ISM 50 - Business Information Systems

Lectures 14

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Class announcements

- For Next Class
  - Read: MySQL Database Case

- Database tutorials
More on layering

Slides modified from those by
David G. Messerschmitt
Example 1

Bob sends a letter to Alice

Bob

Envelope

US Postal Service

Shipping Container

ABC Airlines

Alice

Envelope

UK Royal Mail

Shipping Container
Interactions of Layers

Layer above is a client of the layer below

Each layer provides services to the layer above...

....by utilizing the services of the layer below and adding capability

Layer below as a server to the layer above
Three types of software

- **Application**

- **Components and frameworks:**
  What is in common among applications

- **Infrastructure:**
  Basic services (communication, storage, concurrency, presentation, etc.)
Major layers

- Applications
- Application frameworks and components
- Middleware
- Operating system
- Network
Data and information

Application
Deals with information

Assumes structure and interpretation

Infrastructure
Deals with data

Ignores structure and interpretation
Package = file or message

Infrastructure deals with a package of data (non-standard terminology)
- collection of bits
- specified number and ordering

Infrastructure stores and communicates packages while maintaining data integrity
- File for storage
- message for communication
Data integrity

Retain the
- values
- order
- number

of bits in a package
Example 3

HHC Server Application
- Windows OS
- Networking Infrastructure (Contains: TCP/IP, WiFi)

Passenger Information
- Collection of Packets

HHC Client Application
- Palm OS
- Networking Infrastructure (Contains: TCP/IP, WiFi)
Example 3: Network Infrastructure Expanded
Example 4

HHC Server Application

Windows OS

Networking Infrastructure Layers within TCP/IP, WiFi

"Send me today’s flight information"

DBMS

Unix OS

Collection of Packets

Networking Infrastructure Layers within: TCP/IP, WiFi
Data and information in layers

- The infrastructure should deal with data, or at most minimal structure and interpretation.

- The application adds additional structure and interpretation.

- This yields a separation of concerns.
Information in the infrastructure

*Sometimes it is appropriate for the infrastructure to assume structure and interpretation for data*

- to add capabilities widely useful to applications
- to help applications deal with heterogeneous platforms, where representations differ

At most, data types
Data and information

Application
Deals with information

Assumes structure and interpretation

Assumes standard data types

Infrastructure
Deals with data types