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
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