

# GSAW 2008 Architecture Workshop

## Architecture Development for Responsive Operational Systems

**William S. Macaulay**

# **GSAW 2008 Architecture Workshop Topics**

- 1. Architecture Development Trends**
- 2. Leveraging Flexible Architectures: Examples**
- 3. Value-Added Architecture / Process Attributes**
- 4. Acronyms**

# 1. Architecture Development Trends

1. Architecture Quality Evaluation Process (SEI ATAM..)
2. Verification using Dynamic Models and Testbeds
3. Early Day-in-the-Life / OPSCON Scenario Development
4. Early and Continuing Architecture Quality Evaluation
5. Architecture Technology Demonstrations
6. Architecture FMECA Verification
7. Static Architecture Evaluation: UML 2 Views
8. Legacy, COTS, Web-Based Reuse (Applets..)
9. Use of Design Patterns and Open Source Software
10. Small, Agile-Like Integrated Product Teams

## 2. Leveraging Flexible Architectures: Examples

Attribute / Program	Demo A	Demo B	Program C
Objective	TCPED	End-to-End	MDP
Requirements, CONOPS Baseline	High-Level	High-Level	Formal
Architecture Approach	Web / Legacy Components	Web / Legacy Components	Pipeline, Parallel Servers, SAN
Architecture Assessment Method	RUP, Functional Decomposition	ATAM, DODAF	RUP, Functional Decomposition
Early / Continuous Architecture Verification	Demo / Analysis	Demo / Analysis	Testbed, Dynamic Model
Top-Level Requirements Volatility	Moderate-High	Moderate-Low	Low
Build Cycle Time (weeks)	1-2	1-2	6
Architecture Risk	Multiple Legacy Products + Web	Multiple Legacy Products + Web	Multi-Server SAN, FMECA
End-to-End Verification per Build	Yes	Yes	Yes
Development Span (months)	6	4	40
Technical, Cost, Schedule Goals	Met	Exceeded	Met

### **3. Value-Added Architecture Attributes**

- 1. Formal Process for Architecture Quality Evaluation**
- 2. Dynamic Modeling / Simulation to Verify Architecture**
- 3. Formal Analysis of Failure Modes / Response**
- 4. Early Day-in-the-Life Scenario Development**
- 5. Early End-to-End Integration / Demonstration**
- 6. End-to-End, Test-per-Build Architecture Verification**
- 7. Web-Based / Service-Oriented Architectures**

Architecture Guidelines: 1. Stakeholder Involvement, 2. Breadth-First, 3. Adaptive Process, 4. Focus on Risks, 5. Model / Demonstrate Functionality and Performance

## 4. Acronyms

- **ATAM**                    **Architecture Tradeoff Analysis Method**  
                                  **(See CMU / Software Engineering Institute for process detail)**
- **CONOPS**                **Concept of Operations**
- **COTS**                    **Commercial Off The Shelf**
- **DODAF**                 **Department of Defense Architecture Framework**
- **FMECA**                 **Failure Modes, Effects and Criticality Analysis**
- **MDP**                    **Mission Data Processing**
- **OPSCON**               **Operational Concepts (CONOPS detailed to operations/components )**
- **RUP**                    **Rational Unified Process**
- **SAN**                    **Storage Area Network**
- **SEI**                     **Software Engineering Institute (CMU)**
- **TCPED**                **Tasking, Collection, Processing, Exploitation and Dissemination**
- **UML**                    **Unified Modeling Language**