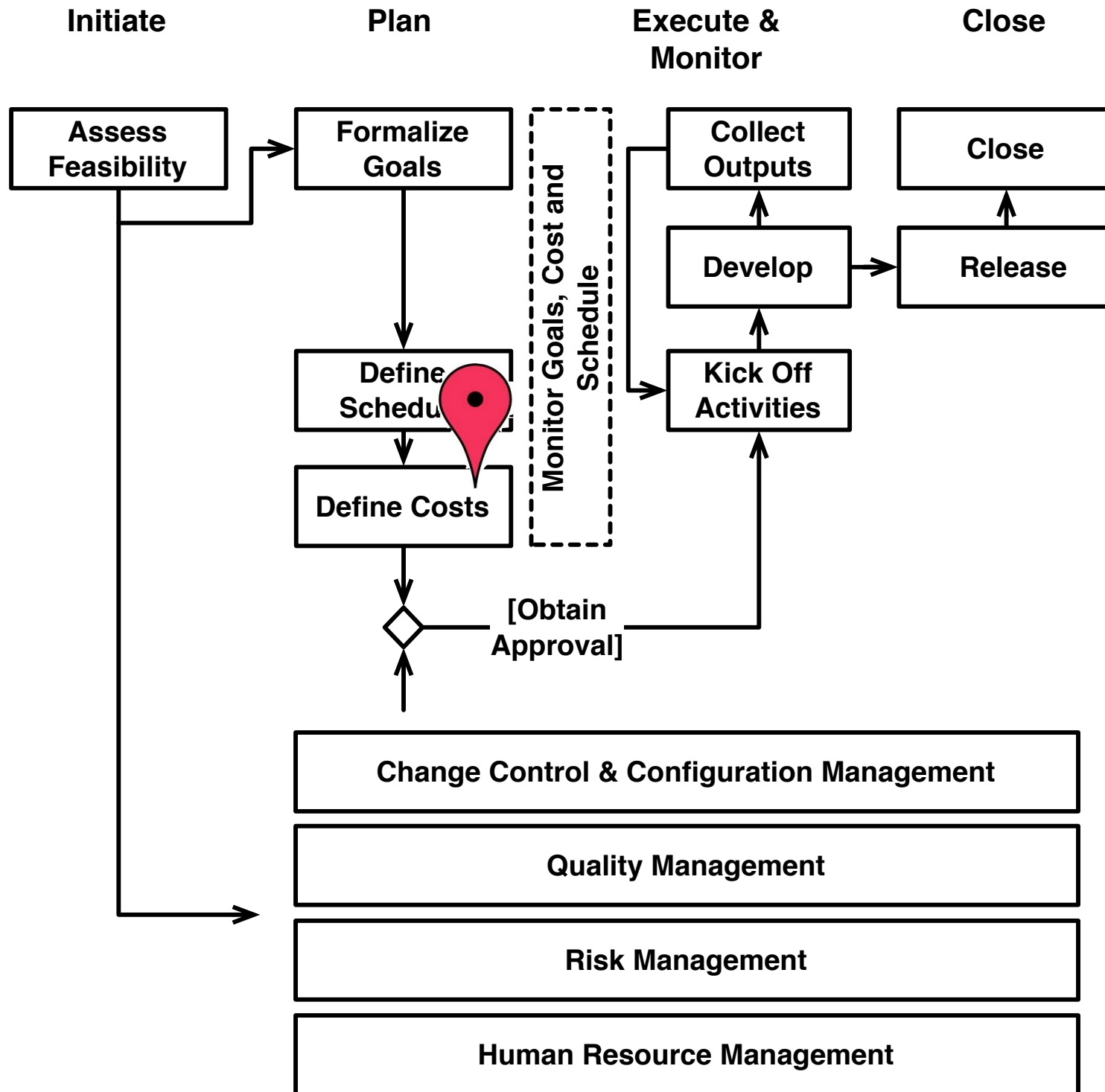


Costing and Budgeting

From cost to value: methods and techniques to
set the right cost to software

Goals of the Unit

- Questions you might face:
 - How much does the development of the software cost?
 - Is the project on budget?
- Goals of the Unit
 - Budgeting
 - Managing Project Costs



Some Definitions

- **Costing:** determining the bare costs to deliver a project
- **Budgeting (and cost control):** determining the financial needs of a project and preparing the books to monitor expenditures (and incomes)
- **Pricing:** determining how much you will charge for the project
- **Life Cycle Cost (LCC) (also called Total Cost of Ownership):** costs to be sustained to operate (use) a system throughout its lifecycle

(Software) Project Costing

(Software) Project Costing

- **Project cost:**
 - The expenses we will incur into to finish a project
 - It does not take into account profit
 - Made of direct and indirect costs (next slide)
- **Cost Element Structure:**
 - Hierarchical structure which defines the cost items which determine the project budget
 - It helps structure the costing and monitoring processes and it reduces the risk of double accounting the same expenses

Direct Costs

- **Direct costs:** costs related to the production of the project outputs
- Direct Costs for software projects
 - **Personnel:**
 - * The salaries of people directly involved in the project (gross, not net!)
 - **Materials and Supply**
 - * Costs of the material necessary to produce project outputs
 - * Usually accounted if the project has specific needs
 - **Hardware and software**
 - * Systems required for developing the system
 - * Usually accounted if the project has specific needs
 - **Travel, meetings and events**
 - **Other Costs**
 - * Books, Training, Renting equipment, ...

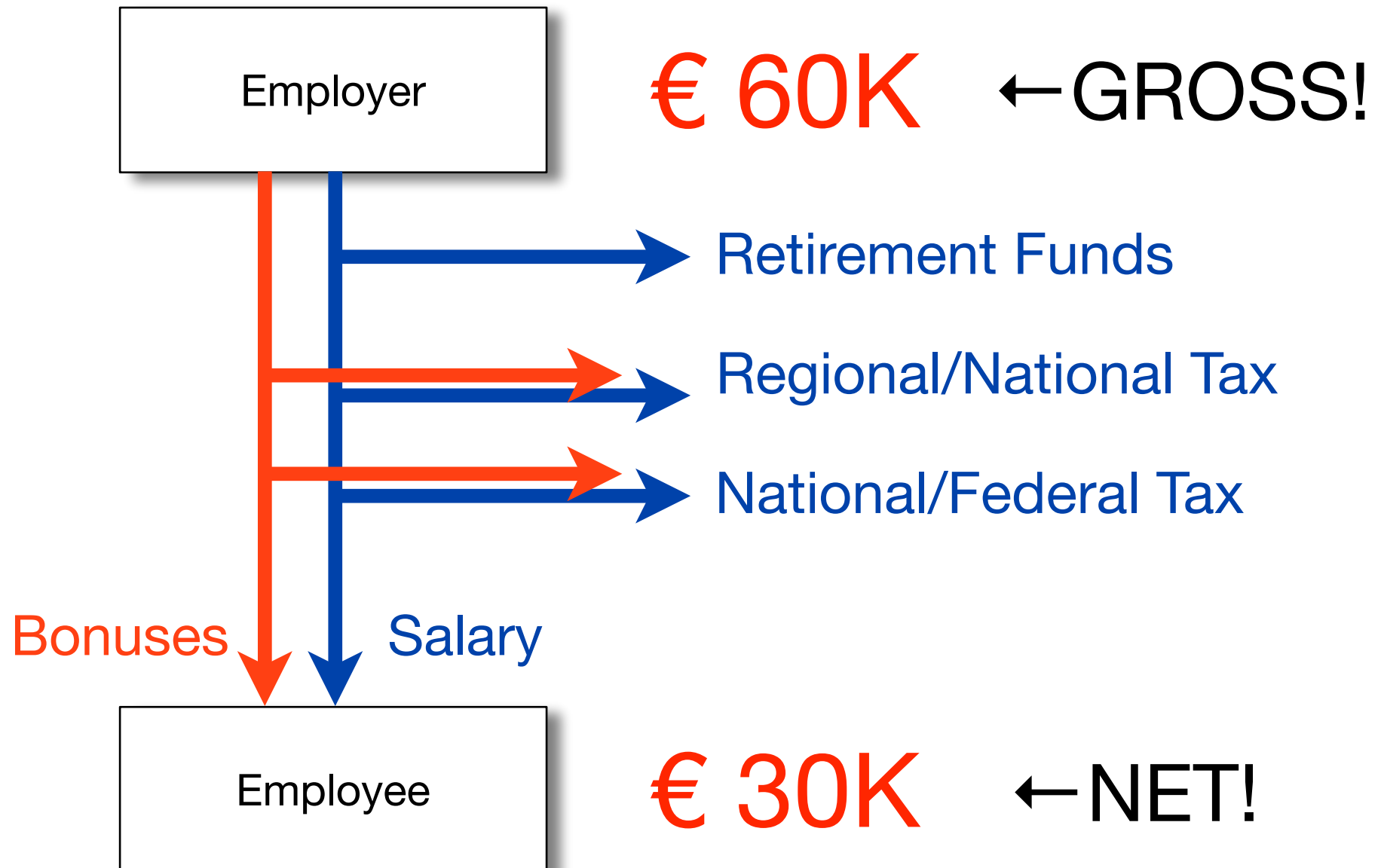
(Software) Project Costing

- **Indirect Costs:** expenses necessary to run the facility and make work actually doable
- Main cost elements for software development:
 - General Overheads
 - * Office space costs (rent, heating, ...)
 - * Consumables
 - * Standard equipment
 - * Administrative Staff
 - Project Overheads
 - * For larger projects, overheads directly accountable to a project

Indirect Costs Computation

- Identification of the expenses contributing to the indirect costs
- Identification of a strategy to allocate indirect costs to a project
 - According to the effort (more effort = more indirect expenses) - Flat or proportional rate
 - According to the project budget (as a percentage of the project budget)
- On a regular basis
 - Assessment of the expenses incurred into in the previous year(s)
 - Estimation of the indirect expenses for the year(s) to come
 - Estimation of the effort which can produced
 - Determination of the overhead rate

Personnel Costs: Gross vs. Net



Project Cost is...

$$\sum_{j=1}^n Hours_j * (PC_j + O_j) + \sum_{i=1}^n C_i$$

H	Total number of hours for profile j
PC	Cost of profile j
O	Overhead of profile j
C	Cost Element i (e.g. hardware)

Project Cost

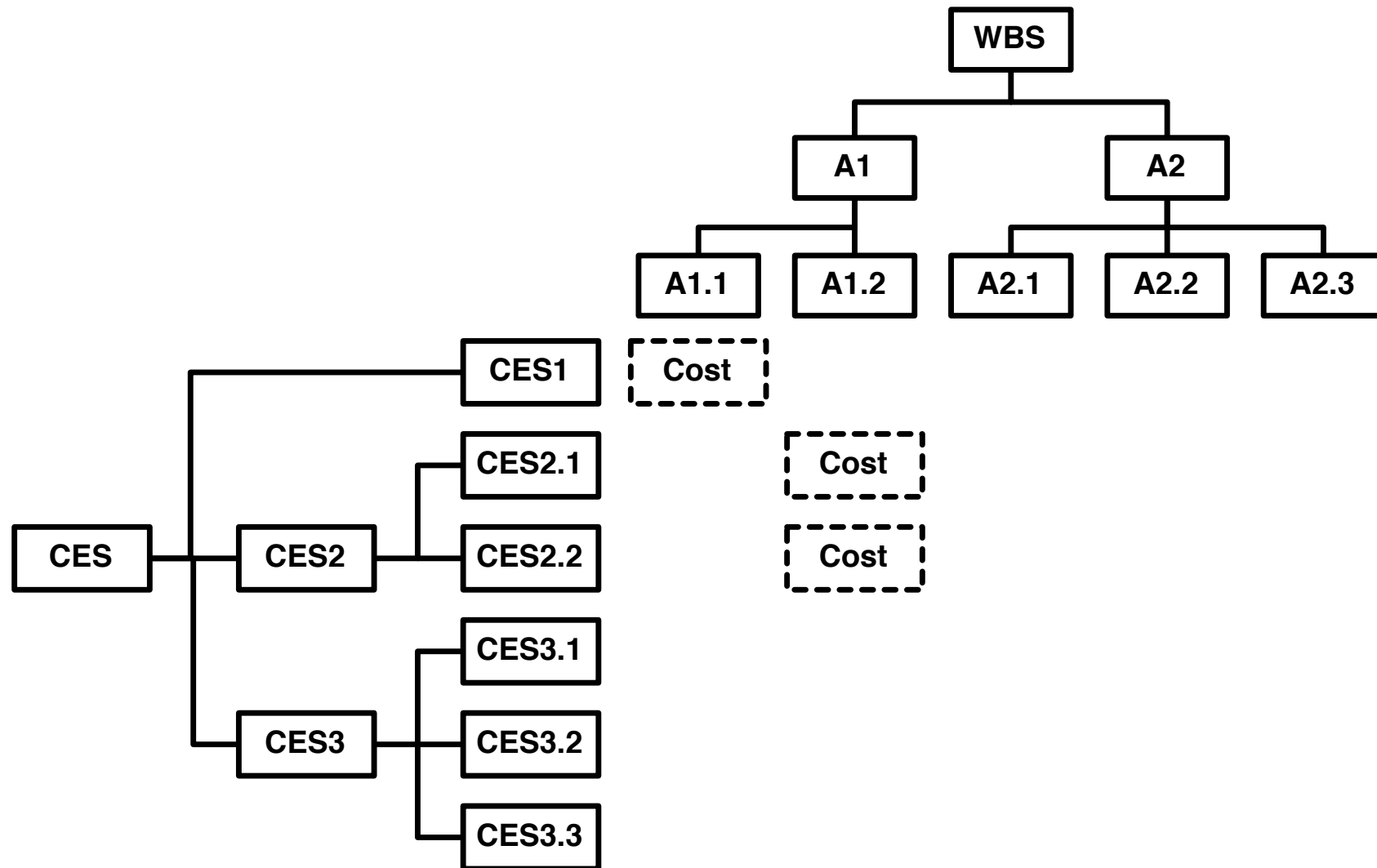
- Project costs can be looked at from different “points” of view:
 - Cost Element Structure (how much do I need for hardware?)
 - Project Structure (how much do I need for “Writing Requirements”?)
 - Expenditure over time (how much do I need in 2014?)

Managing Project Costs

Goals and Means

- Goals
 - Ensuring that the money is available when it needs to be spent
 - Monitoring project expenditures so that the project remains within budget, or the appropriate actions can be taken when this is not the case
- Means
 - Definition of a baseline/cash flow (see next slides)
 - Expense Authorization
 - Expense book keeping (double entry accounting is quite fine)

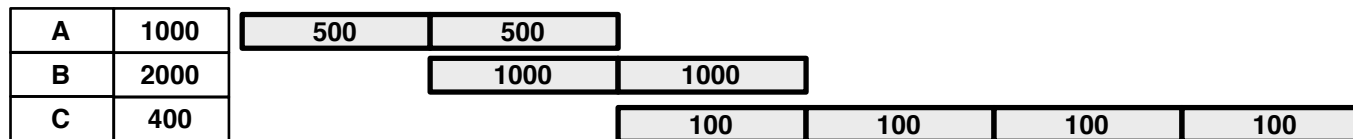
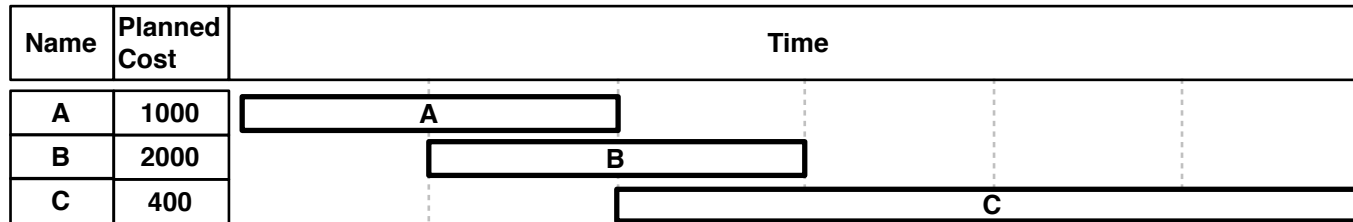
Project Costs and Project Structure



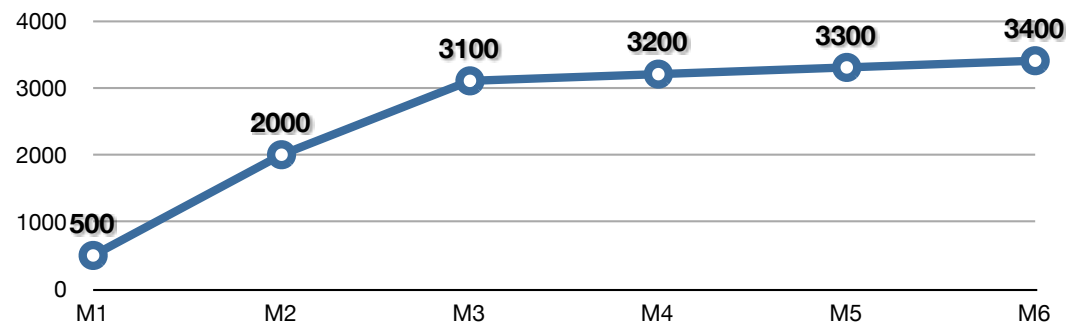
Project Costs and Time

	Q1	Q2	Q3	Q4	Total
Expenses					
Expense 1	€ 10,000	€ 30,000	€ 50,000	€ 10,000	€ 100,000
Expense 2	€ 20,000	€ 40,000	€ 60,000		€ 120,000
Total Expenses	€ 30,000	€ 70,000	€ 110,000	€ 10,000	€ 220,000
Incomes					
Payment	€ 50,000			€ 200,000	€ 250,000
Total Incomes	€ 50,000	€ 0	€ 0	€ 200,000	€ 250,000
Balance	€ 20,000	-€ 70,000	-€ 110,000	€ 190,000	€ 30,000
Financial Need		-€ 50,000	-€ 180,000		

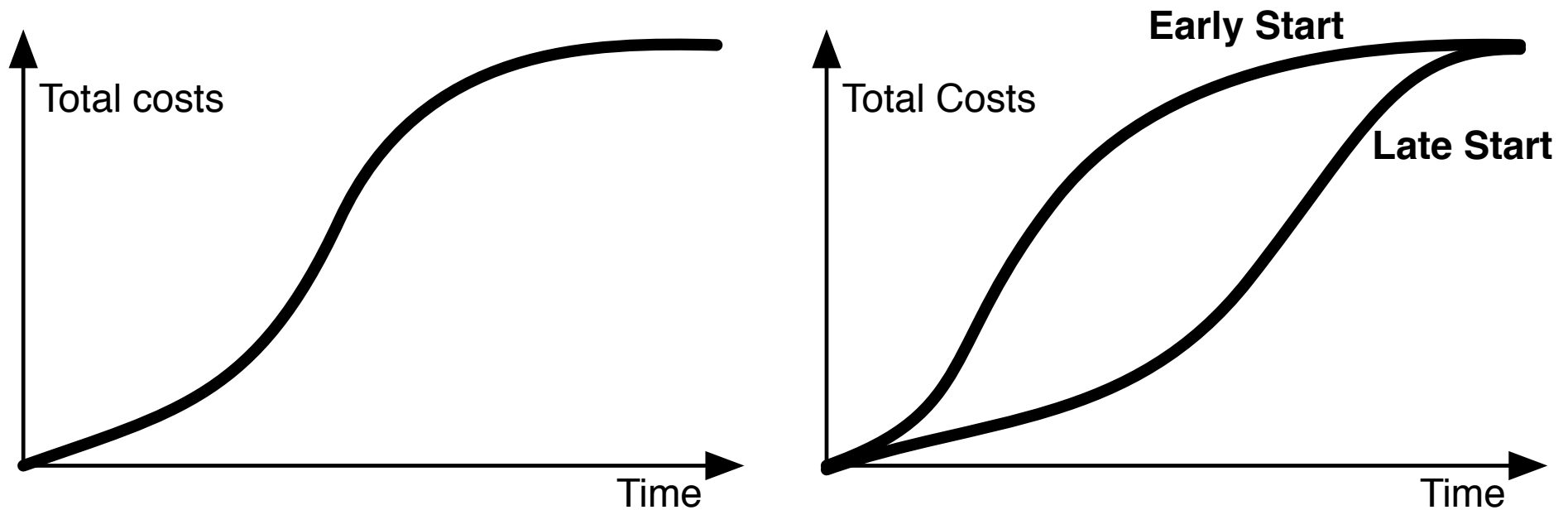
Project Costs and Time



Total	500	1500	1100	100	100	100
Cumulative	500	2000	3100	3200	3300	3400



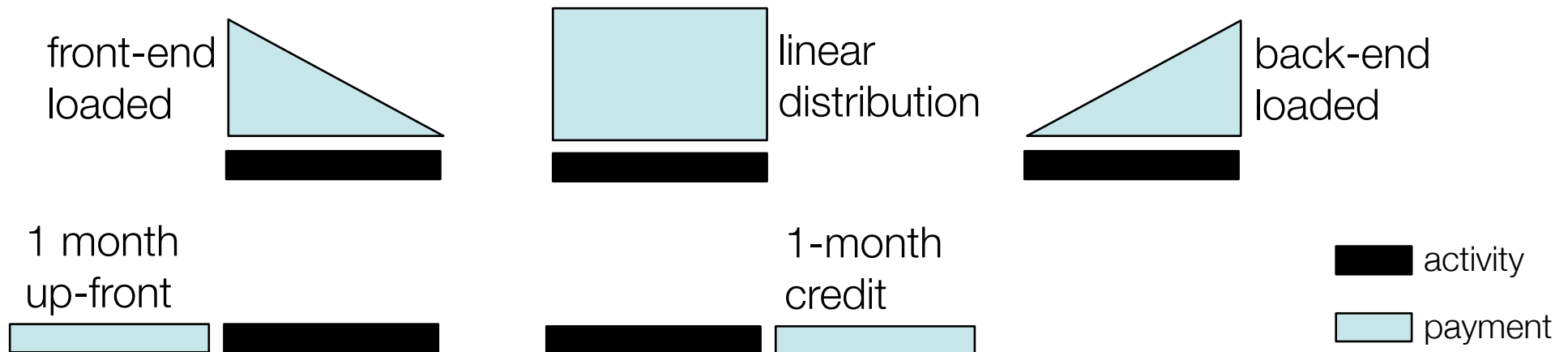
Project Costs and Time



Banana Shape

Expenditure/Load Profile

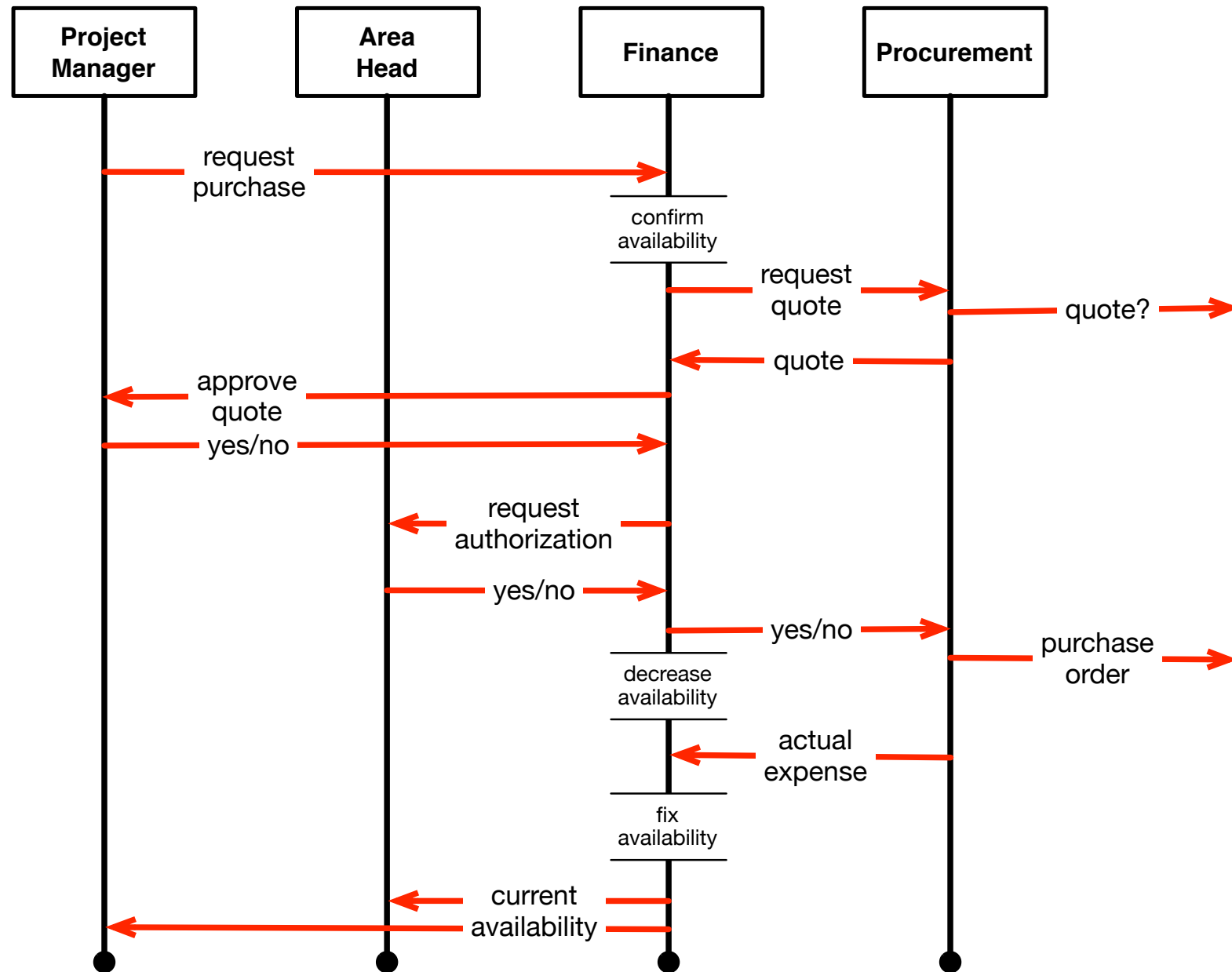
- In general we assume workload distributes uniformly during an activity:
 - A resource working in an activity requiring 40 hours of effort and 1 week of duration is assumed to work 8 hours per day.
- However, this is not necessarily the case, and different profiles can be defined for effort and expenditure:



Expense Authorization

- Project management and financial management are usually allocated to different structures
- According to the organizational structure, the power to authorize expenditures and payments might be solely on the project manager or require a more complex workflow.
- Rules take into account aspects such as:
 - funds availability
 - whether the required expense is budgeted or not
 - the amount of money (expenditures higher than a threshold might require a special authorization)

Expense Authorization: an Example



End of period Report

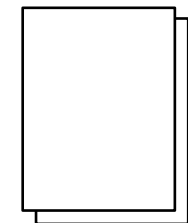
- At the end of each reporting period, documentation is produced about a project financial status
- Two information are available:
 - Budgeted expenditure vs. actual expenditure
 - Expenditure accounting
- The information is used in different ways:
 - To analyze **deviations** (what differences there have been)
 - To confirm/update **projections to end**
 - To evaluate project health and take appropriate actions

The Workflow

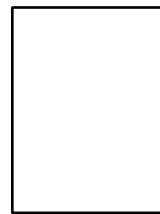
Expected
Expenditures

Actual
Expenditures

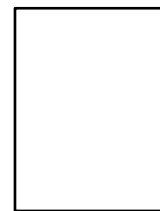
End of Period
Report & Revision



invoices



ledger



report

Budget	Y1	Y2	Y3
Personnel	4000	5000	3000
Hardware	1000	2000	
Subcontracting		1000	6000
...			

Budget	Y1	Y2	Y3
Personnel	3000	5000	3000
Hardware	500	2000	
Subcontracting		1000	6000
...			

Budget	Y1	Y2	Y3
Personnel	5000	4000	3000
Hardware	500	1000	
Subcontracting		1000	6000
...			

What information you are interested in

- Budget: the amount initially budgeted
- Transfers: the variations performed on the budget
- Actual: the amount actually spent

Budget	Budget	Variations	New	Spent	Available
Personnel	4000	+2000	6000	5000	1000
Hardware	3000	-2000	1000	0	1000
Subcontracting	1000		1000	400	600