Fraunhofer IESE

SSA Exercises – Architecture Design

TU Kaiserslautern, SS2018

Lecture "Software and System Architecture (SSA)"

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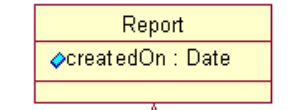
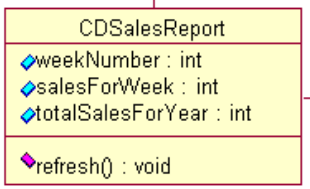
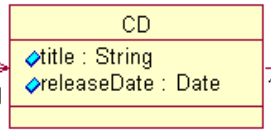
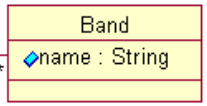
Introduction and recap

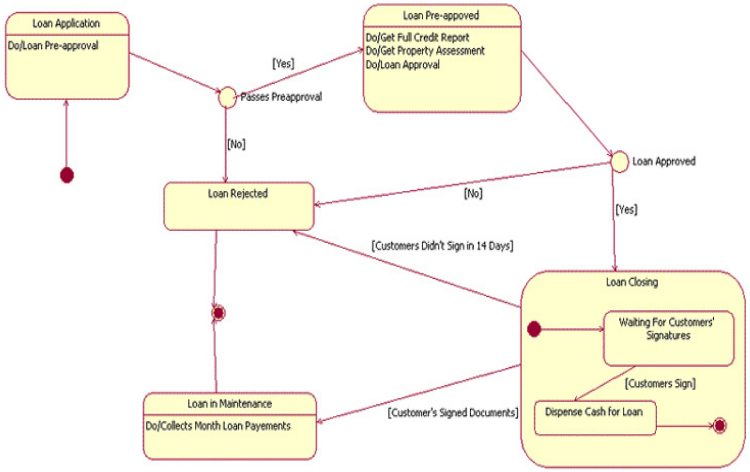
- Architecture drivers
  - Business goals
  - Quality attributes
  - Key functional requirements
  - Constraints
- Architecture decisions
  - Expensive to change, high risks, and being new.
- Design?

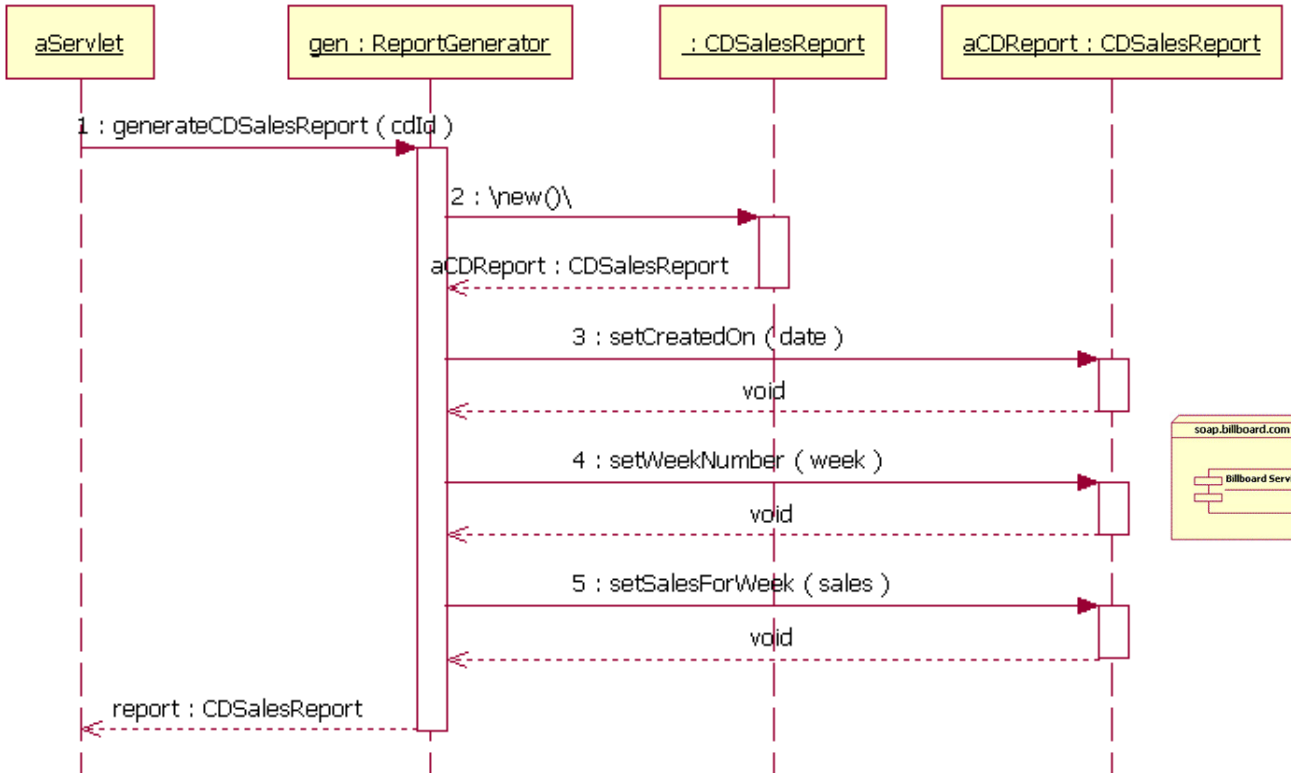

Report
createdOn : Date

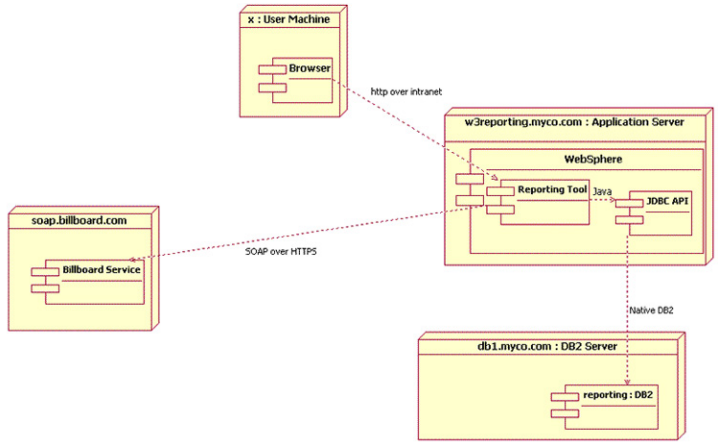

CDSalesReport
weekNumber : int
salesForWeek : int
totalSalesForYear : int
refresh() : void


CD
title : String
releaseDate : Date
1
1..*


Band
name : String
1..*

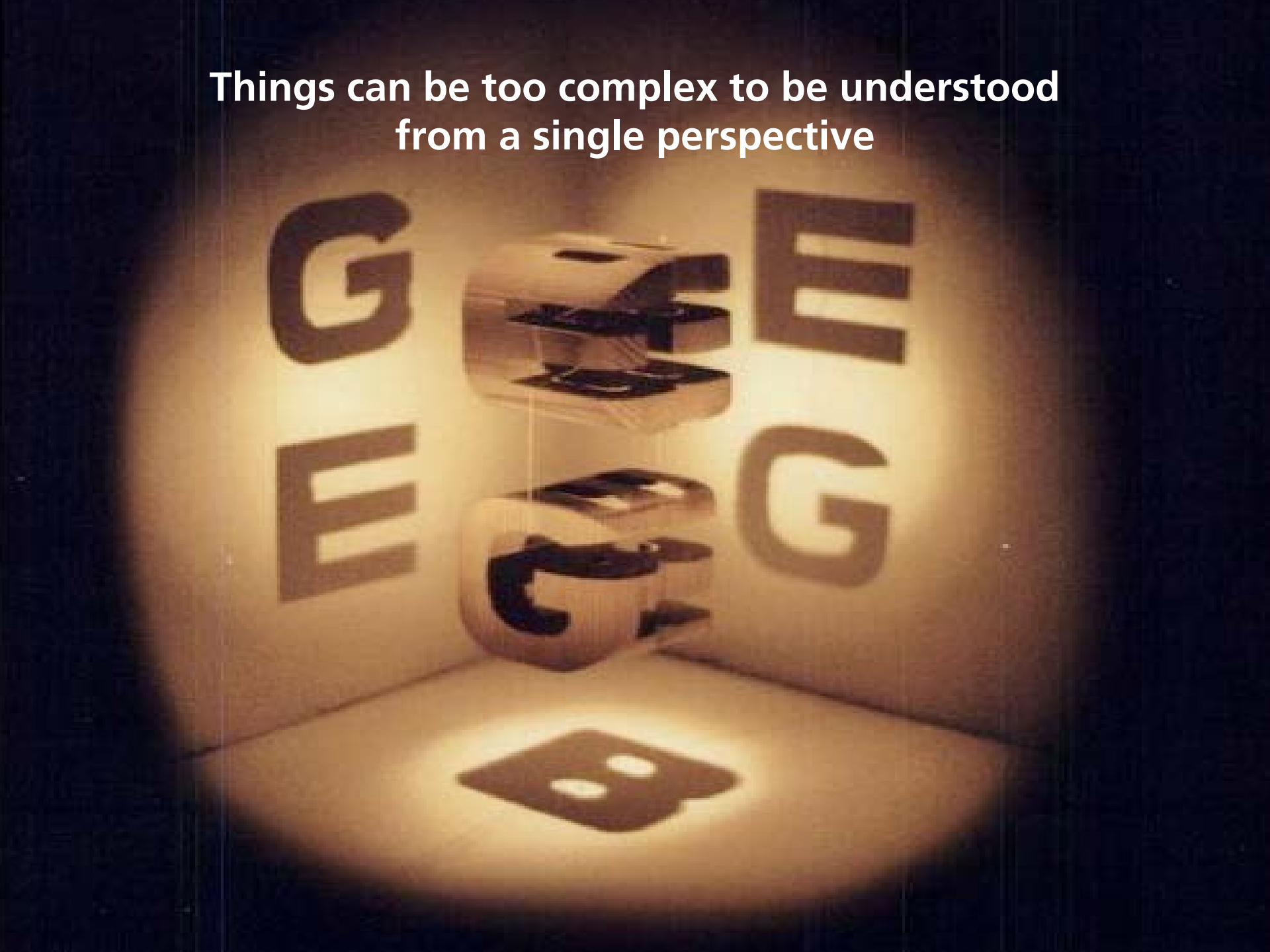

Loan Application
Do/Loan Pre-approval
[Yes]
Passes Preapproval
Loan Pre-appoved
Do/Get Full Credit Report
Do/Get Property Assessment
Do/Loan Approval
[No]
Loan Approved
Loan Rejected
[No]
[Yes]
[Customers Didn't Sign in 14 Days]
Loan Closing
Waiting For Customers' Signatures
[Customers Sign]
Dispense Cash for Loan
Loan in Maintenance
Do/Collects Month Loan Payements
[Customer's Signed Documents]


aServlet
gen : ReportGenerator
: CDSalesReport
aCDReport : CDSalesReport
1 : generateCDSalesReport (cdId)
2 : \new()\
aCDReport : CDSalesReport
3 : setCreatedOn (date)
void
4 : setWeekNumber (week)
void
5 : setSalesForWeek (sales)
void
report : CDSalesReport

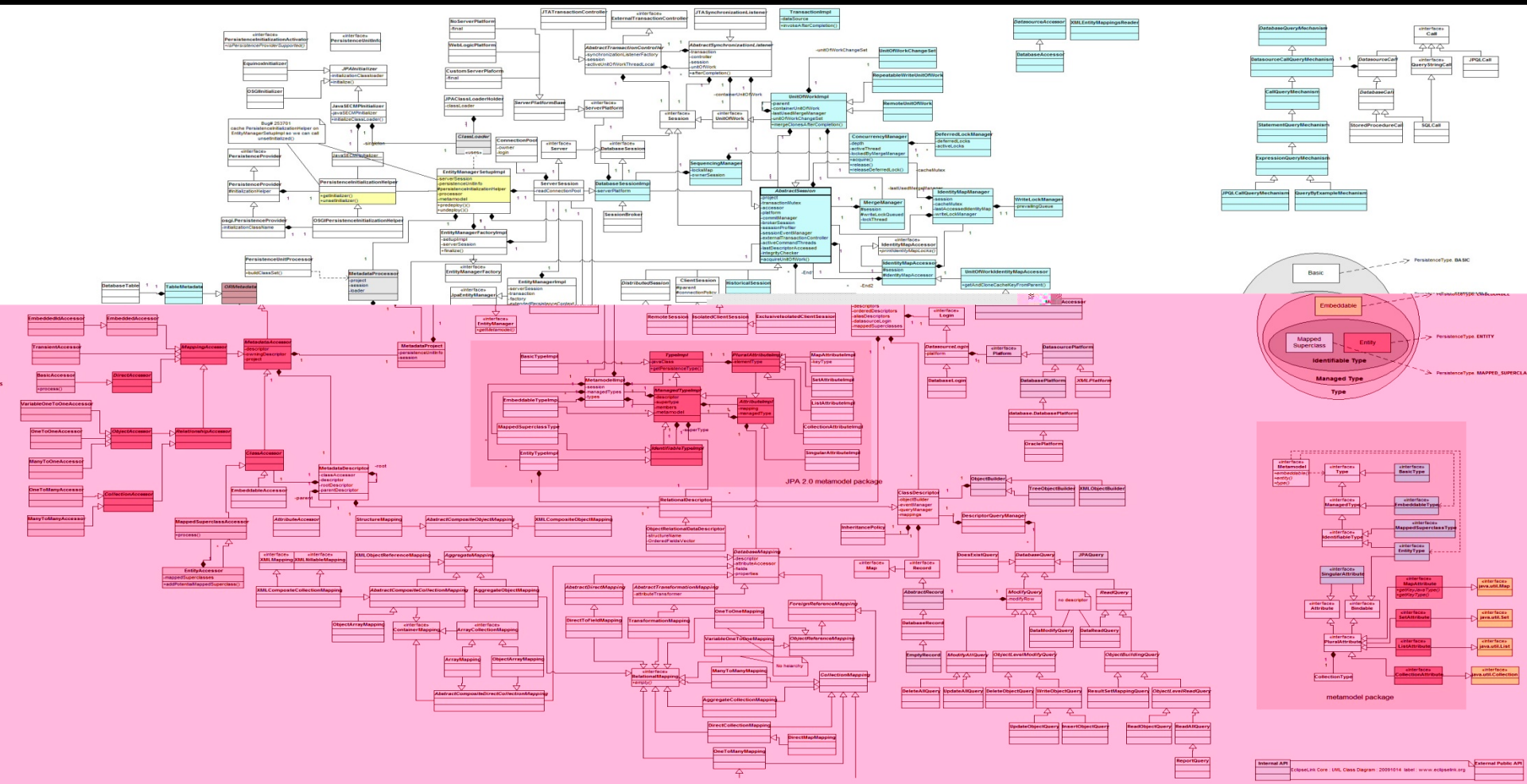

x : User Machine
Browser
http over intranet
w3reporting.myco.com : Application Server
WebSphere
Reporting Tool
Java
JDBC API
soap.billboard.com
Billboard Service
SOAP over HTTPS
Native DB2
db1.myco.com : DB2 Server
reporting : DB2



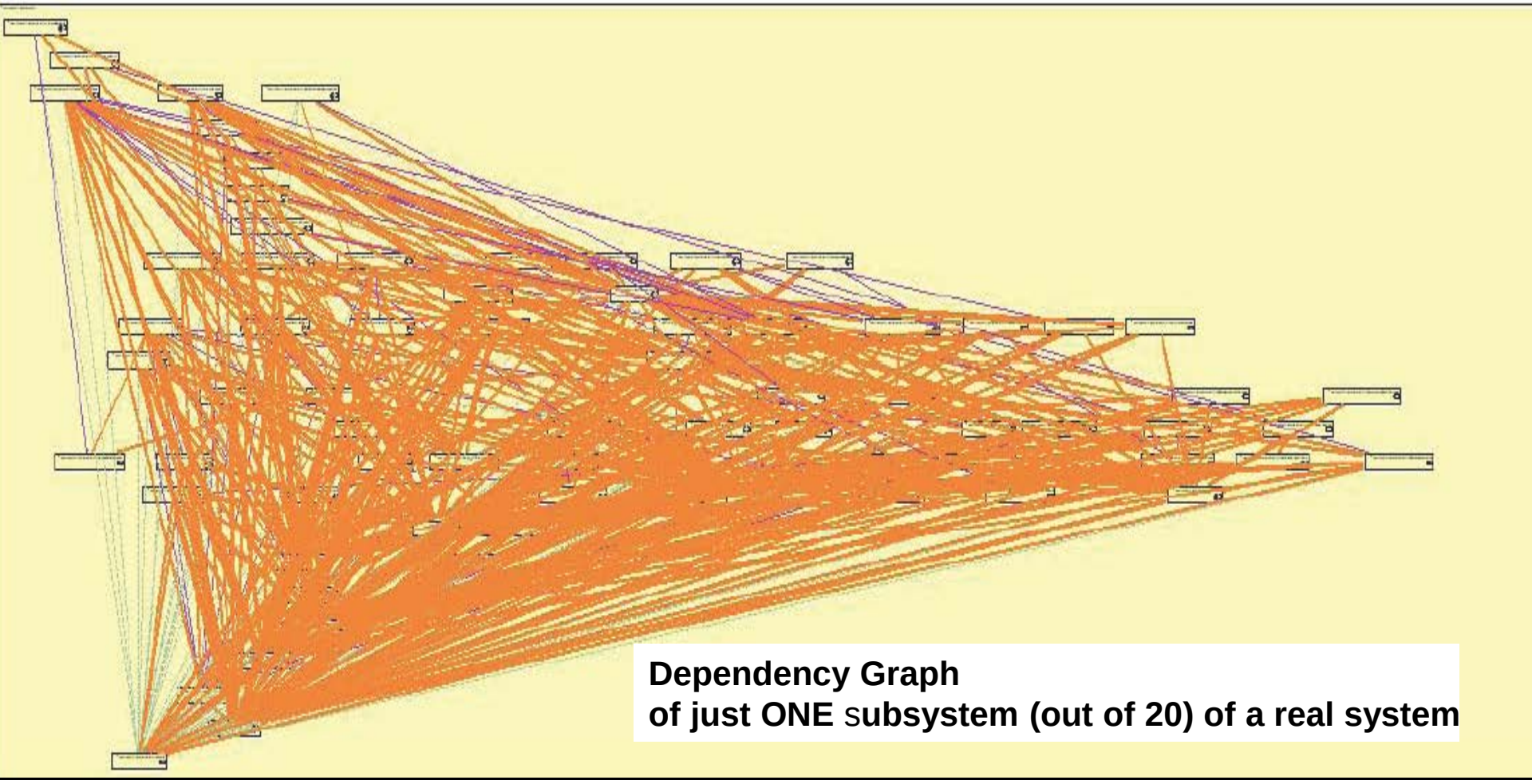

Things can be too complex to be understood from a single perspective



But some try nevertheless …

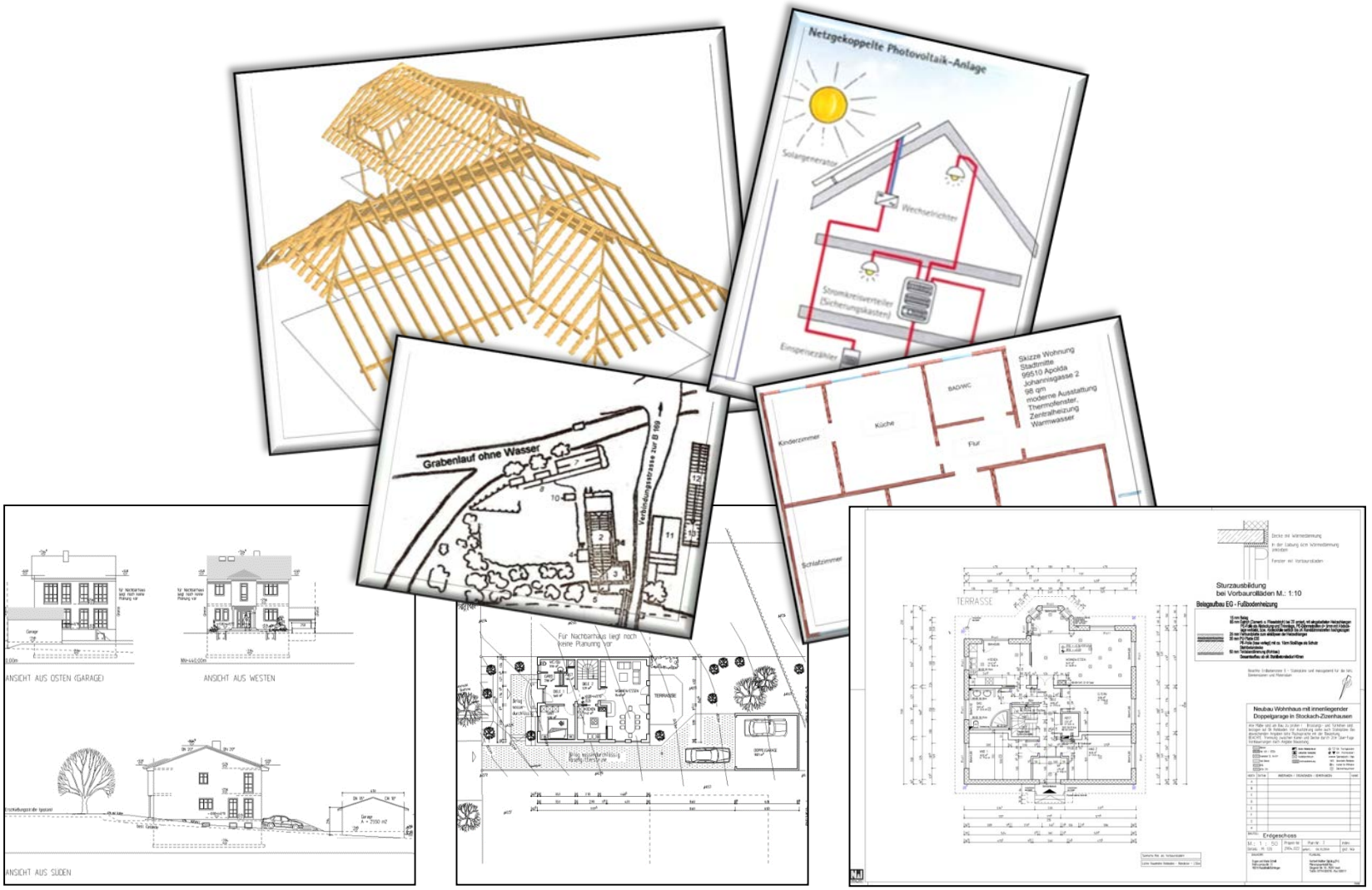


… and fail to keep control over complexity



Dependency Graph
of just ONE subsystem (out of 20) of a real system

Architecture views



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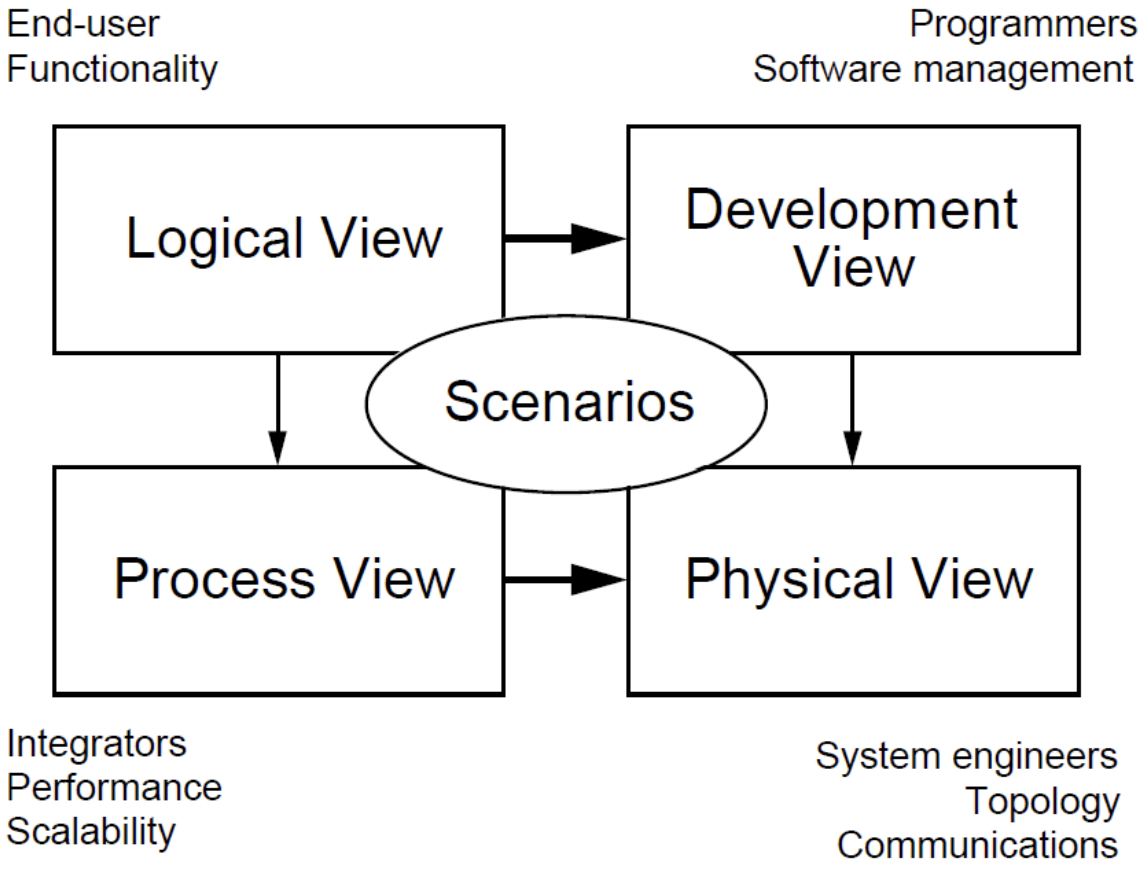
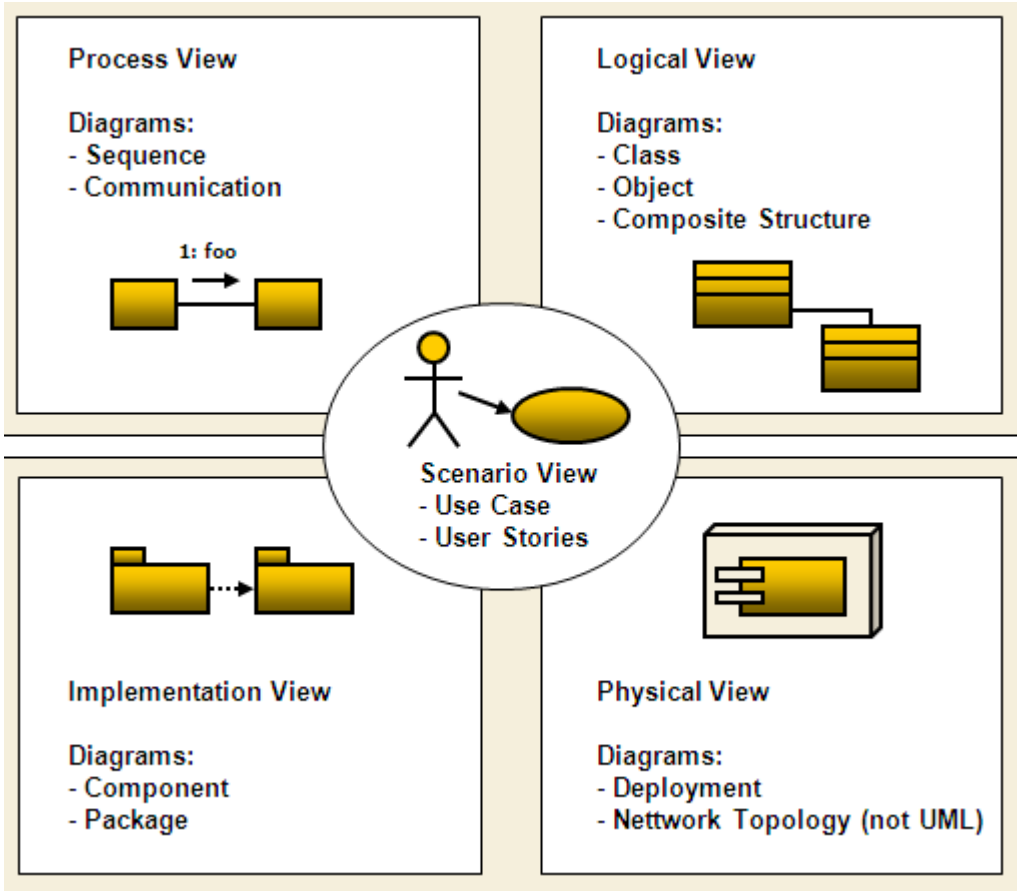
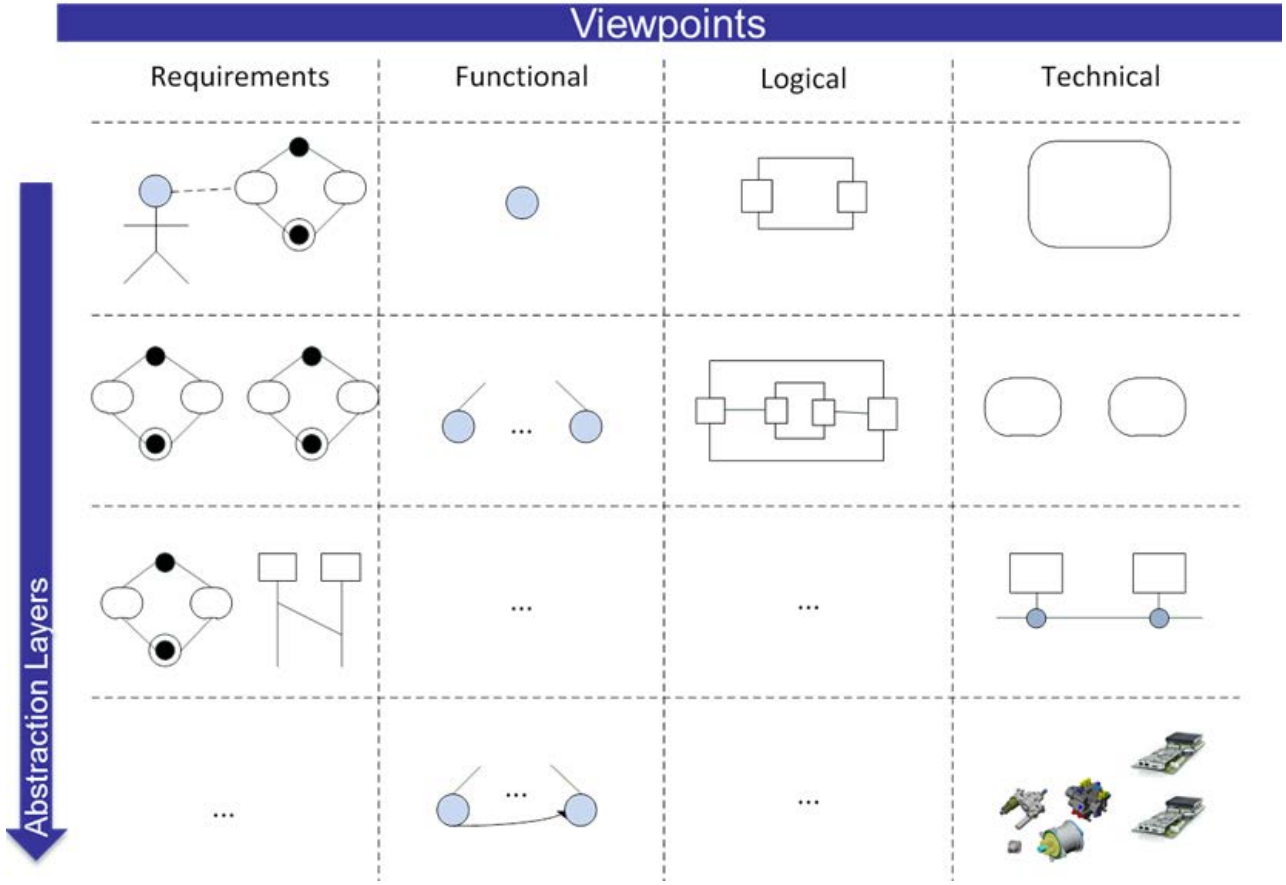
4+1 view model of SW architecture (1995)



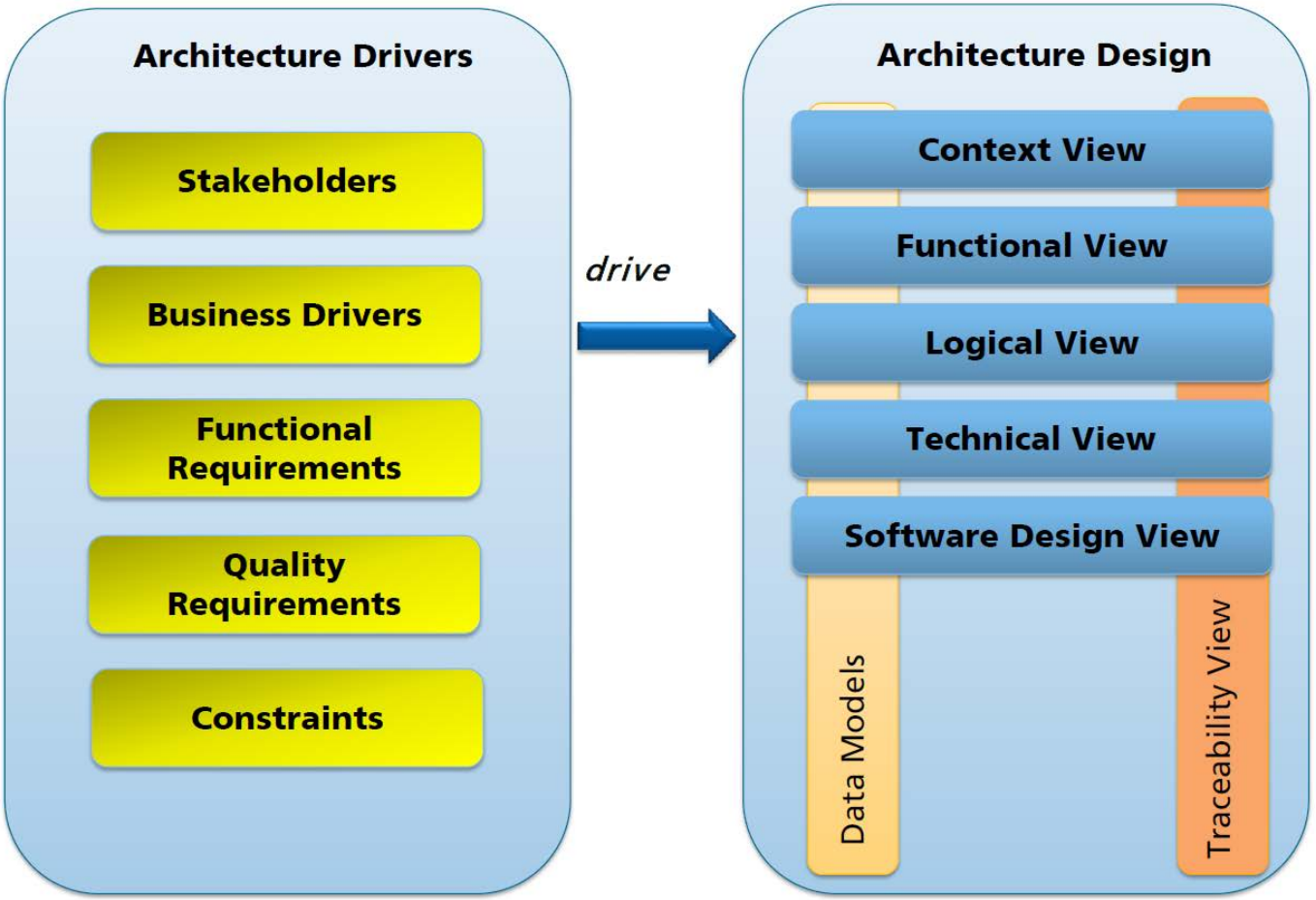
4+1 view model of SW architecture (1995)



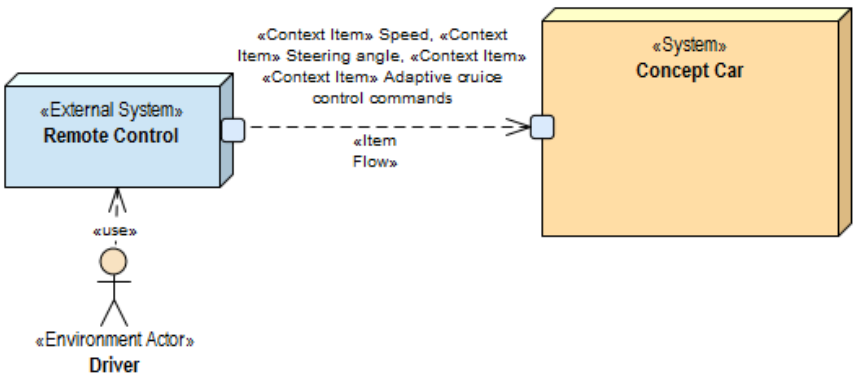
SPES Reference Model

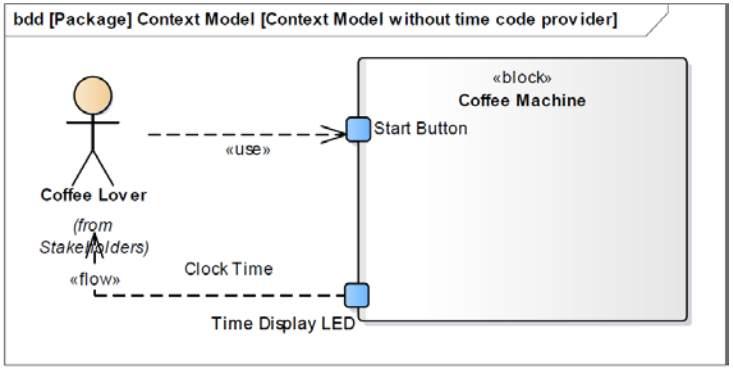


Fraunhofer Embedded Modeling View Framework



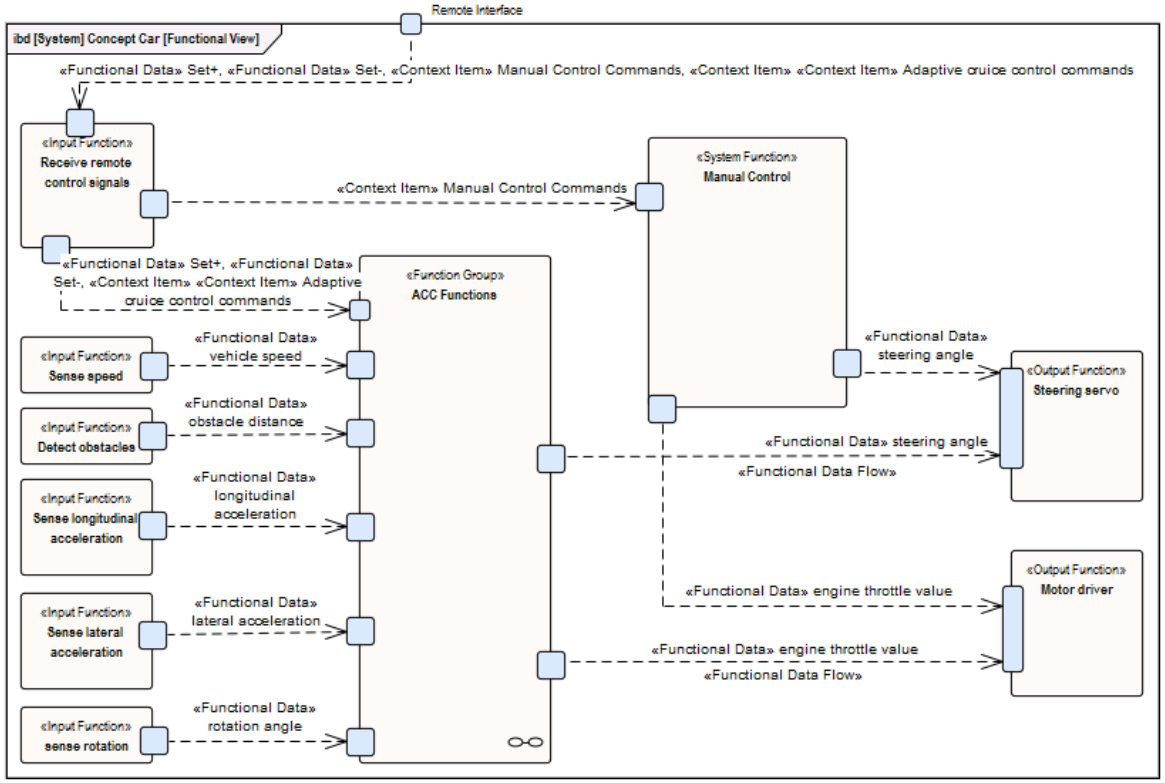
Context view examples





What does the system do and what do the systems/users do in the context?
What data is exchanged between system and context and how many times is the data exchanged?
What are the interfaces and data at the interface to external systems?

Functional view, concept car example



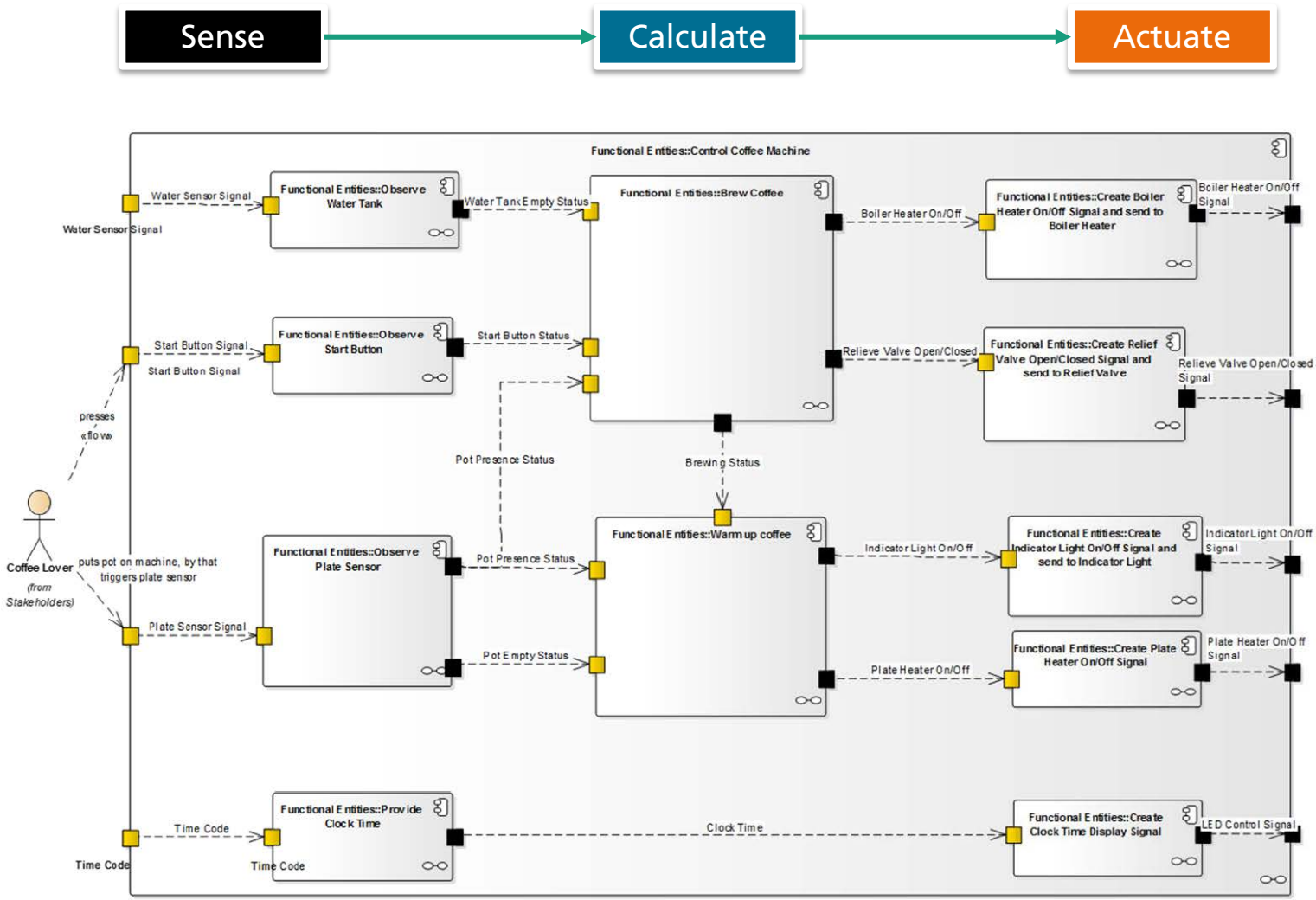
How can the functionality of the system be decomposed into smaller functions?

How do these functions communicate?

What (abstract) data is exchanged?

Which functions are responsible for data creation, transportation, processing, and storage?

Functional view, coffee machine example



Exercise Tasks

- Capture context view of the Farm Management System (FMS), ~ 15 min.
  - Use flipcharts
- Select one functional requirement/driver of Farm Management System (FMS). Capture its functional view ~ 25 min.
- Presentation ~ 30 min
- Q&A ~ 10 min

Example System:
Farm Management System (FMS)


architecture
software
development
systems
requirements
Architecture
time
product
quality
technologies
system
decisions
practices
design
business
generation
like
projects
evolution
processes
Fraunhofer
services
compliance
provide
making
Tekla
particular
aspects
basis
challenges
architectural
make
IESE
organizations
Systems
technology
results
many
level
clear
products
architecture-centric
SAVE
control
evaluation
models
terms
order
documentation
architectures
customers
information
usage
need
implementation
context
activities
organization
packages
goals
support
engineering
key
use
one
competencies
Therefore
Engineering
help