Software Engineering of Internet Applications

Section 3: Lecture 3

Enterprise Information System Patterns

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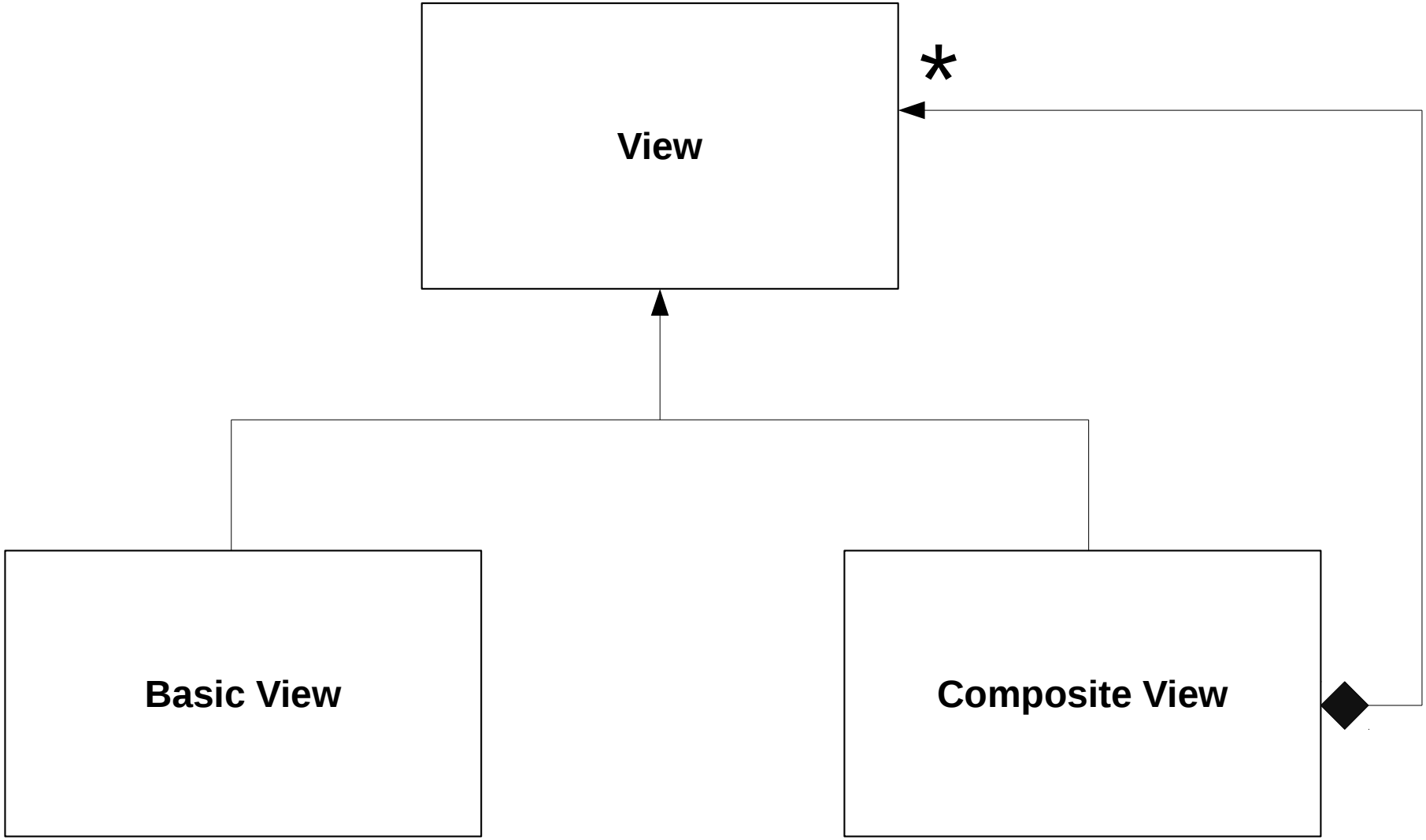
Lecture structure

- Resuming EIS patterns
  - Business tier patterns
  - Worked examples
    - Composite view
    - Session facade
    - Composite entity
    - Value list handler)

Composite View

This presentation tier pattern has the purpose of managing views which are composed from multiple subviews

- Complex web pages are often built out of multiple parts
  - Navigation section
  - News section
- Hard-coding page layout and content provides poor flexibility
- The pattern allows views to be flexibly composed as structures of objects



Class diagram of composite view

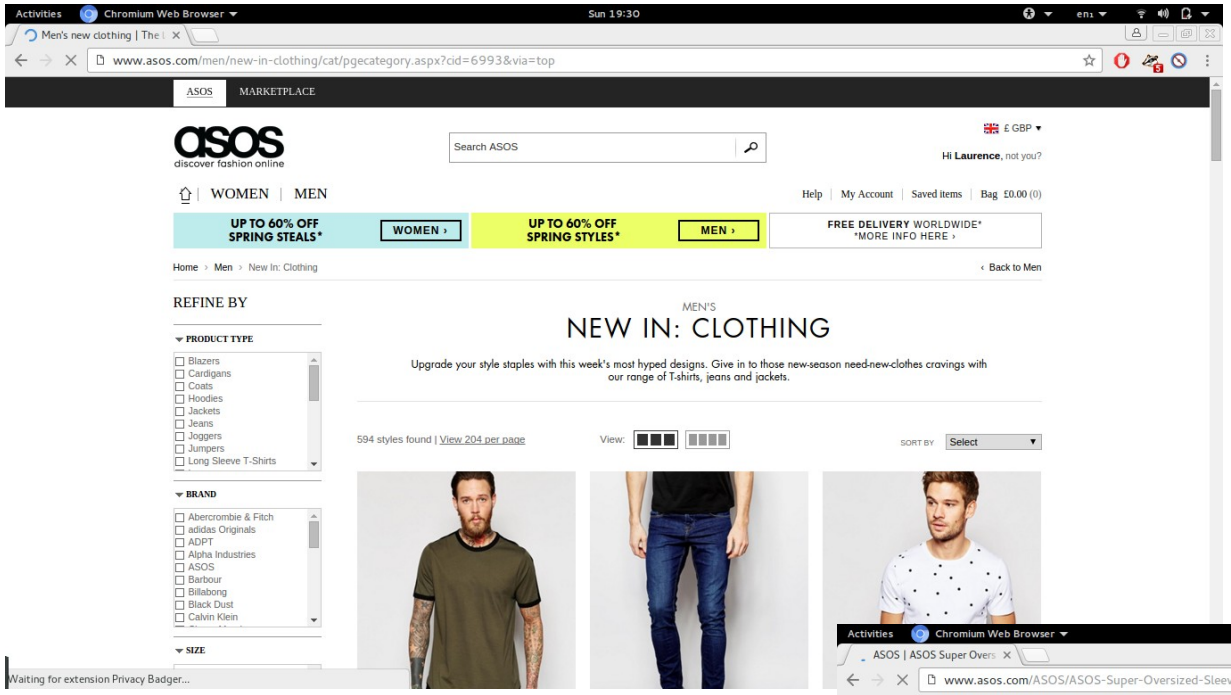
Pattern elements

- Elements of the pattern
  - **View**: a general view, either atomic or composite
  - **View Manager**: organises inclusions of parts of views into a composite view
  - **Composite View**: a view that is an aggregate of multiple views.
    - Its parts can themselves be composite

Advantages

- Modularity
- Enhances Flexibility
- Enhances Maintainability and Manageability

*http://www.oracle.com/technetwork/java/compositeview-137722.html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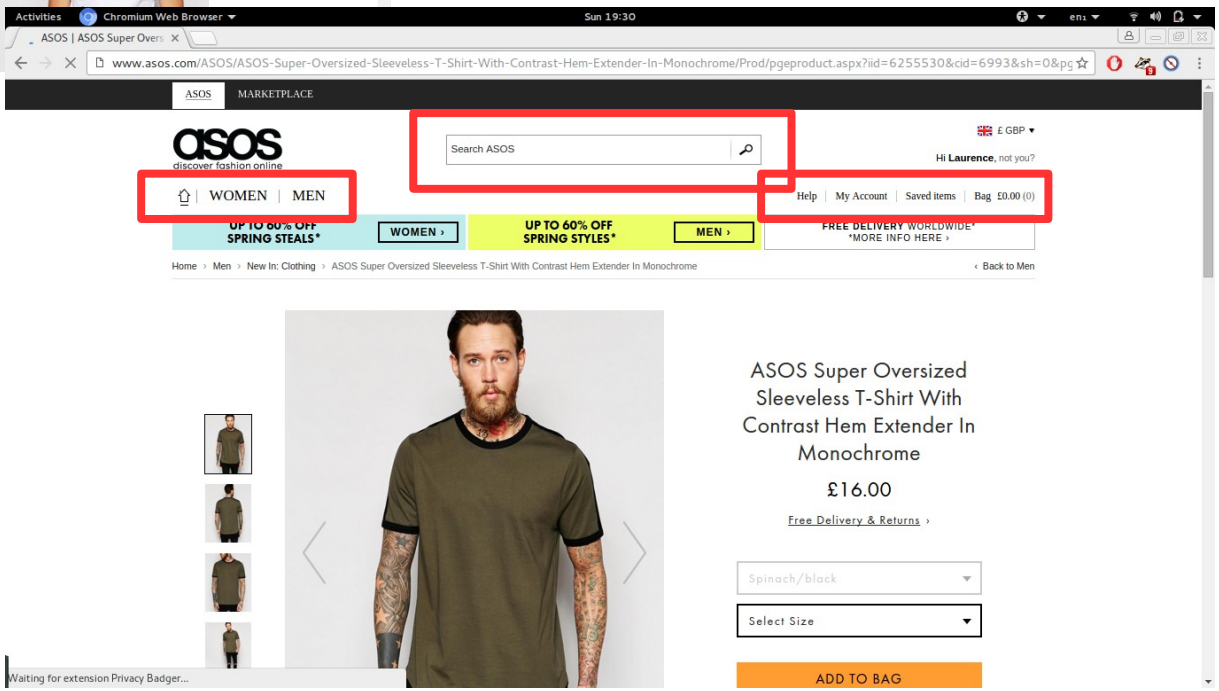
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Java Implementation

- Implement in JSP

```
<jsp:include page = "subview.jsp">
```

- Other approaches include custom JSP tags and XSLT (if data is stored as XML)

Worked example

- Implement a composite view to re-use the following elements
  - Header
  - Footer
  - Navigation

Example available at:

https://github.com/laurencedawson/6CCS3SIA

Value Object

- This business tier pattern has the purpose to improve the efficiency of access to persistent data (e.g. in entity beans) by grouping data and transferring data as a group of attribute values of each object
- It is inefficient to get attribute values of a bean one-by-one by multiple getatt() calls, since these calls are potentially remote
- The pattern reduces data transfer cost by transferring data as packets of values of several attributes. Reduces number of parameters in bean operations
- Can transfer data between presentation and business tiers, and between integration and business tiers.

Example

- Instead of calling
  - getName()
  - getAge()
  - getAddress()

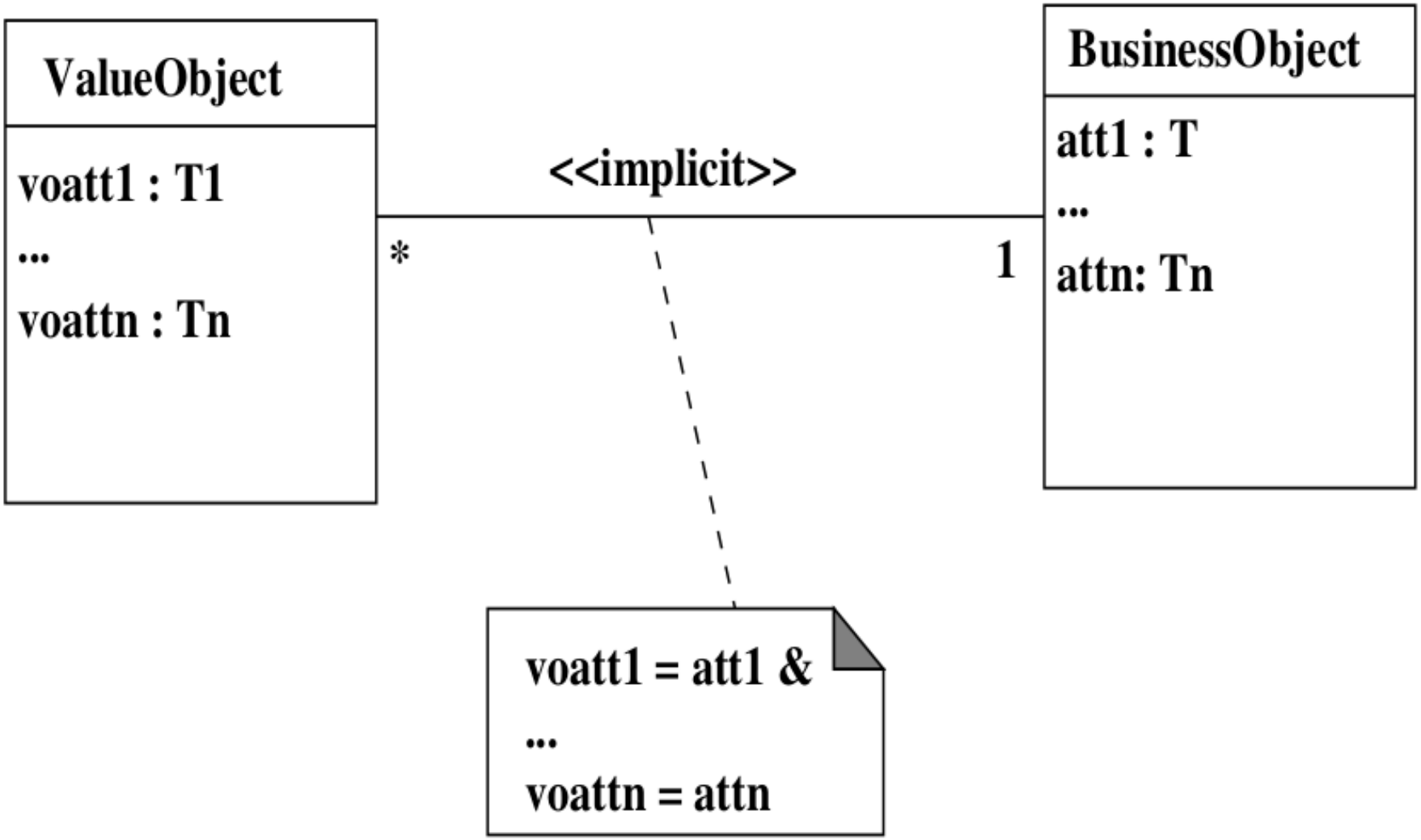
- Return a Value Object containing the variables
- Merges three calls into one

Example (cont.)

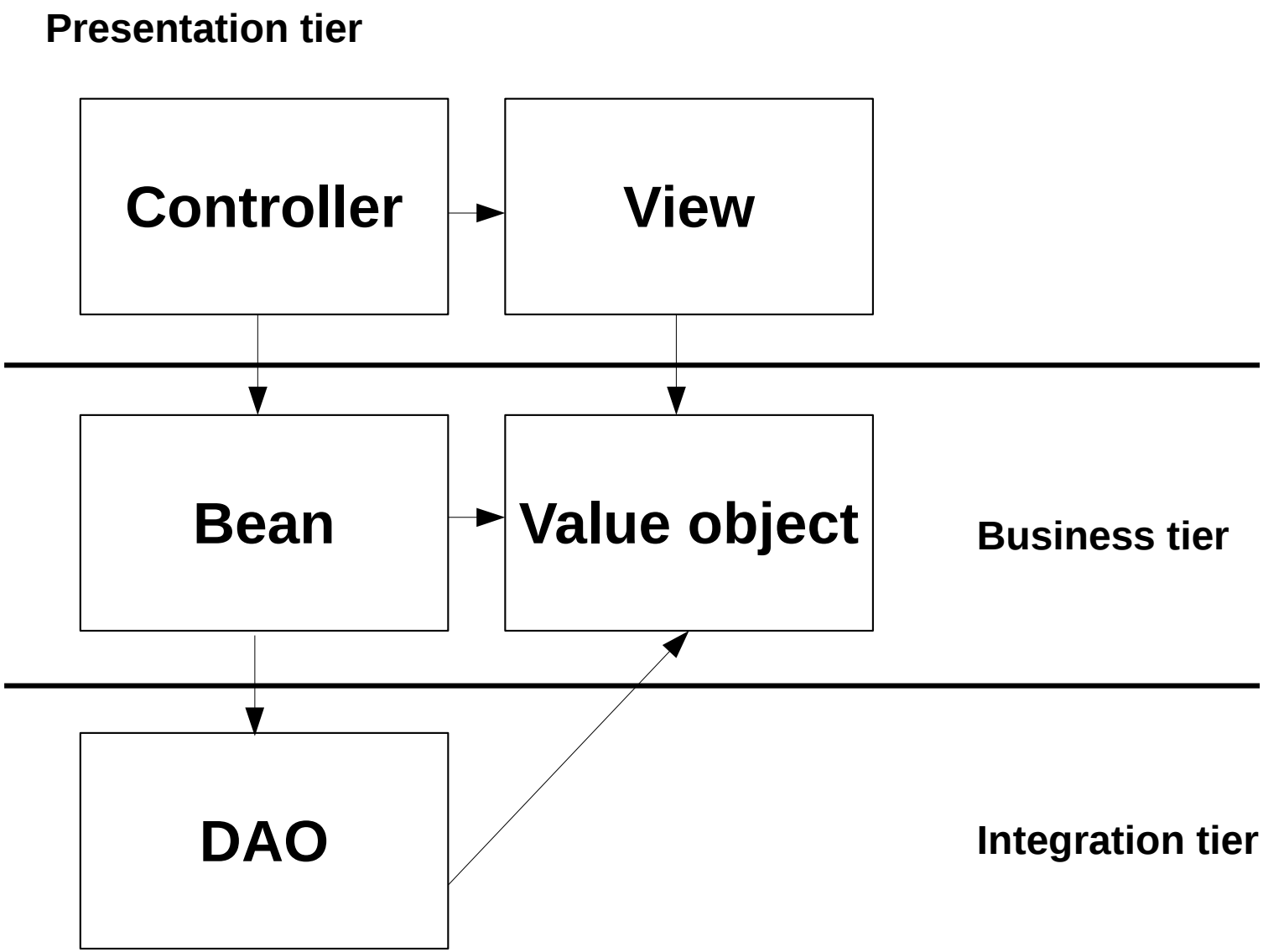
- bean.getName()
- bean.getAge()
- bean.getAddress()

- bean.getValueObject()

```
public class ValueObject(){
    String name;
    int age;
    String address;
}
```



Class diagram of value object



Architecture diagram of value object

Pattern elements

- Elements of the pattern are:
  - **Business Object**: can be a session or entity bean. Holds business data. It is responsible for creating and returning the value object to clients on request
  - **Value Object**: holds copy of values of attributes of business object. It has a constructor to initialise these. Its own attributes are normally public

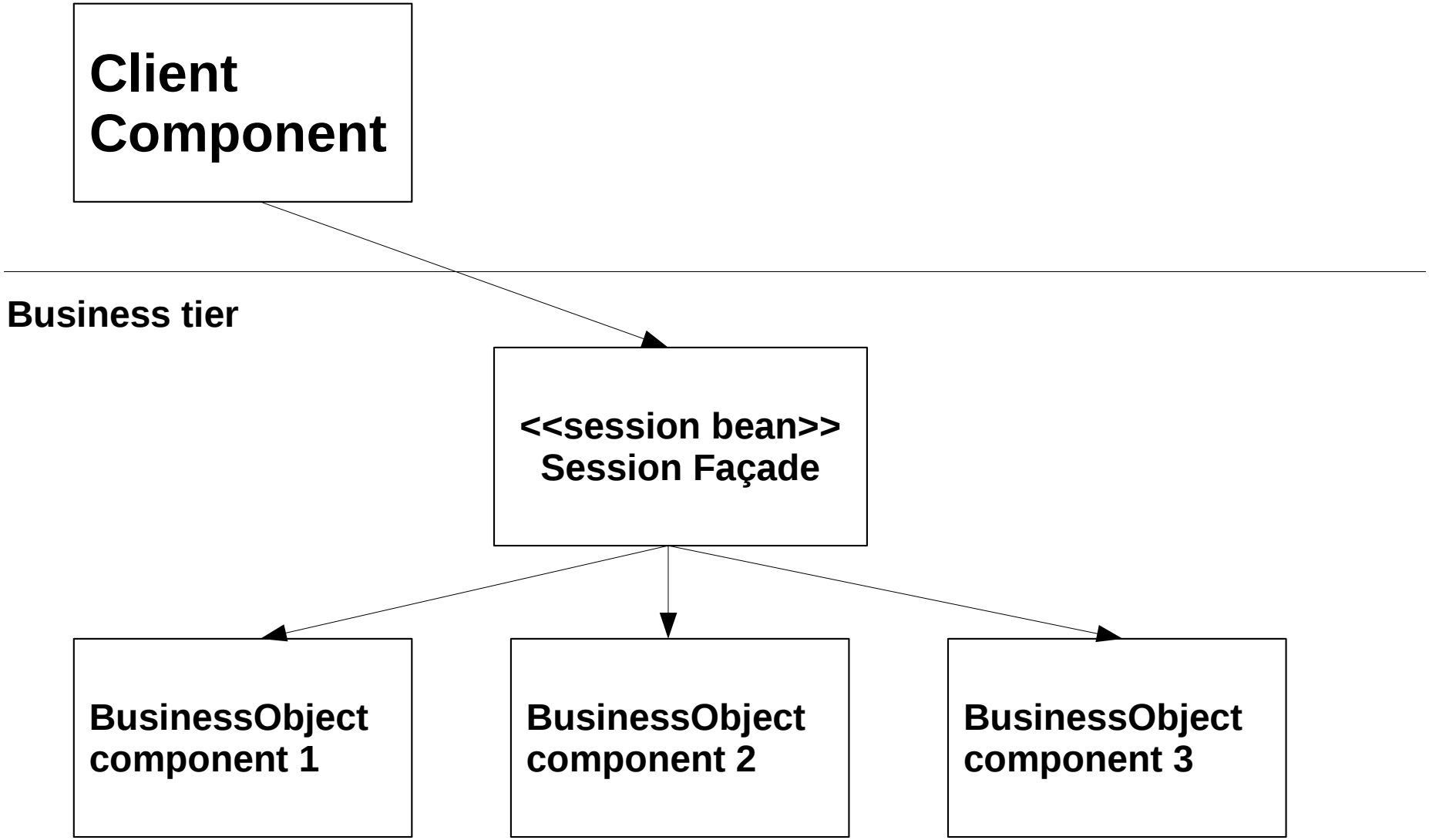
Session Façade

- This business tier pattern aims to encapsulate the details of complex interactions between business objects. A session façade for a group of business objects manages these objects and provides a simplified coarse-grain set of operations to clients.

- Interaction between a client and multiple business objects may become very complex, with code for many use cases written in the same class

- Instead this pattern groups related use cases together in session facades

Architecture of session Façade



Pattern elements

- Elements of the pattern are:
  - **Client**: client of session façade, which needs access to the business service
  - **SessionFacade**: implemented as a session bean. It manages business objects and provides a simple interface for clients
  - **BusinessObject**: can be session beans or entity beans or data

Pattern elements (cont.)

- Several related use cases can be dealt with by a single session façade – if these use cases have mainly the same business objects in common

- Example: CustomerControllerBean, AccountControllerBean, TxControllerBean

Notes

- Need to be careful when writing session façades
  - Common functionality should be grouped
  - Each façade should not handle *too* much or run the risk of becoming a “god bean”*

*http://www.jguru.com/faq/view.jsp?EID=1060330