Applying the UML to Enhance Quality of Web Services

OMG Workshop

Presented By:
Bhuvan Unhelkar, PhD, FACS
Profile: www.unhelkar.com
bhuvian@cit.uws.edu.au
+61 (0) 413-821-454

April, 2003
Agenda

- Introduction
- Quality-Modelling Context
- Positioning the UML for Web-Services
- The Three Modeling Spaces:
  - Problem, Solution and Background
- Quality Checks: Syntax, Semantics and Aesthetics
- Examples with some UML diagrams in each of the Modeling Spaces
Presenter Profile

- Bhuvan UNHELKAR (BE, MDBA, MSc, PhD)
- University of Western Sydney
- Principal of MethodScience.com
- Author of 5 Books
- Detailed Profile on: www.unhelkar.com
Quality in Web Services: Context..

- Understanding Elusive Software Quality
- Additional Issues in Web Services
- Packaging of Web-service Offerings
- Registering of Web-Services (Standardization)
- Creation of Sufficient momentum at Cluster/Industry Level
Quality in Web Services: Context

Primary roles operating in a slice of the triangle. Relevant quality roles such as Tester and Auditor will accompany the primary roles.
Quality in Web-Services: Further

- Quality of Models
  - Creation and Packing of Services
- Testing of Services
- Registration of Services (Yellow Pages)
- Maintenance of Services
- Security as Ongoing Initiative
The Internet Replaces the Physical (Secured and dedicated) connection of a Client-Server Architecture by an Internet Cloud.
Web-Service Basics

Major Ingredients of a Web-based System

- Browsers
  - Graphics, Multimedia
- Servers & Databases
- Infrastructure
  - CORBA, IIOP
- Client Machines
- Scripts
- Hypertext Markup Language
  - HTML
- eXtended Markup Language
  - XML
- Java
The UML: Not a Process, Not a Tool, Just excellent and standard Modelling Technique

Quality Software Process

A Software Process

UML (standard set of notations and diagrams; CASE tool support)

Other Processes

XP
RUP
QSP
AM
OPEN
The three major modeling spaces

- **PROBLEM SPACE**
  - ANALYSIS

- **ARCHITECTURE**
  - BACKGROUND SPACE

- **SOLUTION SPACE**
  - DESIGN + CODE
  - SOLUTION TO REAL-WORLD PROBLEMS
Primary UML Diagrams in MOPS

This state chart diagram describes the various states in which the Client can be.

- **Add Client Details**
- **Accept Home Insurance Proposal**
- **Validate Proposal Details**
- **Obtain Underwriter Approval**
- **Cover Commences**
- **Cover Rejected**
- **Details Valid**
- **Register for Loan**
- **Business Logic**
- **Database**
- **GUI**
- **Current**
- **Policy Holder**
- **Claimant**

This state chart diagram describes the various states in which the Client can be.
This state chart diagram describes the various states in which the Client can be.

- **PolicyHolder**
- **Claimant**

1. **paysPremiumInstalment(amount)**
2. **makesClaim(claimAmount)** [accident]

This state chart diagram describes the various states in which the Client can be.

- **Policy-HomeInsurance**
- **BasicInternalValidation()**
- **Policy()**

1. **getAmountInsured(PolicyId : Policy)**
2. **submitClaimDetails()**
3. **startClaim()**
4. **displayForm()**
5. **submitClaim()**
6. **createClaim()**
7. **getClaimTypeDescr()**
8. **validateClaim()**
9. **createClaimRecord()**
10. **beepSuccess()**

Primary UML Diagrams in MOSS
MOBS – Background Space Modeling and Quality of Web Services

- Creation of Packages
- Modeling System Architecture:
  - Detailed consideration to Components
  - Use of Design Patterns
  - Use of Reusable In-house Patterns
- Considering Deployment
  - Hardware and Operating System related issues
  - Bandwidth and Security
- Registration of Services
UML and Quality: Syntax, Semantics, Aesthetics
(Based on Unhelkar, 2003, Process QA for UML-based Projects, Addison-Wesley, Boston)

Region of abstract skills: experience helps.

Region of concrete skills: knowledge helps.
MOPS – Problem Space Modeling and Quality of Web Services

Activity Diagrams

Aesthetics:
- Web Processes are in Balance—especially with the infrastructure
- Number of Activities & Swimlanes
- Number of Diagrams representing Services

Semantics:
- Meaning understood by Business of the diagram
- Parallel processes, Decision points

Syntax:
- Dependencies of Activities
- Start and End points
MOSS – Solution Space Modeling and Quality of Web Services

Class Diagram (Advanced)

Policy
- PolicyIdentifier: Integer = 0
- AmountInsured: Currency = 0
- StartDate: Date = 01/07/1984
- FinishDate: Date = 00/00/0000
- PremiumAmount: Currency = 5000
- Status: Byte = 0

- getAmountInsured(PolicyIdentifier: Policy): Boolean
- setStartDate(PolicyIdentifier: Integer, StartDate: Date): Boolean
- setFinishDate(): Boolean
- calcPremium(PolicyIdentifier: Integer, PremiumAmount: Boolean): Boolean

Aesthetics:
- Number of Classes, relationships
- Cohesiveness of Classes on a diagram

Semantics:
- Internal processes computed
- Interface of Services offered (Methods)
- Registration of Methods

Syntax:
- Naming of Class, Methods, Attributes
- Typing – as per Language/DB
MOBS – Background Space Modeling and Quality of Web Services

Aesthetics:
- Size and Cohesiveness of Package
- Coupling between Packages

Semantics:
- Business Concept Represented
- Relationship with Language / DB packages

Syntax:
- Notation, Interface
- Direction of Message flow
Standards and Regos:

- www.uddi.org
- www.omg.org
Conclusions & Future Directions

- Web Services Modeling Requires UML
- Application to Mobile Internet
- Standardization is Key to Availability and Use

Do you see what I see?
THANK YOU !!

www.MethodScience.com
www.unhelkar.com

Contacts Welcome!