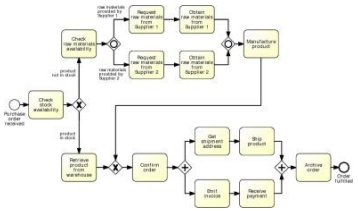
Business Process Management (5)

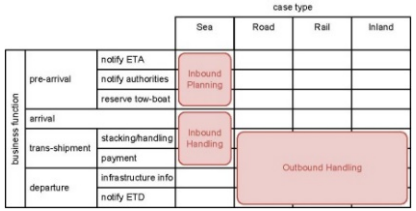
Slides adapted from: Dr. Marlon Dumas

Process Analysis



Process identification

Process architecture

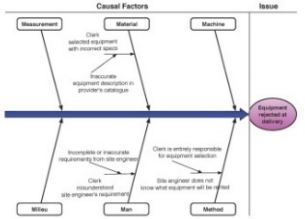


Process discovery

As-is process model

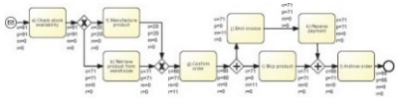
Process analysis

Insights on weaknesses and their impact



Process redesign

To-be process model



Process implementation

Executable process model

Process monitoring and controlling

Conformance and performance insights

Process Analysis Techniques

Qualitative analysis

- Value-Added & Waste Analysis
- Root-Cause Analysis
- Pareto Analysis
- Issue Register

Quantitative Analysis

Value-added analysis

1. Decorticate the process into steps
   - Steps performed before a task
   - The task itself, possibly decomposed into smaller steps
   - Steps performed after a task, in preparation for the next task

2. Classify each step
   - Value-adding (VA)
   - Business value-adding (BVA)
   - Non-value-adding (NVA)

Seven sources of waste

Move

- Transportation
- Motion

Hold

- Inventory
- Waiting

Over-do

- Defects
- Over-Processing
- Over-Production

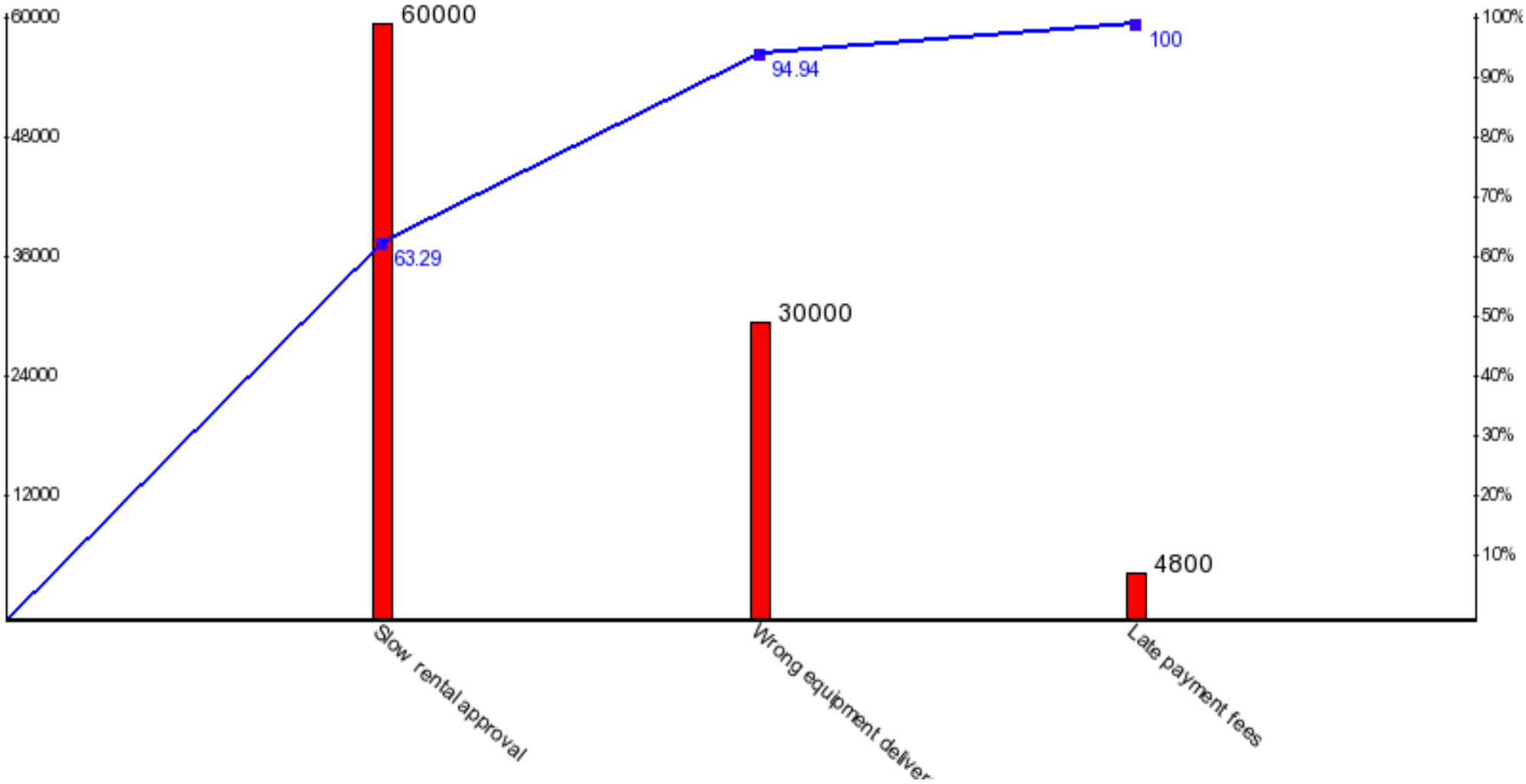
Issue register structure

Can take the form of a table with:

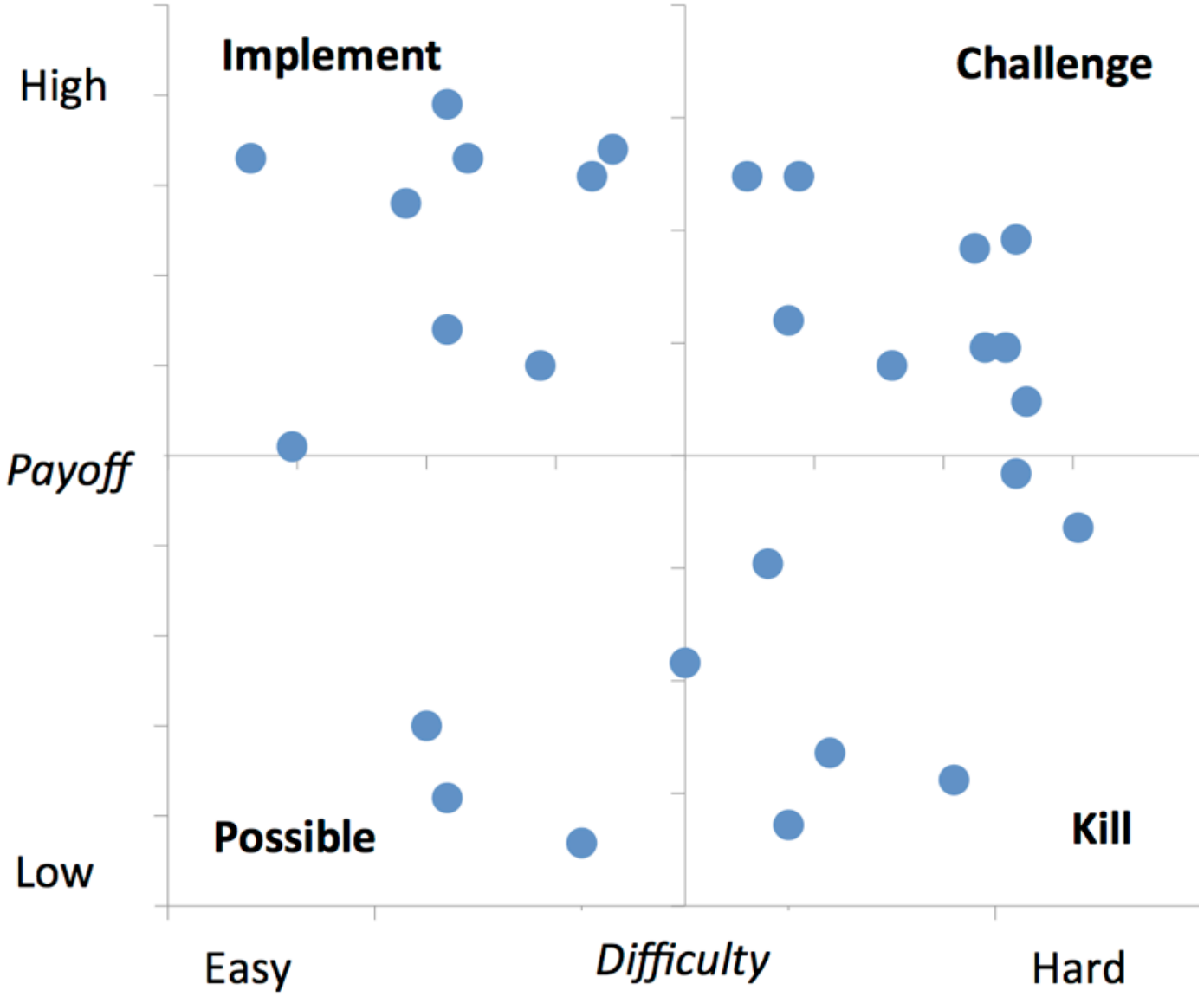
- Issue identifier
- Short name
- Description
- Assumptions
- Impact: Qualitative and Quantitative
- Possible improvement actions

Larger process improvement projects may require *issue trackers*

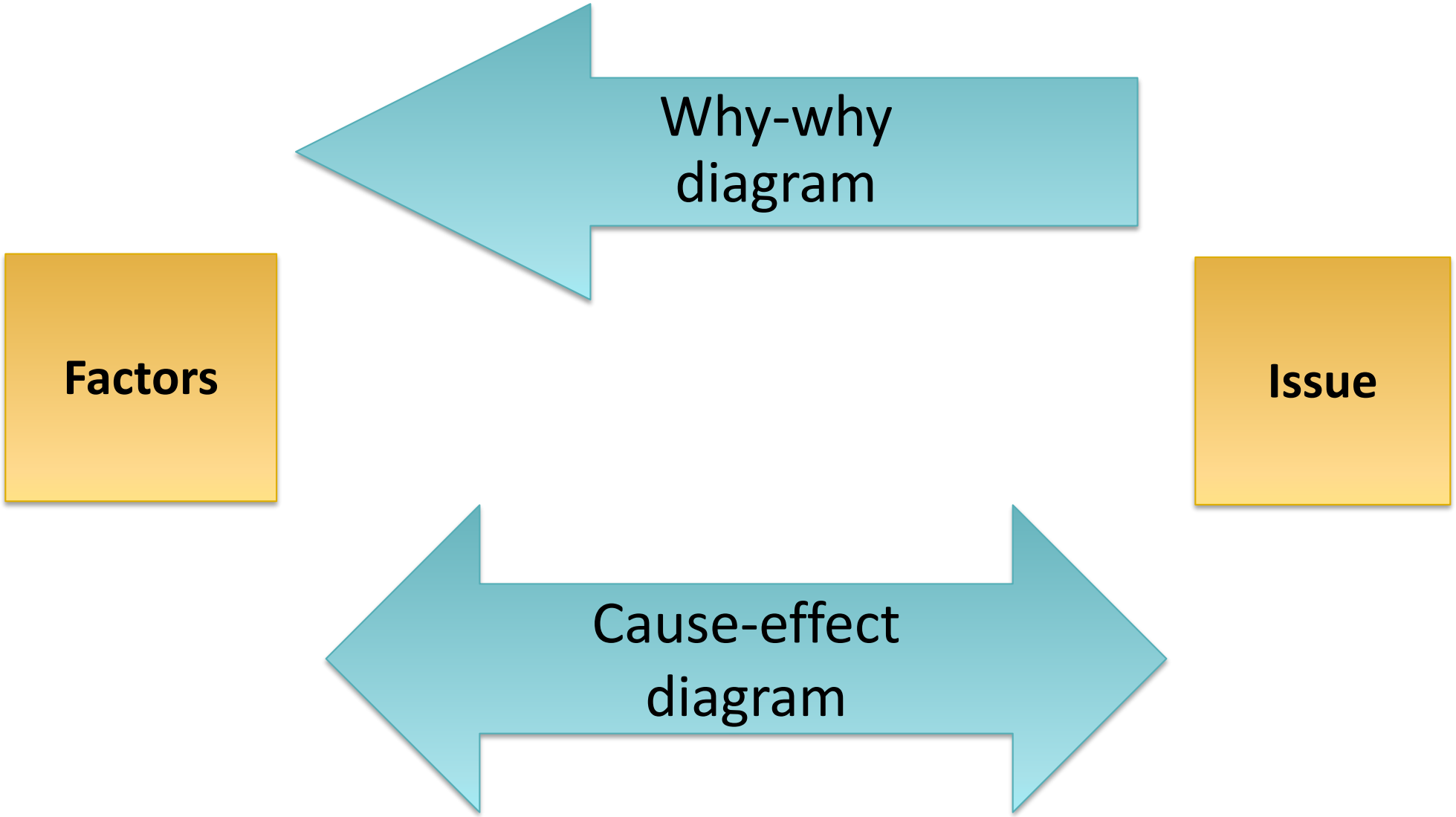
Pareto chart example



Two-Dimensional Prioritization: PICK Chart

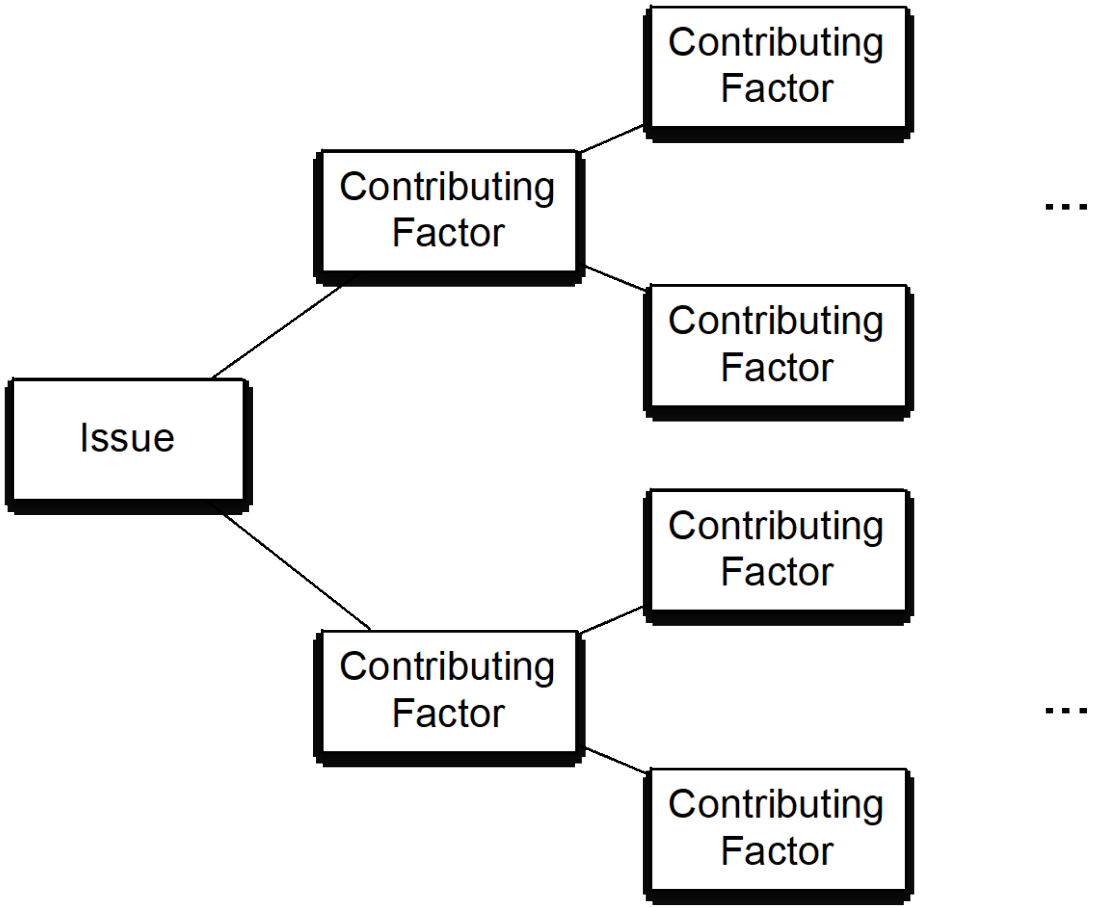


Root-cause analysis

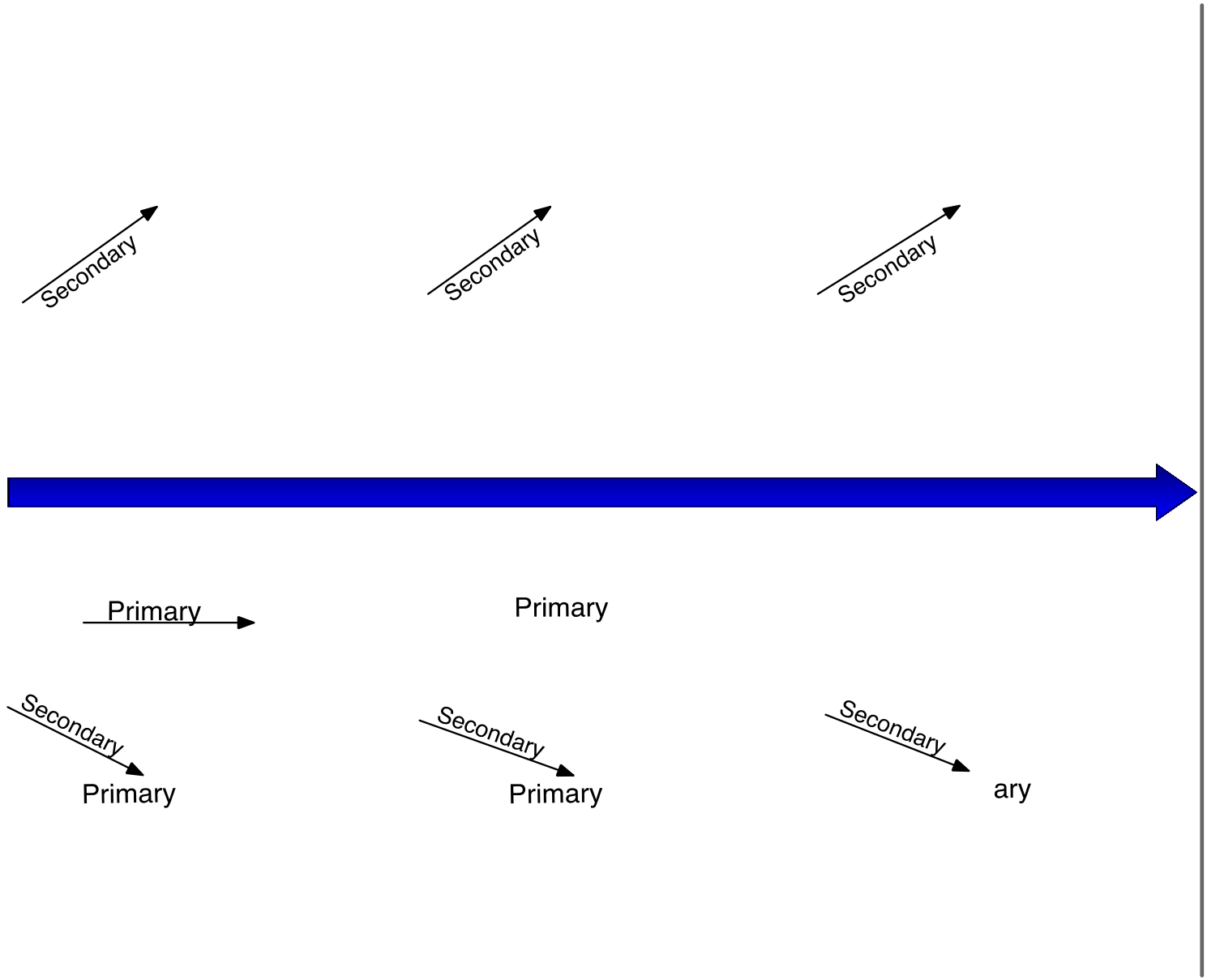


Why-why diagram

Five levels of nesting - “Five Why’s”



Cause-effect (Fishbone) diagram



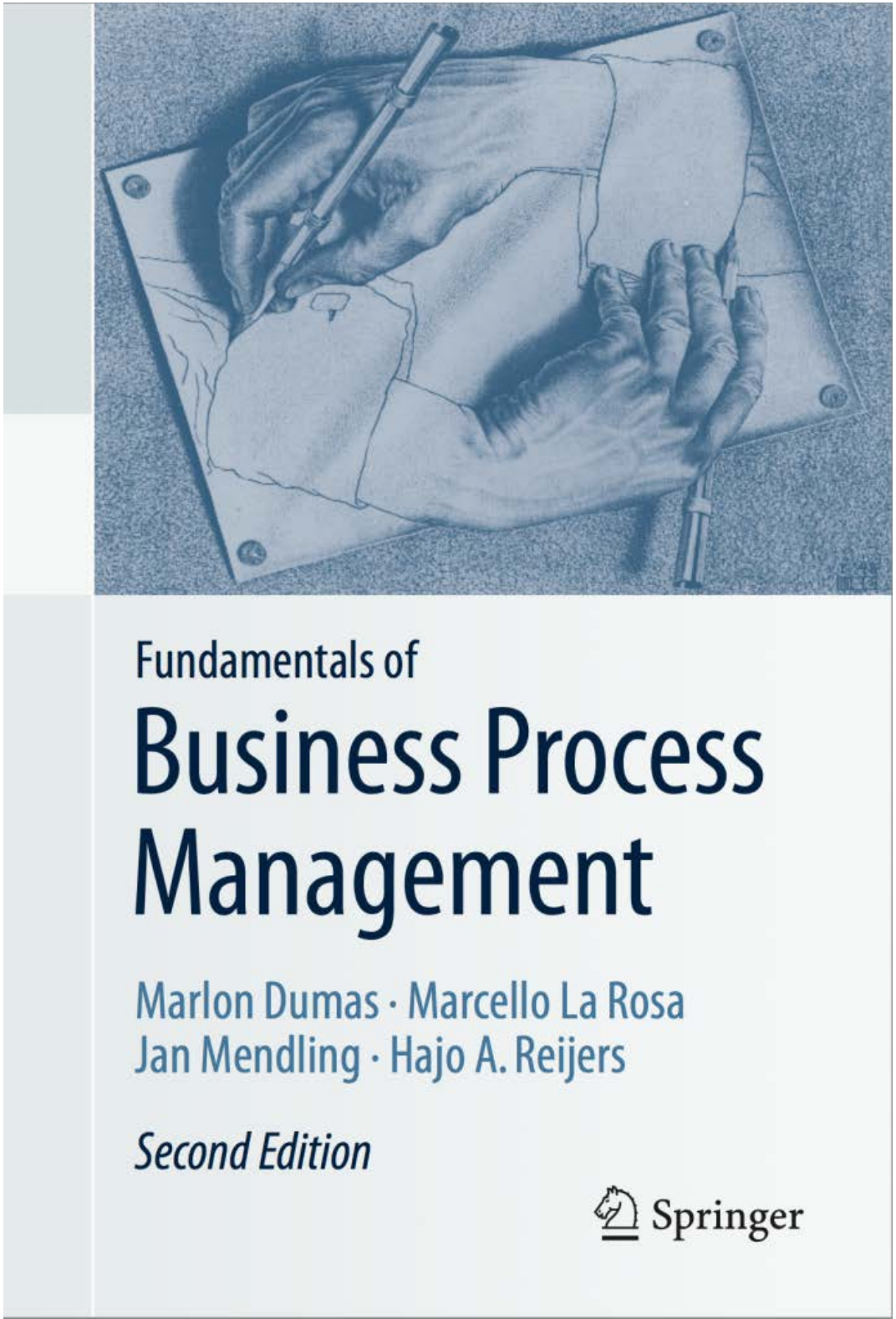
Process Analysis Techniques

Qualitative analysis

- Value-Added & Waste Analysis
- Root-Cause Analysis
- Pareto Analysis
- Issue Register

Quantitative Analysis

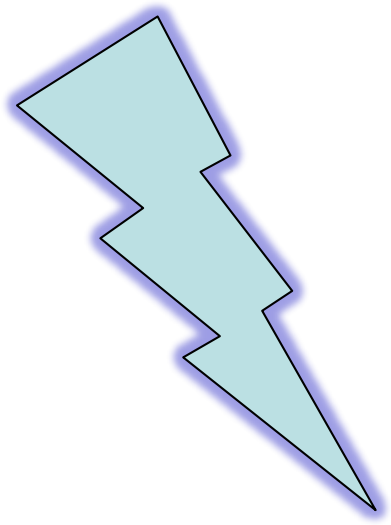
- **Flow analysis**
- Queuing analysis
- Simulation



1. Introduction
2. Process Identification
3. Essential Process Modeling
4. Advanced Process Modeling
5. Process Discovery
6. Qualitative Process Analysis
7. **Quantitative Process Analysis**
8. Process Redesign
9. Process-Aware Inf. Systems
10. Process Implementation
11. Process Monitoring
12. BPM as an Enterprise Capability

Process performance

If you had to choose between two services, you would typically choose the one that is:



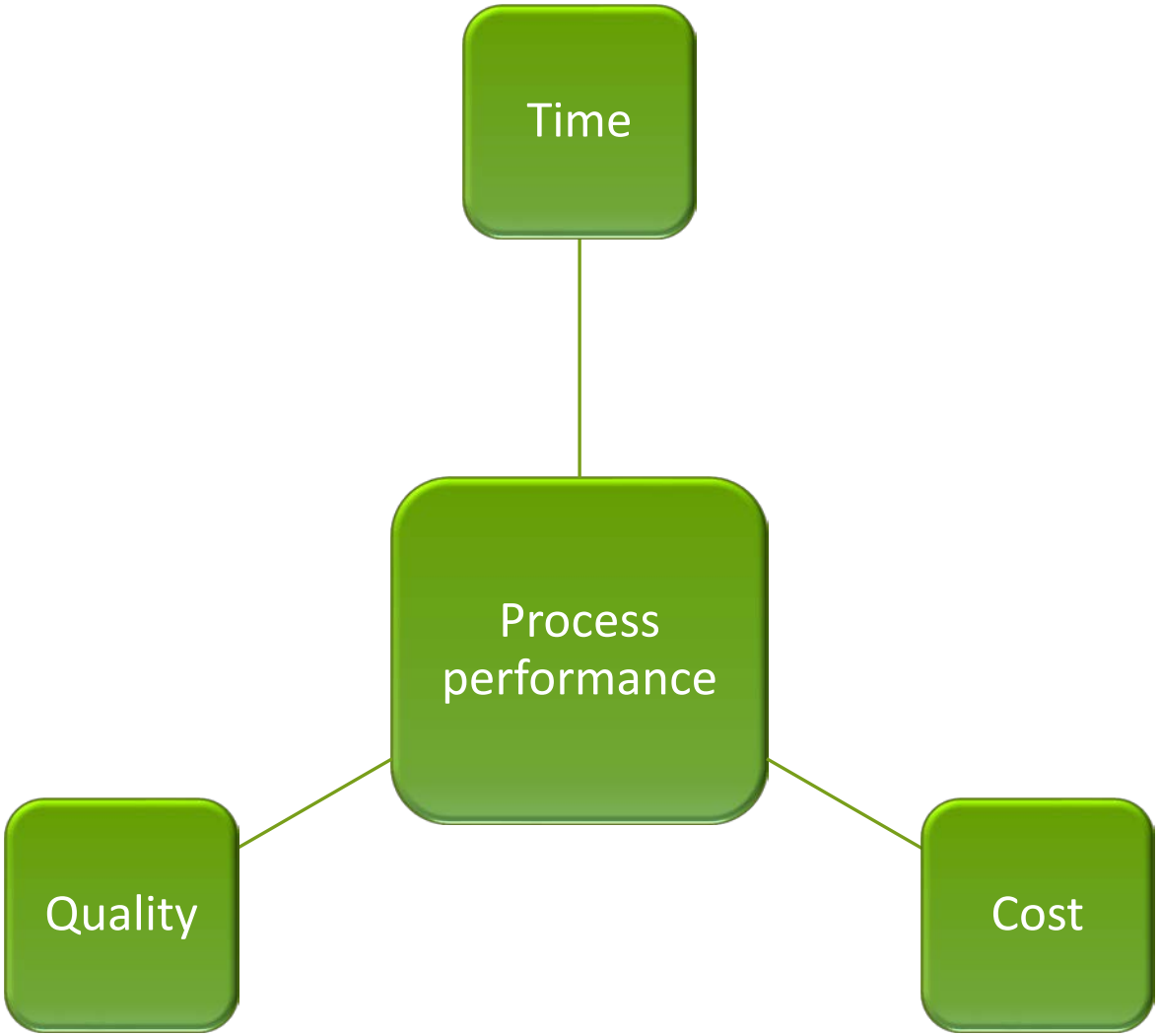
- F...
- C...
- B...

Process performance

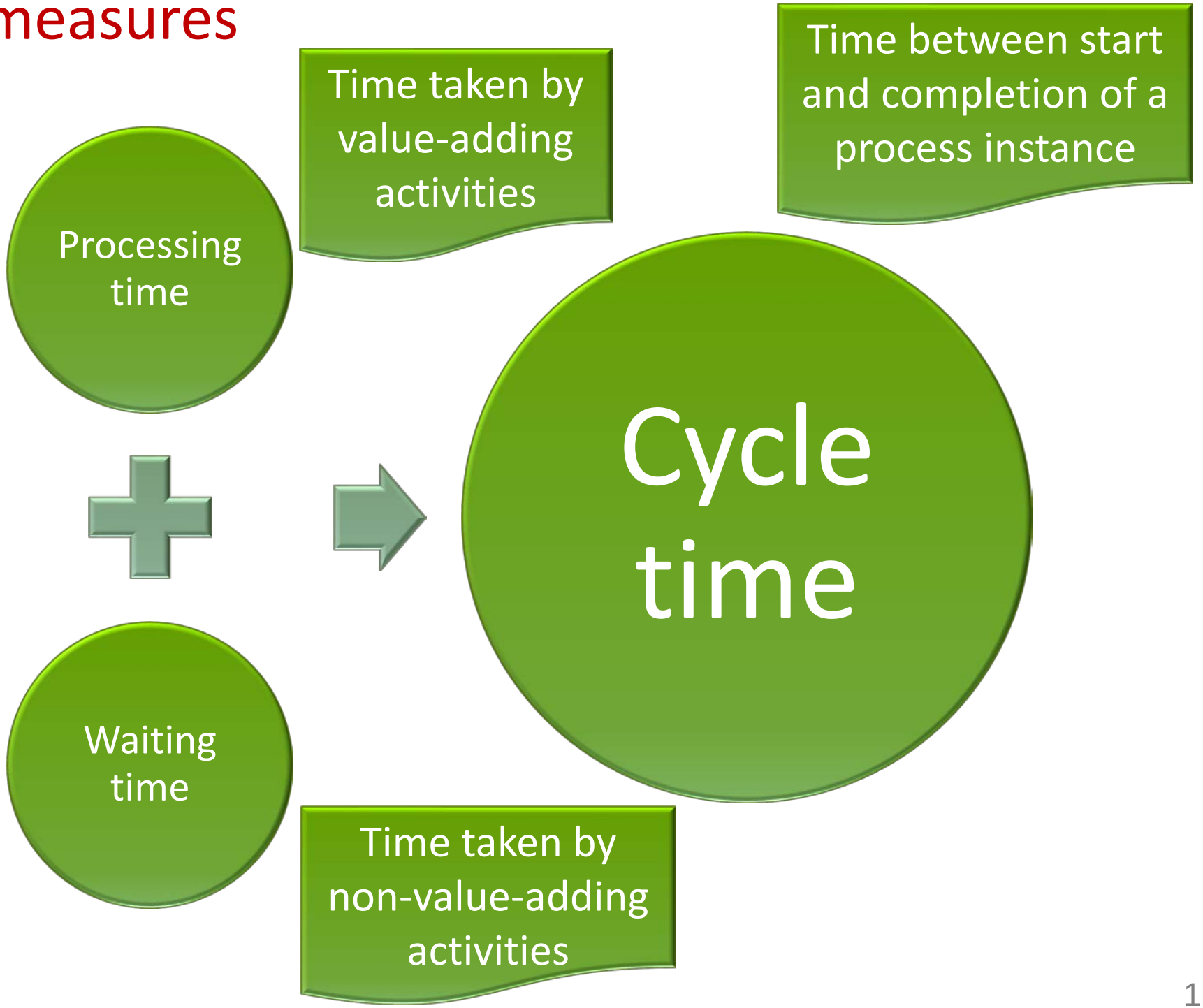
If you had to choose between two services, you would typically choose the one that is:

- Faster
- Cheaper
- Better

Process performance

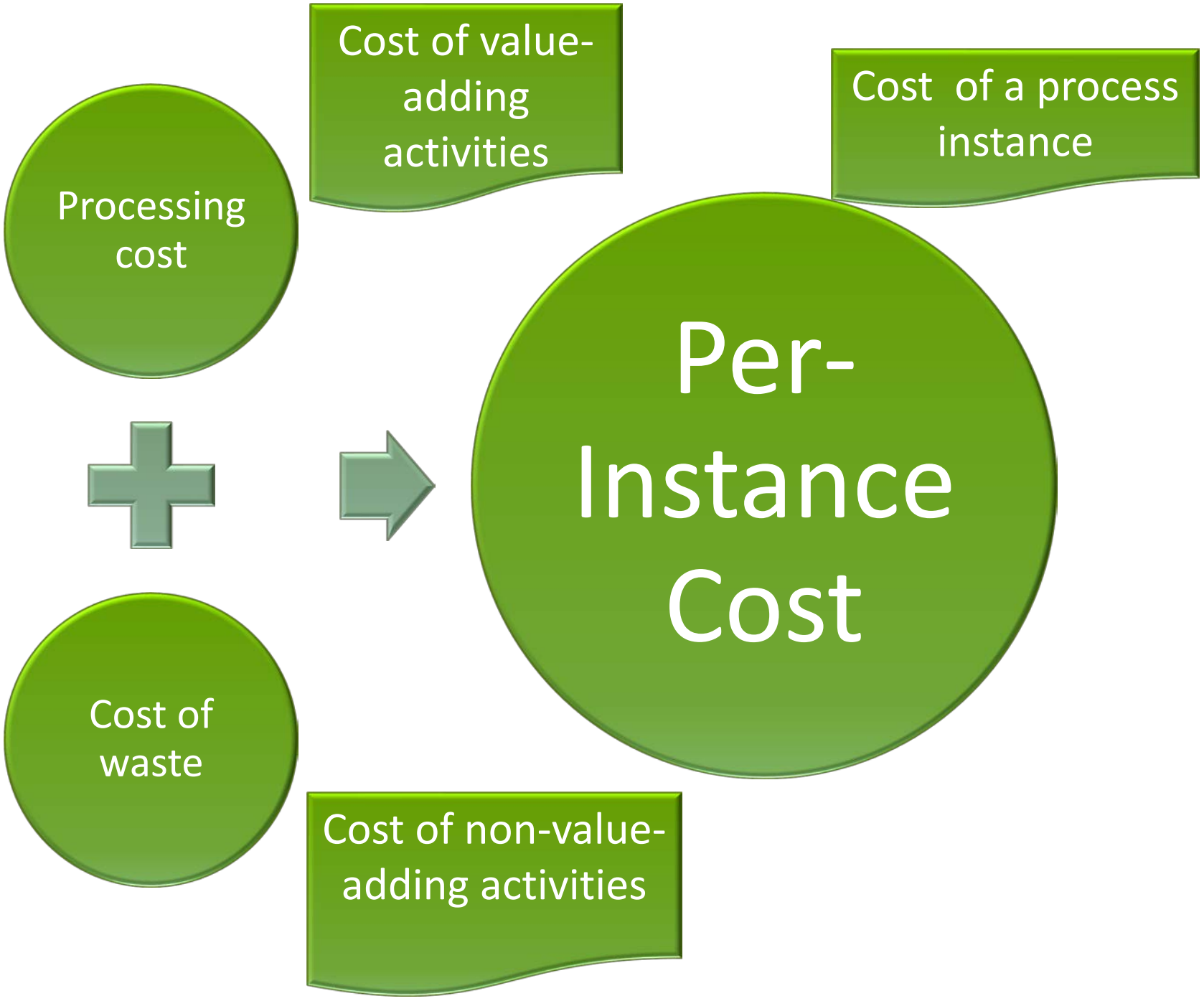


Time measures



Cycle time efficiency

Cost measures



Typical components of cost

Material cost

- Cost of tangible or intangible resources used per process instance

Resource cost

- Cost of person-hours employed per process instance

Resource utilization

Resource utilization = 60%

➔ on average resources are idle 40% of their allocated time

Resource utilization vs. waiting time

Typically, when resource utilization > 90%
➔ Waiting time increases steeply

Quality

Product quality

- Defect rate

Delivery quality

- On-time delivery rate
- Cycle time variance

Customer satisfaction

- Customer feedback score

Identifying performance measures

For each process, formulate process performance objectives

Customer should be served always in a timely manner

For each objective, identify variable(s) and aggregation method → performance measure

Variable: customer served in < 30 min.	Aggregation method: percentage	Measure: ST_{30} = % of customers served in < 30 min.

For each performance measure, define targets

$ST_{30} > 99\%$

Process performance reference models

Supply Chain Operations Reference Model (SCOR)

- Performance measures for supply chain management processes

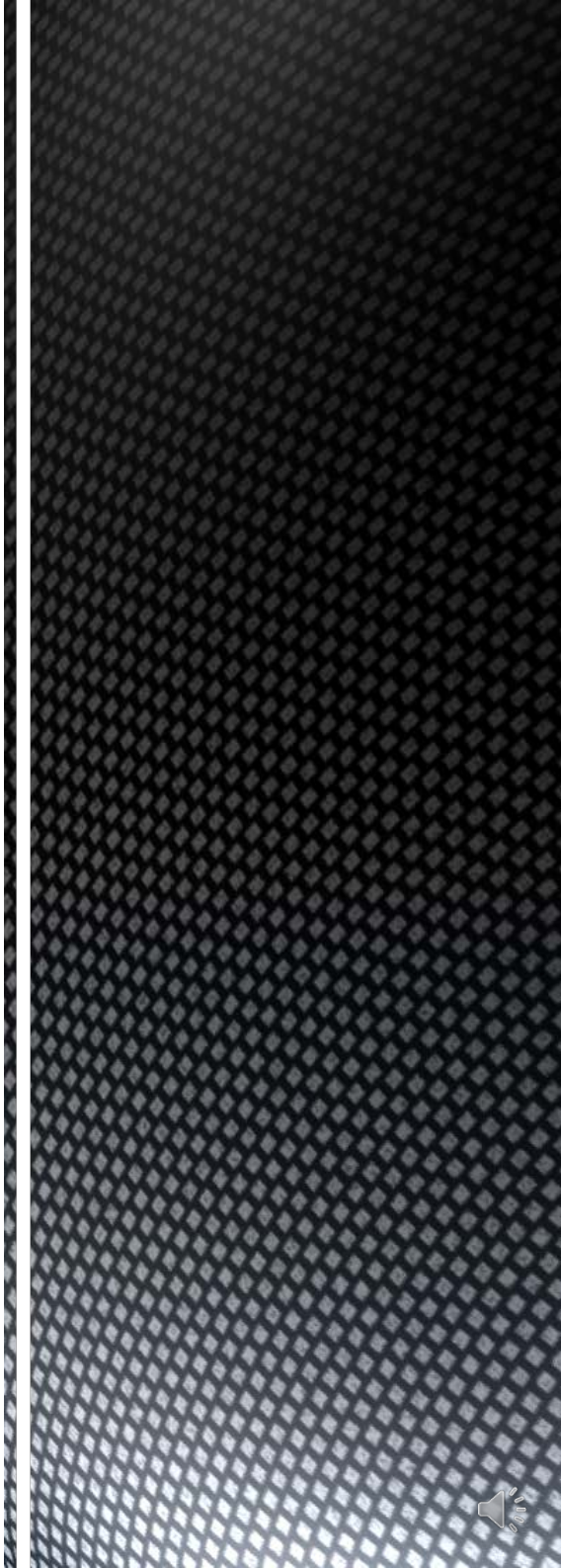
American Productivity and Quality Council (APQC)

- Performance measures and benchmarks for processes in the Process Classification Framework (PCF)

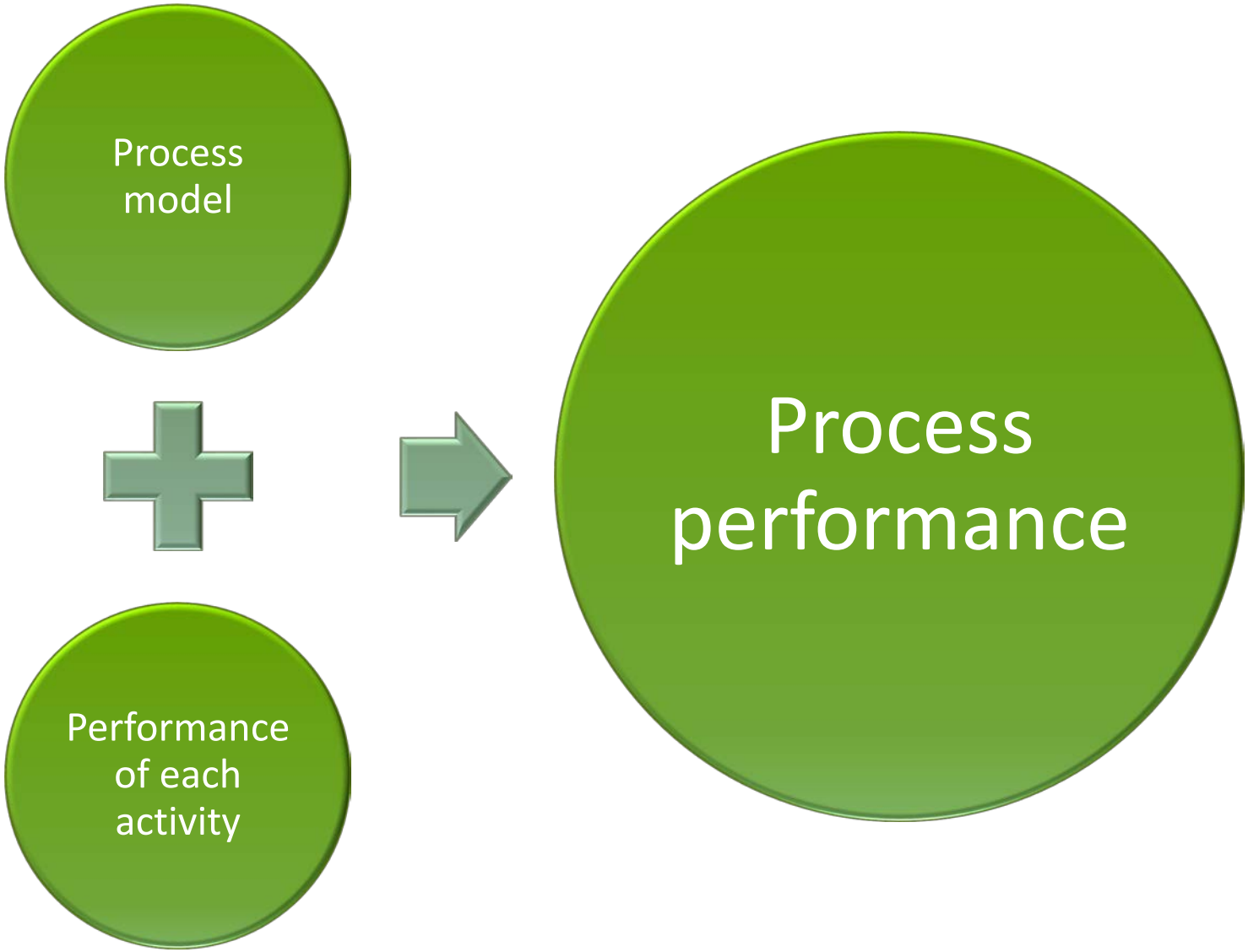
IT Infrastructure Library (ITIL)

- Performance measures for IT service management processes

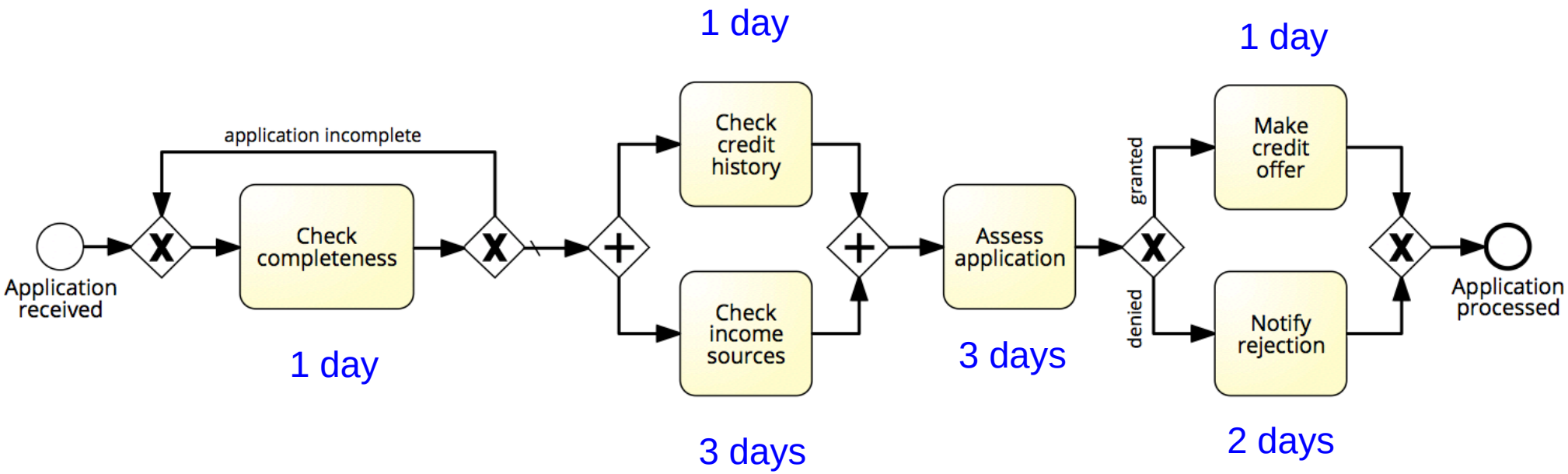
Flow Analysis



Flow analysis



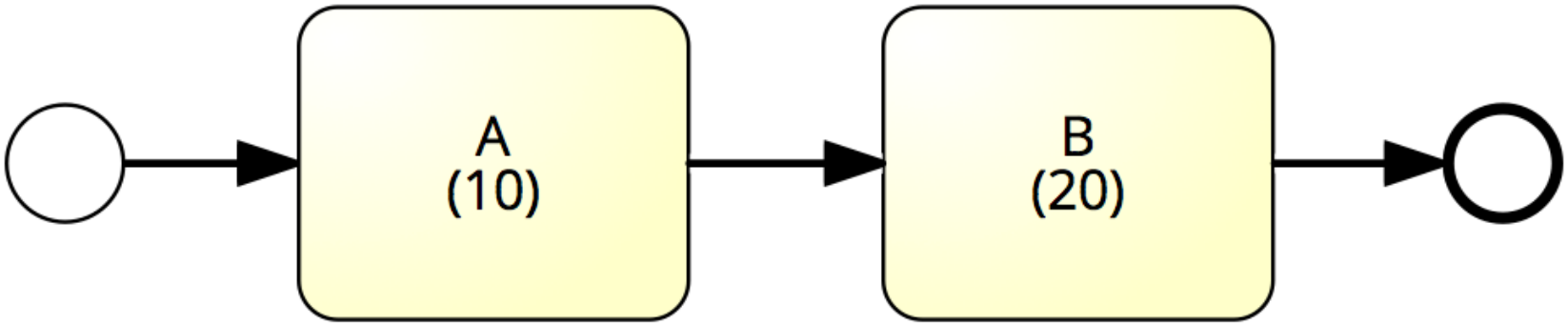
Flow analysis of cycle time



Cycle time = X days

Sequence – Example

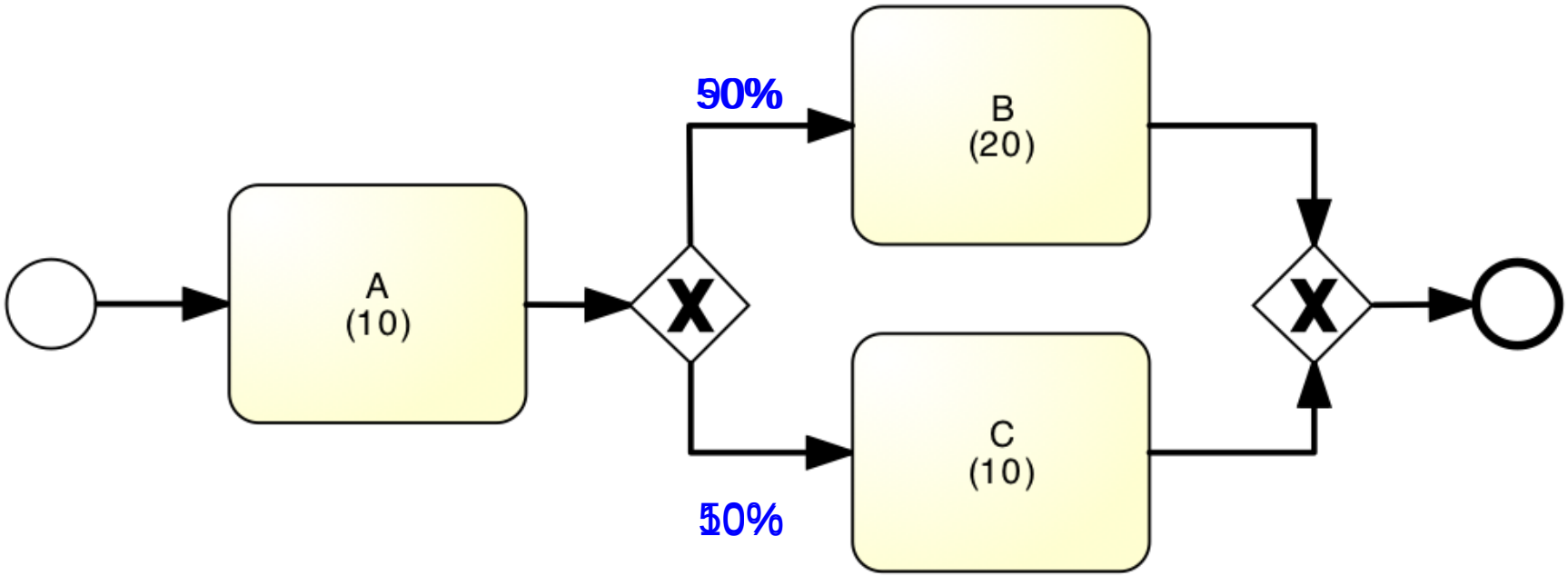
- What is the average cycle time?



Cycle time = 10 + 20 = 30

Example: Alternative Paths

- What is the average cycle time?

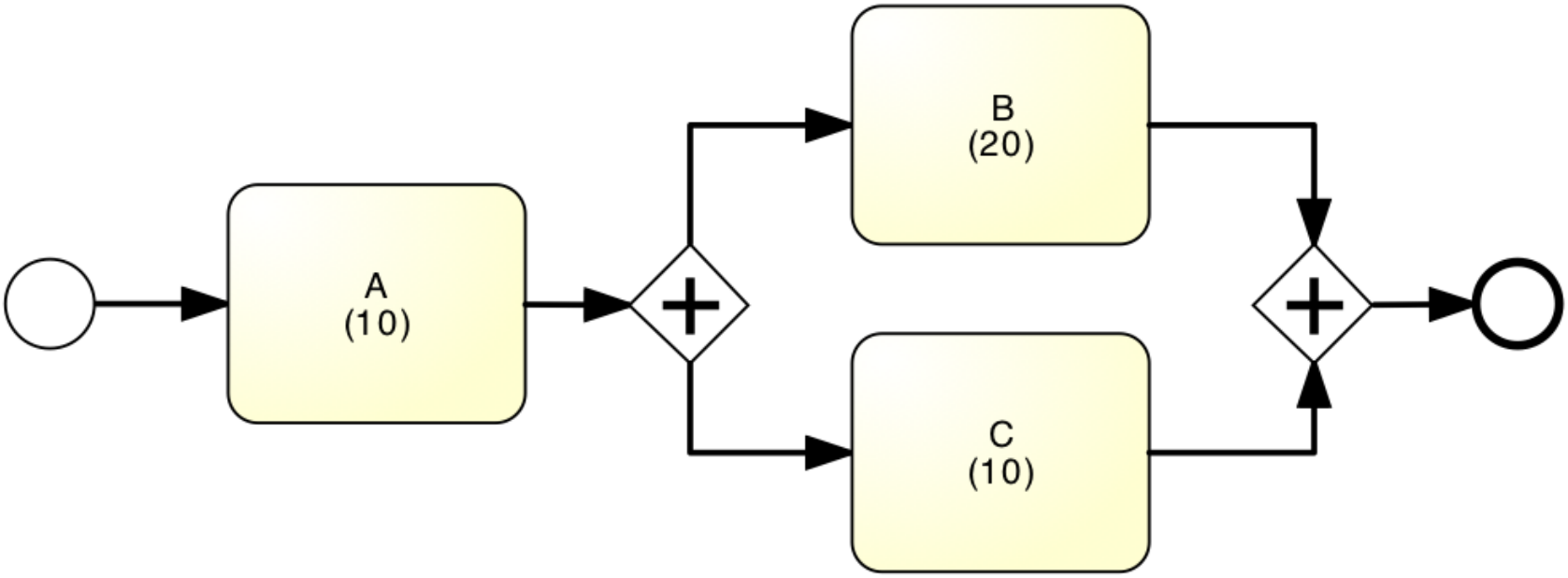


Cycle time = 10 + (20+10)/2 = 25

Cycle time = 10 + 0.9*20+0.1*10 = 29

Example: Parallel paths

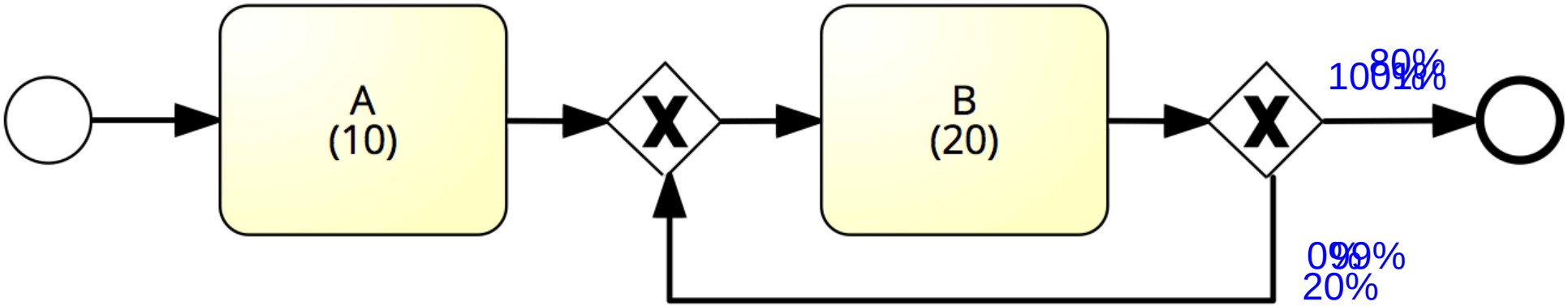
- What is the average cycle time?



Cycle time = 10 + 20 = 30

Example: Rework loop

- What is the average cycle time?

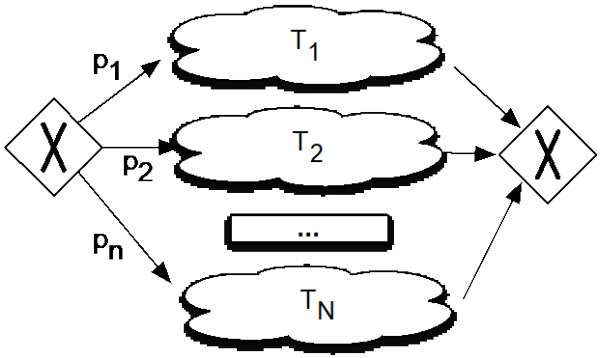


Cycle time = 10 + 20 = 30

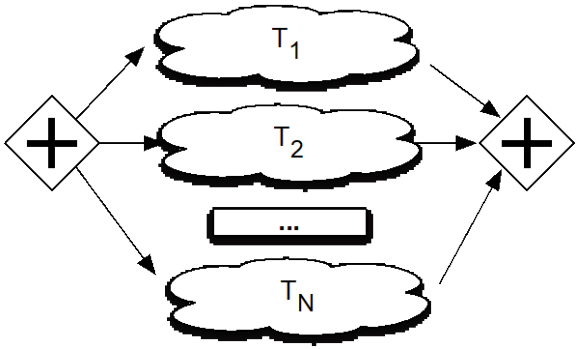
Cycle time = 10 + 20/0.8 = 35

Flow analysis equations for cycle time

$$CT = T_1 + T_2 + \ldots + T_N$$



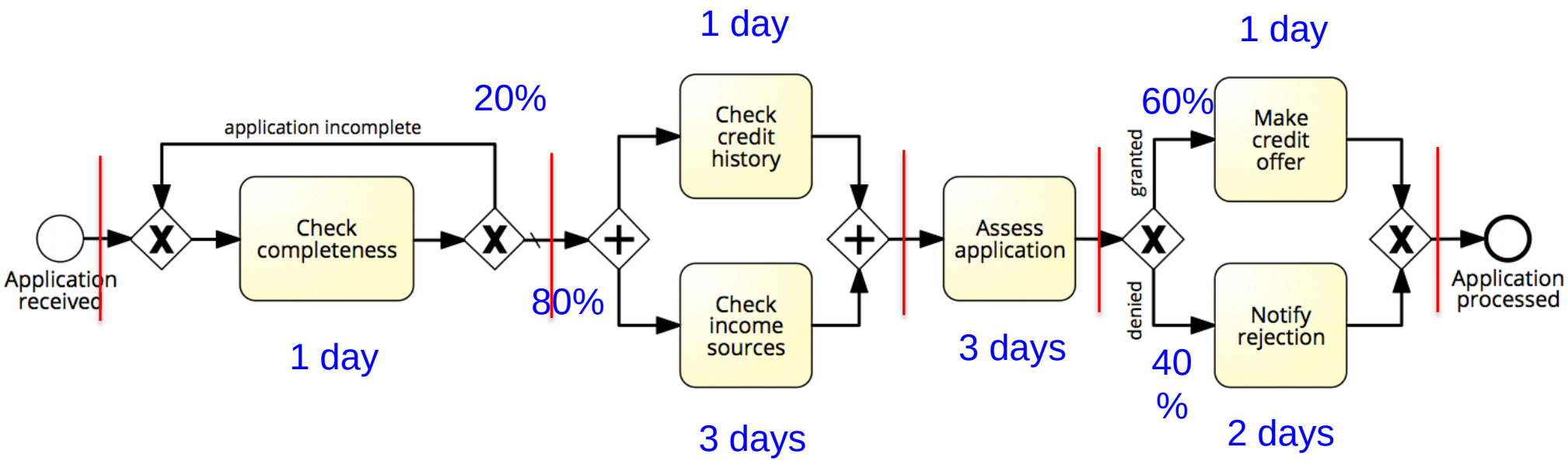
$$CT = p_1 * T_1 + p_2 * T_2 + \ldots + p_n * T_N$$



$$CT = \max(T_1, T_2, \ldots, T_N)$$

$$CT = T / (1-r)$$

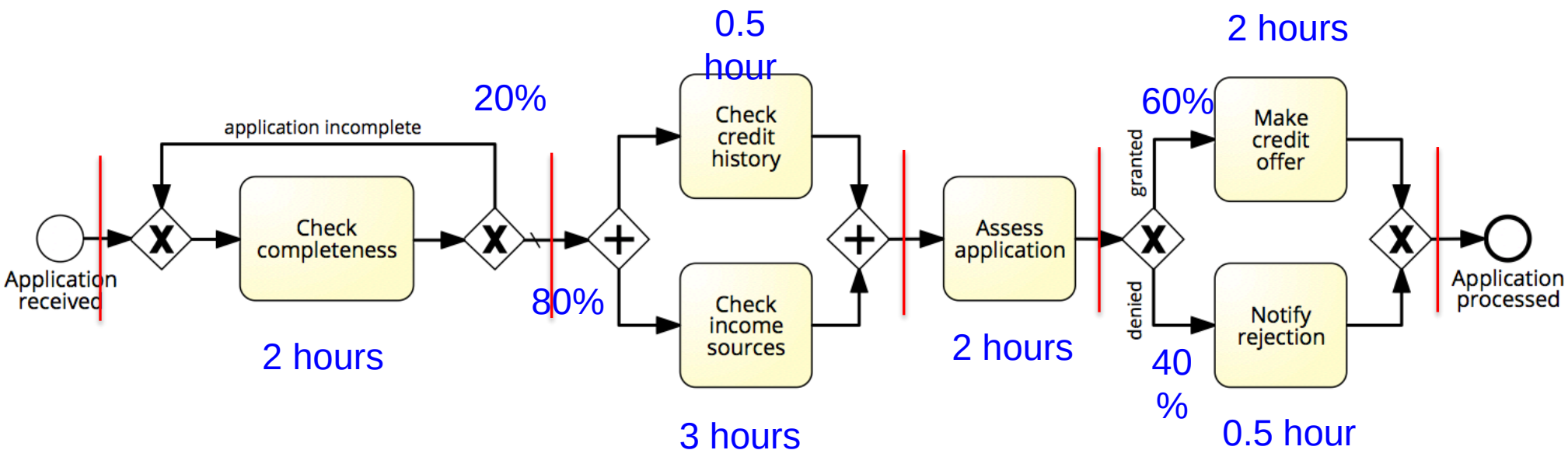
Flow analysis of cycle time



1/0.8 max(1,3) 3 0.6*1+0.4*2

Cycle time = 1.25 + 3 + 3 + 1.4 = 8.65 days

Flow analysis of processing time

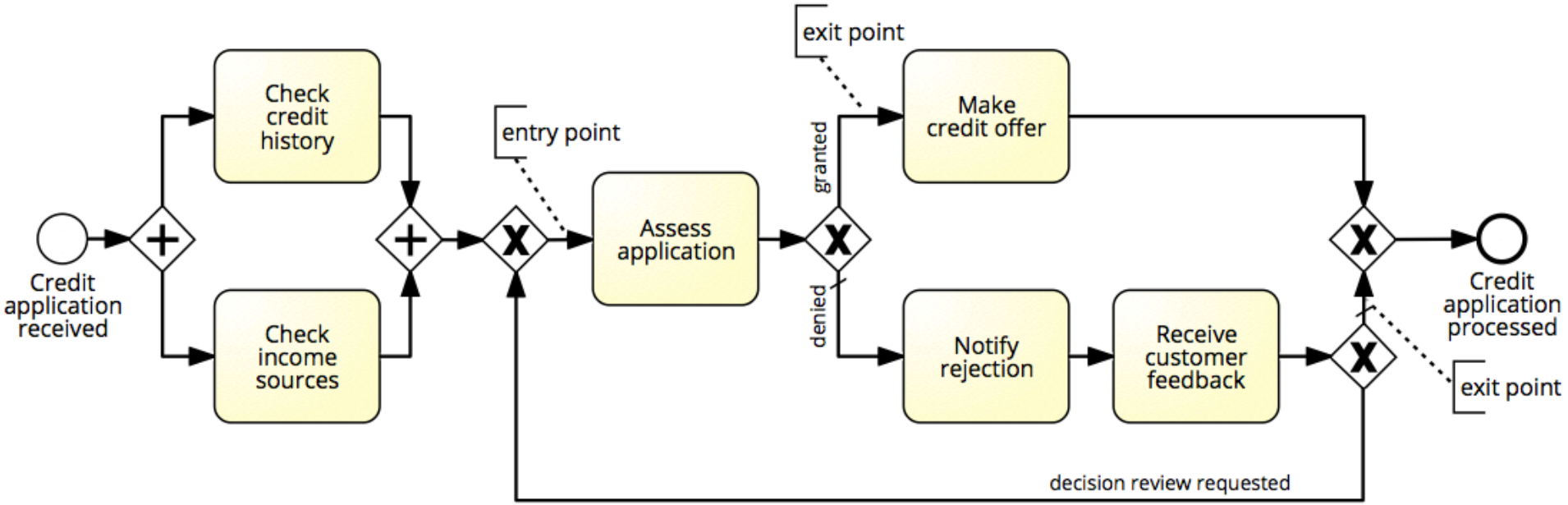


2/0.8 max(0.5,3) 2 0.6*2+0.4*0.5

Processing time = 2.5 + 3 + 2 + 1.4 = 8.9 hours

Cycle time efficiency = 8.9 hours / 8.65 days = 12.9%

Limitation 1: Not all Models are Structured



Limitation 2: Fixed arrival rate capacity

- Cycle time analysis does not consider:
  - The rate at which new process instances are created (arrival rate)
  - The number of available resources
- Higher arrival rate at fixed resource capacity
  ➔ high resource contention
  ➔ higher activity waiting times (longer queues)
  ➔ higher activity cycle time
  ➔ higher overall cycle time
- The slower you are, the more people have to queue up…
  - and vice-versa

Questions