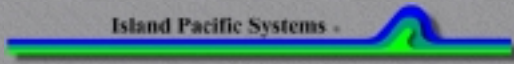


Leveraging Quality
Migrating a Mature, High-Level GUI Framework to Java

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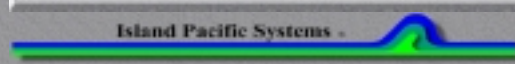


Leveraging Quality Migrating a Mature, High-Level GUI Framework to Java

Overview

- Introduction
- Goals
- Approach
- Frameworks
- Migration Issues
- Conclusions

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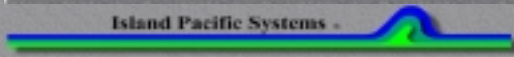


Leveraging Quality Migrating a Mature, High-Level GUI Framework to Java

Introduction

- Value of a language: how well it helps developers produce solutions
- Young languages incur penalties for initial deficiencies of libraries and frameworks
- Java has been quite successful, largely due to its effective leveraging of quality work from other OO languages and environments

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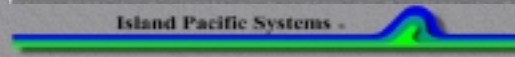


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Background

- Island Pacific Systems used Java to build The Eye™, an OLAP for retailing
- We encountered significant deficiencies for producing clean UI and Domain layering
- Ultimately decided to migrate design of a GUI framework from Smalltalk into Java

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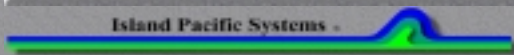


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Goals

- Architectural
- GUI Functionality

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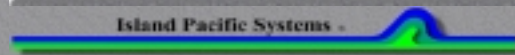
Architectural Goals

- Achieve a good, clean, layering between UI and Domain
 - Keep business logic out of the UI
 - Standardize, simplify, and even automate interfacing between GUI and Domain objects

UI

Domain

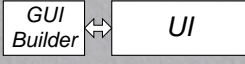
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GUI Functionality Goals

- Maintain integration with a GUI builder
- Support multi-threading in UI for long-running processes
- Capture and report user oriented problems in a reasonable fashion



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Approach

- Architectural
- Migration Tasks

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Architectural Approach

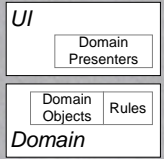
- Architectural concepts:
 - Domain Presentation Layer
 - ValueModel based GUI
- Both concepts are very functional and mature in their Smalltalk form

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Domain Presentation

- The UI is written to present domain functionality to a user
 - Domain can be created and tested independently of GUI
 - UI has frameworks and components (presenters) that make hooking up the GUI to the Domain easier

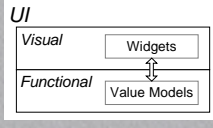


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Value-Model based GUI

- UI is split between:
 - A non-visual (but event-based) description of its functionality
 - A visual presentation of that functionality
- Value Model
 - A simple non-visual event-generating object
 - Supports connecting the visual and non-visual



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Migration Tasks

- Concepts needed to be migrated
 - Into the more restrictive Java language
 - Static typing, less functional base classes, ...
 - Connected into the GUI Builder
- Enhanced to meet our other requirements
- Overall the process was relatively easy because the concepts were complete

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Resulting Frameworks

- Value Models
- Aspects and Aspect Containers
- Presenters
- Other Concepts and Features

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Value Models

- Abstractly “holds” onto an object (its value) and notifies other objects when its value changes
- Like a single property Java Bean, but a protocol
 - Source/representation of its value can vary significantly

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Value Models (2)

- A very general concept that supports event notification and listening within the non-visual portion of the UI
 - UI functionality maintains its state within ValueModels
 - GUI widgets are hooked to ValueModels

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Aspects and Aspect Containers

- A dictionary of ValueModels, where each ValueModel is a property (called an “aspect”) of the container.
- Can be easily hooked into the GUI builder
 - Each panel has an Aspect Container behind it
 - Each widget is hooked to one or more aspects

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Aspects and GUI

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Presenters

- Aspect Containers that are ValueModels on a single Domain Object
 - Aspects represent that object’s properties
 - Supports easily
 - Using a Domain Object within the non-visual functionality
 - Presenting the Domain Object within the visual GUI

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Presenters and GUI

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Other Concepts

- Connectors
 - Connects ValueModels to Widgets
- Validation Rules
 - Domain business rules as separate objects
- Problem Recorders
 - Records any problems when interacting with the Domain

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Other Features

- Frameworks support asynchronous interaction with domain
- Can drill through aspect containers with OQL-like path expressions (“person.name.first”)

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Migration Issues

- Mismatch between MVC-like architecture of Swing and full MVC ValueModels
- Static typing and other Java restrictions
 - Issues minimized by using code generators
- Reliance on a richer set of base classes
- Java still in transition (1.1 to 1.2)

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Current and Future Activities

- Presenters and connectors support tier-point within GUI (light-client capabilities)
- More work on code generators to provide
 - Tighter integration with GUI builder
 - Greater productivity through more sophisticated code generation routines

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Conclusions

- Our resulting architecture and its supporting frameworks
 - Supply the functionality IP requires
 - Support easier coding, testing, and maintenance
 - Are better behaved than previous attempts
 - More standardized and easier to explain

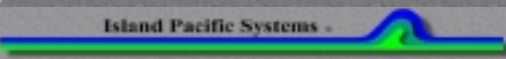
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Suggestions

- Examine work in several languages
- Focus on needs of project and environment
- Keep core concepts of original framework
- Consider commercial products

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