Component-Based Systems Engineering using UML

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Current Development Centricity

Database (SQL)

Distributed Systems

Service Based Components

Message (IDL, XML)

Improved Coherence

Model (UML)
.com Enterprise Drivers

- Orders
  - Direct Customer Interaction
  - Status of Orders/Delivery
- Customer Service
  - Product/Service Support
- Office Access
  - E-mail, Schedules
  - Document repository access
Organizational Needs

• Provide a coherent structure and semantic taxonomy
• Small systems can be Database Centric
• Message Centric systems do not host portals well
• Multiple systems need a middle tier to support the Portal
• Middle Tier needs to be Model Centric
Component-Based Development

Information Viewpoint

Use Cases
Reference Information Model
Terminology

Computational Viewpoint
Component Externals
Component Internals

Component, Interfaces & Messages
Interface Behavior & Sequence Diagrams
Classes, Methods & State
Case Studies

- Wells Fargo Bank
  - Business Object Services

- Government Computer-Based Patient Record project (GCPR)
Wells Fargo Business Object Services

- Components wrap Systems Of Record
- Information Model is the Computation Model
- Coarse Grained Objects map to Components
- Components have CORBA interfaces
- Fine Grained Object graphs passed by value
- Wrappers contain proxy objects hiding CORBA
Wells Fargo

Reference Model (UML)

Model generates Graph IDL

Design Time Message

Run Time Message

IDL

Stubs, Repositories
WHAT IS THE GCPR FRAMEWORK?
GCPR CORBAMed Standards

• Interfaces
  – PIDS (person id)
  – COAS (clinical records)
  – LQS (terminology)
  – RAD (security)

• Product Component
  – 3M MPI
  – Built
  – 3M HDD
  – ?
GCPR

Reference Model

UML Graphs

Design Time Message → Run Time Message

UML Graph

Graph MetaObjects
- Reference Model
- Defines graphs
MetaSpace Shift

Information Model  Computation Model

meta-metamodel

metamodel (UML)

model  model (UML)

object instance  object type/instance
• Computation Model at Reference Metamodel level
Comparisons

• Wells Fargo
  – One Model controlled in Development Org
  – Approach scales well
  – Versioning needs careful attention

• G-CPR
  – Disconnected Information and Computation Models
  – Metadata parsing is a burden
  – Terminology UML integration needed
Research List

- Clarify notation for Graphs
- Graph by Value transports
- Behavior definition
- Terminology in UML