Architecture-aware Programming in Agile Environments

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The Agile Environment
John Deere – Display Development

Size & Complexity

KLOC

MLOC

10x MLOC

Time

?
Starting Point

Systems Engineering
- Requirements Specification

Design & Implementation
- Design Specification
- Code

Verification & Test
- Unit Test
- Integration
- Regression & Field Test

Earliest Customer feedback

#engineers
US EU
Large-Scale Transition Towards Agile

Iterative Waterfall ~1 year Pure Agile

#engineers < 20
#engineers > 180
Vertical Slices
Observations*

Clear phases are gone

Specs -> user stories

Rules & standards?

* „Agile doesn't scale … without architecture“ SATURN 2012
http://www.sei.cmu.edu/library/abstracts/presentations/keuler-saturn2012.cfm
Resulting Mind Sets …

… next PSI ?!

… we don’t document

„Do what you want“

… YAGNI

… Agile as an “excuse”
Root Cause: Philosophy Issues

Agile ∩ ∑ Agile Techniques

Agile!={Programming}\{Plan}
Architecture Awareness

... Haven‘t seen any
How did we know?

“Who is responsible for this component?”

“Who is impacted if I want to make a change, and who needs to review the change?”

“Oh … didn’t know we had that service implemented already”
The Challenges: How …

“… do the developers know about architectural structures?”
“… can developers to stay focused on writing code?”
“… do we deal with the fact that developers are feature- and code-centric?”
What was our Approach?

... Connecting Architecture and Implementation
Code-centric Architecture

Unified Component Communication

Glue code generation
Common Technical Framework

Architecture Description

Transformation Chain (Acceleo)

Generated Glue Code

Manual C++ Code
Architecture Description
<systemManifest name="mySystem"/>
  <component name="ui" typedef="ui.xml"/>
  <component name="logic" typedef="logic.xml"/>
  <component name="data" typedef="data.xml"/>
</systemManifest>

<componentType name="logic">
  <name="computeData"/>
  <reply>
    <parameter name="data"/>
  </reply>
</request>
<state name="ready" type="bool"/>
<event name="dataProcessed"/>
</interfaceManifest>
Co-Location of Architecture and Code
Experiences

Developers … … need guidance
… embrace encapsulation of architectural decisions

Architecture … … visible by co-location with implementation

Modeling tool not accepted XML-based notation

“On-demand” generation of component structures … convincing factor for Developers
Thank you for your attention!

… Questions?

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