAM
- Organizational theory
- Meetings

Inputs

- Project Charter,
- Project Mgm plan; Quality, Scope PM
- Project docs: Schedule, Requirement docs, Risk, SH register
- EEF
- OPA

Outputs

- Resource mgm plan
- Team charter
- Project documents

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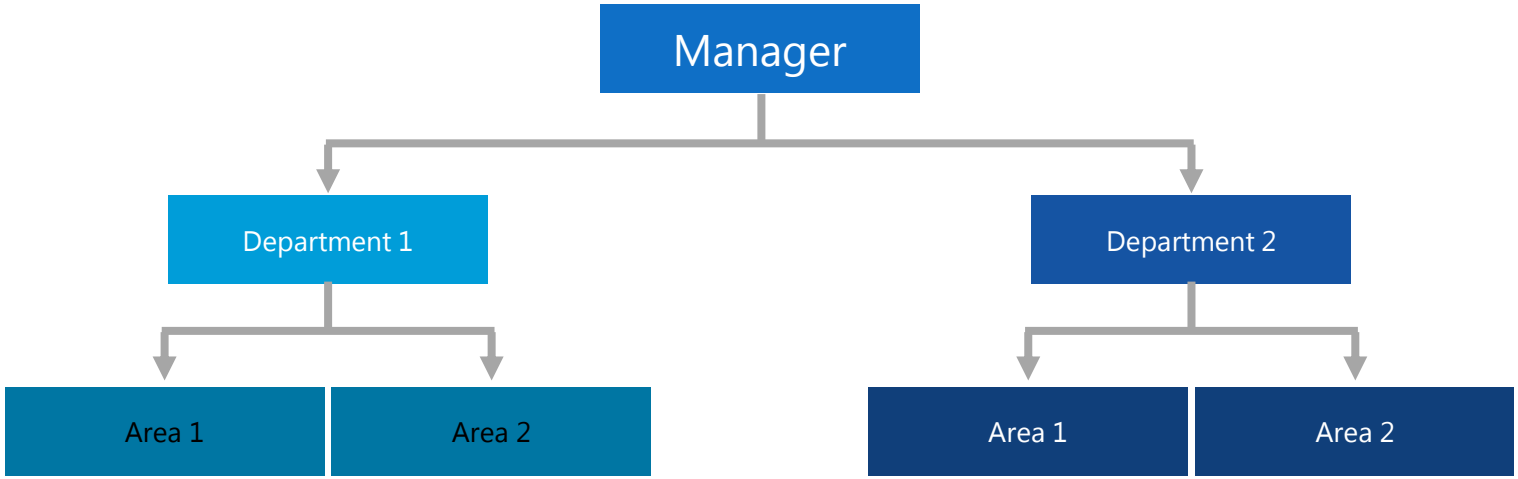
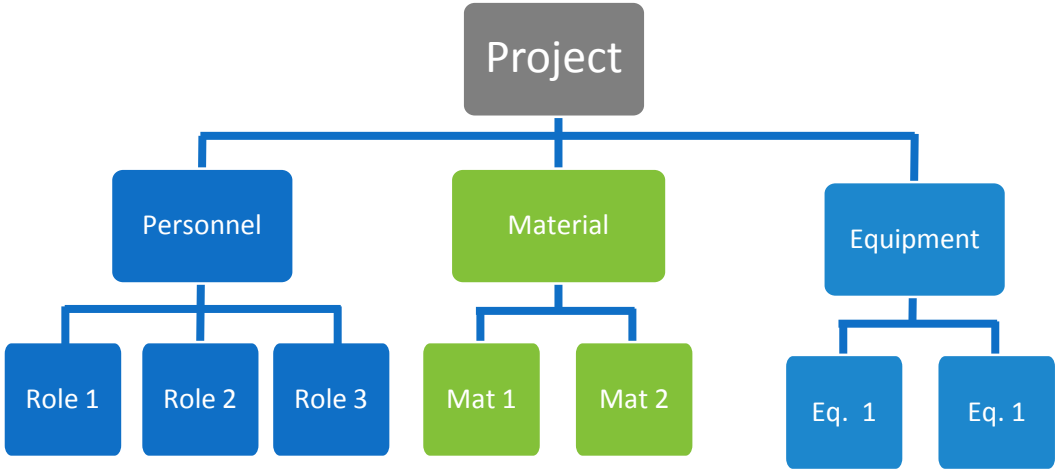
Data representation Organizational Chart



- Represent who is responsibly of what, authority
- Hierarchical: OBS, RBS
- Matrix charts: Responsibility Assignment Matrix (RAM).

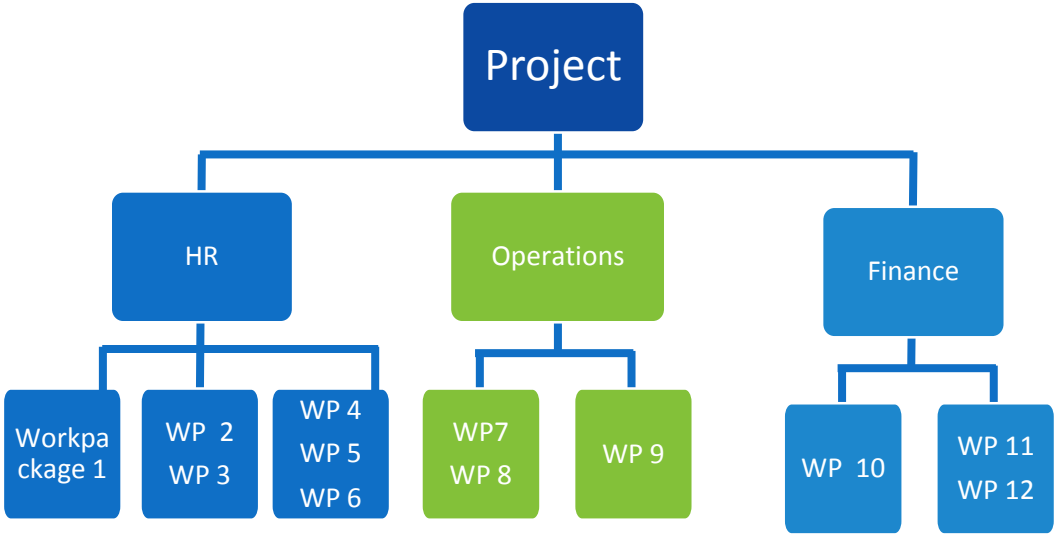
RBS

Resource Breakdown structure



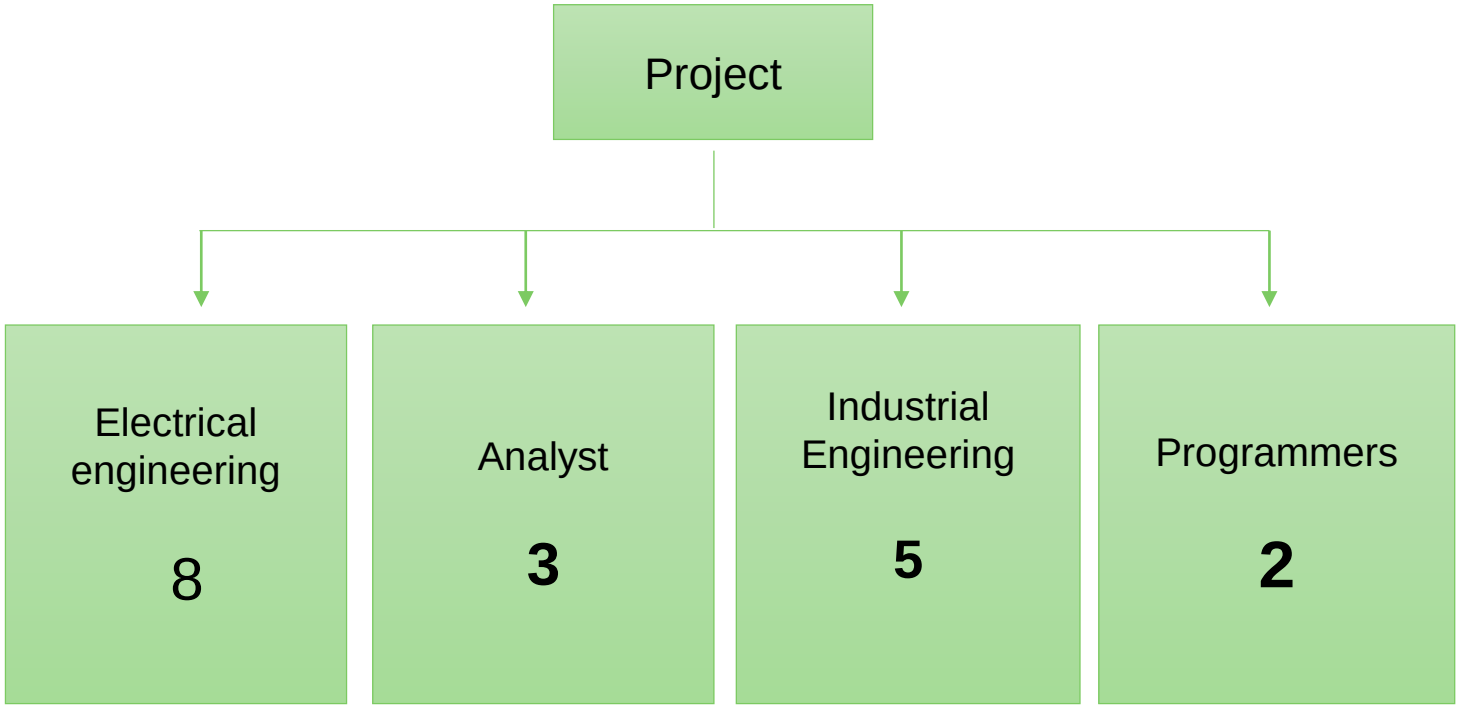
OBS

Organizational Breakdown structure



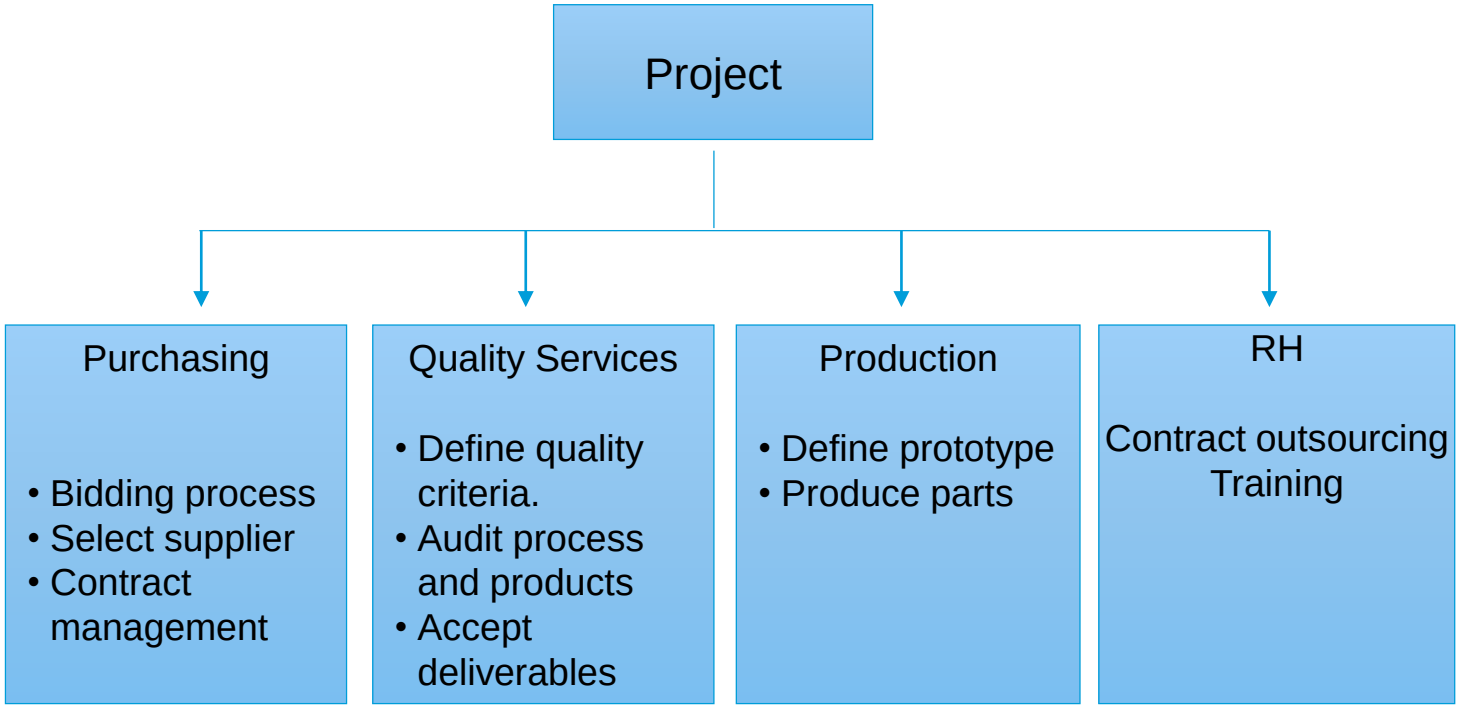
RBS

Show resource number by type



OBS

Show task assignments by organizational unit



Resource Management Plan

Guidance on how resources should be categorized, allocated, managed and released. Divided between the team mgm plan and physical resources

Roles and responsibilities

- Identification and acquiring resources
- Role: function
- Authority: right to apply resources, make decisions
- Responsibility: assigned duties and work
- Competency: skill required

Project organization charts

Graphic display of team members and reporting relationships.

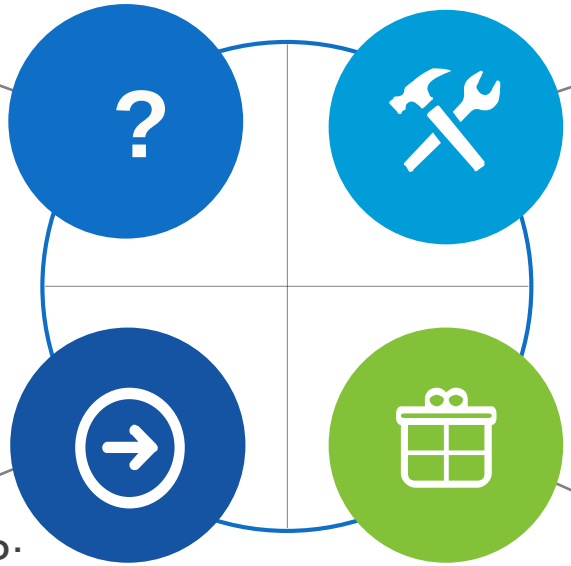
Project team resource mgm

- Staff acquisition
- Resource calendars
- Realize plan
- Training
- Resource control
- Recognition and rewards

9.2 Estimate Activity Resources

What is it?

Estimating the type and quantities of material, HR, equipment or supplies required.



Tools and Techniques

- Expert judgment
- **Bottom-up estimating**
- **Analogous estimating**
- **Parametric estimating**
- **Data analysis:** Alternative analysis
- PMIS
- Meetings

Inputs

- Project Mmgm P: Resource MP, Scope baseline
- Project Docs.: Activity attributes and list, Assumption log, Cost estimates, Calendars, risks
- EEF
- OPA

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Outputs

- Activity resource requirements
- Basis of estimates
- Resource Breakdown Structure
- Project docs.; Activity attributes, Assumption log, Lesson Learned

Estimate Activity Resources

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Management Institute, Inc

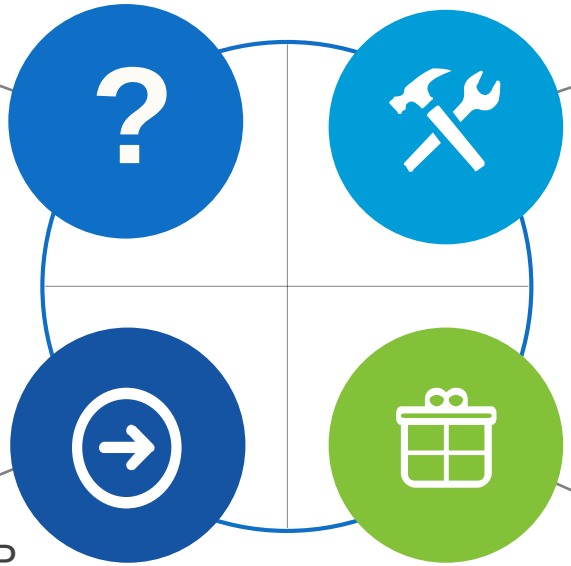
¿When aggregate a resource? Estimates

How many/much resources, time or effort are needed?

9.3 Acquire Resources

What is it?

Obtaining team members, facilities, equipment, materials, etc an assigns them to activities periodically



Tools and Techniques

- Decision making: Multicriteria
- Interpersonal/team skills: negotiation
- Pre-assignment
- Virtual teams

Inputs

Project MP: Resource MP, Procurement MP, Cost baseline
Project Docs.: Schedule, Calendars, Requirements, Stakeholder register
EEF,
OPA

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Outputs

- Physical resources & team assignments
- Resource Calendars
- Change Request
- PM Plan updates
- Project Docs updates: lesion learned register, schedule, RBS Risk, SH
- EEF
- OPA

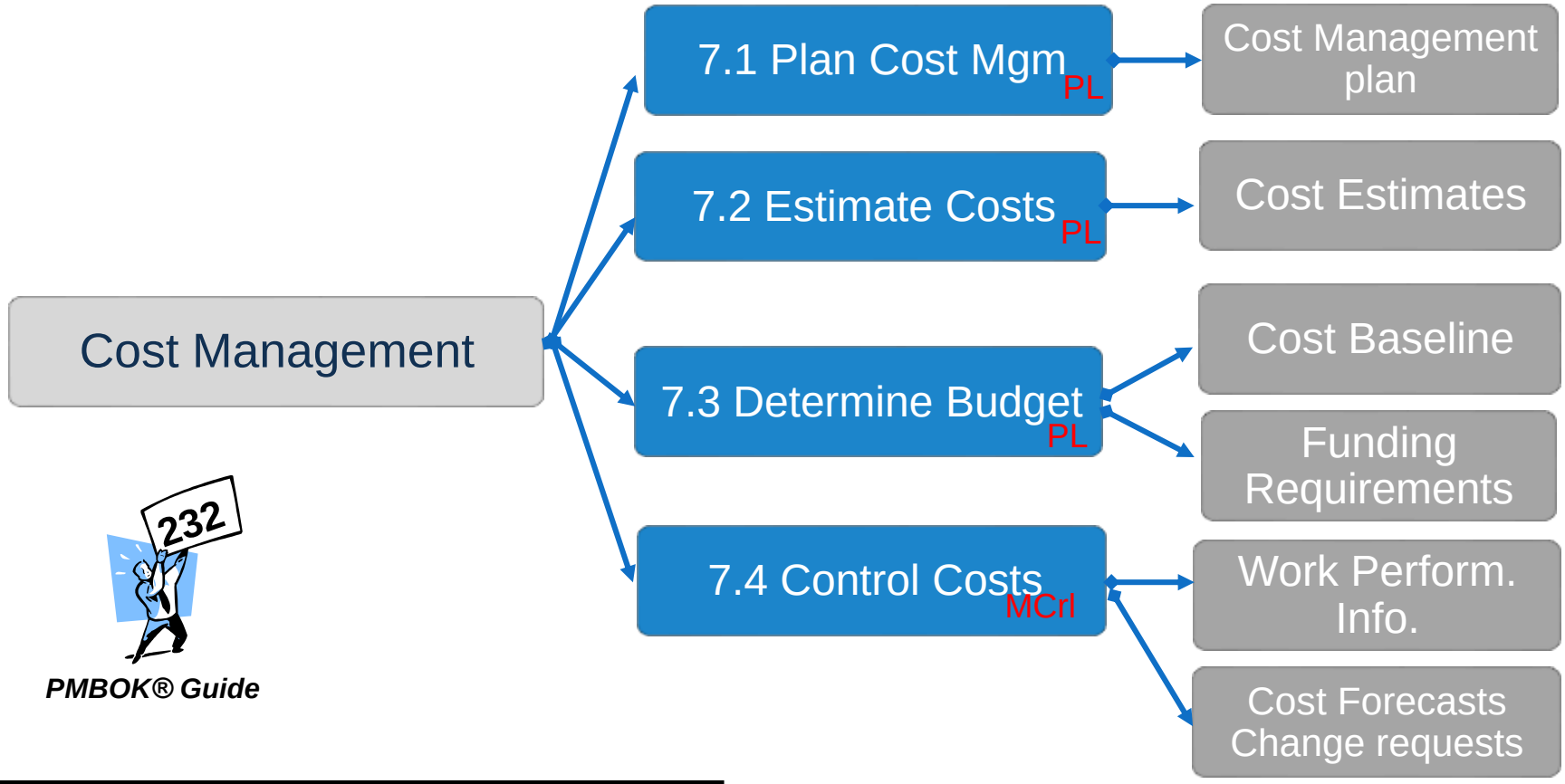
Acquire Resources

- Decision making: multicriteria decision
  - Availability
  - Cost
  - Ability
  - Experience
  - Knowledge
  - Skills
  - Attitude
  - International factors.
- Pre-assignment
- Virtual teams

7. Cost Management

(PMBOK)

Avanza
Proyectos exitosos



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Difficulty	Time to study	Exam Importance	Amount of Data
High	High	High	Medium

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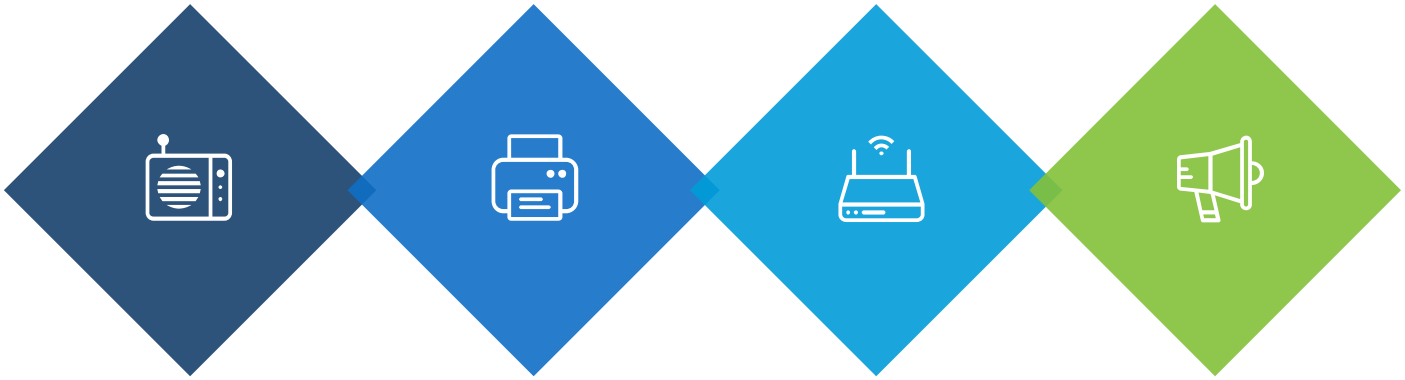
Key Concepts



It’s based on cost of resources

Project decisions affects product operation

Different SH measure cost in different ways and times

May address different techniques as ROI, Cash flow, Payback period

7.1 Plan Cost Management

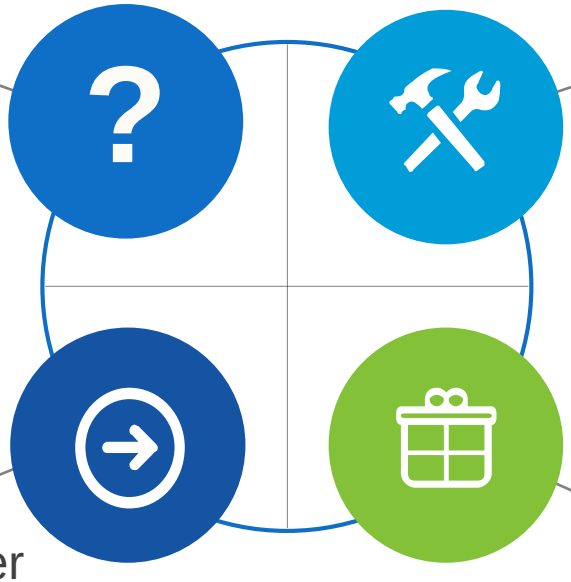
Avanza Proyectos exitosos

What is it?

Defining how the project cost will be estimated, budgeted, managed, monitored and controlled

Tools and Techniques

- Expert Judgment
- Data Analysis
- Meetings



Inputs

- P Charter
- Project Mgm Plan: Schedule, Risk PM,
- EEF
- OPA

Outputs

Cost management plan (units, precision, controls, % thresholds, rules of performance measurement, reports, process)

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7.2 Estimate costs

What is it?

Determine a prediction of the monetary resources to complete activities. Trade-offs and risk

Tools and Techniques

- Expert Judgment
- Analogous
- Parametric
- Bottom up
- Three-point estimating
- Data analysis (reserve analysis, cost of quality)
- PMIS
- Decision making

Inputs

- Project Mgm Plan: cost, quality, scope baseline
- Project docs: lesson learned, schedule, resource req., risks
- EEF
- OPA

Outputs

- Cost estimates
- Basis of estimates
- Project documents updates (assumptions log, risks)

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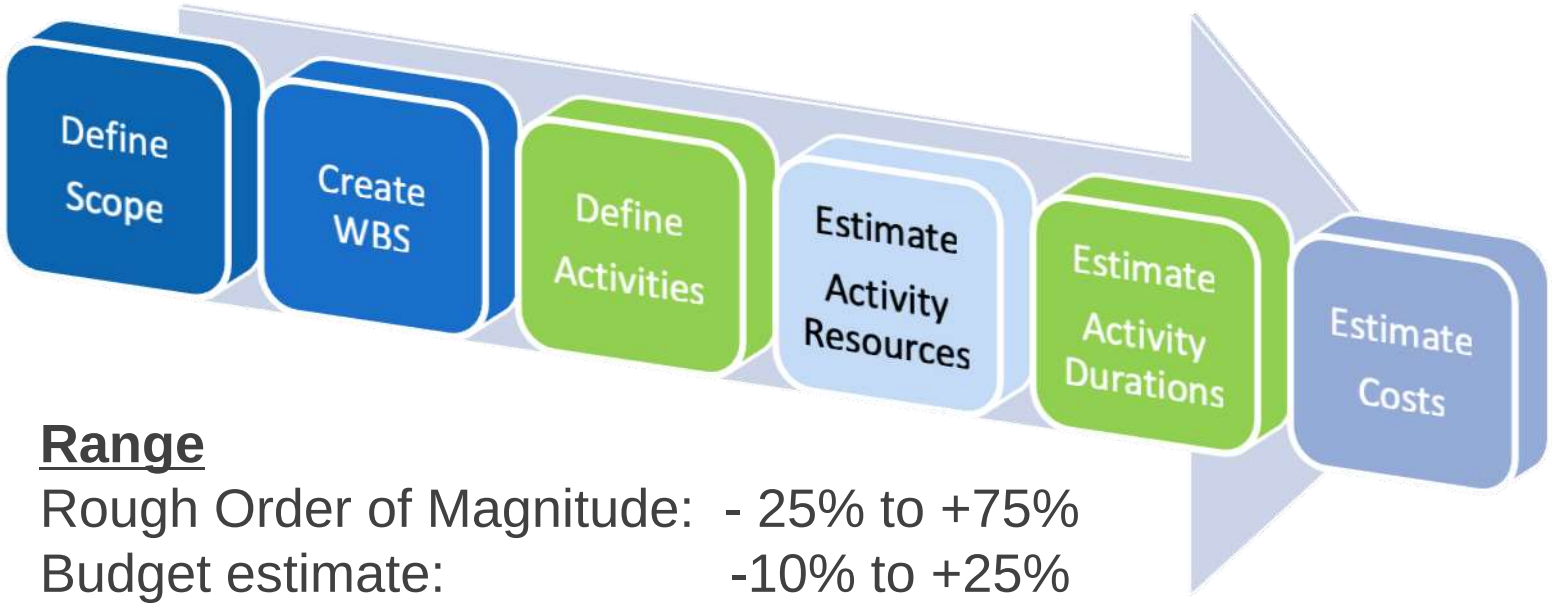
Estimate Costs



Range

Rough Order of Magnitude: - 25% to +75%
Budget estimate: -10% to +25%
Definitive estimate: - 5% to +10%

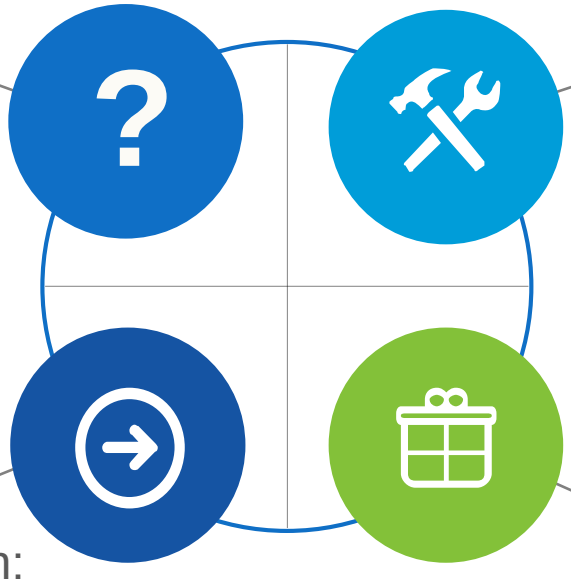
Reserve Analysis: contingency reserves to account for cost uncertainty.

7.3 Determine Budget

What is it?

Aggregating of individual estimates to establish an authorized cost baseline.

Cost baseline: includes authorized budgets and contingency reserve but exclude Management Reserve



Tools and Techniques

- Expert judgment
- Cost aggregation,
- Data analysis (Reserves)
- Historical information
- Funding limit reconciliation
- Financing

Inputs

- Project mgm plan: Cost & resources mgm plans, scope baseline
- Project documents: cost estimates, schedule, risks.
- Business documents
- Agreements
- EEF, OPA

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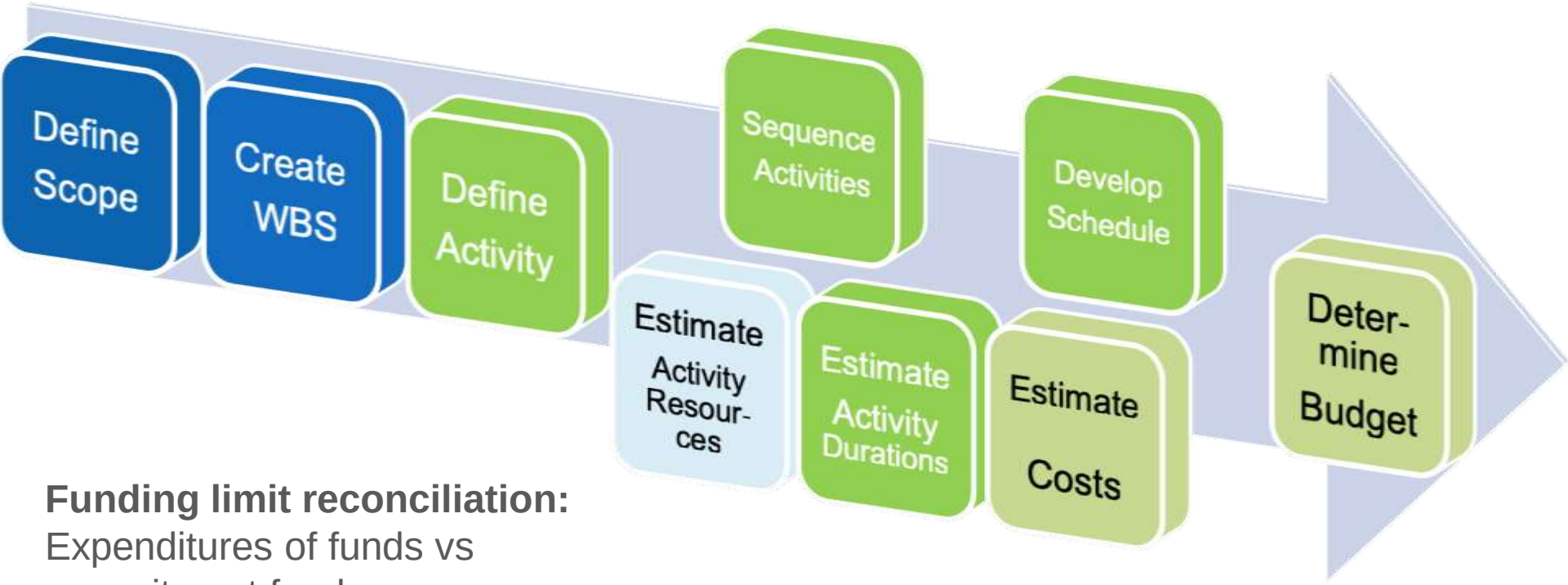
Outputs

- Cost baseline
- Funding requirements
- Project documents updates; Costs, Schedule, risks

Determine Budget

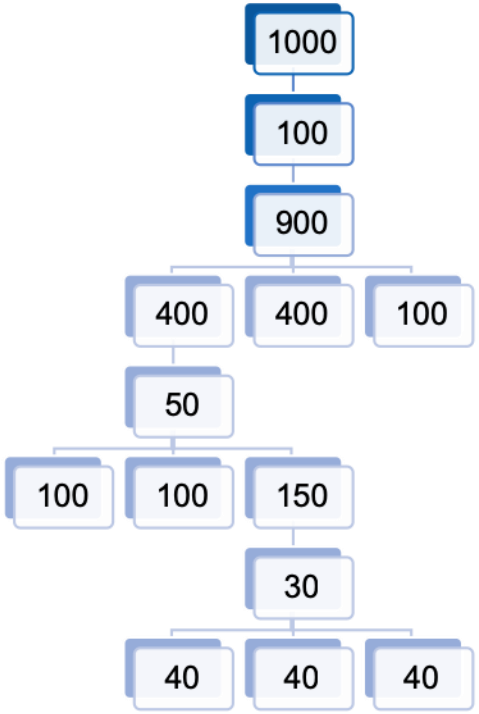


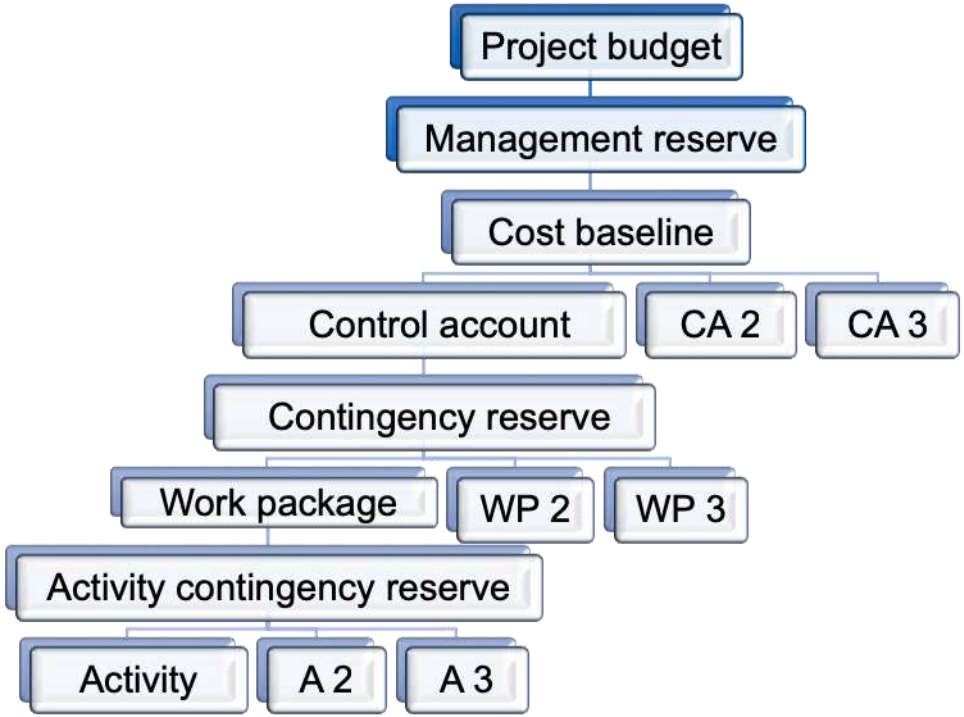
Funding limit reconciliation:
Expenditures of funds vs commitment funds

Cost Performance Baseline

Time-phase approved budget used for comparison to actual results. Can be changed only through formal procedures.

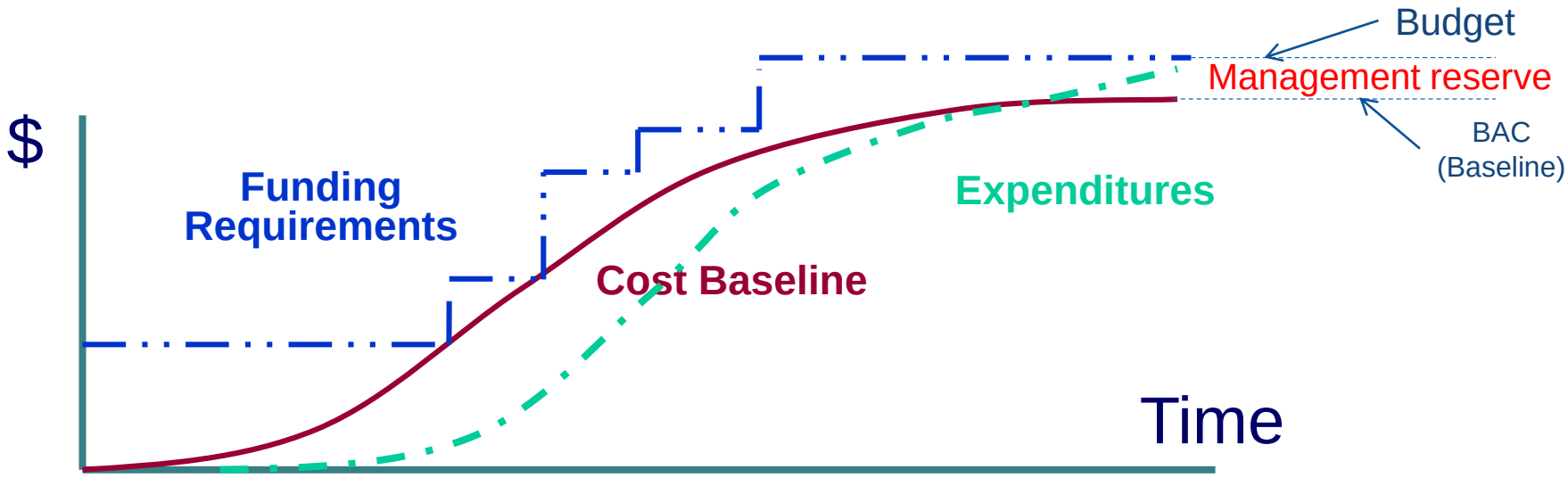
Determine Budget





Cost Performance Baseline

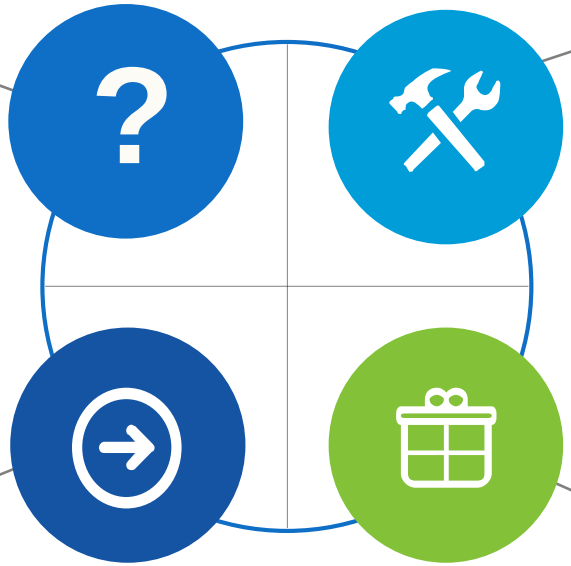
Time-phase approved budget used for comparison to actual results. Can be changed only through formal procedures.



9.6 Control Resources

What is it?

Ensuring that the physical resources assigned and allocated to the project are available as planned, monitoring plan vs actual utilization. Release them



Tools and Techniques

- Data analysis: Alternatives & cost-benefit analysis, Performance reviews, Trend analysis
- Problem solving
- Interpersonal/team skills
- PMIS

Inputs

- Project Mgm Plan: Resource MP
- Project docs. Issue log, Lesson learned, Schedule, RBS, Risks
- Work performance data
- Agreements
- OPA

Outputs

- Work performance info
- Change request
- PM Plan updates: Resource MP, Schedule & cost baseline

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Control resources

- Agreements
- Performance reviews
- Trend analysis
- Negociation and influencing

7.4 Control Costs

What is it?

Monitoring the project status & managing changes to cost baseline. Changes have to be approved on integrated change control process

Tools and Techniques

- Expert judgment
- Data analysis (EVA, variance, trend & reserve analysis)
- Forecasting
- TCPI
- PMIS

Inputs

- Project mgm Plan
- Project documents
- Project funding requirements
- Work performance data
- OPA

Outputs

- Work performance information,
- Cost forecasts
- Change requests
- Project mgm plan and documents updates

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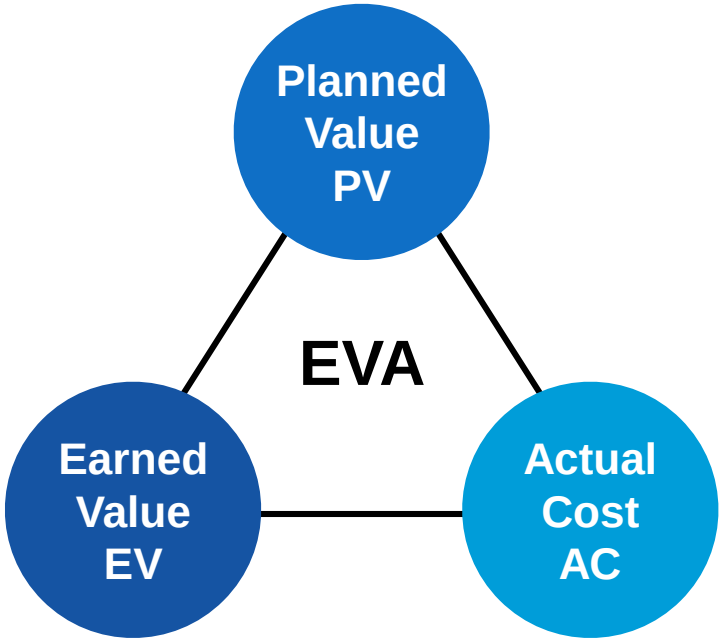
Data Analysis

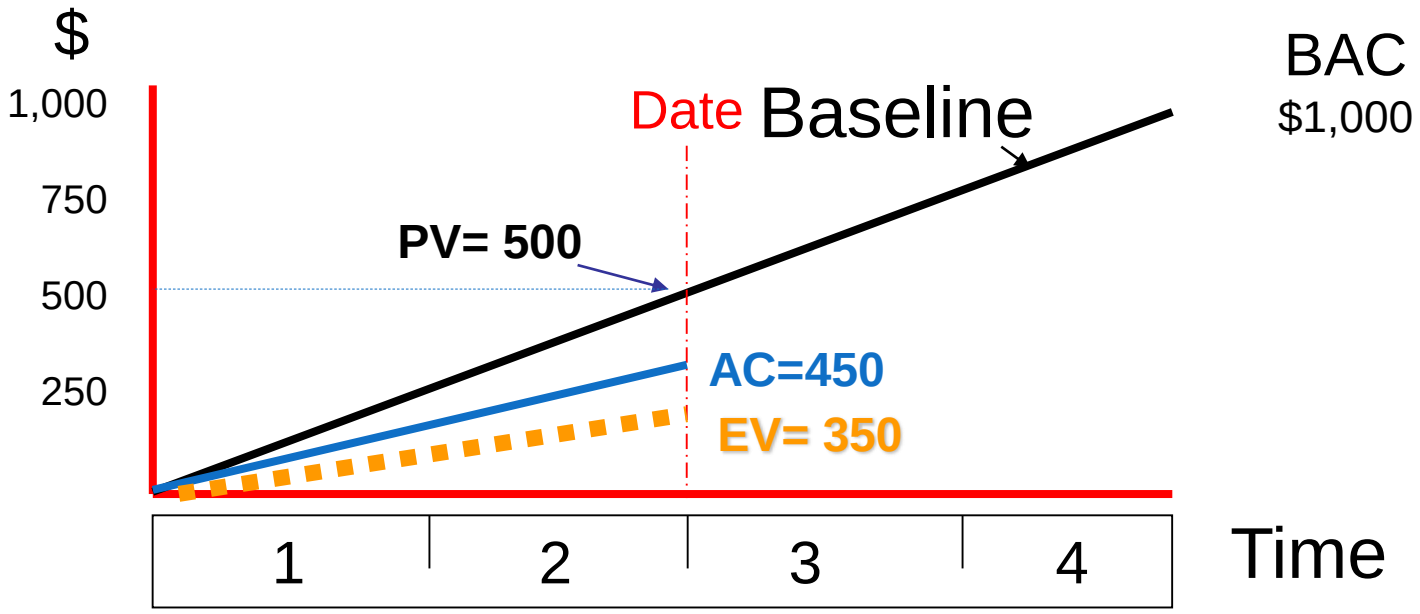
Earned Value Analysis (EVA)

EVM - Earned Value Management

- It integrates scope, cost and schedule
- It uses baseline to asses project performance
- It helps PM to forecast final cost and time



Earned Value (EVA or EVM)



Ejemplo

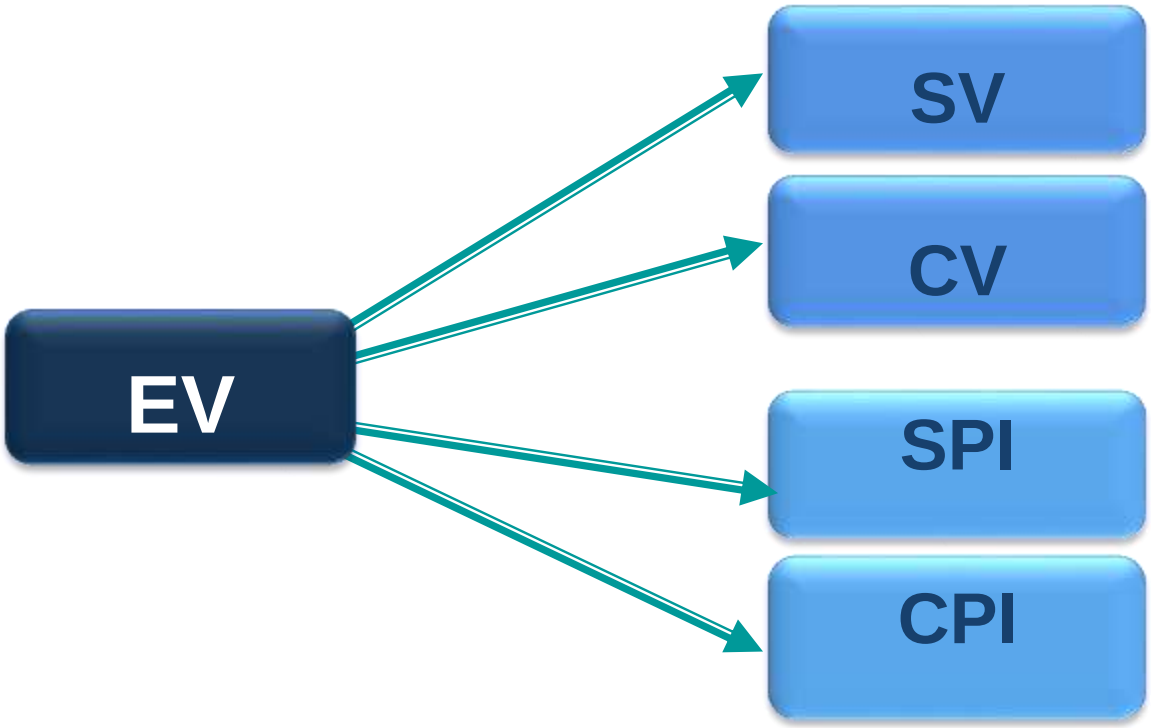
- Proyecto: 4 mesas 4 semanas
- $250 por producto
- Presupuesto total: $1,000
- Fecha de corte: 2a semana

- ¿Cómo va el proyecto?

Earned Value

- PV= 500
- AC= 450
- EV=350
- CV= EV-AC 350 – 450 = -100
- SV= EV-PV 350 - 500 = -150
- CPI= 350/450 = 0.77
- SPI= 350/500 = 0.7

Variance analysis



Schedule Variance

SV=EV-PV

Cost Variance

CV=EV-AC

Schedule performance Index

SPI=EV/PV

Cost Performance Index

CPI=EV/AC

E V A

CV= Cost Variance

CV = EV – AC

SV = Schedule Variances

SV =EV - PV

>= 0

< 0

V A R I A N C E S

E V A

CPI = Cost Performance Index

CPI = EV / AC

>= 1

SPI = Schedule Performance Index

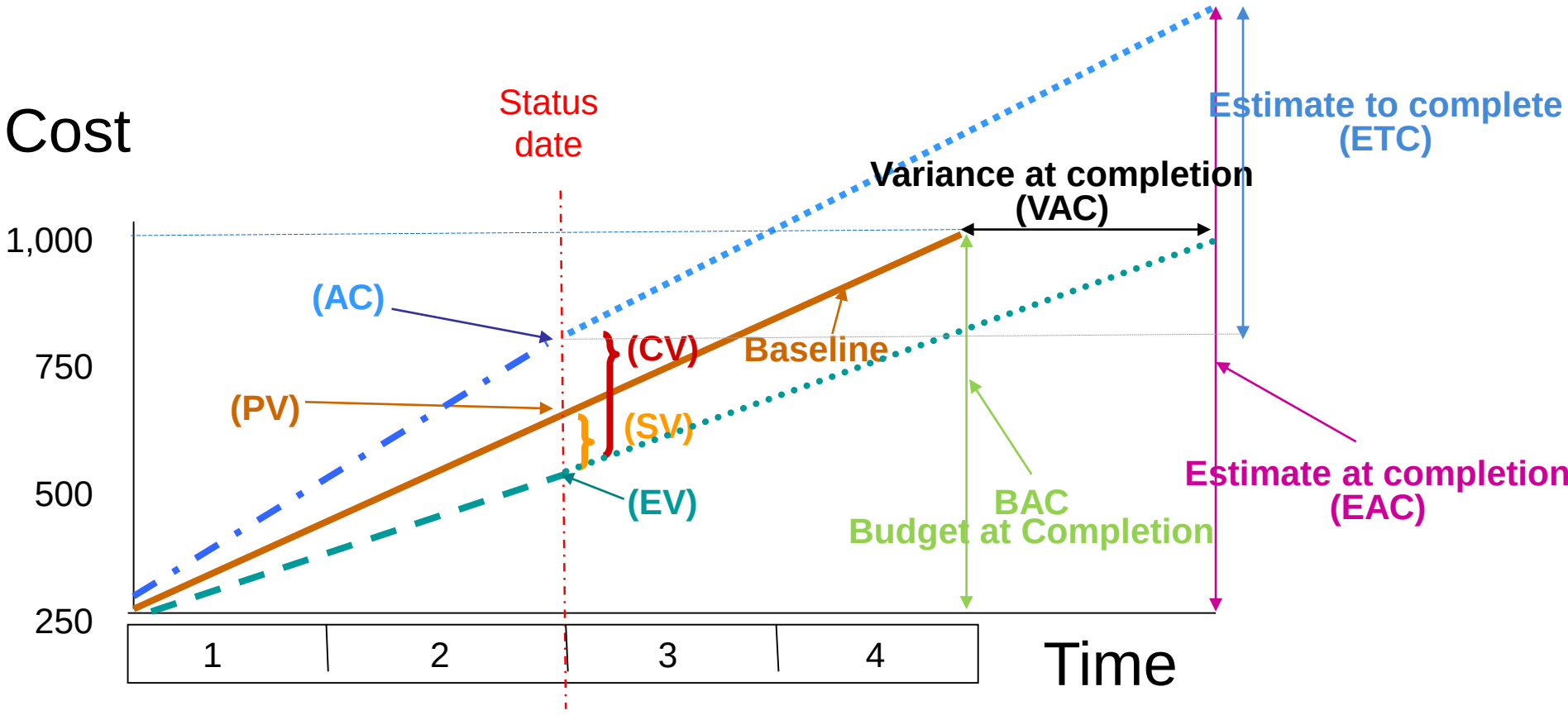
< 1

SPI = EV / PV

I N D I C A T O R S

Trend Analysis. Charts

From EVA



Trend Analysis. Forecasts
From EVA

Estimate at completion – EAC
Estimate to complete – ETC

EAC = AC + ETC (Actual Cost + Estimate to complete)

EAC forecasts for ETC work performed at budgeted rate
EAC= AC + (BAC – EV)

EAC forecasts for ETC work performed at present CPI
EAC = BAC / CPI

To Complete Performance Index (TCPI)

A measure of the cost performance that is required to be achieved with the remaining resources in order to meet a specified management goal –

Work remaining divided by funds remaining

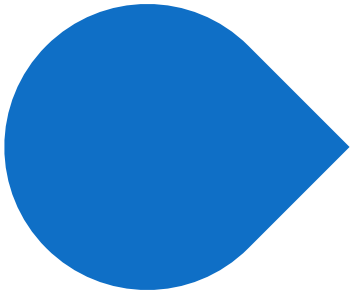
TCPI = (BAC-EV)/ (BAC-AC) Based on BAC

TCPI = (BAC-EV)/ (EAC-AC) Based on EAC *(When EAC is approved)*

To Complete Performance Index (TCPI)

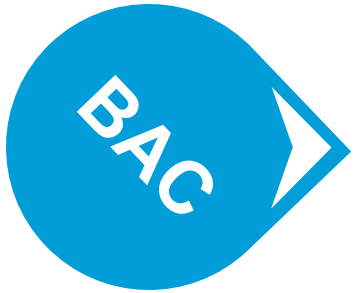
Avanza
Proyectos exitosos

General



$$\frac{\textit{Work remaining}}{\textit{funds remaining}}$$

Based on BAC



$$\frac{(BAC\text{-}EV)}{(BAC\text{-}AC)}$$

Based on EAC

$$\frac{(BAC\text{-}EV)}{(EAC\text{-}AC)}$$

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Basic PM Questions

PM Question	EVM Measures
How is the project in time aspect?	**Schedule Analysis & Forecasting**
Is the project ahead or behind schedule?	Schedule variance (SV)
Time efficiency?	Schedule Performance Index (SPI)
It is important how the project is, but more important: **how it will finish?**	Estimate At Completion (EAC)

Based on Practice Standard for Earned Value Management. ®PMI

Basic PM Questions

PM Question	EVM Measures
How is the project in cost aspect?	**Cost Analysis & Forecasting**
Is the project under or over budget?	Costo Variance (CV)
Cost efficiency?	Cost Performance Index (CPI)
How efficiently PM must use remaining resources to finish on budget?	To-Complete Performance Index (TCPI)
What will be the finally project cost?	Estimate at Completion (EAC)
Cost gap when finishing?	Variance at Compleition (VAC)
What is the remaining work cost?	Estimate to Complete (ETC)

Example. Performance to date

- Variables:
-
- (PV) = $ 900
- (EV) = $ 700
- (AC) = $1,000

Variances

Cost variance (CV=EV-AC)

= 700-1000 = -300

Schedule variance (SV=EV-PV)

= 700-900= -200

Indexes

Cost performance Index (CPI) = EV/AC

= 700/1000 = 0.7

Schedule Performance Index (SPI) =

EV/PV = 700/900 = 0.77

Exercise 1

- Calculate CV, SV, CPI, SPI
  - Budget at completion (BAC) = 1,000
  - Planned Value (PV) = 400
  - Actual Cost (AC) = 320
  - Earned Value (EV) = 350

- Cost Variance (CV) = 350 – 320 =
- Schedule Variance (SV) = 350 – 400 =
- Cost Performance Index (CPI)= 350/320 =
- Sch. Performance Index (SPI)= 350/400 =

Exercise 1

- Calculate CV, SV, CPI, SPI
  - Budget at completion (BAC) = 1,000
  - Planned Value (PV) = 400
  - Actual Cost (AC) = 320
  - Earned Value (EV) = 350

- Cost Variance (CV) = 350 – 320 = 30
- Schedule Variance (SV) = 350 – 400 = - 50
- Cost Performance Index (CPI)= 350/320 = 1.09
- Sch. Performance Index (SPI)= 350/400 = 0.87

Question Examples

Exam Exercise

You are building 6 machines. Each of them is identical, and the projected cost for the project is $ 100,000 and is expected to take 5 weeks.

At the end of the 2nd week, you have spent $17,500 per machine and have finished 2; you are ready to begin on the 3th.

1 . Calculate values

2. Is the project ahead of or behind schedule?

3. Is the project going to be completed over or under budget?

Budgeted At Completion
Planned Value
Earned Value
Actual Cost
Cost Variance
Schedule Variance
Cost Performance Index
Schedule Performance Index
Estimated At Completion
Estimated To Completion
Variance At Completion

EVA Exercise. Answers

Budgeted At Completion	$100,000
Planned Value	$40,000.00
Earned Value	$33,333.33
Actual Cost	$35,000.00
Cost Variance	-$1,666.67
Schedule Variance	-$6,666.67
Cost Performance Index	0.95
Schedule Performance Index	0.83
Estimated At Completion	$105,263.15
Estimated To Completion	$70,263.15
Variance At Completion	-$5,263.15

EVA Exercise Answers

BAC = $100,000.00

PV = 2 weeks ÷ 5 weeks = 40% complete of 100,000 = $40,000

EV = 2 machines ÷ 6 machines = 33.3% of 100,000 = $33,333

AC = $17,500 per machine, 2 machines = $35,000

CV = (EV) $33,333.33 — (AC) $35,000.00 = -$1,666.67

SV = (EV) $33,333.33 — (PV) $40,000.00 = -$6,666.67

CPI= (EV) $33,333.33 ÷ (AC) $35,000.00 = 0.95

SPI = (EV) $33,333.33 ÷ (PV) $40,000.00 = 0.83

EAC = (BAC) $100,000.00 ÷ (CPI) 0.95 = $105,263.15

ETC = (EAC) $105,263.15 — (AC) $35,000.00 = $70,263.15

VAC = (BAC) $100,000.00 — (EAC) $105,263.15 = -$5,263.15

www.avanzaproyectos.com
contacto@avanzaproyectos.com

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