Assessment of URDAD as a Design Methodology for Model Driven Development

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Introduction

The aim of this study is to:

- Verify and assess the implementability of URDAD
- Verify and assess the business value of URDAD
- Explore tools that are available to facilitate Model Driven Development
- Refine and enhance URDAD.
URDAD

- Use Case, Responsibility Driven Analysis and Design
- Originator = Dr. Fritz Solms
- What is URDAD?
  - Design methodology to enforce sound design principles
  - An implementable algorithmic analysis and design methodology which generates a technology neutral design model
- For the purposes of this study, URDAD is implemented using UML.
URDAD Embedded Within MDA

MDA Based Approach

Functional/use case requirements

Quality requirements/capabilities

URDAD
Use Case & Responsibility Driven Analysis and Design

PIM
Platform Independent Model

Architecture & Technology Mapping

PSM
Platform Specific Model

Implementation Mapping

EDM
Enterprise Deployment Model
URDAD Overview

1. Capture stakeholder requirements for use case
2. Analysis Workflow
3. Design Workflow
4. Business Process Design (PIM)
5. Use Case Contract
6. Design
7. Use Case Contract
8. Fix level of granularity by identifying and assigning responsibilities which need to be addressed
9. Define business process for current level of granularity
10. Go to next lower level of granularity
11. Specify role player contracts
12. Business process fully specified
13. Business process not yet fully specified
URDAD Analysis and Design Steps

Start of the process.

Includes quality requirements.

Input for business process design.

Responsibility fixes level of granularity.

Analysis

- Identify use case
- Identify stakeholders
- Identify user
- Specify use case contract
- Specify user workflow

- Identify functional requirements for each stakeholder
- Identify required secondary actors

Elicit stakeholder requirements for use case.

External service providers and observers.

Submit business process for implementation

Mapping onto implementation technologies and deployment architecture.

End of process.

Business Process Design

Stake Holder Requirements

- Identify core responsibilities which need to be addressed
- Assign each responsibility to a separate conceptual role player (to a contract)

- Define workflow at this level of granularity
- Extract collaboration context

[Business process fully specified]

[Business process not yet fully specified]

Represent view of business process at a particular level of granularity.

Contains information on services role players must provide as well as the communication channels required between the role players.
Design Activities Included in URDAD

- Enforce single responsibility principle
- Fix the levels of granularity
- Lock into contracts
- Introduce a controller for each level of granularity
- Document relationships between design layers
- Drive structure from process
Design Attributes Achieved by URDAD

- Loosely coupled components
- Maintainability / extensibility
- High level of reusability
- Testability
- Simplicity / understandability
- Technology neutral
- Traceability
Aims of URDAD

- **URDAD aims to:**
  - Make the design simpler by defining a step for step algorithm for the design process
  - Enforce accepted requirements for “good design” through the design methodology itself
  - Separate conceptual design from its realization (e.g. the implementation technologies and deployment architecture)
  - Have a design methodology which enables one to manage levels of granularity/refinement effectively
  - Generate an output: for each level of granularity
    - A contract for each role player
    - Technology Neutral Workflow specifying how the role players collaborate to realize use-cases
Questions That Need to be Answered

- Can one successfully follow the URDAD methodology for a realistic problem?
- Can URDAD be embedded within MDD?
  - Does URDAD generate a suitable PIM?
  - Is the PIM a complete technology neutral design?
  - Can one do technology mappings from the PIM to the Platform Specific Model (PSM)?
- Does the URDAD methodology drive the generation of reusable components that are technology neutral?
- Can one do tracing of any design/requirements element back to the core stakeholder requirements?
- Can the outcomes of URDAD be used for automatic functional test case generation?
Possible Challenges

- Meta data challenges of UML
- PIM requirements
- Code generation and MDA toolsets
- Accuracy and relevance of empirical data
Questions

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