**Student Information**

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Course: Enterprise Architecture

**Class Exercise 1**

**Scenario for the Exercise:**

Imagine you are a part of the IT team for a medium-sized online bookstore. Currently, the system has different components for managing books, customers, and payments, but each component works independently, causing delays and inefficiencies. The bookstore wants to improve customer experience by integrating all these components into a unified system using SOA.

Your task is to help the bookstore create a simple SOA-based architecture that connects these services and makes the system more efficient

**Q1.** **Can you describe how these layers would work together for a customer buying a book on the website? (Hint: Think about how the website interacts with the services and how services interact with the data.**

**Answer 1**: There are 3 layers

* Presentation Layer: This layer is used to interact with the users from their computer/mobile, see the books list, login/signup, viewing cart and orders, and paying for the orders.
* Business logic Layer: This layer is the main backbone and does all the calculations in a server like, when a user opens a book details, it will send the details to the client devices and if they add it to their cart, the details will get stored in the database.
* Operational systems Layer: This is the brain of the application and is used to store all kinds of data ranging from user accounts, payment & order details to inventory data.

**Q2.** **Can you suggest three services the bookstore might need in the Business Logic Layer? For each service, write one or two sentences explaining what it does. (Hint: Think about what happens when someone buys a book.)**

**Answer 2**: There will be 3 + 1 (Additional) services.

1. Orders Service: In this, users will make orders from the actual product page, validates the user request with the inventory service to check if the product actually exist and have number of stocks for this order.
2. Payment Service: This service is used to collect money from the users from various payment gateways (Banks, PayPal, Stripe, etc) and also to store the payment history information in database for future references.
3. Inventory service: This service has the list of all the books available in the store and it stores every information about a book i.e. category, title, description, price, ref number, stock available, etc.
4. User Accounts service: It is used for register, login and everything related to user accounts.

**Q3.** **Why is it helpful to reuse the same service for multiple parts of the system? (Hint: Think about how reusing services might save time or prevent errors.)**

**Answer 3:** Reusing the same service in other places or maybe in other projects will save a lot of time and money that is involved in development and testing. Because that service is battle-tested and maintained for many months or years, and it will be relatively stable when compared to developing a new system. And if the service is designed and developed in such a way for re-usability, like using feature flags and properties that able to toggle when not needed, this will enable to reuse these services wherever possible

**Q4.** **What are two key benefits the bookstore would get from using SOA? (Hint: Think about how it could improve efficiency and reduce costs.)**

**Answer 4:** Using Service-Oriented Architecture has several benefits, In terms of development, only some part of the team needs to diagnose what the issue is, because if an issue occurs in a system it is easy to find which part of the service is broken or need to be fixed. Reusability is another benefit, using a service in multiple places by modifying some parts of it as it reduces cost and time it takes, and have fewer bugs.

**Q5. How can using SOA make it easier to add these new features to the system?**

**Answer 5:** Using Service-Oriented Architecture will greatly reduce time and money to build a new service for every features if there is a possibility to reuse the existing system, like for the eBooks and audio books, they just need to modify the inventory service a little bit and introduce a new property to the book in database called category to know what kind of product the user needs and to show them.

**SOA solution diagram**

