Software Architecture Context
Topics

- Contexts of software architecture
- The architecture influence cycle
- What is the role of a software architect?
Contexts of Software Architecture

- **Technical** - technical role in the system or systems of which it’s a part
- **Project life cycle** - relationship to the other phases of a software development life cycle
- **Business** - affect on an organization’s business environment
- **Professional** - role of a software architect in an organization or development project
Architecture Influence Cycle

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Intricate Interactive Waltz of Influence and Counterinfluence

- Architects must identify and **actively engage the stakeholders** to solicit their needs and expectations.
- A software architect must have considerable communication, collaboration, and negotiating skills:
  - In addition to comprehensive **technical and domain knowledge**
  - Technically AND politically correct

“90% social sciences and diplomacy, 10% technology!”
The Architecture Milieu of Influences

- **Stakeholders:**
  - Users
  - Managers
  - Investors
  - Marketing
  - Customers
  - Support
  - Developers

- **Business Context**
  - Schedule and budget
  - Functional requirements
  - Architecturally significant requirements
  - Goals
  - Constraints

- **Project Context**
  - What life cycle
    - E.g., iterative or agile

- **Professional Context**
  - Experience
  - Knowledge
  - Bias

- **Technology Context**
  - Constraints
  - Legacy systems
  - External systems
  - Platforms
  - Standards
  - Innovation

- **Architects**

- **Software Architecture**

- **Project**
The Architecture Milieu of Influences

**Business Context**
- New business opportunities
- Requirements for next systems
- Economies for support and development

**Stakeholders:**
- Users
- Managers
- Investors
- Marketing
- Customers
- Support
- Developers

**Project Context**
- Prescribe development structure
- Change engineering culture
- Technical development environment

**Professional Context**
- Architect’s experience and knowledge
  – what works, what doesn’t

**Technology Context**
- Requirements for future systems
- Opportunities for integrating new technologies, innovation

**Architects**
What is the Role of a Software Architect?
Architecture in the Product Life-Cycle

Inception | Elaboration | Construction | Transition | Upgrade
---|---|---|---|---
Envision | Create and Analyze | Architecture | Reuse | Other Products

Architectural Baseline

Architect’s Role

Highest | Lower
Architect’s Responsibilities

1. Contribute to the **business case** for the system
2. Understand the **architecturally significant requirements**
3. Design or select the architecture
4. Document, **communicate**, and **represent** the architecture
5. **Analyze** or **evaluate** the architecture
6. **Oversee/contribute** to system **construction** based on the architecture
7. Ensure the implementation conforms to the architecture - **validate**
Architecture Decision Scope and Impact

<table>
<thead>
<tr>
<th>Systemic (broad scope)</th>
<th>Low Impact</th>
<th>High Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>not architectural (this could be a trap)</td>
<td>focus of architectural decisions</td>
<td>not generally architectural (though might set architecture guidelines and policies as needed)</td>
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Software Architect Role Profile

- Architecture design but also …
- System software and hardware selection
- Build vs. buy decisions
- Architecturally significant requirements
- Development methodology, process, standards
- Technical and project leadership
- Coaching
- Hands on construction
- Leverage experience, track technology trends
Software Architect Role (Job Description)  
(from Hofmeister et al., *Applied Software Architecture*)

- The software architect **creates a vision**
  - Keeps up with innovations and technologies
  - Understands global requirements and constraints (business and technical)
  - Creates a vision (global view) of the system
  - Communicates the vision effectively
  - Provides requirements and inputs to the system architect (if separate role)

- The software architect is the **key technical consultant**
  - Organizes the development team around the architecture design
  - Manages dependencies
  - Reviews and negotiates requirements
  - Assesses technical capabilities of staff
  - Motivates the team
  - Recommends technology, training, tools
  - Tracks the quality of the design
  - Ensures architecture meets its design goals
Software Architect Role (continued)

- The software architect makes decisions
  - Leads the design team
  - Makes early design decisions (key global ones)
  - Knows when to end discussion and make a decision
  - Identifies and manages risk

- The software architect coaches
  - Establishes dialog with each team member
  - Teaches the team the architecture design and gets their buy-in
  - Listens to feedback
  - Knows when to yield to design changes
  - Knows when to let others take over detailed design

- The software architect coordinates
  - Coordinates activities of tasks that influence or are influenced by the architecture
  - Maintains integrity of the design
  - Ensures that the architecture is followed
Software Architect Role (continued)

- The software architect **implements**
  - Considers the design implications of introducing a new technology
  - May look at low-level details to validate initial concepts
  - May **prototype** to explore and evaluate design decisions
  - May implement a thin vertical slice to minimize implementation risk
  - May implement components as an implementation model for developers

- The software architect **advocates**
  - Advocates investment in software architecture
  - Works to incorporate software architecture into the software process
  - Continues to assess and advocate new software architecture technologies
  - Advocates architecture reuse
Career Path
(from Hofmeister et al., Applied Software Architecture)

- Set your sights on becoming an **expert in software engineering**
  - gather broad experience
  - develop technical, leadership, communication and people skills
- **Apprentice** (hang out) with an experienced architect, or better get an **architect mentor**

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Individual Contributor | Software Engineer | Senior Software Engineer | Team Leader | Architect
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*Increasing responsibility, scope and challenge*