SOFTWARE FOR DOMAIN EXPERTS

Digital transformation mapmaking as a service
Exploring the business opportunity
Workshop at The Cube, Athens, Oct 17, 2019

Digital Transformation Mapmaking
DCSYM for value modelling

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Digital Transformation
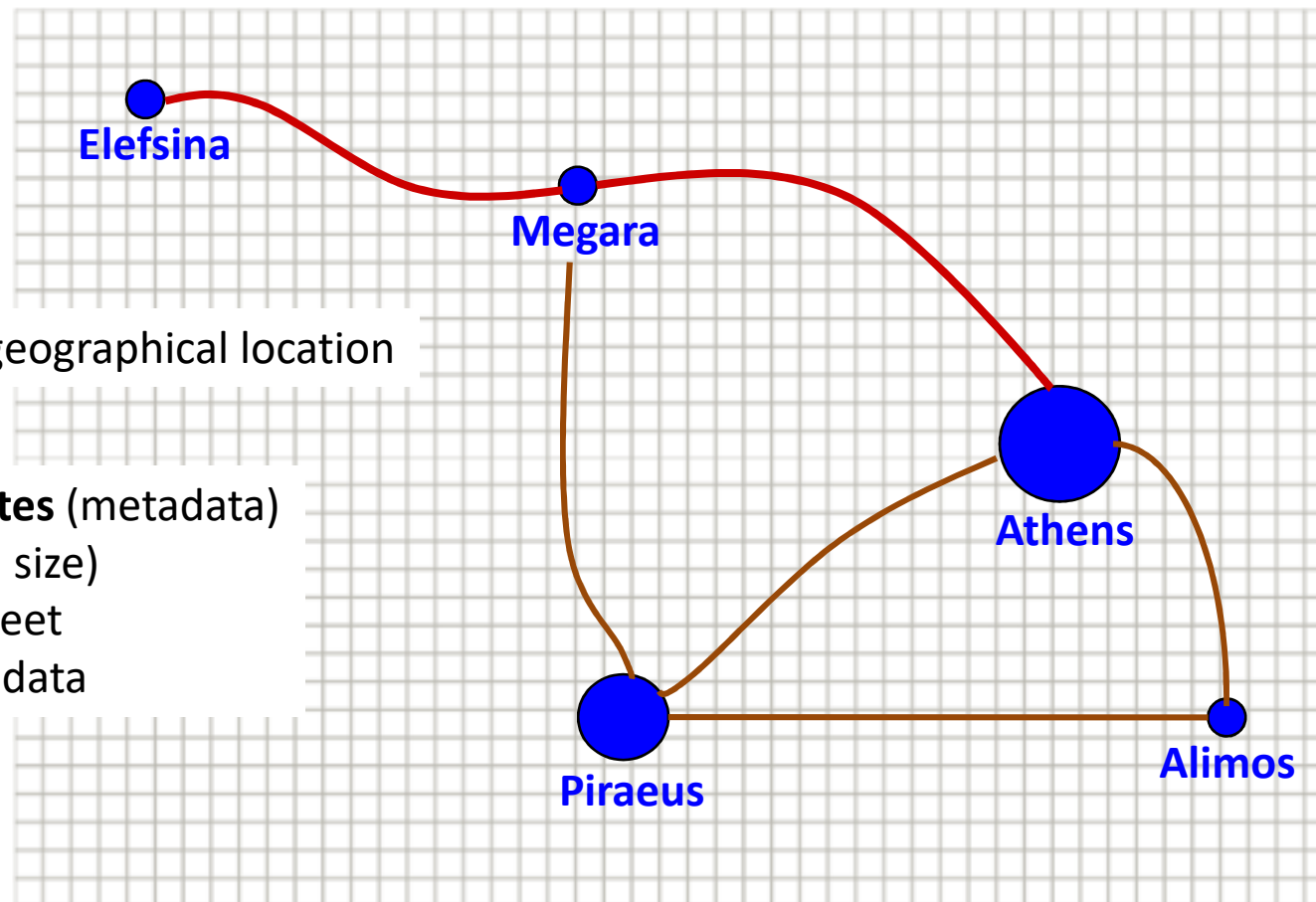

SOURCE: powerdigitalmarketing.com

Mapping

Background: geographical coordinates
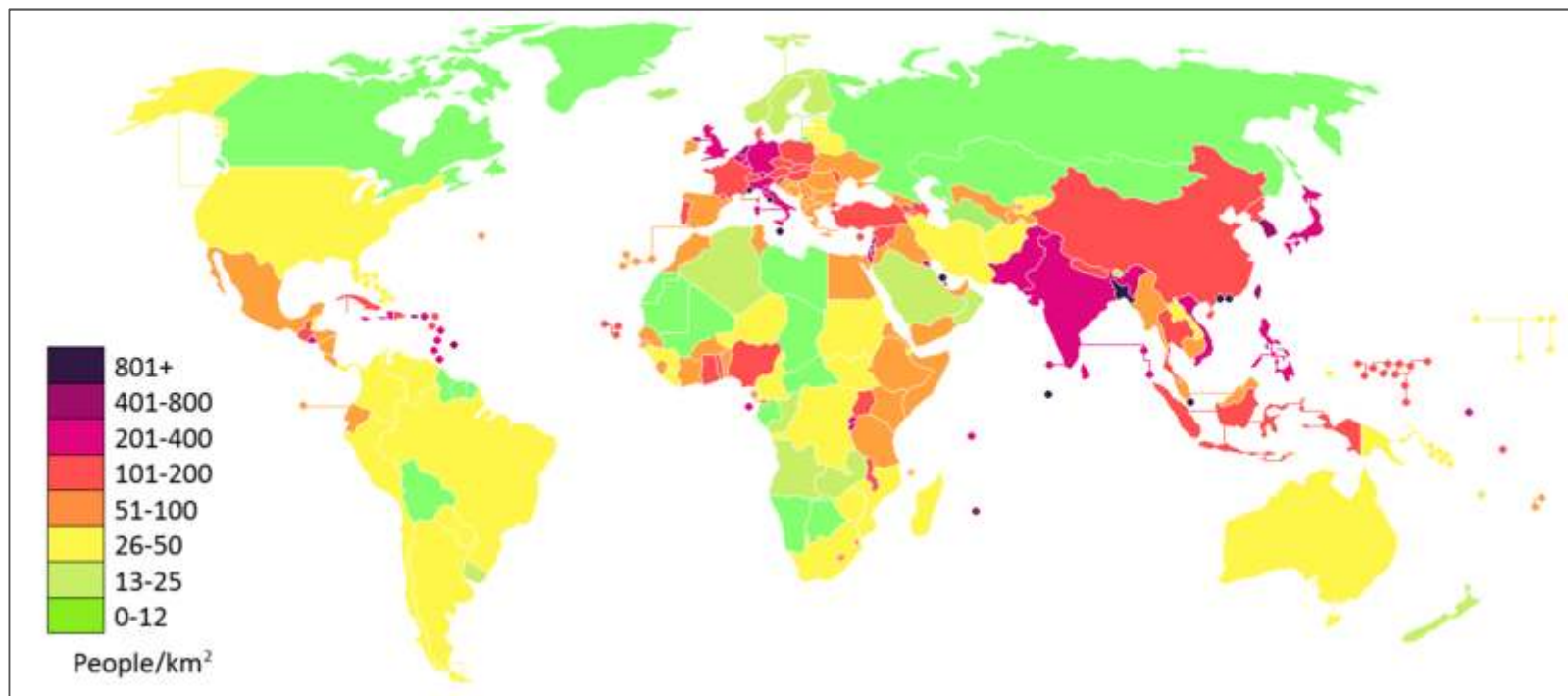
Objects having geographical location

Objects' attributes (metadata)
- Visible (color, size)
- Properties sheet
- Other binary data

Mapping :: Static

World population density map, 2006

801+
401-800
201-400
101-200
51-100
26-50
13-25
0-12
People/km²

SOURCE: commons.wikimedia.org/wiki/File:World_population_density_map.PNG

Mapping :: Dynamic, Real Time, Interactive

SOURCE: flightradar24.com

Software Maps

Background

SW modules

Objects mapped

Code volume
Code complexity
Nesting level
Development status
Testing effort
Change impact
Failure Propagation
Etc... etc...

Software map example

File
server/src/main/java/org/jboss/ejb/plugins/cmp/jdbc/bridge/JDBCCMRFieldBridge.java
Color: Code-Nesting-Level - 7 (min: 0, max: 10)
Height: Max McCabe Complexity - 177 (min: 0, max: 207)
Size: Lines-of-Code - 2388 (min: 0, max: 2957)

Name of Most Complex Method:
RelationDataManager.{none}()

Complexity hotspots in the implementation of the JBoss software system.

Metrics mappings: **ground area**: lines-of-code **height**: McCabe complexity
color: level of control-flow-nesting

SOURCE: Bohnet, J., & Döllner, J. (2011).
Monitoring code quality and development activity by software maps.

Software Development Challenges
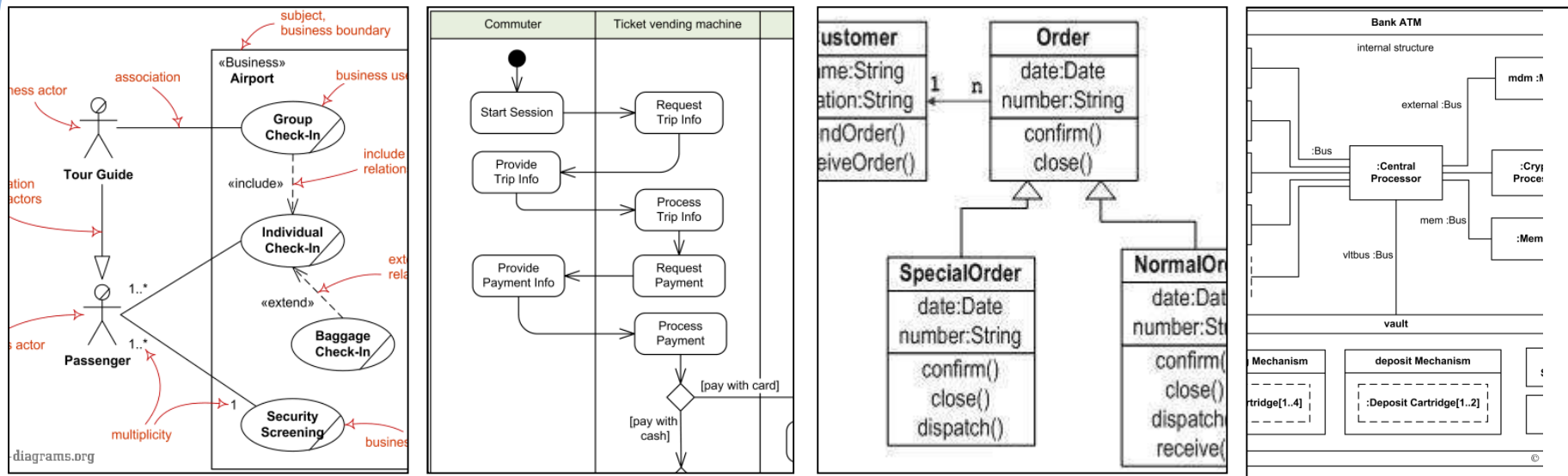
Challenges:

- Meet requirements

- Deliver on time

- Deliver on budget

- Quality standards

- Maintainability

Requirements:

- Stakeholders groups

- Often conflicting

- Changing

- Sometimes unwritten

Developers spend a significant part of their time with trying to understand the system's structure and behavior
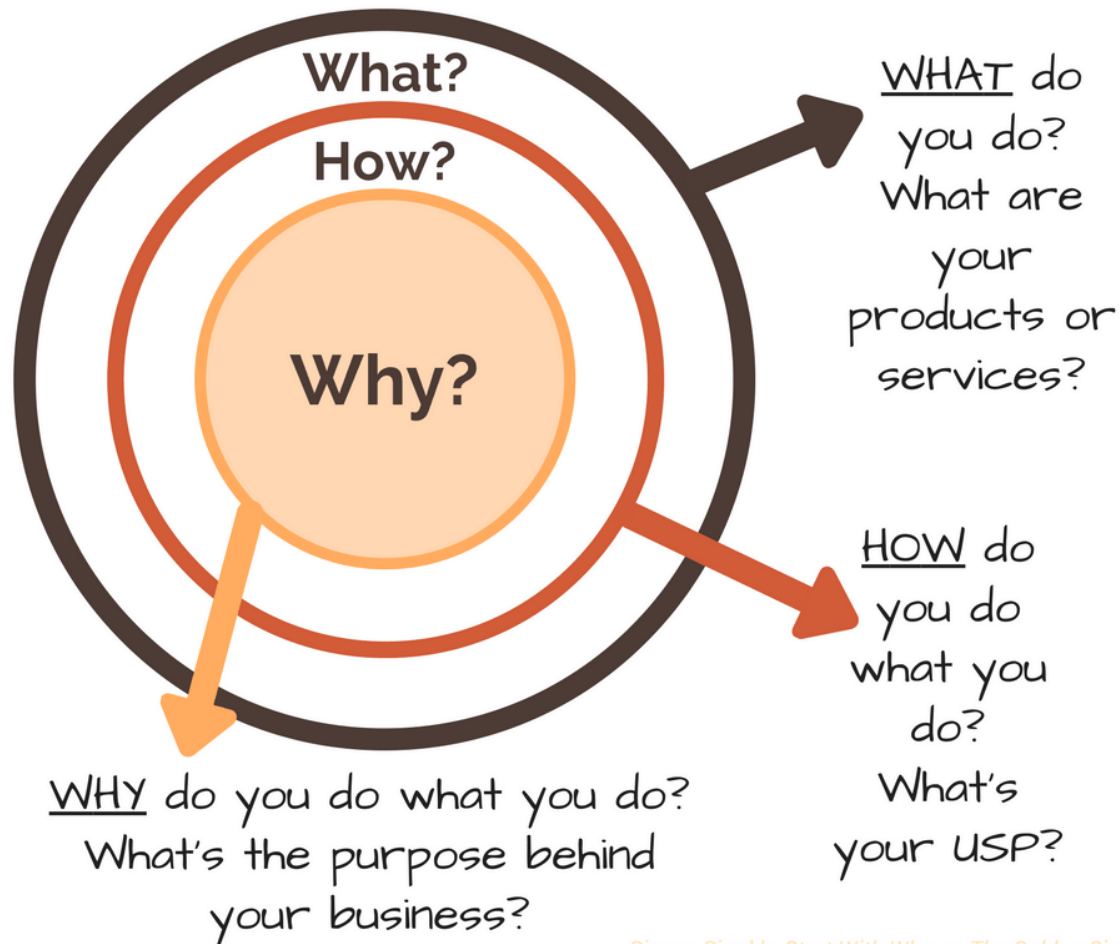
UML

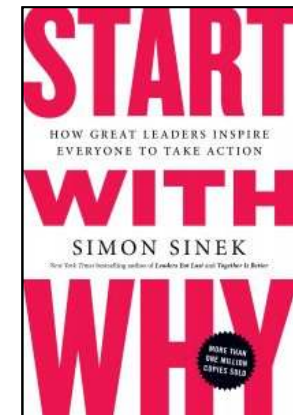UML is a standard but for whom ?

UML misuses:

- Overuse

- Using all capabilities

- Analysis -> paralysis

UML scope is a problem for learning and using it

Why – How – What

Simon Sinek's *Start With Why*, or *The Golden Circle*
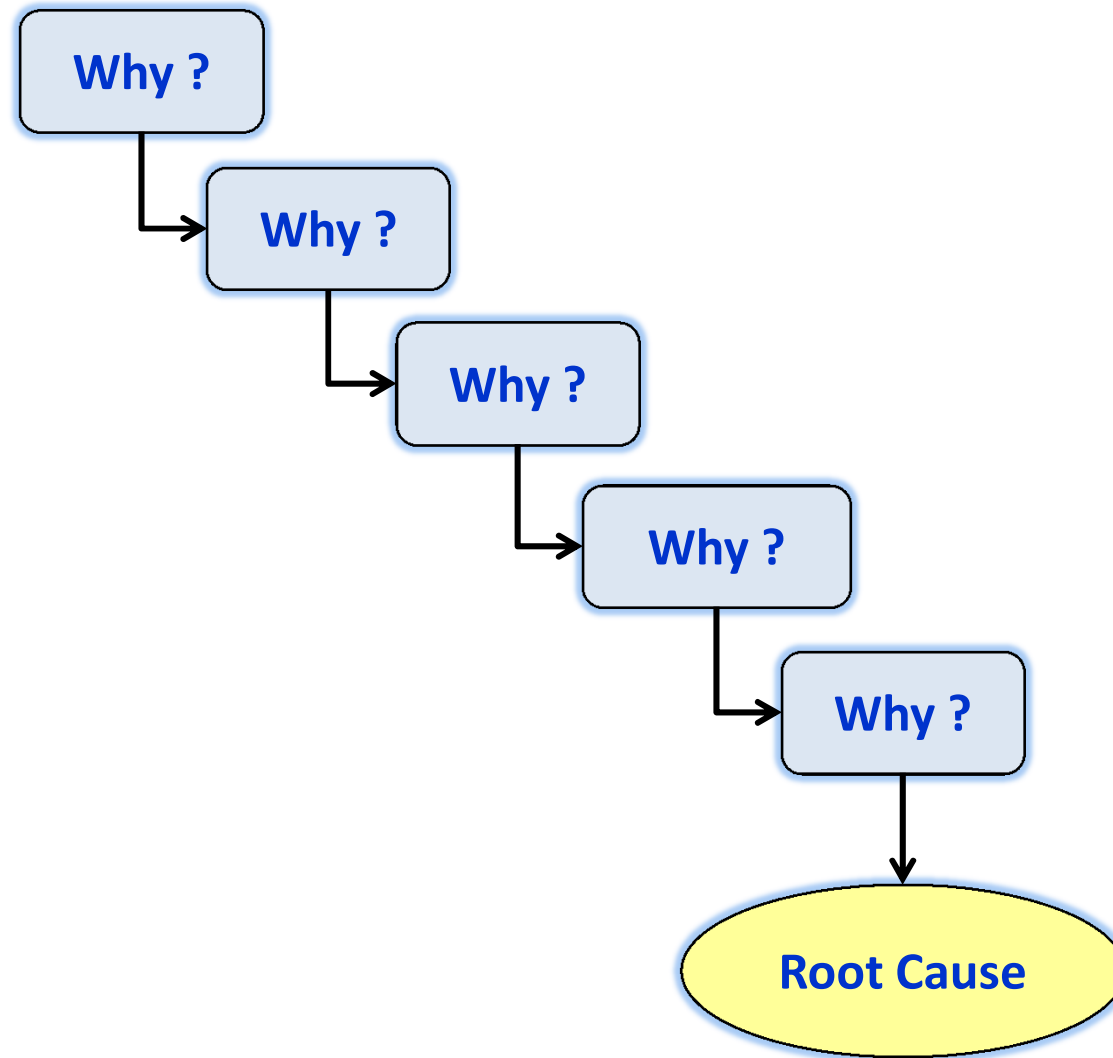
Simon Sinek's book: "Start With Why"
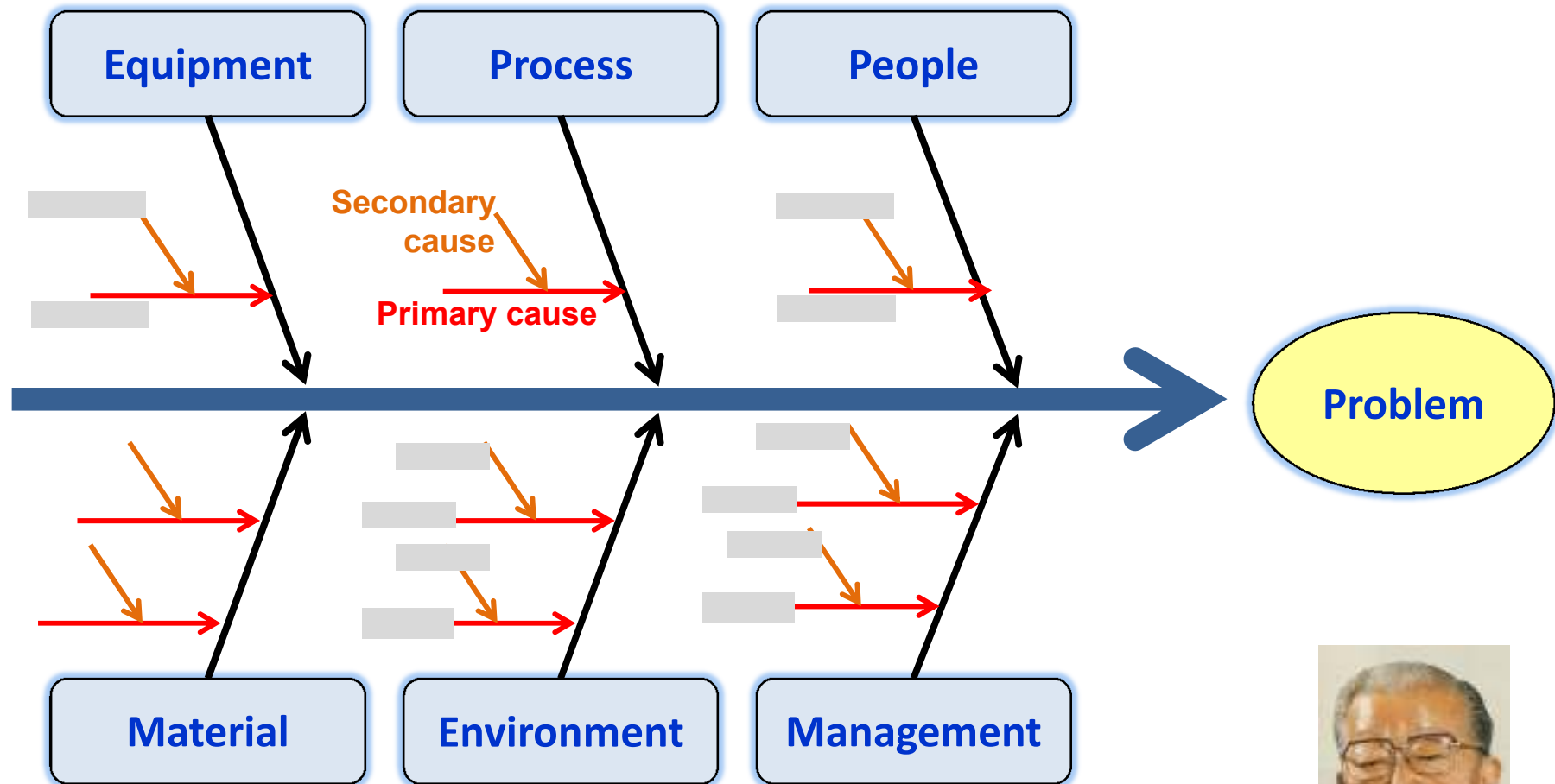
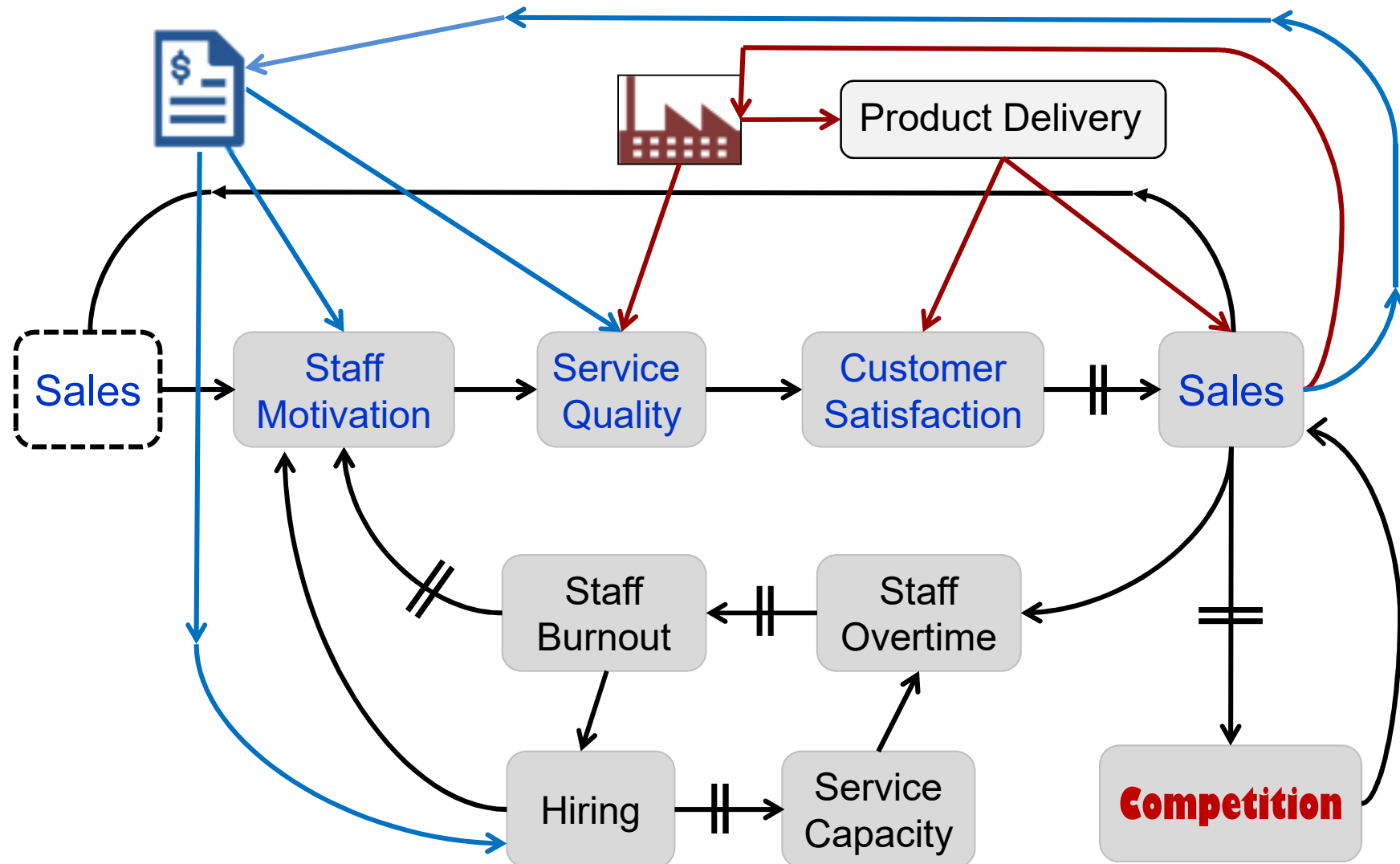# The root cause - Five whys

Sakichi Toyoda

Taiichi Ohno

Why ?

Why ?

Why ?

Why ?

Why ?

Root Cause

Cause-and-effect diagrams

Equipment

Process

People

Secondary cause

Primary cause

Material

Environment
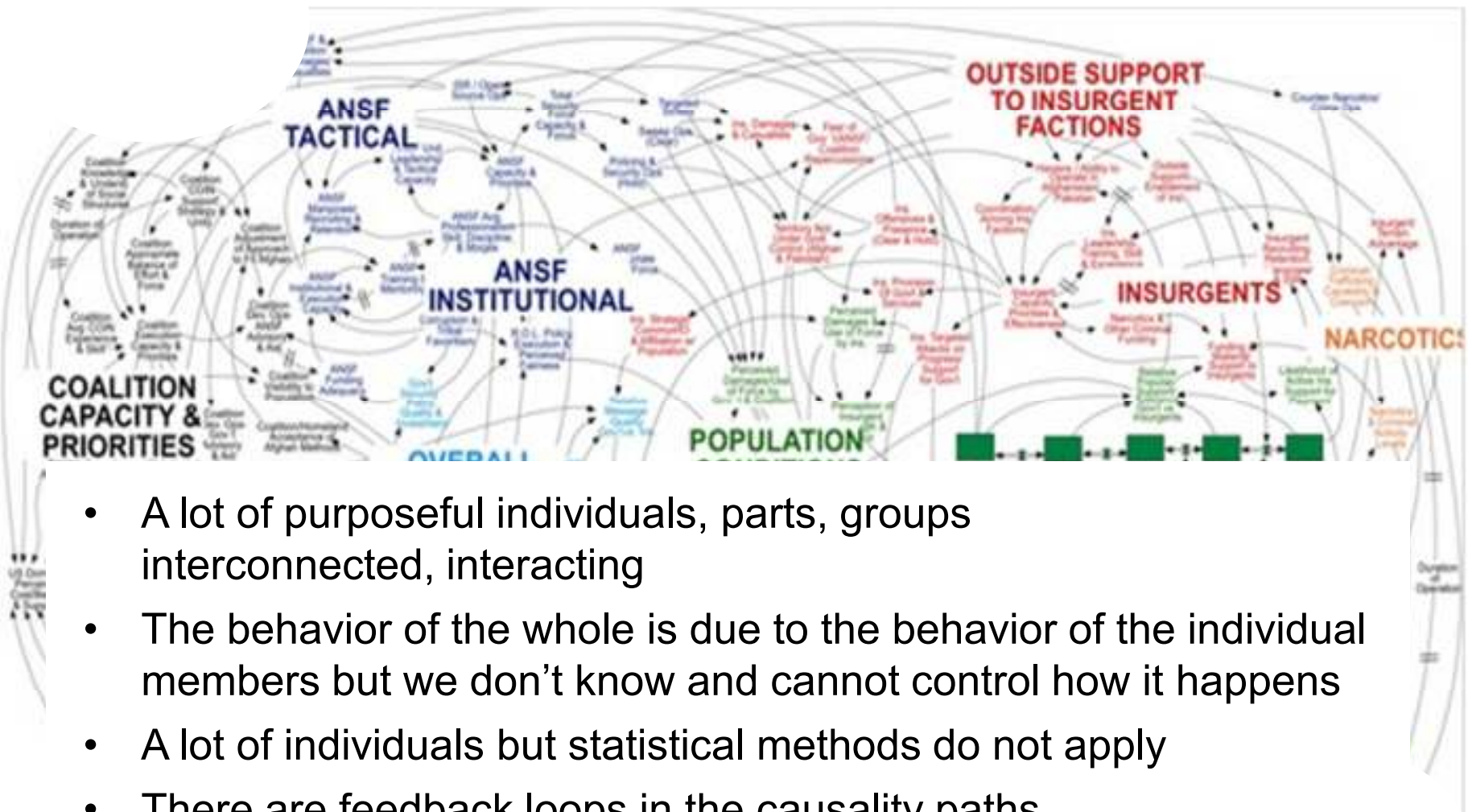
Management

Problem

Ishikawa diagrams or **Fishbone** diagrams

Trying to find the "root" cause

# Characteristics of a Complex System

- A lot of purposeful individuals, parts, groups interconnected, interacting
- The behavior of the whole is due to the behavior of the individual members but we don't know and cannot control how it happens
- A lot of individuals but statistical methods do not apply
- There are feedback loops in the causality paths
- There are delays in the cause-and-effect interactions
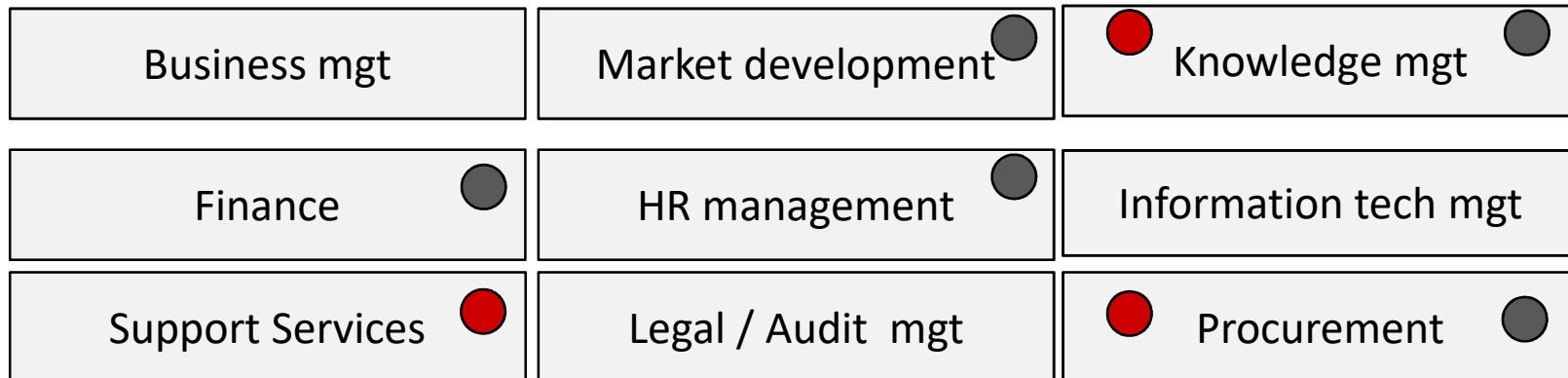
Dealing with complexity

Mental Models – Higher abstraction levels – Variety reduction
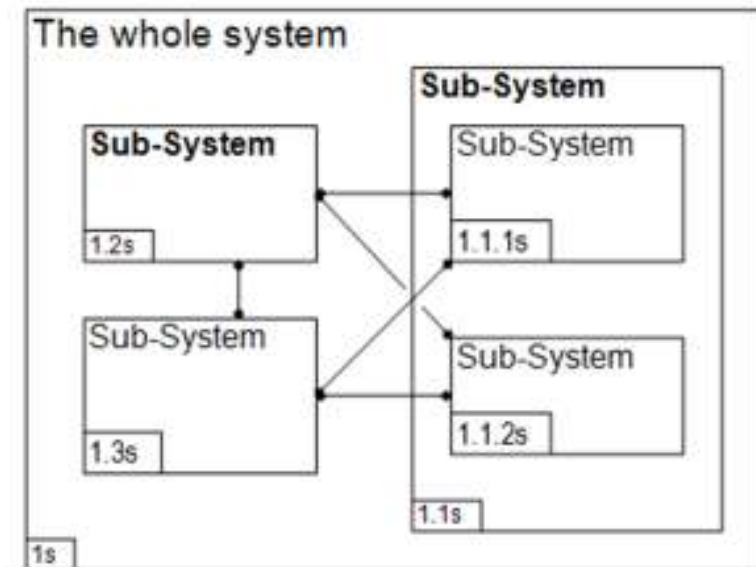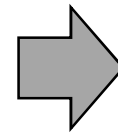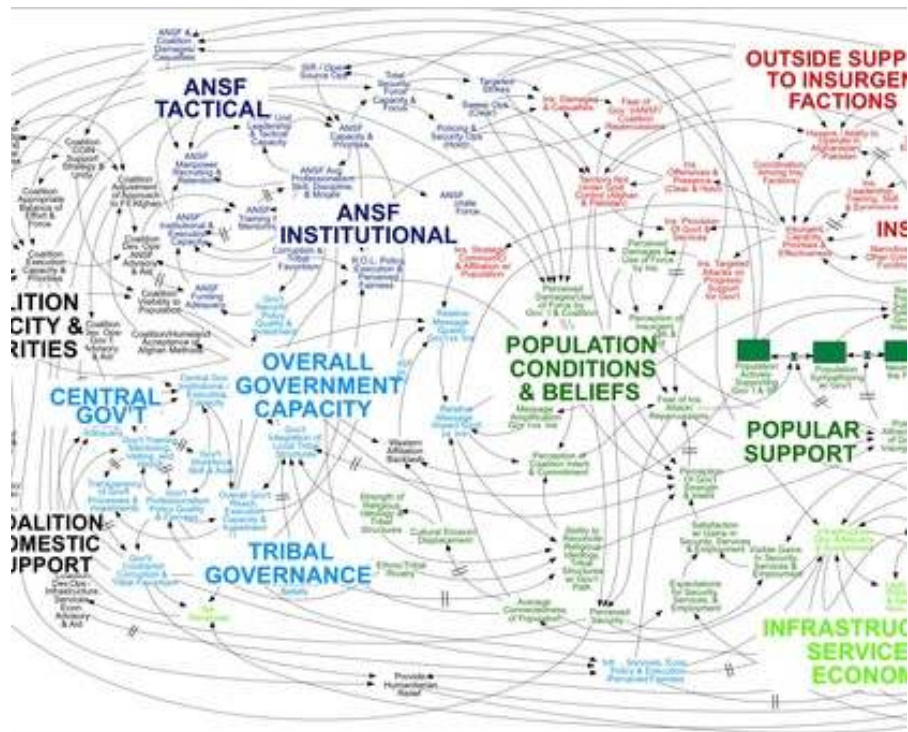
Value mapping background :: Value Chain Modelling

Athens Water Supply and Sewerage Company   (EYDAP S.A.)

Primary value activities - value chain

Water supply | Water Processing | Water distribution | Sewage collection | Sewerage processing | Billing | Customers Services

Business mgt	Market development	Knowledge mgt
Finance	HR management	Information tech mgt
Support Services	Legal / Audit mgt	Procurement
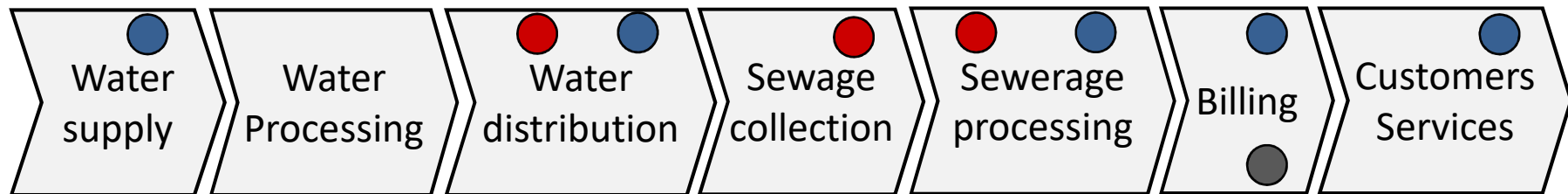
Secondary / support activities

Value mapping background :: Business Model Canvas
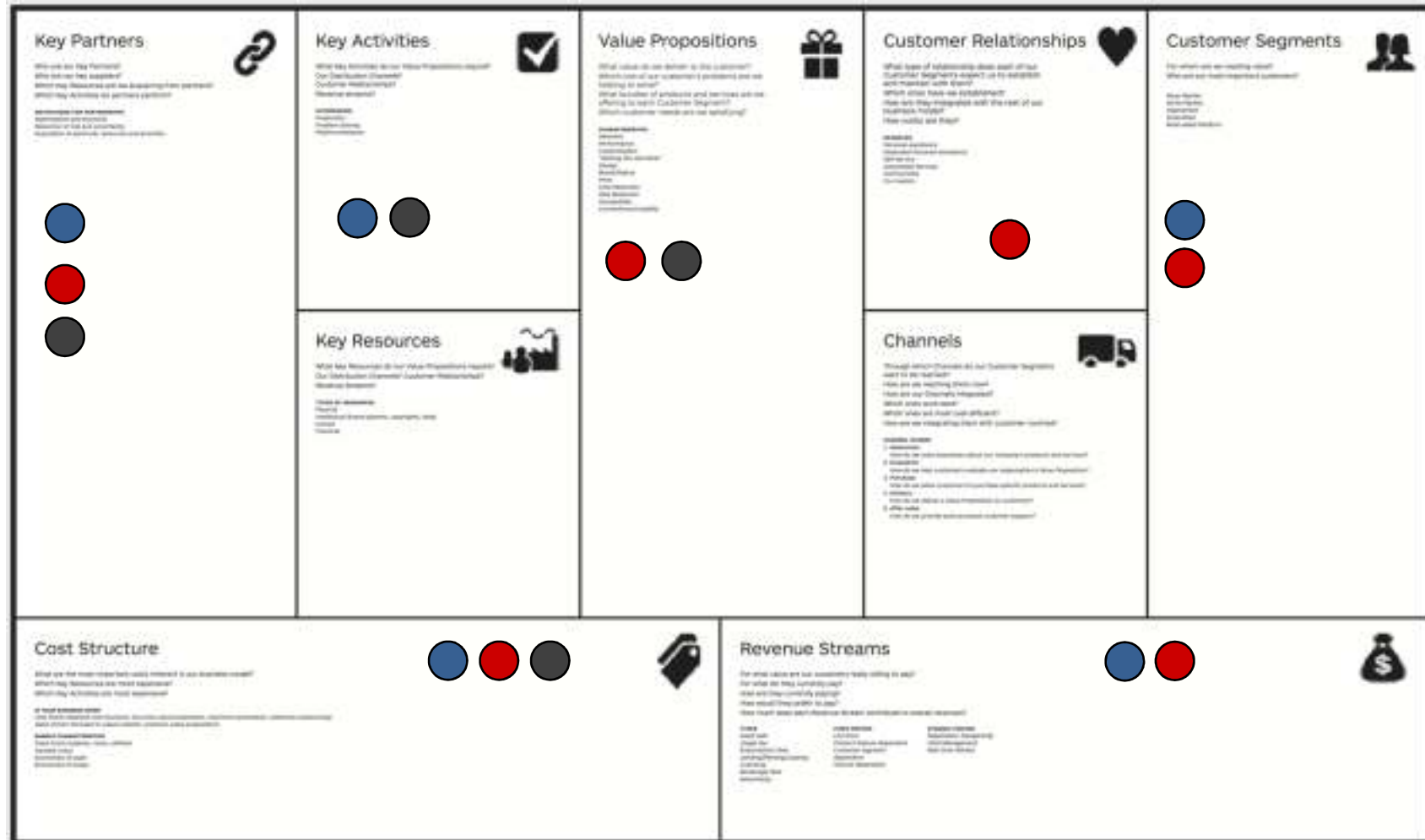
SOURCE: en.wikipedia.org
Business Model Canvas: nine business model building blocks, Osterwalder, Pigneur & al. 2010

DCSYM (Design and Control Systemic Methodology)

A modelling methodology for systems
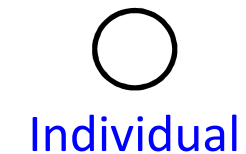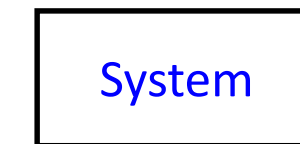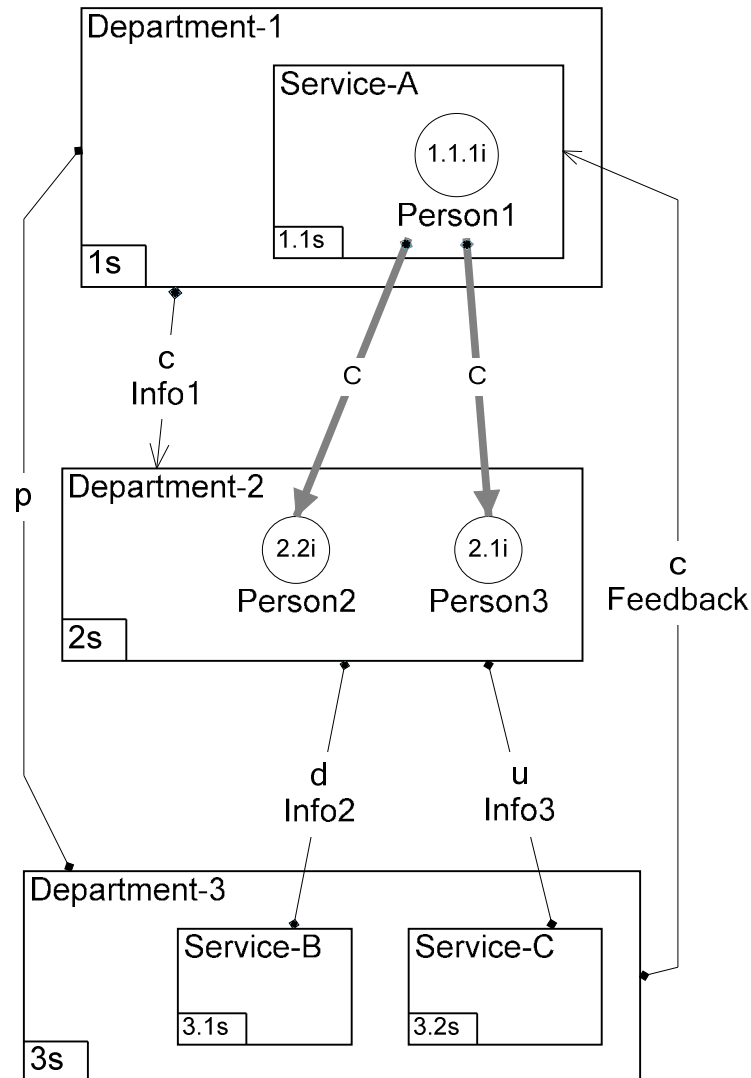
Relations types		
c	C	communication
g	G	general interaction or influence
u	U	purposeful action
p	P	potential conflict
d	D	distorted communication
δ	Δ	distorted purposeful communication

DCSYM example

BMC as a system – DCSYM approach

Mapping s/w on processes with DCSYM

Athens Water Supply and Sewerage Company (EYDAP S.A.)

Management Processes

Business mgt
1.1s

Market Development
1.2s

Knowledge mgt
Process mgt
1.3.1s
1.3s

Environmental mgt
1.4s

1s

CORE PROCESSES

Water Division

Water Supply
2.2.1s

Water Processing
2.2.3s

Water Disributon
2.2.2s

2.2s

Sewerage Division

Sewage Collection
2.1.1s

Sewage Processing
2.1.2s

2.1s

Customers Division

Billing
2.3.1s

Customer Services
2.3.2s

2.3s

2s

Support Processes

Finance
3.1s

HR mgt
3.2s

Information Tech mgt
3.3s

Support Services
3.4s

Procurement
3.5s

3s

22

Mapping s/w on processes with DCSYM — Athens Water Supply and Sewerage Company (EYDAP S.A.)

Management Processes

- Business mgt — 1.1s
- Market Development — 1.2s
- Knowledge mgt — 1.3s
  - Process mgt — 1.3.1s
- Environmental mgt — 1.4s

1s

CORE PROCESSES

Water Division
- Water Supply — 2.2.1s
- Water Processing — 2.2.3s
- Water Disributon — 2.2.2s

2.2s

Sewerage Division
- Sewage Collection — 2.1.1s
- Sewage Processing — 2.1.2s

2.1s

Customers Division
- Billing — 2.3.1s
- Customer Services — 2.3.2s

2.3s

2s

Support Processes

- Finance — 3.1s
- HR mgt — 3.2s
- Information Tech mgt — 3.3s
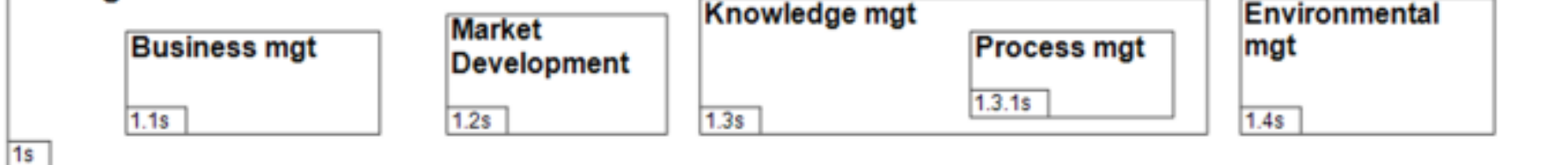 - G.I.S. — 3.3.1s
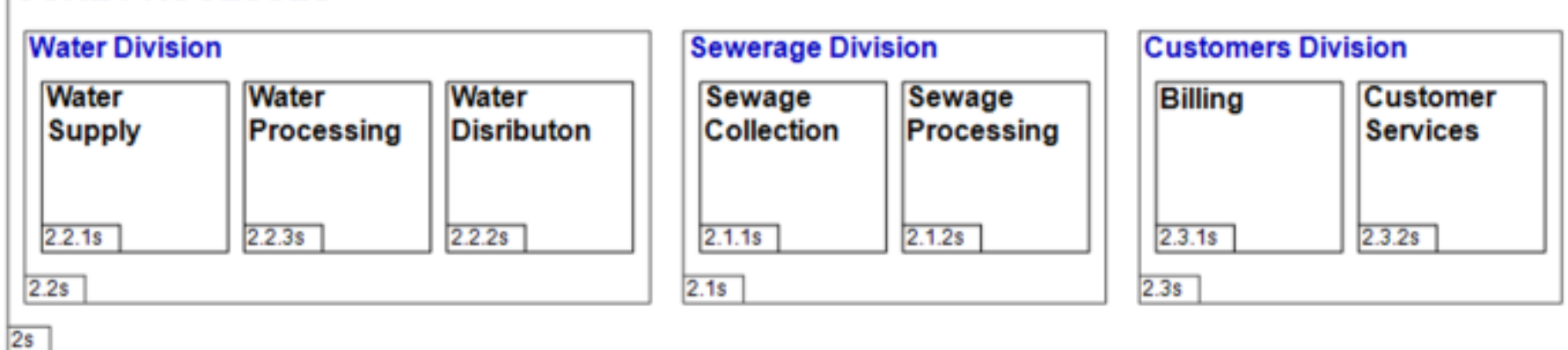- Support Services — 3.4s
- Procurement — 3.5s

3s

23

Mapping s/w on processes with DCSYM

Athens Water Supply and Sewerage Company (EYDAP S.A.)

Management Processes

| Business mgt 1.1s | Market Development 1.2s | Knowledge mgt 1.3s — Process mgt 1.3.1s | Environmental mgt 1.4s |

1s

CORE PROCESSES

Water Division
- Water Supply 2.2.1s
- Water Processing 2.2.3s
- Water Disributon 2.2.2s

2.2s

Sewerage Division
- Sewage Collection 2.1.1s
- Sewage Processing 2.1.2s

2.1s

Customers Division
- Billing — Billing IS 2.3.1.1s / 2.3.1s
- Customer Services 2.3.2s

2.3s

2s

Support Processes

| Finance 3.1s | HR mgt 3.2s | Information Tech mgt 3.3s | Support Services 3.4s | Procurement 3.5s |

3s

Mapping s/w on processes with DCSYM

Athens Water Supply and Sewerage Company (EYDAP S.A.)

Management Processes

- Business mgt — 1.1s
- Market Development — 1.2s
- Knowledge mgt — 1.3s
  - Process mgt — 1.3.1s
- Environmental mgt — 1.4s

1s

CORE PROCESSES

Water Division
- Water Supply — 2.2.1s
- Water Processing — 2.2.3s
- Water Disributon — 2.2.2s

2.2s

Sewerage Division
- Sewage Collection — 2.1.1s
- Sewage Processing — 2.1.2s

2.1s

Customers Division
- Billing — 2.3.1s
- Customer Services — 2.3.2s

2.3s

2s

Support Processes

- Finance — 3.1s
- HR mgt — 3.2s
- Information Tech mgt — 3.3s
- Support Services — 3.4s
- Procurement — 3.5s
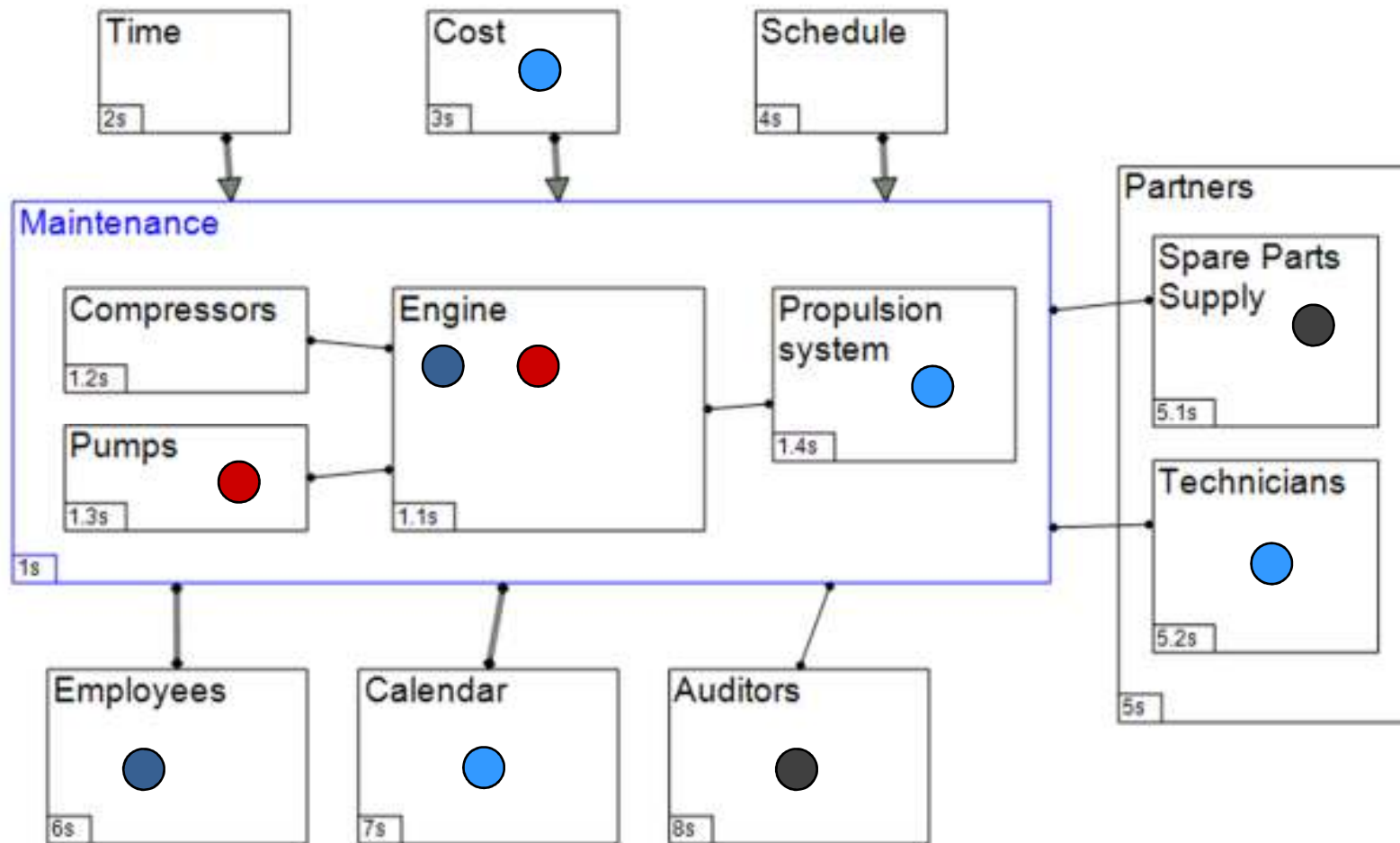 - Procurement IS — 3.5.1s

3s

25

Mapping s/w on processes with DCSYM
Athens Water Supply and Sewerage Company (EYDAP S.A.)

Maritime shipping company example #1

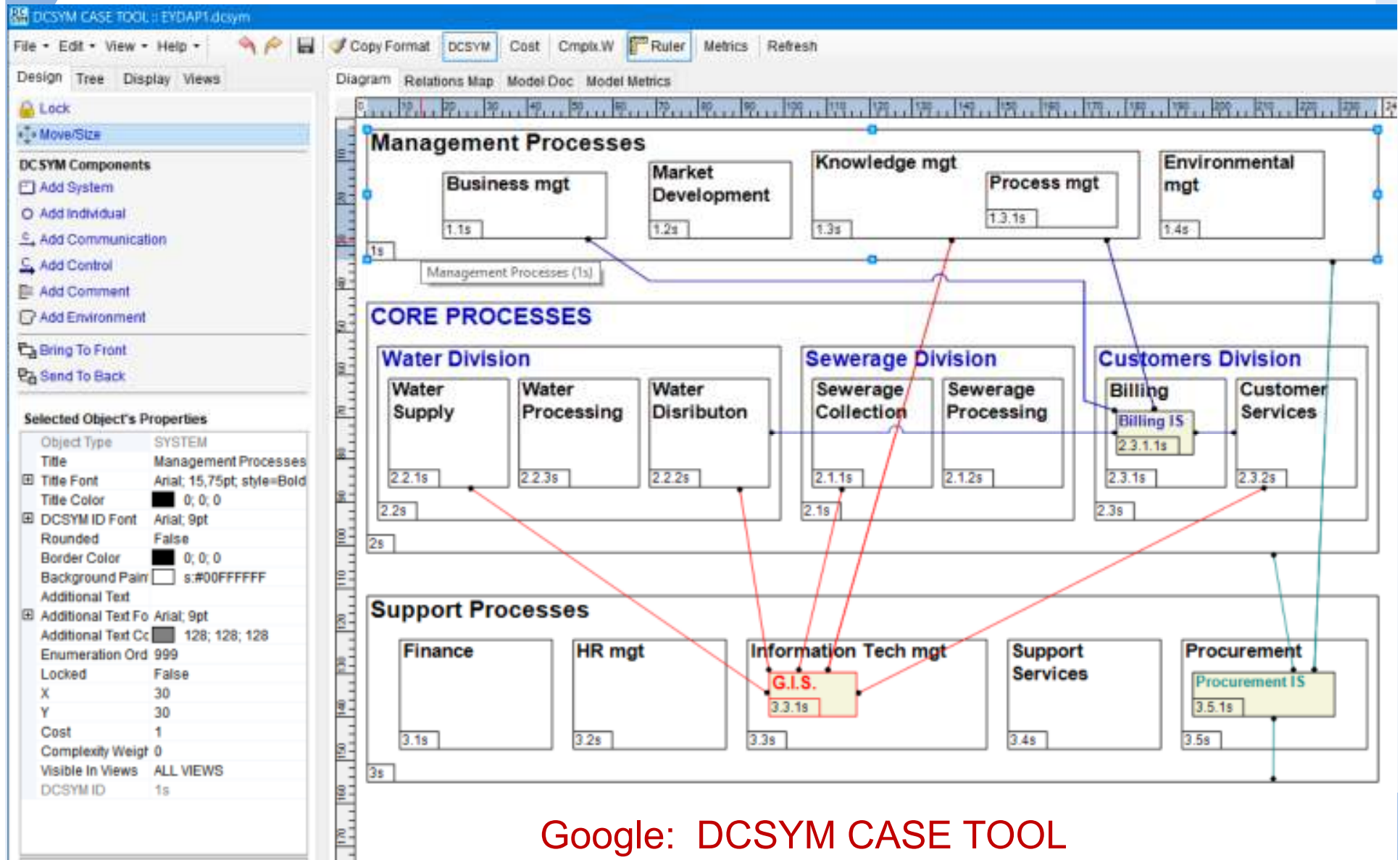Systemic mental model: Keep engines operational

Case study adapted from: SOFTWARE MAPMAKING, Karl Jeffery and Dimitris Lyras, September 2019

Maritime shipping company example   #2

Systemic mental model: Keep engines operational

Case study adapted from: SOFTWARE MAPMAKING, Karl Jeffery and Dimitris Lyras, September 2019
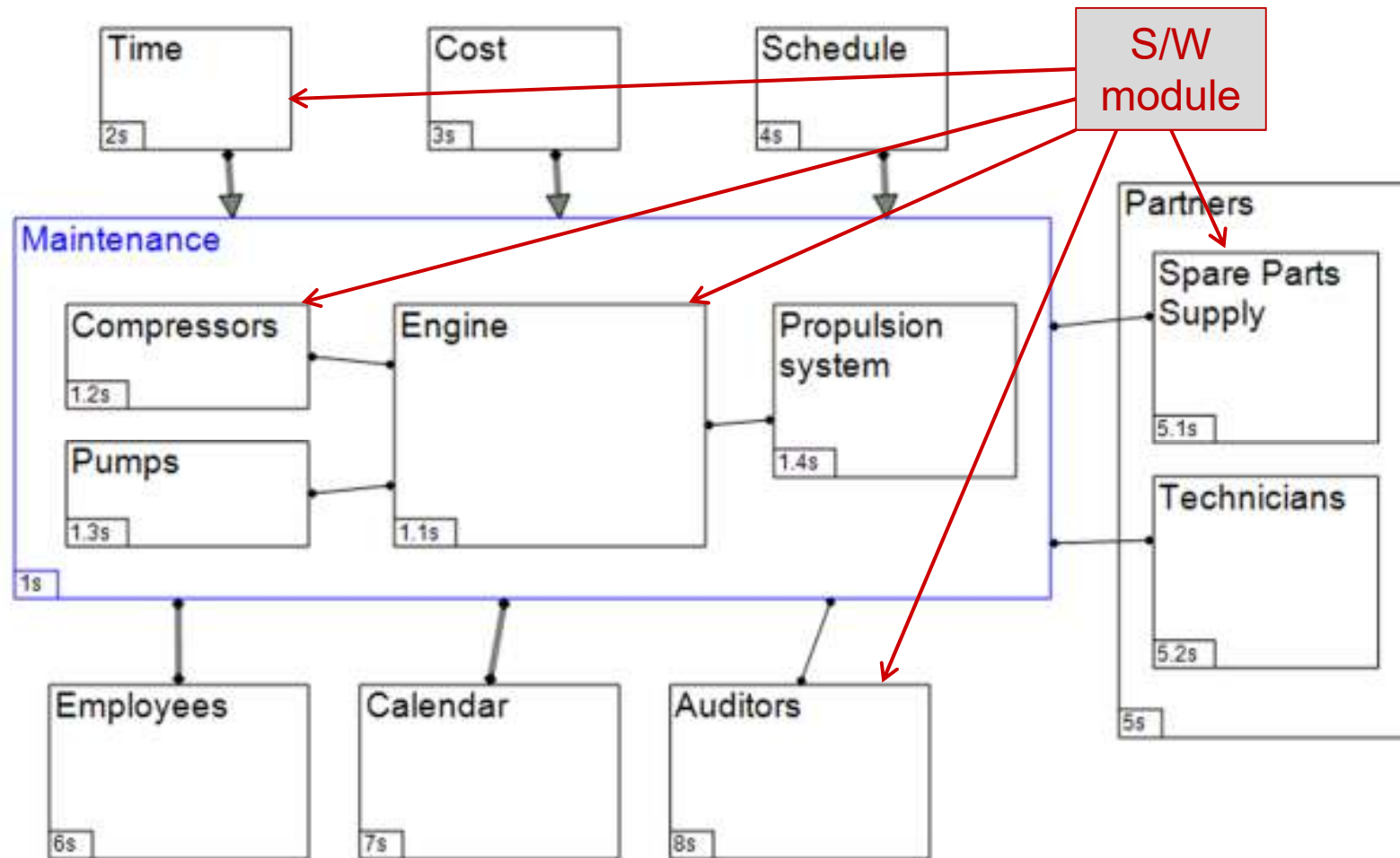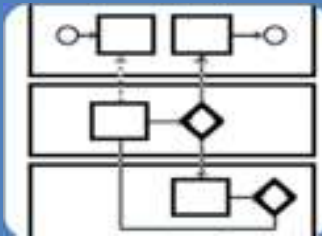
DCSYM & DCSYM CASE TOOL
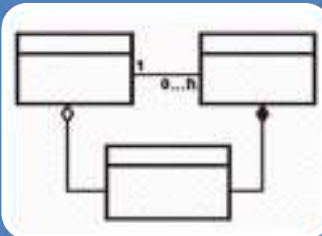

Google: DCSYM CASE TOOL

Why – How – What in s/w development
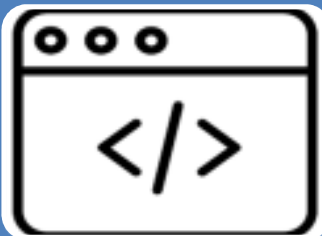
(in s/w development)

WHY we are doing something

- Defining goals (BMC, Value Chain, DCSYM…)
- Mapping the purpose

HOW we are doing it

- UML (Use Cases, Collaboration diagrams…)
- BPMN

WHAT we are doing

- Code
- Documentation…

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Digital Transformation Mapmaking
DCSYM for value modelling

- Shift from Software Maps to Goal or Value maps

- UML modelling is not for all stakeholders

- To create Goal/Value maps we need to find the purpose

- To find the purpose is not easy because we manage complex systems or situations

- To deal with complexity we create models and these models are our maps background

- There are some high level models for visualizing goals or value

- DCSYM is a methodology/tool aiming at systems modeling, thus, useful to create goals/value map background

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