ADD Iteration 1

Step 1: Considered Inputs

Descriptions

User Stories

Name	Description
US01 - Register User	As a User I want to register myself in the application so that I use it

Quality Attributes

Name	Description
QA1 - Maintainability	The prototype should be implemented in a way so that future problems/bugs found during the development, deployment and possibly support can be resolved quickly without major costs.
QA2 - Complexity	The complexity of prototype shouldn't surpass certain limits due to the simplicity of the context.
QA3 - Modifiability	Future updates of the prototype should be simple and low cost. For example, the prototype must be implemented in a way that it will not fail if, for some reason, the ports of the services are changed.
QA4 - Scalability	The prototype must support scalability by thinking in future features that can be implemented. For example, the addition of a new microservice should be as simple as smooth as possible.

Concerns

Name	Description
CON1 – Prototype accessible from the web	The developed prototype must be accessible using a web browser.

Name	Description
CON2 – Developer staff and deadline	<span>The team must develop the prototype in six weeks, being the delivery deadline on the 22nd of December of 2022. </br>The team was constituted by four members.
CON3 – Authentication and Authorization	The prototype must contain Authentication, so that only registered user can access it, and Authorization, so that certain features can be limited to certain users.
CON4 – Multiple ports	With multiple microservices, using different ports, there can be confusion in the frontend (Single Page Application) on which port to call.

Architectural Constraints

Name	Description
CRN1 - Microservices	The monolithic developed in the first part of the project must be divided into microservices.
CRN2 – Data Migration	The data in the monolithic, developed in the first part of the project, must be migrated to their respective new database (in each microservice).
CRN3 - Deployment	The deployment of the prototype should be, ideally, based on containers.

Technology Constraints

Name	Description
TC1 – The use of two or more programming languages	The prototype must be developed using two, or more, programming languages.

Name	Description
TC2 – Open-source tools only	Only open-source tools are allowed in the development of the prototype.
TC3 - GraphQL	The team must analyse GraphQL and its suitability to the project. However, the tool might, or not, be used in the final version of the prototype.
TC4 - Open API (Swagger)	The Open API (Swagger) must be used for the documentation of the API.
TC5 - ContextMapper	ContextMapper must be used for the creation of a context map.

Priorities

User Story

Name	Importance	Difficulty
US01 - Register User	High	High

Quality Attributes

Name	Importance	Difficulty
QA1 – Maintainability	High	Medium
QA2 – Complexity	Medium	Low
QA3 – Modifiability	High	Medium
QA4 - Scalability	Low	Medium

Concerns

Name	Importance	Difficulty
CON1 – Prototype accessible from the web	High	Medium

Name	Importance	Difficulty
CON2 – Developer staff and deadline	High	High
CON3 – Authentication and Authorization	High	Medium
CON4 – Multiple ports	Medium	Medium

Architectural Constraints

Name	Importance	Difficulty
CRN1 – Microservices	High	High
CRN2 – Data Migration	High	High
CRN3 – Deployment	High	High

Technology Constraints

Name	Importance	Difficulty
TC1 – The use of two or more programming languages	High	Medium
TC2 – Open-source tools only	High	Low
TC3 - GraphQL	Medium	High
TC4 - Open API (Swagger)	High	Medium
TC5 - ContextMapper	Medium	Medium

Step 2: Establish iteration goal and select inputs to be considered in the iteration

The iteration goal is to decompose the monolithic into microservices while addressing the following main drivers:

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* User Stories: US1
* Quality Attributes: QA1
* Concerns: CON3
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 * Architecture Constraints: CRN1, CRN2, CRN3
 * Technology Constraints: TC1, TC3, TC4
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Step 3: Choose one or more elements of the system to decompose.

The elements to refine are the previously mentioned drivers.

The monolithic will be decomposed into microservices.

Step 4: Choose design concepts that satisfy the selected drivers

Design Decisions and Location	Rationale and Assumptions
Update the existing Domain Driven Model for the application	The diagram describing the relationships between the different aggregate roots, entities and value objects, created in the first part of the project, must be updated due to the addition of new features.
Create a Context Map for the application	A context map specifying all the contexts of the application and their relationships must be created.
Create a Deployment Diagram for the application	There must be a diagram describing the different components and their interactions.
Create Sequence Diagrams for the application	Diagrams to demonstrate the flux of information related to the primary features.

Design Decisions and Location	Rationale and Assumptions
Create a Components Diagrams for the application	There must be a diagram describing the different components and their interactions.

Step 5: Instantiate architectural elements, allocate responsibilities, and define interfaces

MicroService Migration

The monolithic was decomposed into microservices by root entities defined in the **Domain Driven Model**. This can also be seen as business capabilities.

Microservice Name	Business Capability	Responsibility
User Auth	User management	Management of users, authentication and authorization.
Sandwich	Sandwich Management	Management of sandwichs.
Order	Order Management	Management of orders made by costumers.
Shop	Shop Management	Management of shops.
Promotions	Promotions Management	Management of local and global promotions of sandwichs.

In the first part of the project, it was decided to merge the manager and costumer aggregate in the microservice User Auth to address **CON3**.

Patterns

Pattern	Description
Strangler Fig Apllication	This pattern aims to incrementally re-write small parts of the codebase until we have strangled all our old codebase and we can be totally removed it. Using this pattern rollbacks are easier, reduces the risks when the codebase is updated. https://www.freecodecamp.org/news/what-is-the-strangler-pattern-in-software-development/
API Composition	It is a run-time composition that loads data in-memory through an API Composer Service built on the top of two or more services. This pattern should be used whenever is possible, but because of its in-memory load nature must be used carefully and only when the data to load is relatively small. https://www.linkedin.com/pulse/api-composition-pattern-microservices-arpit-bhayani/

Microservice Comunication

Step 6: Sketch views and record design decisions

Domain Driven Design

Domain Driven Design

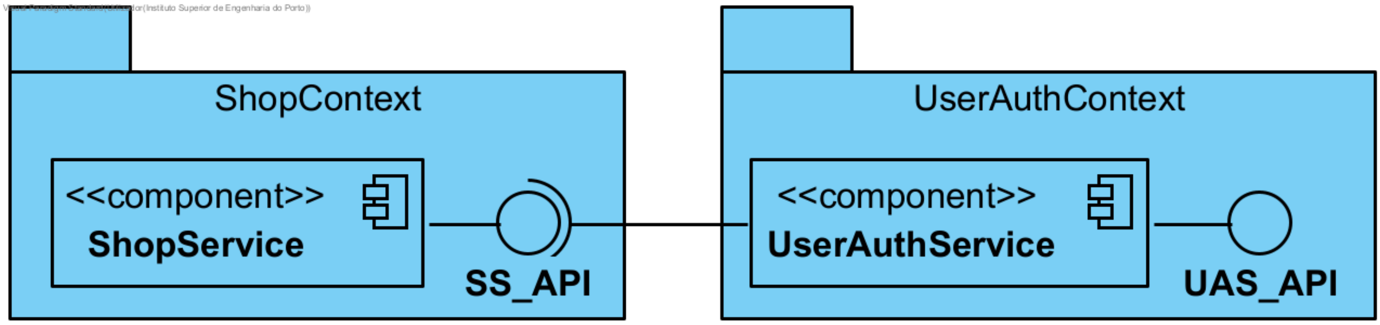
The Domain Driven Design model remains almost the same. The updates were:

User Aggregate

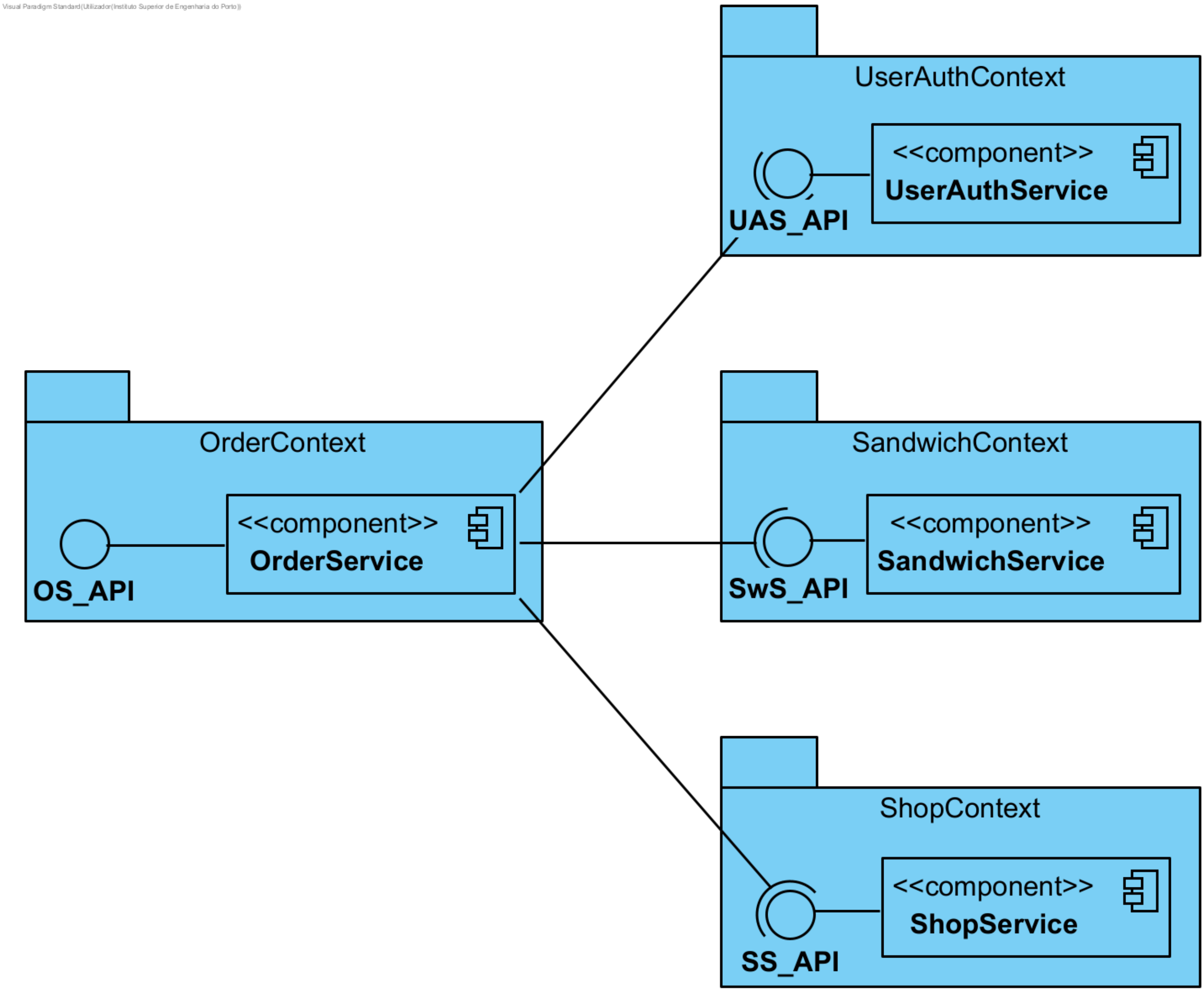
The Manager Aggregate and Costumer Aggregate in order to address the **CON3**. The User class has the attributes for the authentication and authorization and is the superclass of Manager and Costumer. Manager and Costumer classes remains with their unique attributes from the last iteration.

Component Diagrams

In order to increase the visibility of the component diagrams, the group decided to create one diagram for each context with the connections/binding made to its API.



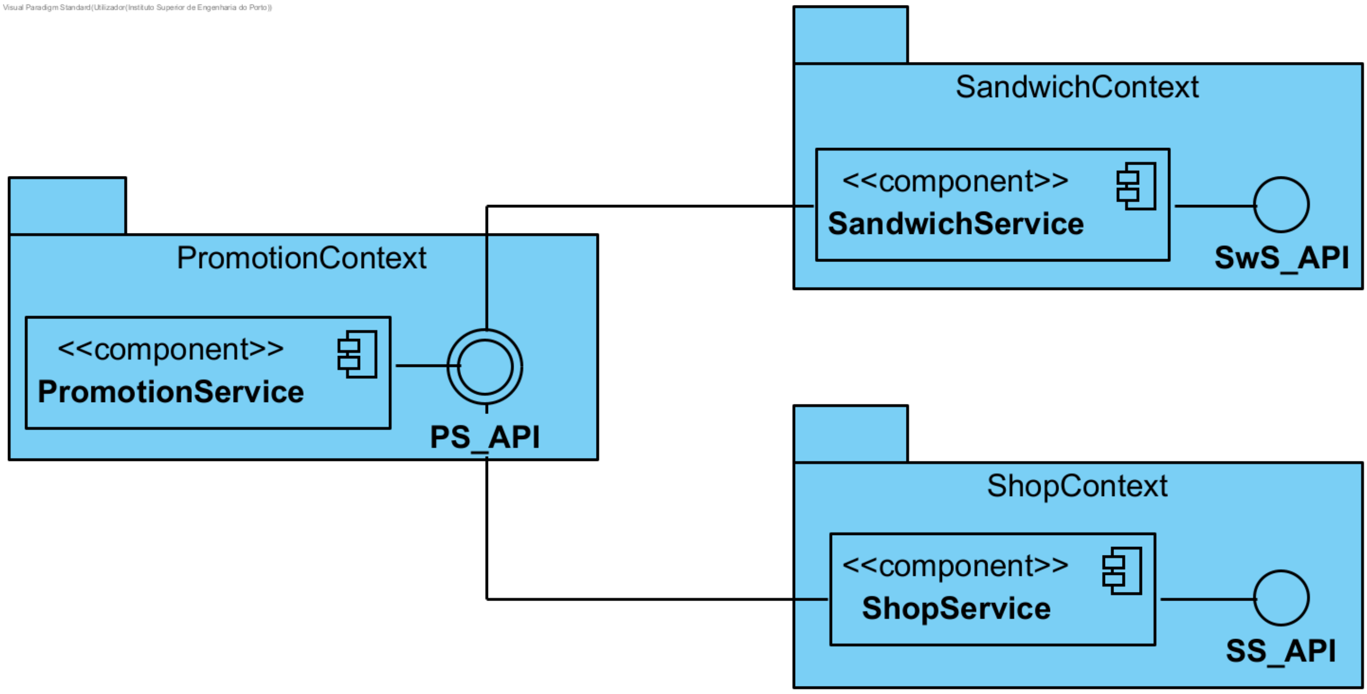
UserAuthService uses the Shop API to verify if the shop associated to the manager exists.



OrderService uses the Shop API to verify if the shop associated to the order exists.

OrderService uses the UserAuth API to verify if the costumer associated to the order exists.

OrderService uses the Sandwich API to retrieve all the sandwiches within an order.



SandwichService uses the Promotion API to retrieve the promotions of a sandwich.

ShopService uses the Promotion API to retrieve the promotions of a shop.

Context Map

Domain Driven Design

The context map describes the different microservices that were created for the prototype, having the monolithic built in the first part in mind. The team achieved, after many meetings, this context map that explains and demonstrates how the contexts communicate with each other. The definition of some properties used in the context map are explained below.

- OHS (Open Host Service): This protocol defines and gives access to different contexts, which means that it can communicate with other bounded contexts through domain events that use different bounded context.
- Upstream and Downstream: Upstream term define the context that transmit information/data to other contexts and can influence the downstream contexts. Upstream contexts usually have impact in different context because of the fact that they have data for the other contexts to work properly.

Step 7: Analyse current design, and review iteration goal + achievement of design purpose

Iteration 1

Not Addressed	Partially Addressed	Completely Addressed
CRN3	QA4	QA1
TC1	CON3	QA3
-	CON4	TC2
-	CRN1	TC4
-	CRN2	TC5
-	TC3	-