How to Build, Implement, and Use an Architecture Metamodel

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How to Build, Implement, and Use an Architecture Metamodel
Objectives

• Review industry standard for architecture descriptions
  – Stakeholders, concerns, viewpoints, and views
• Introduce method for defining architecture viewpoints based on stakeholder scenarios and concerns
  – Based on Architecture Description UML Profile
• Describe techniques for designing custom metamodel for rendering required architecture views
Architecture Description Standard

ISO/IEC 42010:2011 (f/k/a IEEE 1471)
Refined Viewpoint Metamodel

Describes the “Who”, “Why”, “What” and “How” for architecture modeling
Gather Modeling Requirements – Workflow

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Describe Stakeholders and Scenarios

- «Architecture Stakeholder»: Solution Architect
- «Architecture Stakeholder»: Application Owner
- «Architecture Stakeholder»: Architecture Manager

- Understand Projects Impact on Application Landscape
- Understand Current Application Architecture Landscape
- Understand Target Application Architecture Landscape
- Develop Project Architecture Blueprint

«defines»

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Describe Architecture Concerns

In the context of this project, which applications interact with which other applications?

Which applications are impacted by this project?

What is the anticipated impact of this project on each application?

In the context of this project, which applications interact with which other applications?

What is the nature of the interactions amongst the applications within scope of this project?

Which interactions between applications are impacted by this project?

What are the proposed changes to existing application interactions?

Which interactions are being removed by this project?

Which interactions are being added by this project?
Identify Architecture Viewpoints

- Which applications are impacted by this project?
- What is the anticipated impact of this project on each application?
- In the context of this project, which applications interact with which other applications?
- What is the nature of the interactions amongst the applications within scope of this project?
- Which interactions between applications are impacted by this project?
- What are the proposed changes to existing application interactions?
- Which interactions are being removed by this project?
- Which interactions are being added by this project?

### Project Application List

**Viewpoint Type:** Grid

**Modeling Language:** N/A

**Required Elements:** Application, Project

**Required Attributes:** Application.Name, Application.Owner, Application.ProjectImpactType, Project.Name

**Required Relationships:** Project Impacts Application

**Constraints:** Applications impacted by specified Project

**Alternate Depiction:** Show using extended UML Class diagram with Applications and Projects and their relationships.

### Logical Application Diagram

**Viewpoint Type:** Diagram

**Modeling Language:** UML Component

**Required Elements:** Application

**Required Attributes:** Application.Name, Application.ProjectImpactType, ApplicationInteraction.InteractionType, ApplicationInteraction.ProjectImpactType

**Required Relationships:** Application Interacts With Application

**Constraints:** Applications impacted by specified Project

**Display Notes:**
- Emphasize project impact for each application by changing application border color/width
- Emphasize application interaction types with different line styles
AD Elements and Correspondences

![Diagram showing relationships between AD Elements, Architecture Description, Architecture Rationale, System Concern, Correspondence, and Correspondence Rule.]
Update Architecture Metamodel

Application
- Name: text
- Description: memo
- SOX Compliance: Yes/No
- Target Lifecycle State: Application Lifecycle State
- Business Criticality: Business Criticality Level

Application Interaction
- Interaction Type: Application Interaction Type

Project Application Impact
- Project Impact Level: Project Application Impact Level

Project
- Name: text
- Description: int
- Start Date: date
- End Date: date

Person
- First Name: text
- Last Name: text
- Phone Number: text
- Email Address: text

Application Interaction Type
- Batch
- Real-Time

Project Application Impact Type
- No Impact
- Validate Impact
- Verify Impact
- Impacted

Application Lifecycle State
- Proposed
- Provisional
- Standard
- Contained
- Retired

Business Criticality Level
- Safety-critical
- Mission-critical
- Essential
- Regular
- Non-critical
Project Application Impact Diagram
Conclusion

• Exploit existing architecture standards for determining how to model (and how much) for what purpose

• Use conventional modeling techniques for understanding stakeholder concerns and designing architecture viewpoints
  – And for designing custom metamodel

• Implement custom metamodel using UML profiles
  – Basis for consistent semantics and tool usage
Questions?
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