IMPORTANT NOTICE TO STUDENTS

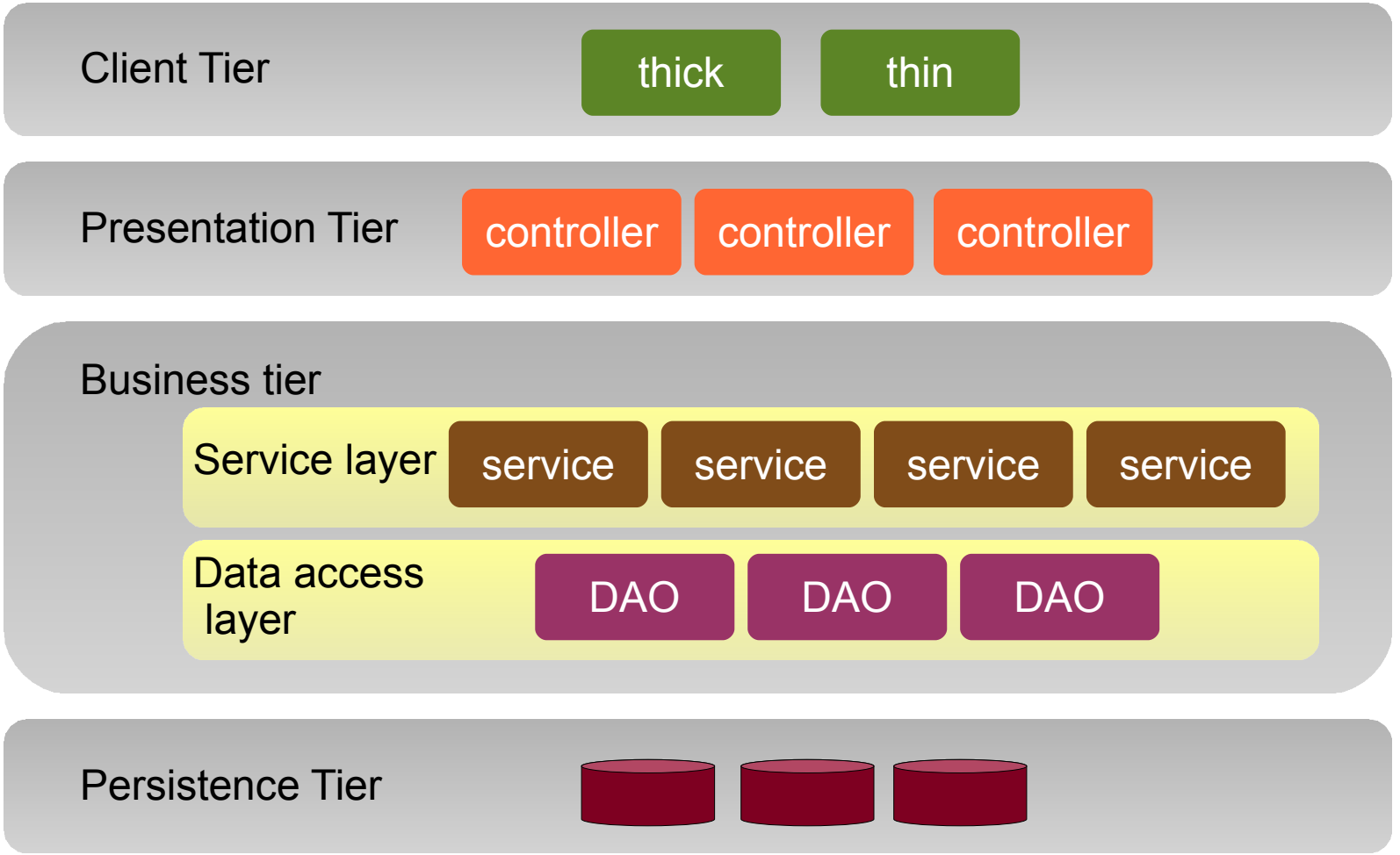
These slides are **NOT** to be used as a replacement for student notes.
These **slides** are sometimes **vague and incomplete on purpose** to spark class discussions

Service Layer Design
"Facade Vs. Command"

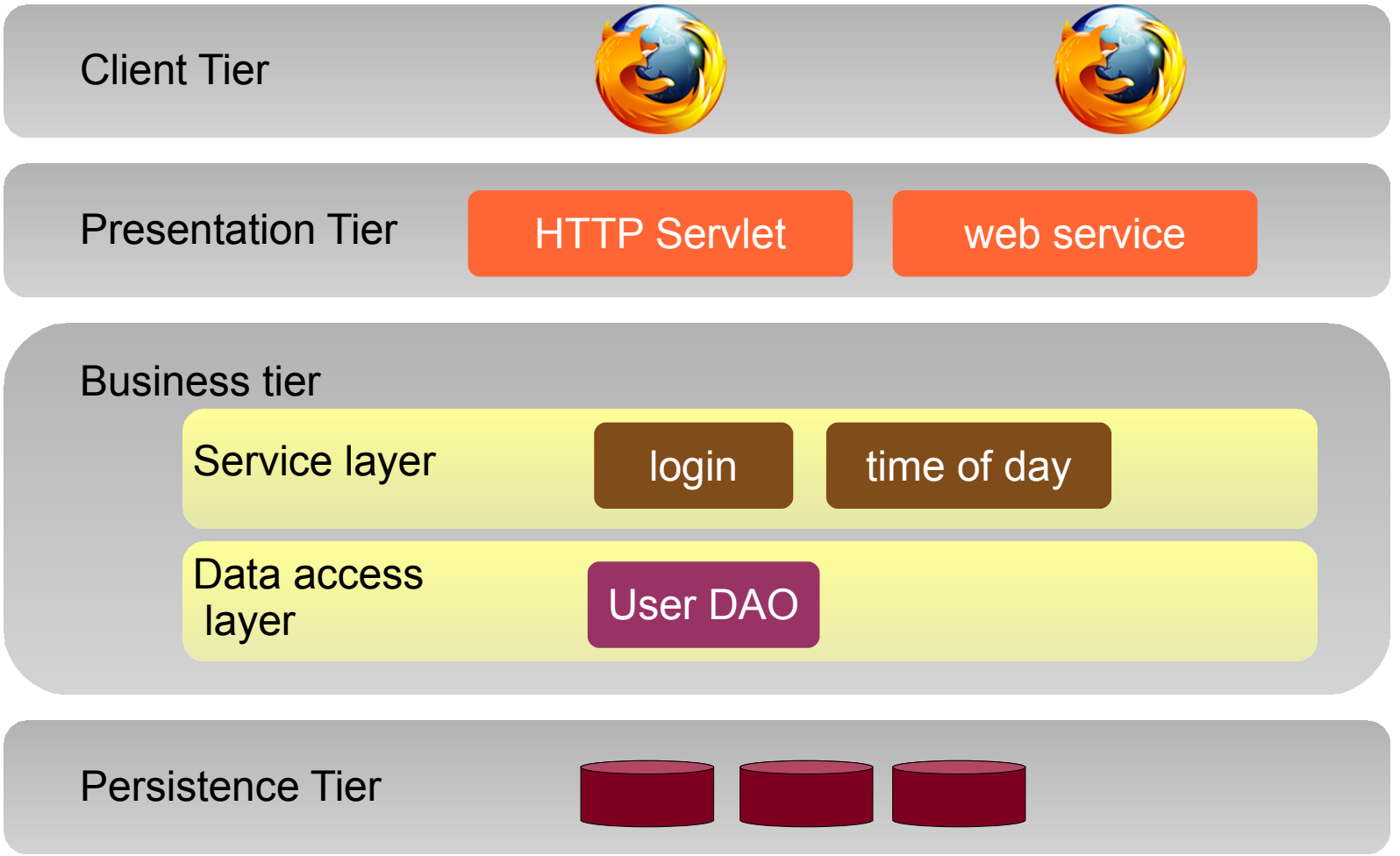
CS 446 / 646 ECE452
[DATE]

WATERLOO
CHERITON SCHOOL OF COMPUTER SCIENCE

Introduction



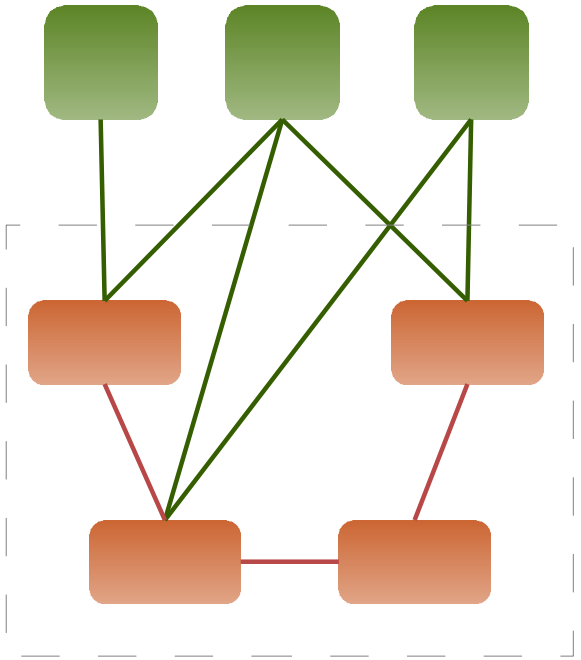
Introduction



Facade

Intent

- *"provide a unified interface to a set of interfaces in a subsystem"*



Considerations

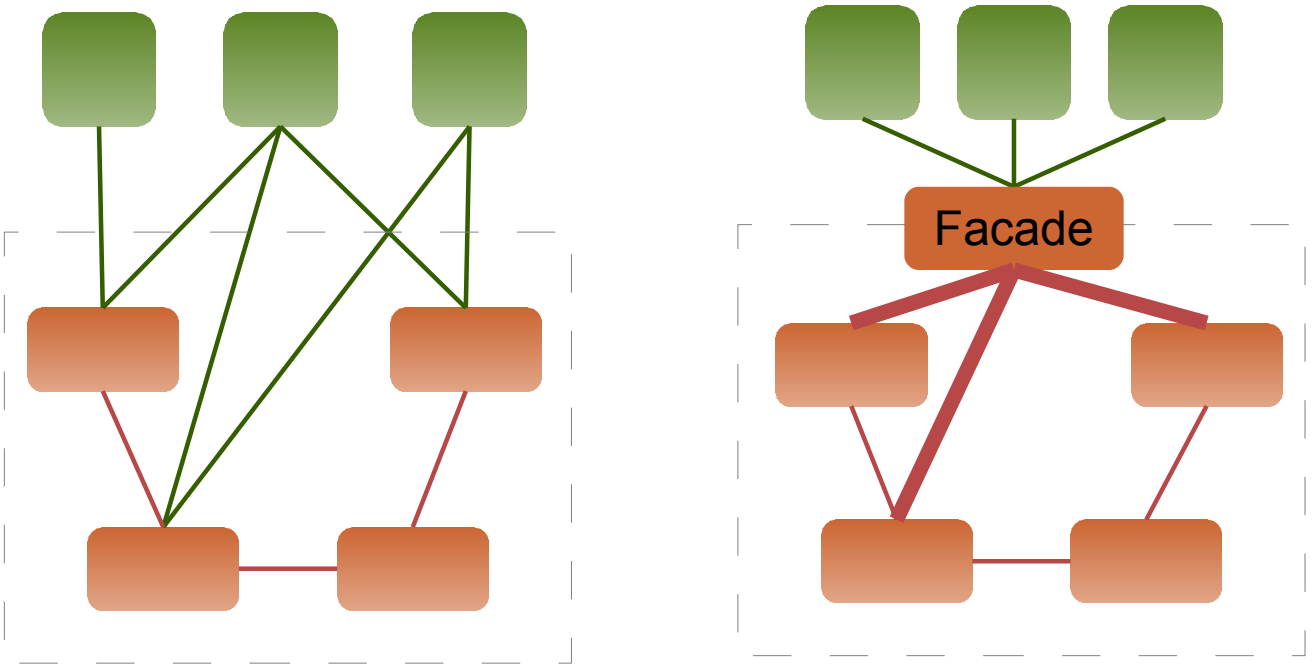
- inter component ***coupling***
- system **evolution**
- fault-tolerance

creational? structural? behavioural?

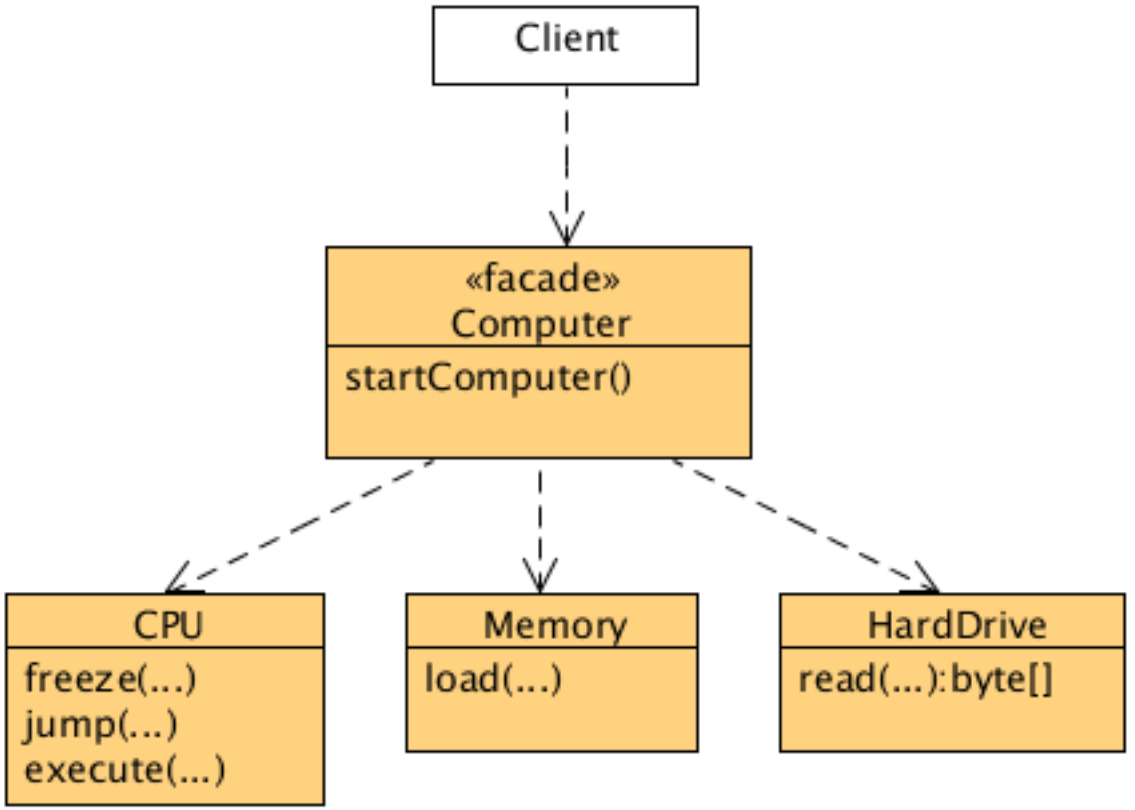
Facade

Intent

- *"provide a unified interface to a set of interfaces in a subsystem"*



Example



Facade pattern: http://en.wikipedia.org/wiki/Facade_pattern

Facade Pattern

Advantages

- looser coupling
- lower network communication
  - in enterprise application each method call incurs communication latency
- provides an extension point (how?)
  - security, logging
- promotes reusability
  - unit of (business) work
- **simple** to understand & implement

Facade Pattern

Disadvantages

- Evolution
  - facade methods are written in stone (why?)
- Scalability
  - addition of new methods
  - deprecation of old methods
  - facade becomes complicated itself
    - error reporting/handling
    - does not grow organically

Facade Pattern

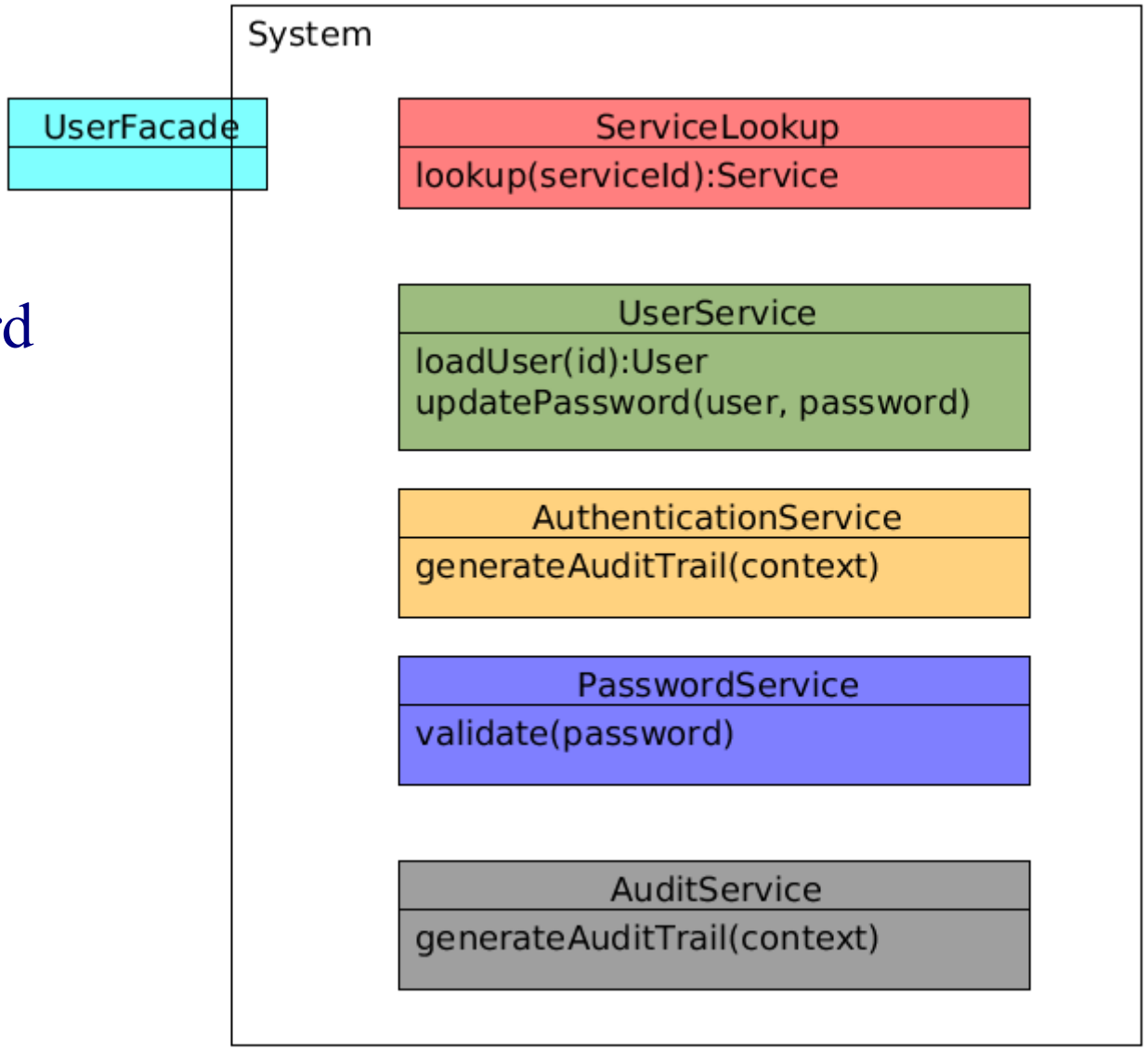
Disadvantages

- Re-usability
  - change in execution environment
  - aggregation of facade methods

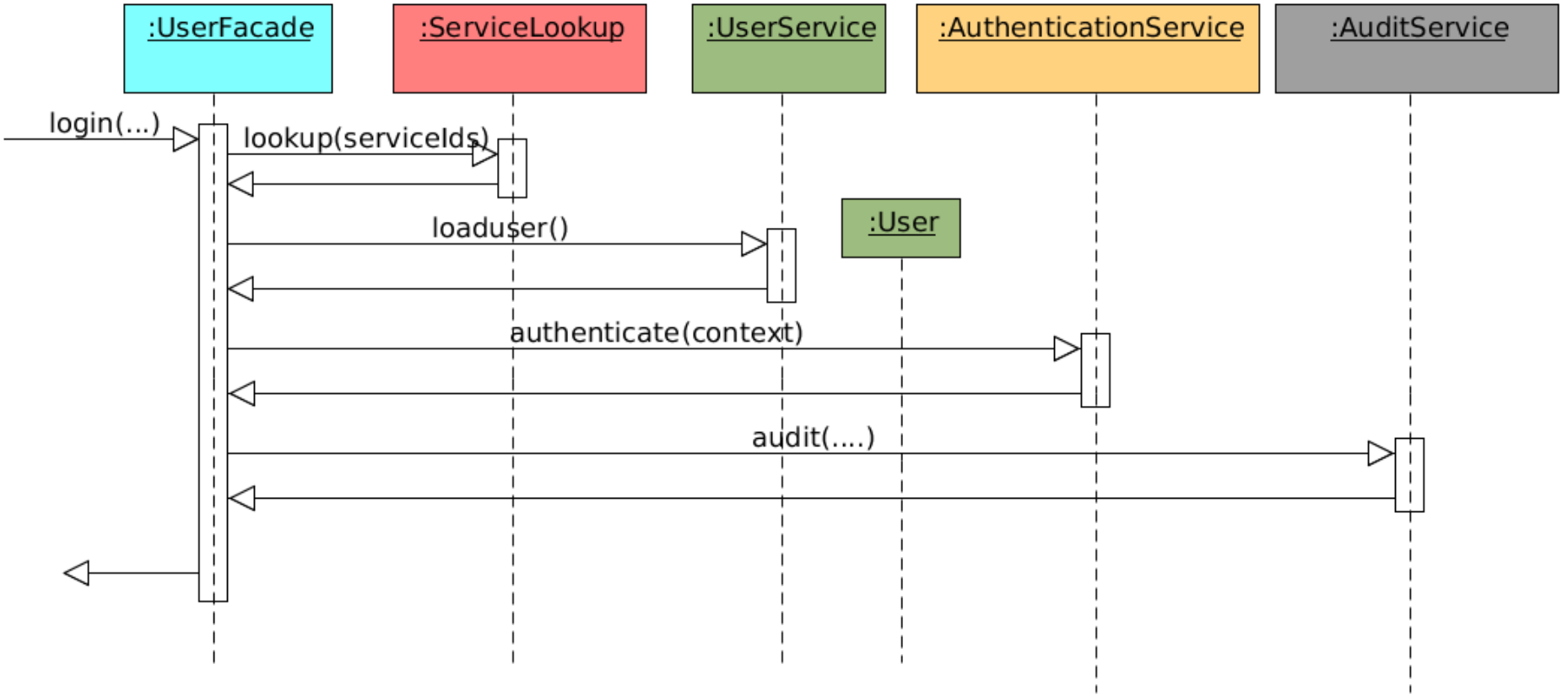
Facade based Service Layer

Class Activity

- identify facade
  - login
  - change password



Login Example



Command Pattern

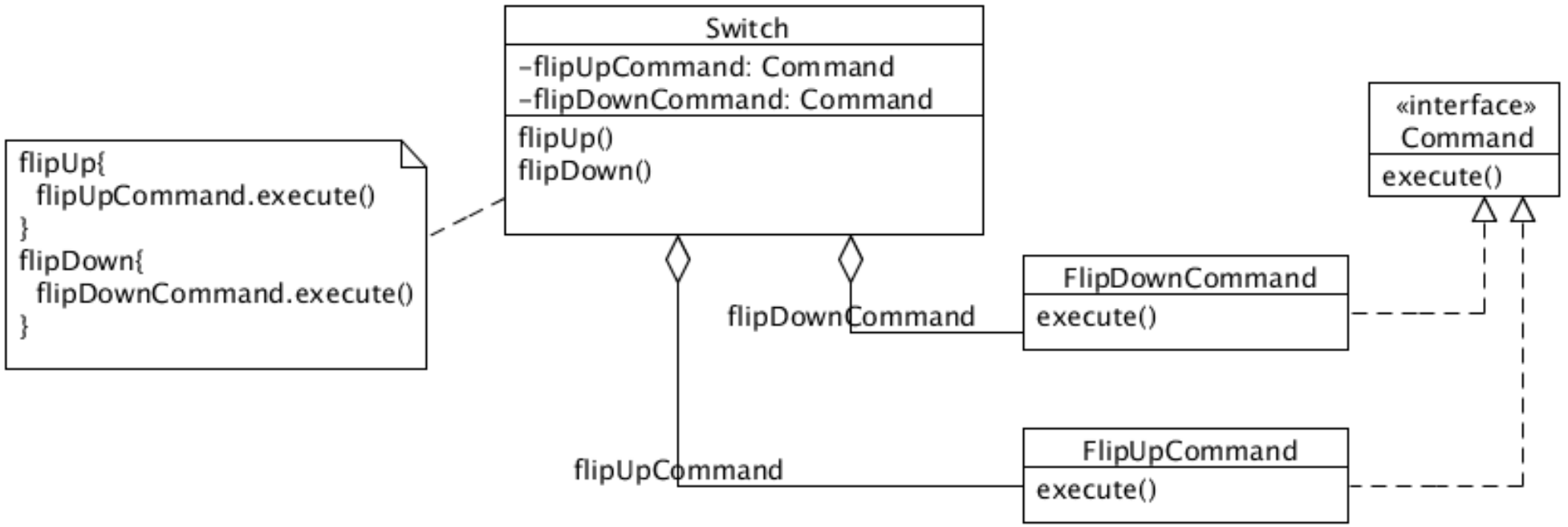
Intent

- *"encapsulate the request as an object..."*

So what

- how does the execution change?
  - can we serialize objects?
  - can we aggregate requests (commands)?
- separation of concerns
  - caller object from the execution object
- dynamic in nature
  - commands can be replaced at runtime (why?)

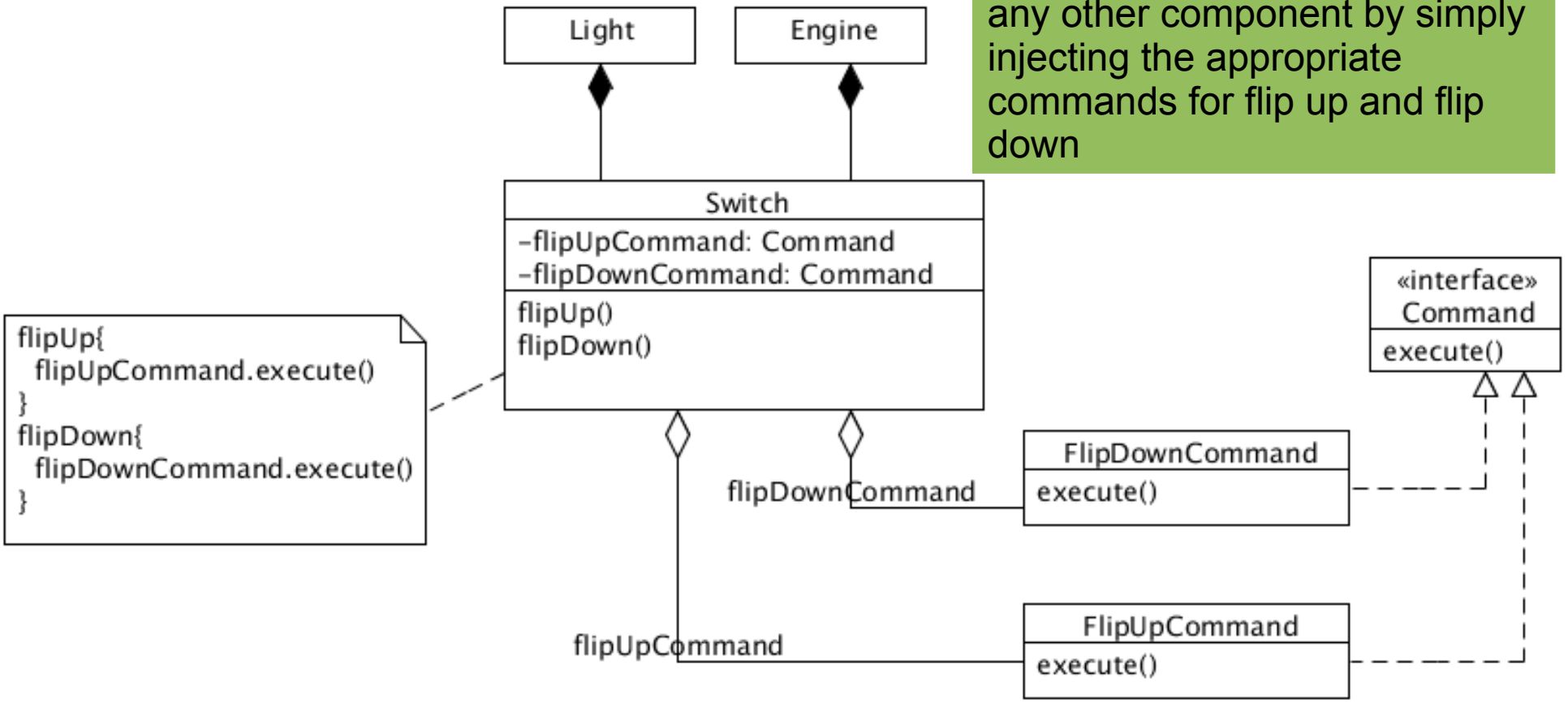
Command Pattern



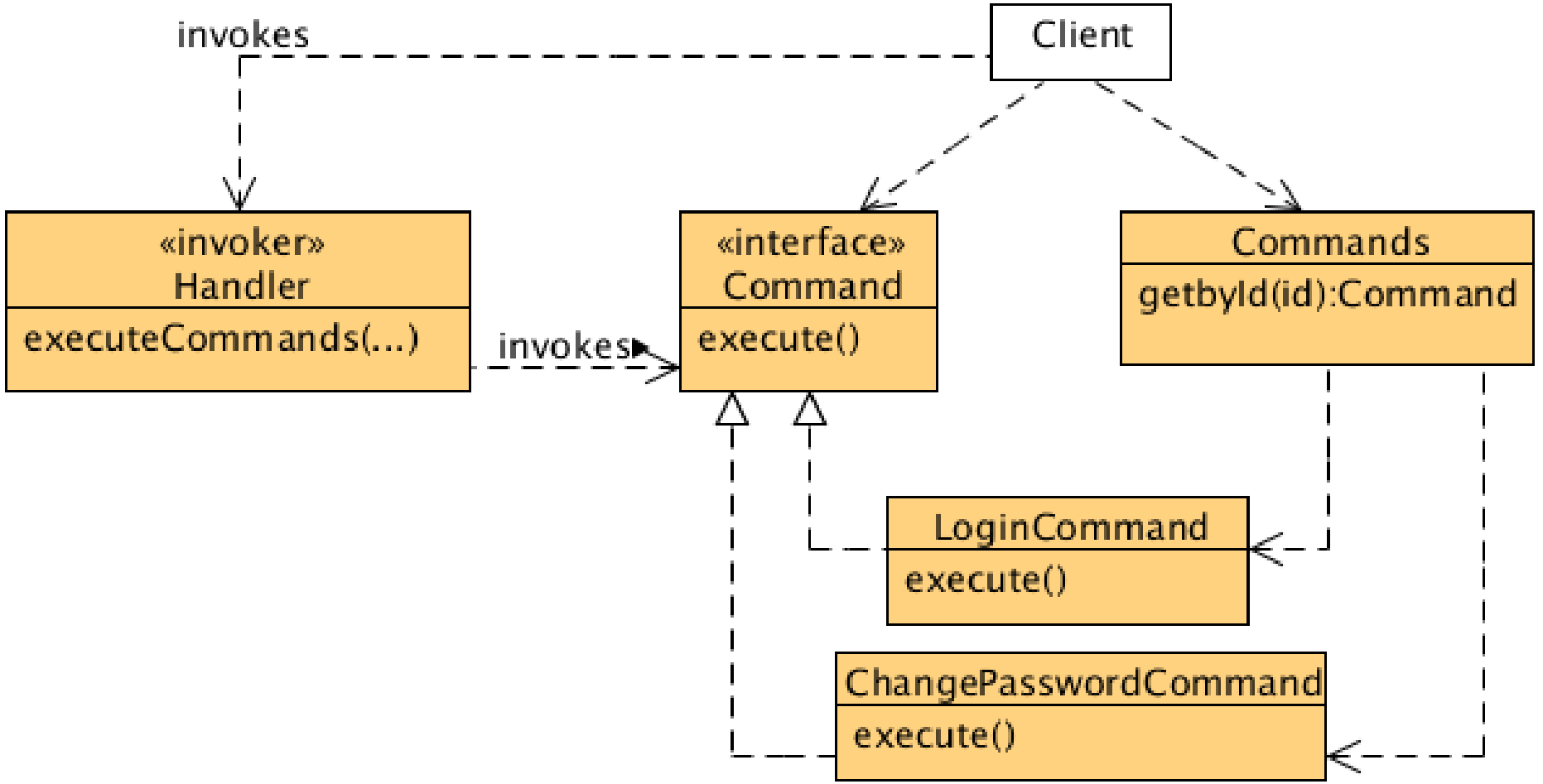
where is the functional logic implemented here?

Command Pattern

A switch can be associated with any other component by simply injecting the appropriate commands for flip up and flip down



Command Service Layer

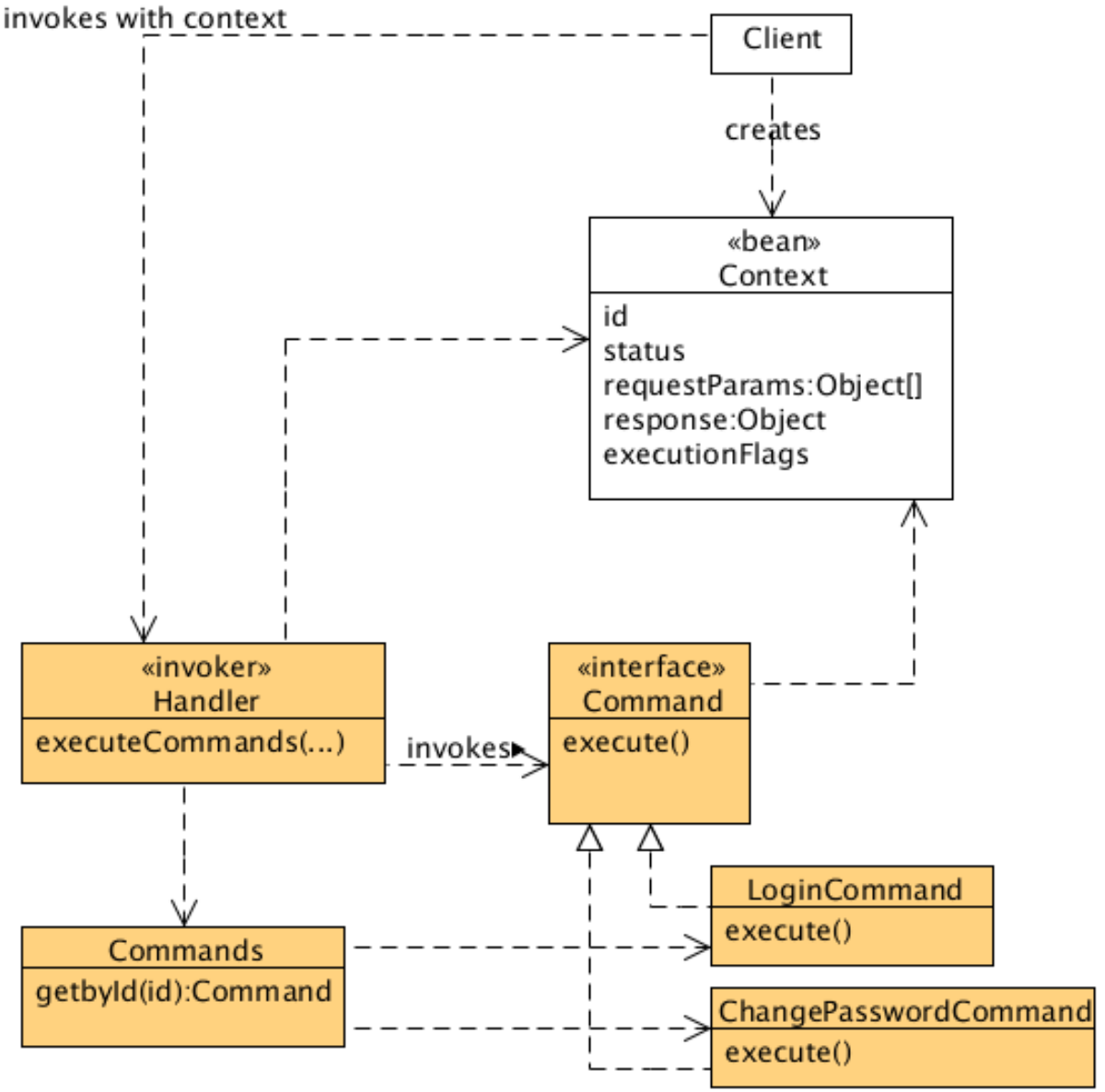


Command Service Layer

Observation

- if commands represent business functionality then how come they are exposed to the client?
- in tiered applications, how do we deal with the marshalling and demarshalling of commands objects?
  - expensive to move 'heavy duty' objects

Command Service Layer



Command Service Layer

Evolution

- defining new commands is trivial
- deprecating commands is easy
  - only need to retain the command identifier

Unit of work

- each unit of work is a command
- what was the unit of work in facade?

Command Service Layer

Scalability

- as the system grows we only add new concrete implementations
- more control over execution environment
- *can I merge two or more commands into a single execution unit –* ***composite command****?*

Command as Service Layer

Re-usability

- commands are simple & hence can be used in many different ways
  - single command
  - command chains (aggregation)
  - composite command

Testing

- easy to test
  - due to the separation of concerns