Balancing Process and Content; Understanding Architecting in relation with Other Processes

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Abstract
The automotive domain is quite demanding. Trucks and Cars have to be highly dependable (e.g. safe and reliable), and to operate in wildly varying conditions (from harsh environments such as deserts up to extreme winter weather). The life time of the vehicles is decade(s). The production volume demands mass production and well tuned supply chains to operate in a competitive environment. More and faster market and technology changes come on top of all these demands.

Partial solution to this demanding environment is an intricate set of processes. Good processes are crucial. Unfortunately, processes can also hamper the business, for instance by focusing so much on form that content gets lost. Architecting is an activity that delivers content (needs analysis, requirements, design concepts, design decisions). Architecting can benefits a lot from good process interaction, reversely it can suffer tremendously from lack of process or overkill of process.
architecting in
business context

What is a process?

How much process
is needed?

performance of 
supporting processes

solutions to common
problems

workshops,
time-boxes and iteration

summary
Simplified process view

- Customer
- Supplying business
  - Strategy process
  - Customer oriented (sales, service, production) process
  - Product creation process
  - People, process and technology management process

Balancing Process and Content

Version: 0
September 6, 2020
RSPprocessDecomposition
Balancing Process and Content

version: 0
September 6, 2020
RSPprocessDecompositionAnnotated

Tension between processes

1. **Strategy**
   - People, process and technology
   - Long term: know how (soft) assets

2. **Process**
   - Feedback
   - Short term: cashflow!

3. **Value**
   - Customer oriented
   - Mid term: cashflow next year!

4. **Product Creation**
   - Supplying business
   - Long term: know how (soft) assets

5. **Customer**
Platform strategy adds one layer

Supplying business value to the customer is a long-term goal. In the short term, focus on cashflow. For the mid-term, concentrate on cashflow next year. In the long term, create assets, both tangible and intangible, such as component or platform creation and know how (soft) assets.

People, process, and technology are key components in achieving these objectives.
System Architecture Process in Business Context

- Customer-Oriented Process
- Sales, Logistics, Production, Service, Presales
- Customer
- Needs and Feedback
- Technical Product Documentation
- Product-related processes
- Product roadmap
- Technology, Process, and People roadmaps
- People, Technology, and Process
- Reality check
- Material
- Stakeholder Interaction
- Budget, Planning, and Policy
- Systems Architecting Process

People, Process, and Technology Management Process

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version: 0 September 6, 2020 SAPprocessSimplified
What is a process?

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Performance of supporting processes

Solutions to common problems

C A F C R

Workshops, time-boxes and iteration

Summary

Architecting in business context
Purpose What is to be achieved and why

Structure How will the goal be achieved

Rationale What is the reasoning behind this process

Roles What roles are present, what responsibilities are associated, what incentives are present, what are the criteria for these roles

Ordering What phasing or sequence is applied
Definition of a Process

"A process is an activity which takes place over time and which has a precise aim regarding the result to be achieved. The concept of a process is hierarchical which means that a process may consist of a partially ordered set of subprocesses."

"Method Integration; Concepts and Case Studies" by Klaus Kronlöf
A process within an abstraction hierarchy
architecting in business context

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Effectiveness (Flexibility, Manageability)

Effectiveness

- Process weight
  - Very low
  - Low
  - Medium
  - High

Manageability

- Supply chain
- Mass production
- Long life times
- Dependability

Flexibility

- Evolution
- Responsiveness
  - Market change
  - Technology change

Manageability

- Supply chain
- Mass production
- Long life times
- Dependability

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BPCAeffectivenessCurves
Effectiveness in Defense, Aerospace, Automotive

Effectiveness = Flexibility $W_F$ * Manageability $W_M$

Effectiveness $W_F = 0.1$ $W_M = 0.9$
If Balance Shifts

Effectiveness = Effectiveness \( W_F \) * Manageability \( W_M \)

\[ W_F = 0.3 \quad W_M = 0.7 \]
Typical Situation in Defense

<table>
<thead>
<tr>
<th>Effectiveness</th>
<th>Process Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>medium</td>
</tr>
<tr>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>very high</td>
<td>high</td>
</tr>
</tbody>
</table>

Manageability

Flexibility

desired weight

actual weight

effectiveness loss

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summary
Supporting Processes for Architecting

- people, process and technology managers intend to support systems architecting by processes, tool, et cetera

- product creation process
  - phase gate process
  - documentation process
  - reviewing process
  - engineering process
  - meeting structure
  - templates
  - check lists
  - repositories
  - tools

- people, process and technology management process
How effective are these Processes?

How many hours per week do you sit in meetings?

How many hours per week does the system architect spend on writing documentation?

How satisfied are the consumers of documentation?

  How easy can information be found?

  How up-to-date is the information?

What is the quality of the review process?

Does the system architect feel supported by the processes at all times?
Common Problems

large monolithic documents
  late, not up-to-date, time consuming to review and update
system architects spending 70%+ of time in meetings
ineffective reviews
  too many reviewers, lack of ownership, too little time and attention, form rather than content
noise generation due to too much prescribing templates or frameworks
  information overload, essentials are hidden
poorly searchable repositories
  data and information cannot be found
Balance Form and Content

**de facto activities**
- form
  - meetings
  - reading
  - writing
  - traveling
  - thinking
  - analyzing
  - testing
  - walking & listening

**core competences**
- content
  - understanding customer needs
  - specifications requirements
  - key performance parameters
  - hands-on
  - analyzing and making trade-offs
  - understanding technologies and options

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BPCAllmeArchitect
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Summary
Design Modular Documentation

compound document

document

structure

overview

document

document

document

document

document

compound document
Recursive as "Normal" Designs

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DGdocumentRecursion
Documenting with A3’s

A3 Architecture Overviews Focusing architectural knowledge to support evolution of complex systems
by: Daniel Borches and Maarten Bonnema, INCOSE 2010

Legend

Functional View

Visual aid

Quantification of key parameters

Physical View

Constraints Choices

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LAWFexampleDDASoverview
Light-weight Distributed Reviews

- Wide group of people, with an active concern or an expected contribution;
- Many iterations
- Multiple media:
  + Meetings,
  + On paper
  + Informal et cetera

Specification specific Change Control Board
4 peoples/roles:
1 producer
1 consumer
1 context
1 independent

Criteria for reviewers:
+ Know how
+ Critical
+ Sufficient time

By "lowest" operational manager: Project leader, subsystem PL, ...

The author is responsible for contents and organization of the flow (consults and review)

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LWRStateDiagram
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summary

C A F C R model

architecting in business context
The “CAFCR” model

What does Customer need in Product and Why?

Customer What
- Customer objectives

Customer How

Product What
- Functional

Product How
- Conceptual
- Realization

What
- drives, justifies, needs

How
- enables, supports
CAFCR can be applied recursively

Consumer

Customer's Business

Drives

Customer Business

Consumer Drives

Value Chain

larger scope has smaller influence on architecture

System (producer)
CAFCR+ model; Life Cycle View

Customer objectives
Application
Functional
Conceptual
Realization

operations
maintenance
upgrades

Life cycle

development
manufacturing
installation

sales, service, logistics, production, R&D
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Summary
Time-boxes and Iteration

Bottom-up to top down

Second iteration

Story -> use case

Shared overview

Improved overview

Depth insight 1st big picture

Day 1

Day 2
Workshop timeline

start

conception

preparation

workshop

consolidation and follow-up

ca 10 weeks

prerequisite

goal

owner

leader

facilitator

participants

date reservations

preliminary program and invitation

definite date

venue

(optional)
distribute presentations

allocate roles

anticipate problems

program

workshop format

invitation

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WHTimeline
Sequence of Workshops

ratio of effort/time

1 : 4 : 1

Problem understanding

individual digesting and processing

Analysis

individual digesting and processing

Decision

time

ca 2 weeks

ca 2 weeks
Most Subject Progress Outside Workshop

- Problem understanding
- Analysis
- Progress
- Individual digesting and processing
- Shared vision
- Subject progress

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WHTprogress
Venue Requirements

- open seating formation
- sufficient walking space
- ask for a room for 2* #participants
- plenary area
- break-out rooms

**plenary area**
### Secret Workshop Success Factors

<table>
<thead>
<tr>
<th>Active</th>
<th>&gt;70% of the time active</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>short intro, short broadcasts</td>
</tr>
<tr>
<td>Focused</td>
<td>clear scope and goal</td>
</tr>
<tr>
<td></td>
<td>format</td>
</tr>
<tr>
<td>Well-prepared</td>
<td>timely invitation</td>
</tr>
<tr>
<td></td>
<td>seed presentations</td>
</tr>
<tr>
<td>Involved participants</td>
<td>full-time present</td>
</tr>
<tr>
<td></td>
<td>no cellphone</td>
</tr>
<tr>
<td></td>
<td>no e-mail</td>
</tr>
</tbody>
</table>
architecting in business context

different time scales

What is a process?

How much process is needed?

goal oriented

performance of supporting processes

solutions to common problems

documentation needs modular design
distributed review

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BPCAsummary

workshops, time-boxes and iteration

time boxes of 5..40 minutes
interaction and learning

summary