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.
Simplified process view

- **Customer**
- **Suppuling Business**
  - **Strategy**
    - Process
  - **Customer Oriented** (sales, service, production) process
  - **Product Creation**
    - Process
  - **People, Process and Technology Management**
    - Process
Tension between processes

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RSPprocessDecompositionAnnotated

Customer

Supplying business

Strategy

Process

Value

Customer oriented

Feedback

Product creation

People, process and technology

Long term

Know how (soft) assets

Short term; cashflow!

Mid term; cashflow next year!

Next year!
Platform strategy adds one layer

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RSPprocessDecompositionPlusAnnotated
System Architecture Process in Business Context

Customer-Oriented Process

Product Creation Process

People, Process, and Technology Management Process

context, vision

Reality check

Systems Architecting Process

Stakeholder interaction

Product roadmaps

Technology, Process and People roadmaps

Budgets

Reality check

Systems Architecting Process

Stakeholder interaction

Product related processes

People, Technology Process

Customer Roadmap

Business Drivers

Needs and Feedback

Information

Order

Support

Product

Support

Material

Presales sales logistics production service

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SAPprocessSimplified
What is a process?

How much process is needed?

performance of supporting processes

solutions to common problems

workshops, time-boxes and iteration

model

summary
Process Attributes

**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

principle → **drives** → process → **elaborated in** → procedure → **supported by** → tool

abstract → specific and executable

**is**

formalism
architecting in business context

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Effectiveness (Flexibility, Manageability)

Flexibility:
- Evolution
- Responsiveness
  - market change
  - technology change

Manageability:
- supply chain
- mass production
- long life times
- dependability

Process weight:
- very low
- low
- medium
- high
- very high
Effectiveness in Defense, Aerospace, Automotive

Effectiveness = Flexibility $W_F \times$ Manageability $W_M$

Effectiveness $W_F=0.1 \ W_M=0.9$

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BPCAeffectiveness
If Balance Shifts

Effectiveness = Flexibility $W_F$ \* Manageability $W_M$

Effectiveness $W_F=0.3$ $W_M=0.7$
Typical Situation in Defense

Effectiveness

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

Manageability

Desired Weight

Actual Weight

Effectiveness Loss

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

Balancing Process and Content

Supporting Processes for Architecting

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?
  - How timely is documentation available?
- 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**
- meetings
- reading
- writing
- traveling
- thinking
- analyzing
- testing
- walking & listening

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

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BPCAtime Architect
What is a process?

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Architecting in business context

Workshops, time-boxes and iteration
Design Modular Documentation

document structure

overview

compound document

document

document

document

document

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

draft

final review = final check contents

concept

authorization = check process

authorized

consultation & review

- 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, ...

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LWRstateDiagram
What is a process?
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Summary

Model

Architecting in business context
The “CAFCR” model

What does Customer need in Product and Why?

Customer What: Customer objectives
Customer How: Application
Product What: Functional
Product How: Conceptual
Realization

- drives, justifies, needs
- enables, supports
CAFCR can be applied recursively
CAFCR+ model; Life Cycle View

- Customer objectives
- Application
- Functional
- Conceptual
- Realization

Life cycle operations: maintenance, upgrades, development, manufacturing, installation

Life cycle sales, service, logistics, production, R&D
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summary
Time-boxes and Iteration

bottom-up  top down  second iteration  story ->use case

shared overview  improved overview  depth insight  1st big picture

day 1  day 2

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MAITIterationTiming

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Workshop timeline

- **prerequisite**
- **goal**
- **owner**
- **leader**
- **facilitator**
- **participants**
- **consolidation and follow-up**
- **workshop**
- **conception**
- **preparation**
- **time**

- **start**
- **date reservations**
- **preliminary program and invitation**
- **definite date**
- **venue**
- **allocate roles**
- **anticipate problems**
- **program workshop format invitation**
- **(optional) distribute presentations**

- **ca 10 weeks**
Sequence of Workshops

ratio of effort/time

1 : 4 : 1

ca 2 weeks
ca 2 weeks

Problem understanding
individual digesting and processing

Decision
individual digesting and processing

Analysis

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WHTratios
Most Subject Progress Outside Workshop

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

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Venue Requirements

open seating formation
sufficient walking space
ask for a room for 2* #participants

plenary area

break-out rooms
Secret Workshop Success Factors

- active
  - >70% of the time active
  - short intro, short broadcasts

- focused
  - clear scope and goal
  - format
  - timely invitation

- well-prepared
  - seed presentations
  - seed questions
  - full-time present
  - no cellphone
  - no e-mail

- involved participants
architecting in business context
different time scales

What is a process? goal oriented

How much process is needed?

performance of supporting processes
documents needs modular design
distributed review

solutions to common problems

summary