Module 4: Architecture in IT

In the sense of information systems
  - Web architectures
  - Enterprise architectures
  - Interoperation architectures
  - Message-oriented middleware

Architecture Conceptually

  - How a system is organized
  - An over-used, vaguely defined term
    - Software architecture
    - Standards, e.g., Berners-Lee’s “layer cake”
    - May include processes
    - May include human organizations
Understanding Architecture: 1

- Two main ingredients of a system
  - Components
  - Interconnections

- *Openness* entails specifying the interconnections cleanly
  - Physical components disappear
  - Their logical traces remain

- *Information environments* mean that the interconnections are protocols

Exercise: Examples of Architecture

Identify the main components and interconnections for the following domains

- Buildings
- Plumbing
- Power systems
Understanding Architecture: 2

- Components and interconnections are not sufficient to characterize an architecture
- Two additional ingredients of an architecture
  - Constraints on the components and interconnections
  - Patterns involving the components and interconnections
- Openness entails the constraints
  - Do not apply on the physical components directly

Exercise: Examples of Architecture

Identify the main constraints and key patterns for the following domains

- Buildings
- Plumbing
- Power systems
Understanding Protocols

- Protocols encapsulate interactions
  - Connect: conceptual interfaces
  - Separate: provide clean partitions among logical components
- Wherever we can identify protocols, we can
  - Make interactions explicit
  - Enhance reuse
  - Improve productivity
  - Identify new markets and technologies
- Protocols yield standards; their implementations yield products

Architectural Examples

When viewed architecturally, each logical component class serves some important function

- Power: UPS
- Network connectivity
- Storage: integrity, persistence, recovery
- Policy management
- Decision-making
- Knowledge and its management

What are some products in the above component classes?
IT Architectures

The term is used more broadly in IT settings
- The organization of an IT system
- The extensibility and modifiability of a system
- Even the governance of a system

IT Governance

The human management of IT systems
- The human organization in a system taken broadly
- Even the processes by which a system is updated or upgraded (including the human aspects such as permissions)
- Nontechnical aspects, such as flows of responsibility

Used to be confused with architecture, but now increasingly separated