Enterprise Application Patterns

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Typical Business Information System

Client Tier
- Client Devices
- Appliances

Presentation Tier
- Presentation & Content
- Web Server

Business Tier
- Business Processing
- App Server

Information Tier
- Data Management
- Info Server

adapted from [M05]
Enterprise Application Patterns

• How to build and integrate layers:
  – Client (access devices)
  – Presentation (handling of client requests)
  – Domain (application logic)
  – Data (databases, other data sources)

• What alternative approaches exist?

• What are the drivers and tradeoffs?

• What technologies to select?

• Fowler: Patterns of Enterprise Application Architecture, Addison Wesley, 2003
Enterprise Application Patterns

Domain Logic:
- Transaction Script
- **Domain Model**
- Table Module
- Service Layer

adapted from [F03]
Example: Domain Model

![Diagram of a domain model with classes and relationships]

Application Server

Data Store

Data Mapper
Enterprise Application Patterns

Presentation:
- MVC
- Page/Front Controller
- Template/Two Step View
- Application Controller
- ...

adapted from [F03]
Example: Page Controller

- handle HTTP get/post
- select model/view

Page Controller

- servlet

JSP

display HTTP

Application Server

adapted from [F03]
Enterprise Application Patterns

adapted from [F03]

Mobile Clients

Stationary Clients

Web Server

Application Servers

Data Stores

Data Access:

- Table/Row Data Gateway
- Active Record
- **Data Mapper**
- Unit of Work
- Identity Map
- Lazy Load

- Identity Field
- Foreign Key Mapping
- Association Table Mapping
- Dependent Mapping
- Embedded Value
- Lazy Load

- Serialized LOP
- Single/Class/Concrete Table Inheritance
- Inheritance Mappers
Enterprise Application Patterns

Data Access:
- Metadata Mapping
- Query Object
- Repository

adapted from [F03]
Example: Data Mapper

adapted from [F03]
Enterprise Application Patterns

adapted from [F03]

Distribution, Concurrency, State:

- Remote Facade
- Data Transfer Object
- Optimistic/Pessimistic Offline Lock
- Coarse Grained/Implicit Lock
- Client/Server/Database Session State
Enterprise Application Patterns

adapted from [F03]

Base:

- Gateway
- Mapper
- Layer Supertype
- Separated Interface
- Registry
- Value Object
- Money
- Special Case
- Plugin
- Service Stub
- Record Set

Data Stores
Configuration Example: Simple Application

MVC with Two Step View or Application Controller

Transaction Script

Table Data Gateway
Configuration Example: Complex Application

Mobile Clients \rightarrow \text{Stationary Clients} \rightarrow \text{Web Server} \rightarrow \text{Application Servers} \rightarrow \text{Data Stores}

- Domain Model
- Service Layer
- Data Mapper
- Metadata Mapper

\text{MVC}
Archetype Example: Person (partial)

adapted from [AN03]
Archetype Example: PartyRole (partial)

adapted from [AN03]
Archetype Example: ProductCatalog (partial)

adapted from [AN03]
Example: Party – Role – Relationship – Policy Model*

* courtesy of Matthew Arrott; adapted from [AN03]