

What is IT Systems Architecture?

Introduction and Overview

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Architecture is a term that lots of people try to define

There is not just one way to state a system's architecture

Common elements of most attempts to define architecture, in the context of IT and other systems:

- Breakdown of a system into its parts
- The relationship between the parts (static and dynamic)
- Decisions about the design of a system that are hard to change

Architectures can be implied, apparent, or explicitly planned

Implied architecture

 of abstract things such as <u>music</u> or <u>mathematics</u>

Apparent architecture

 of natural things, such as <u>geological</u> formations or the <u>structure of biological cells</u>

Explicitly planned architecture

 of human-made things such as <u>software</u>, <u>computers</u>, <u>enterprises</u>, and <u>databases</u>, in addition to buildings.

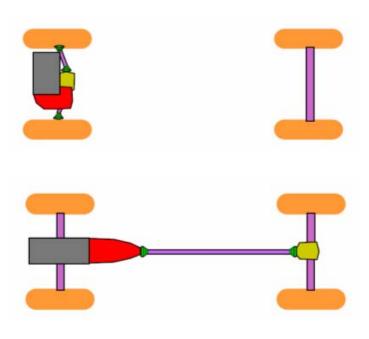
Etymology:

- Latin: architectus

- Greek: arkhitekton (αρχιτεκτων) = master builder
 - From arkhi (αρχι) = chief + tekton (τεκτων) = builder, carpenter
 - archon: one of the nine chief magistrates of ancient Athens, 1659, from Gk. arkhon "ruler"

In every usage, an architecture, whether implied, apparent or explicitly planned, may be seen as:

- A subjective mapping from one of many possible human perspectives
 - to the <u>elements</u> or <u>components</u> of some kind of <u>structure</u> or system,
 - which preserves the <u>relationships</u> among the elements or components.



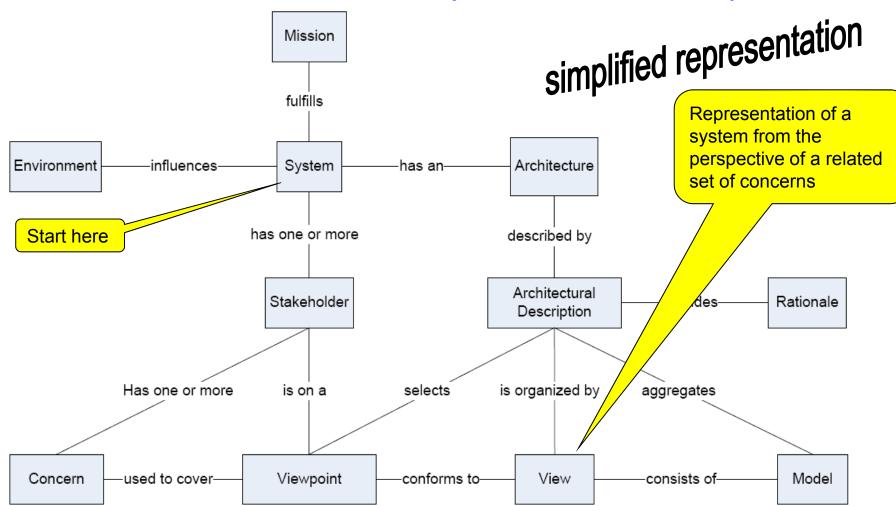
IT Architecture: Definitions and Characteristics

- ANSI/IEEE Std 1471-2000: IEEE Recommended Practice for Architectural Description of Software-Intensive Systems
 - The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution
- Rechtin, The Art of Systems Architecting
 - The structure (in terms of components, connections, and constraints) of a product, process, or element.
 - Architecture is what architects produce: The set of information that defines a system's value, cost, and risk for the purposes of the systems sponsor.
- Must address
 - Function and quality, including aesthetics for the user (client / customer)
 - Feasibility and cost for the builder



Conceptual Framework of the IEEE Standard P1471

Recommended Practice for Architectural Description of Software-Intensive Systems





Architectural Description

- A collection of Workproducts to document an architecture
- Addressed to one or more Stakeholders to answer their Concerns about the system
- Organized into one or more Views of the system
- Each View addresses one or more Concerns of the Stakeholders
- A View is a way of looking at an architecture
- A View is what you see when you look at the architecture from a particular Viewpoint



Architectural Views

- Enable the architecture to be communicated to, and understood by, all the stakeholders
- Enable stakeholders to verify that the system will address their concerns
- Examples

Scope description: Planner's view

Model of the business: Owner's view

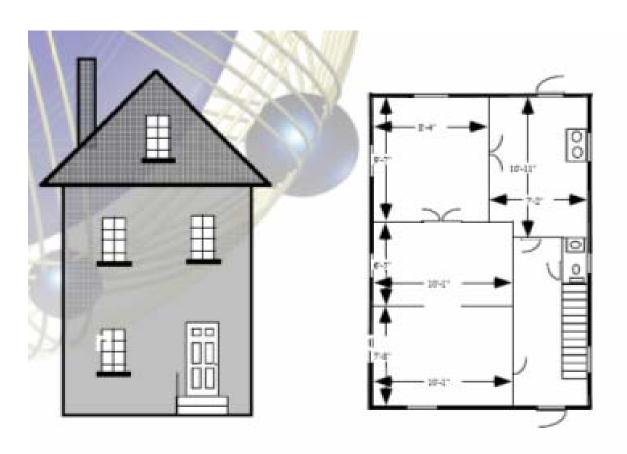
Information system model: Designer's view

Technology model: Builder's view

Detailed blueprints:
 Subcontractor's view



Multiple views and models

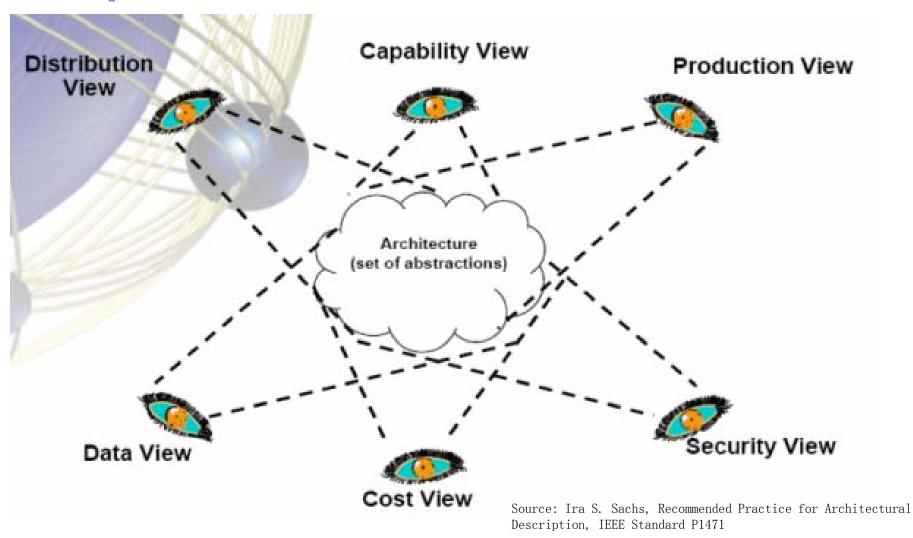


- Bill of Materials
- 2x4x8 250
- 2x6x8 150
- 4x4x10 10
- Siding 1500 sq ft
- Shingles 500 sq ft
- 8d nails 20 lb
- 6d nails 10 lb

Source: Ira S. Sachs, Recommended Practice for Architectural Description, IEEE Standard P1471



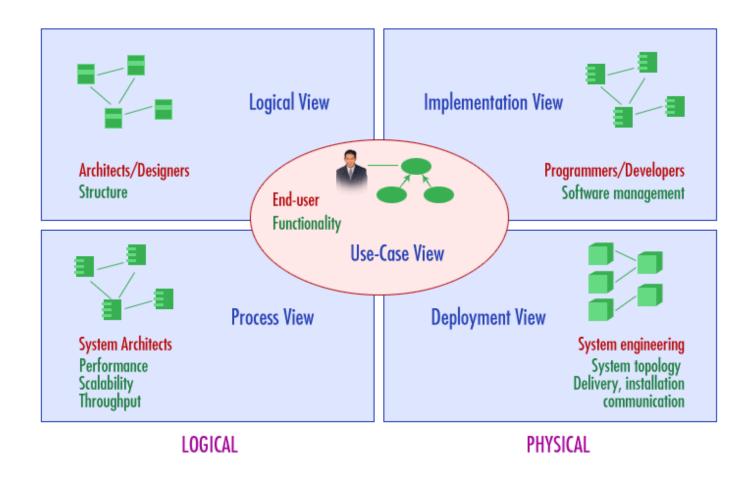
Sample Views



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The 4+1 view model of software architecture



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