Assignment 1

Functional Decomposition and Service Composition

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1 Domain, Sub-Domains, and Bounded Contexts

The smart shopping application's domain is solely focused on suggesting a list of stores by applying selected criteria on a shopping list. Following activities are performed in the domain's main functionality:

1. User browses products;
2. User adds product(s) in a shopping list;
3. User selects a criteria, i.e., sort shopping list by products price or store distance;
4. Application applies the selected criteria on the shopping list and suggests a list of stores;

The domain also contains various other activities, e.g., add/update products, application display single product, etc. These activities are not considered in the main functionality because they do not focus on the core problem. Therefore, we call them secondary activities. The domain is divided in to following sub-domains:

- *User sub-domain*: The scope or bounded context of this sub-domain is to manage user information.
- *Shopping list sub-domain*: The scope or bounded context of this sub-domain is to manage shopping list information.
- *Product sub-domain*: The scope or bounded context of this sub-domain is to manage product information.
- *Store sub-domain*: The scope or bounded context of this sub-domain is to manage store information.
- *Scraping sub-domain*: The scope or bounded context of this sub-domain is to scrape products information from available store's websites.
- *Suggestion sub-domain*: The scope or bounded context of this sub-domain is to provide suggestion by applying selected criteria on a shopping list.
- *Map sub-domain*: The scope or bounded context of this sub-domain is to display available stores on map.

2 Services, and their APIs and Collaborations

Each sub-domain is mapped to a specific service. Below is the list of services:

1. *User service*: is mapped from user sub-domain.
2. *Shopping list service*: is mapped from shopping lists sub-domain.
3. *Product service*: is mapped from product sub-domain.
4. *Store service*: is mapped from store sub-domain.
5. *Scraping service*: is mapped from scraping sub-domain.
6. *Suggestion service*: is mapped from suggestion sub-domain.
7. *Map service*: is mapped from map sub-domain.

Below is the list of system operations that are mapped to the services:

1. *Create a user*: operation invokes by external client. The user service implements it without the collaboration of any other service.

2. *Create a shopping list*: operation invokes by external client. The shopping list service implements it without the collaboration of any other service.

3. *Create a product*: operation invokes by external client and scraping service. The product service implements it without the collaboration of any other service.

4. *Create a store*: operation invokes by external client. The store service implements it without the collaboration of any other service.

5. *Retrieve products*: operation invokes by external client. The product service implements it without the collaboration of any other service.

6. *Retrieve a product*: operation invokes by external client. The product service implements it without the collaboration of any other service.

7. *Retrieve nearby stores*: operation invokes by external client. The store service implements it without the collaboration of any other service.

8. *Retrieve websites*: operation invokes by scraping service. The store service implements it without the collaboration of any other service.

9. *Retrieve a suggestion*: operation invokes by external client. The suggestion service implements it without the collaboration of any other service.

10. *Update a shopping list*: operation invokes by external client. The shopping list service implements it without the collaboration of any other service.

11. *Update a product*: operation invokes by external client. The product service implements it without the collaboration of any other service.

12. *Update a store*: operation invokes by external client. The store service implements it without the collaboration of any other service.

13. *Delete a product from a shopping list*: operation invokes by external client. The shopping list service implements it without the collaboration of any other service.

14. *Scrape products from websites*: operation invokes automatically (time interval). The scrapping service implements it with the collaboration of store service. First, this operation collects websites from store service by invoking its *Retrieves Websites* operation. Then, it scrapes products information from the websites. When all the websites are scraped, this operation sends the scraped data to product service by iteratively invoking its *Create a product* operation.

3 BMPN Work-Flow

The BMPN work-flow of main functionality is formulated according to orchestration approach, see figure 3.1.

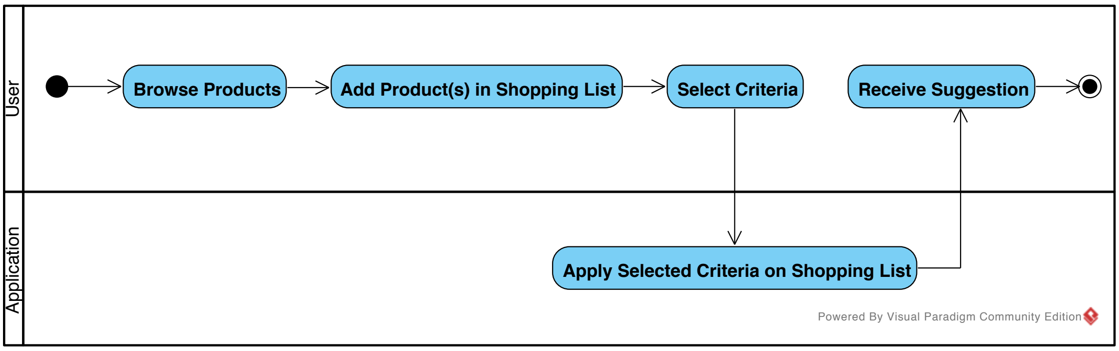
User
Application
Browse Products
Add Product(s) in Shopping List
Select Criteria
Receive Suggestion
Apply Selected Criteria on Shopping List
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Figure 3.1: BMPN work-flow

We chose this approach because all the activities in the work-flow are in sequential order and performed in same organization as a single process. Moreover, no external service is interacting in the work-flow.

There are two actors in the BMPN work-flow. First, the user, i.e., the client side. Second, the application, i.e., the server side that includes all the services. The description of the work-flow is as follows:

1. Work-flow begins.
2. User browses the products. Here, one may argue that why this work-flow is not showing that products are fetched from the application. As we mentioned above, we call these activities as secondary activities. Therefore, we start when user already received the products.
3. User adds products in shopping list. Here, we assume that user add at least one product in shopping list.
4. User selects a criteria, i.e., by products price or store distance. This activity sends selected criteria and user's shopping list to application.
5. Application applies selected criteria on shopping list. This returns a list of stores that are sorted according to the selected criteria.
6. User receives suggestion, i.e., a sorted list of stores, from the application.
7. Work-flow ends.

Time Log

Task	**Time**
Domain, Sub-Domains, and Bounded Contexts	22 hrs
Services, and their APIs and Collaborations	18 hrs
BMPN Work-Flow	15 hrs
Presentation	30 min

The assignment was challenging and took lot of time to understand the concepts. I went through many cycles to remove unnecessary information from this report.