Software Architecture in Practice

Chapter 1: The Architecture Business Cycle

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Lecture Objectives

This lecture will introduce students to

- **the factors influencing architectures**
- **the factors influenced by architectures**
- **the components of the architecture business cycle (ABC)**

Why Is Architecture Important?

Architecture affects both the business and technical aspects of an organization.

We will discuss the technical aspects later in the course.

Business aspects of architecture include

- **software for specific systems**
- **enterprise architecture: a common infrastructure for a collection of systems, e.g.,**
  - **IBM Open Blueprint**
  - **DoD DII COE**

Business Importance of Architecture -1

Software for specific systems

- **provides leverage of control of a marketplace (e.g., Microsoft)**
- **provides a vehicle for management oversight and control**
- **allows focus on a niche in the marketplace (e.g., interoperability)**
- **provides for the scoping of products**
- **can be used as a sales tool (e.g., conforms to industry standards)**

Business Importance of Architecture -2

Enterprise architectures enable

- **shorter learning time**
- **specialized tool support**
- **sharing of infrastructure costs among systems**

Factors Influencing Architectures

Architectures are influenced by

- **stakeholders of a system**
- **technical and organizational factors**
- **architect's background**

Customers

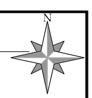
Customers are the people who pay for system development.

Customer concerns include
- **cost of the system**
- **usability and lifetime of the system**
- **interoperability with other systems**
- **time to market**
- **platform portability**

End Users

End users are the people who use the system. They include
- **"regular" users**
- **system administrators**
- **members of the development organization**

End users are concerned with
- **ease of use**
- **availability of function**



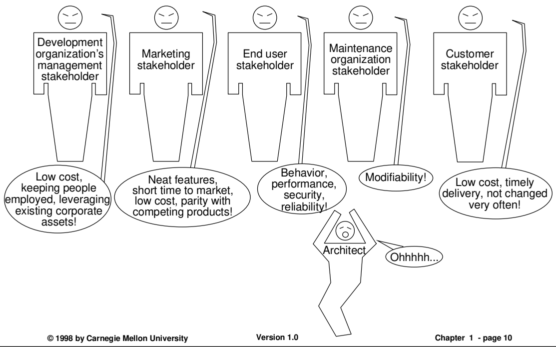
Other Stakeholders

Development organization

Marketers

Maintenance organization

Stakeholders of a System



Development Organization Concerns - 1

Immediate business issues
- **amortizing the infrastructure**
- **keeping cost of installation low**
- **utilizing personnel**

Long-term business issues
- **investing in an infrastructure to reach strategic goals**
- **investing in personnel**

Development Organization Concerns - 2

Organizational structure issues
- **furthering vested interests, e.g.,**
  - **maintaining an existing database organization**
  - **supporting specialized expertise**
- **maintaining the standard method of doing business**

Technical Environment

Current trends: today's information system will likely employ a

- **database management system**
- **Web browser for delivery and distribution across platforms**

This was not true 10 years ago.

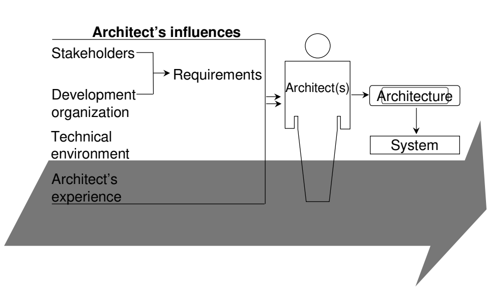
Available technology: decisions on using a centralized or decentralized system depend on processor cost and communication speed; both are changing quantities.

Architect' s Background

Architects develop their mindset from their past experiences.

- **Prior good experiences will lead to replication of prior designs.**
- **Prior bad experiences will be avoided in the new design.**

Summary: Influences on the Architect



Factors Influenced by Architectures

Structure of the development organization

Enterprise goals of the development organization

Customer requirements

Architect's experience

Technical environment

The architecture itself

Architecture Influences the Development Organization Structure

Short term: Work units are organized around architectural units for a particular system under construction.

Long term: When company constructs collection of similar systems, organizational units reflect common components (e.g., operating system unit or database unit).

Architecture Influences the Development Organization Enterprise Goals

Development of a system may establish a foothold in the market niche.

Being known for developing particular kinds of systems becomes a marketing device.

Architecture becomes a leveraging point for additional market opportunities and networking.

Architecture Influences Customer Requirements

Knowledge of similar fielded systems leads customers to ask for particular features.

Customers will alter their requirements on the basis of the availability of existing systems.

Architecture Influences the Architect's Experience and Technical Environment

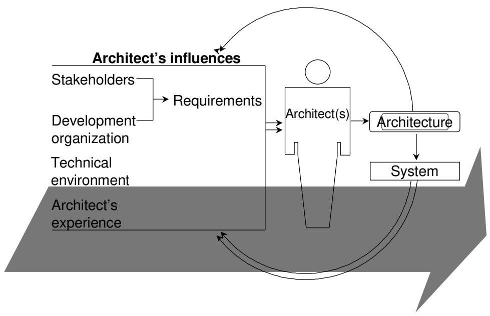
Creation of a system affects the architect's background.

Occasionally, a system or an architecture will affect the technical environment.
- the WWW for information systems
- the three-tier architecture for database systems

A Cycle of Influences

Architectures and organizations influence each other.
- Influences to and from architectures form a cycle.
- An organization can manage this cycle to its advantage.

Architecture Business Cycle (ABC)



What Makes a Good Architect? -1

People skills: must be able to
- **negotiate competing interests of multiple stakeholders**
- **promote inter-team collaboration**

Technical skills: must
- **understand the relationships between qualities and structures**
- **possess a current understanding of technology**
- **understand that most requirements for an architecture are not written down in any requirements document**

What Makes a Good Architect? -2

Communication skills: must be able to
- **clearly convey the architecture to teams (both verbally and in writing)**
- **listen to and understand multiple viewpoints**

What Makes a Good Architecture?

Fitness for purpose

Achievable within a reasonable budget

Achievable within a reasonable time

(Note: Lecture 10 deals with evaluating an architecture.)

Lecture Summary

Architecture involves more than just technical requirements for a system. It also involves non-technical factors, such as
- **the architect's background**
- **the development environment**
- **the business goals of the sponsoring organization**

Architecture influences the factors that affect it.
- **Architects learn from experience.**
- **The development environment is expanded and altered.**
- **Businesses gain new marketing possibilities.**

Discussion Questions

1. **How does the nature of your enterprise affect the architectures that it develops? How do the architectures affect the nature of the enterprise?**

2. **What kind of business goals drive (or have driven) the creation of the software architectures of your enterprise?**

3. **Who are the stakeholders that exert the most influence over the architecture of systems in your organization? What are their goals? Do the goals ever conflict?**