UML Component Diagrams

SCS 1310 - Object Oriented Programming and Modelling

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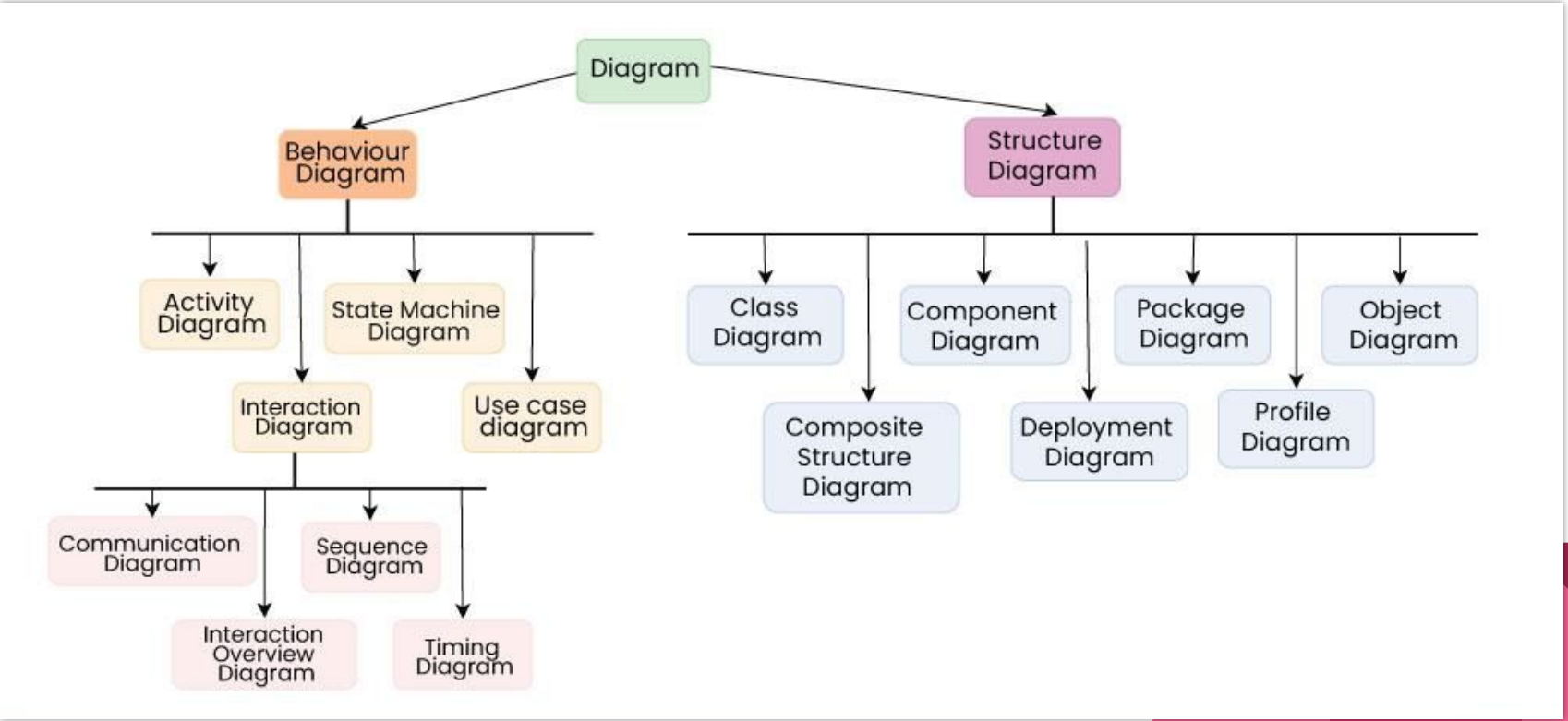
Types of UML Diagrams



What is a Component Diagram?

- Shows how the components of a system are arranged and relate to one another.
- Describes the different elements required for implementing a system.
- Component diagrams can be used to
  - Model the components of a system
  - Model the database schema
  - Model the system’s source code

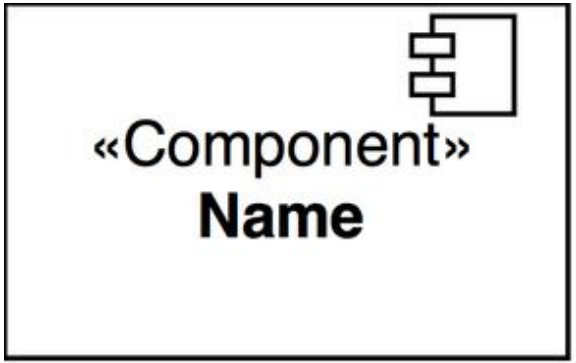
Class diagram vs Component diagram

	Class diagram	Component Diagram
Element Description	Represents a template or blueprint for objects	Represents a modular and reusable part of a system or software application. Encapsulates a set of related classes, interfaces, and dependencies
Associated UML Diagram	Show the static structure of a system, including classes, their attributes, methods, and associations between classes	Show the high-level structure of a system in terms of its components and how they interact with each other
Use Case	For object-oriented design and analysis	Useful in software development to represent the modular structure of a system

Basic components of a component diagram

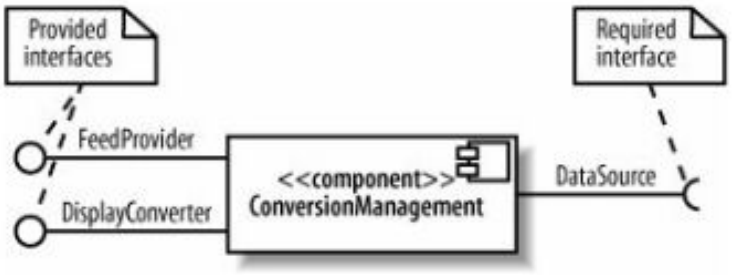
Component

- Represent modular parts of the system that encapsulate functionalities
- Components can be software classes, collections of classes or subsystems.
- Component can be represented as
  - A rectangle with the stereotype text and/or icon
  - Component stereotype provides visual cues about roles played by the component in a system.
  - Example Stereotypes:
    - <<component>>
    - <<subsystem>>



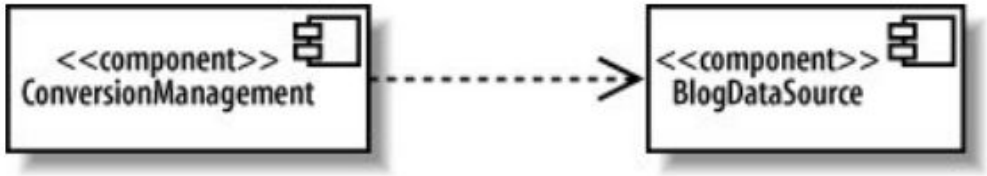
Interface

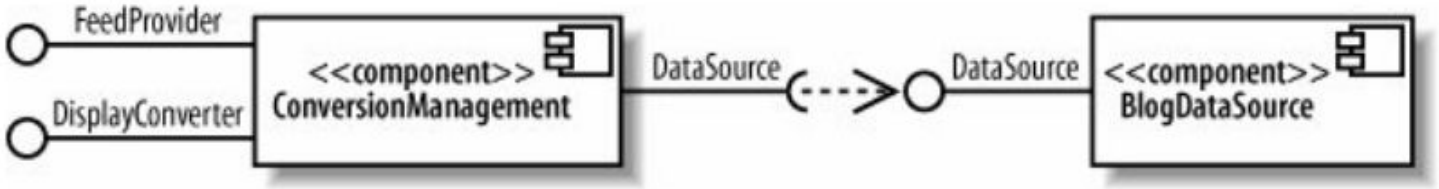
- Specify a set of operations that a component offers or requires.
- Serving as a contract between the component and its environment.
- A full circle represents an interface created or provided by the component.
- A semi-circle represents a required interface.



Dependencies

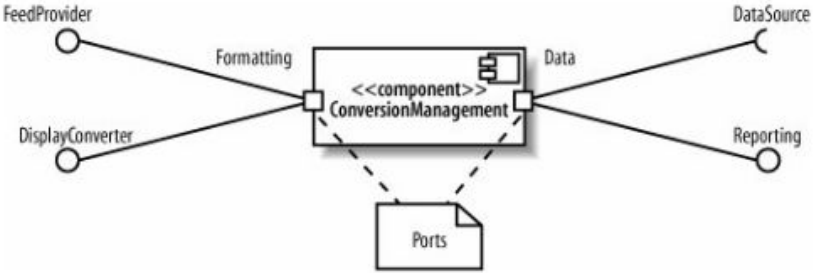
- Draw dependencies among components using dashed arrows.





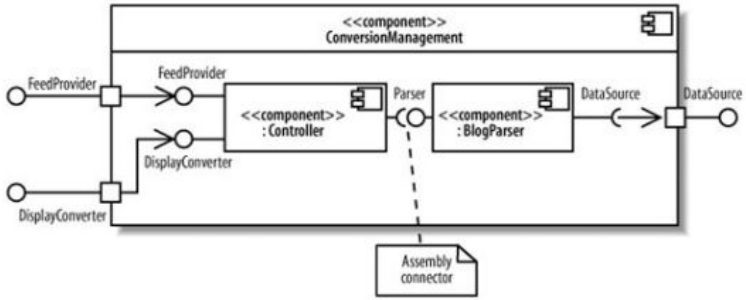
Port

- Ports are represented using a square along the edge of the system or a component.
- A port is often used to to model distinct ways that a component can be used with related interfaces attached to the port.



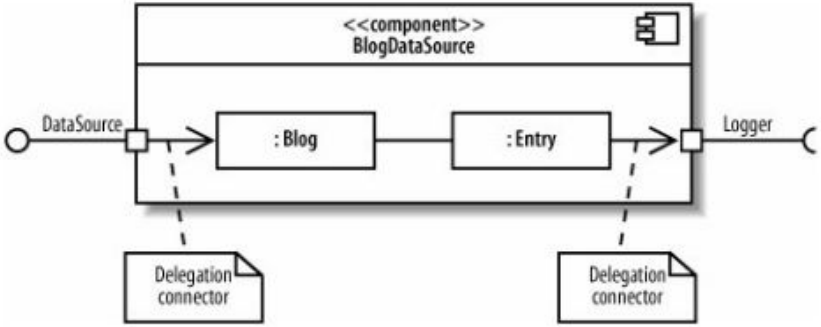
Connectors

- Two kind of connectors
  - Assembly connector
  - Delegation connector
- **Assembly connector**
  - Show that a component requires an interface that another component provides.
  - Snap together the ball and socket symbols that represent required and provided interfaces.



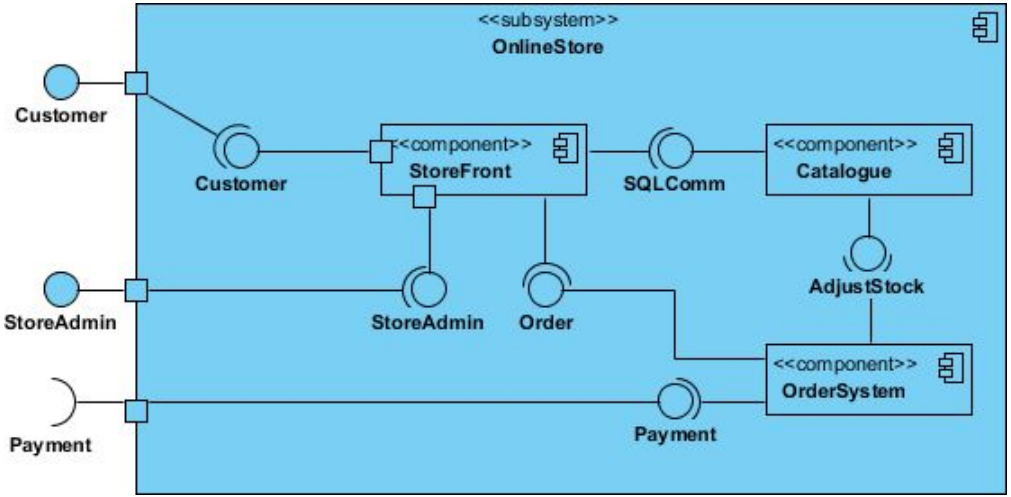
Connectors

- **Delegation Connector**
  - Links the external contract of a component to the internal realization.
  - A port may delegate to a set of ports on subordinate component.
  - Message and signal flow will occur between the connected ports.



Subsystem

- The subsystem classifier is a specialized version of a component classifier.
- A subsystem is a secondary or subordinate system that's part of a larger system.
- Subsystem notation element inherits all the same rules as the component notation element.
- The only difference is that a subsystem notation element has the keyword of subsystem instead of component.



UML component diagram : eCommerce system