

COMP5047 Group Coursework

Task 1: Organisation of the Team and Project Management (20 Marks)

The part that was assigned to me for task 1 is CloudTables-Service. The CloudTables-Service subsystem improves restaurant service staff's everyday responsibilities and customer interactions by using modern online technologies and cloud infrastructure to increase efficiency and minimise errors. The CloudTables-Service subsystem provides a platform for real-time table booking administration, allowing service staff to check availability, change table statuses, and accommodate walk-ins without overbooking. It also links with the CloudTables-Customer subsystem to provide proper table availability for customers via the mobile app and avoid system errors.

The subsystem will handle food orders, allowing staff to either take them directly from clients or obtain them using the CloudTables-Customer mobile app. Orders can be read, updated, and submitted to the kitchen in real time, with clear indications of specific requests or dietary restrictions. The subsystem will offer order tracking, allowing workers to monitor order status throughout the preparation and delivery process. Integration with the cloud helps to decrease communication delays. The CloudTables-Service subsystem supports payment processing, allowing staff to generate bills, handle split payments, and accept a variety of payment methods such as cash, credit/debit cards, and things like Apple pay/Google pay. This integration guarantees secure transactions and precise financial data logging. Customers can settle bills using the app, and staff receive real-time alerts of successful payments. The CloudTables-Service subsystem design values user experience, guaranteeing that staff can learn quickly and with minimal training. The UI is responsive to desktop and tablet screens, with straightforward navigation. Accessibility features like different languages and customisable display settings can be included to cater to a wide range of user needs which allows the system to be flexible.

The CloudTables-Service subsystem will use a cloud-based backend for data storage, synchronisation, and processing, ensuring that service staff operations are accurately reflected throughout all subsystems. This integration requires careful design and implementation of APIs, authentication protocols, and data models to assure stability and security, as an occupied table will update availability in the app that the customers use. The subsystem's development prioritises security and data privacy by encrypting all communications between the client-side interface and cloud servers to protect sensitive information such as customer payment details and personal preferences, as well as implementing role-based access controls for employees.

In conclusion, the CloudTables-Service subsystem is a comprehensive solution that simplifies restaurant operations for service staff. It provides capabilities for managing table reservations, processing orders, addressing customer requirements, and analysing performance. It interfaces with other CloudTables subsystems to provide a unified experience for all parties involved.

Task 2: Analysis and Specify Software Quality Requirements (20 Marks)

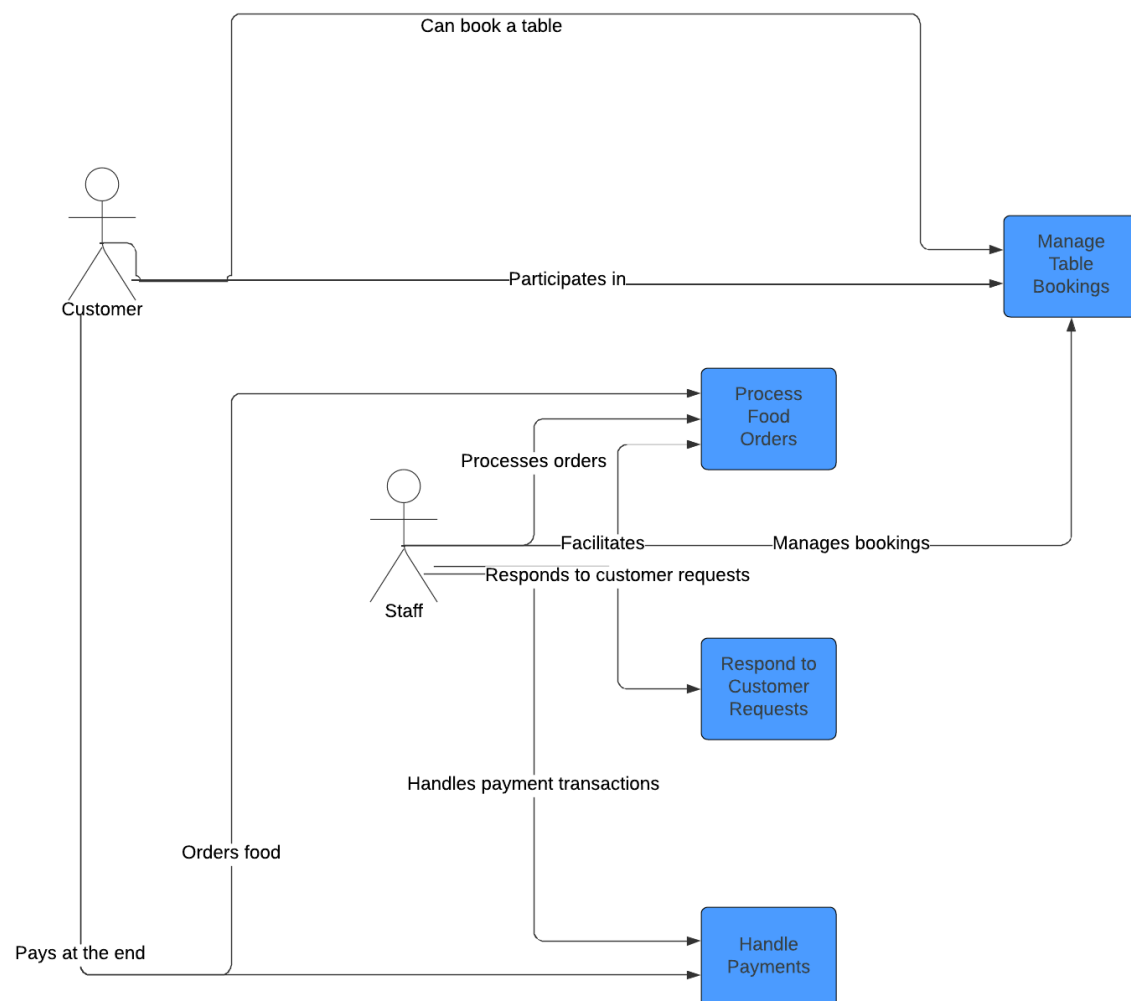
The part that was assigned to me for task 2 is Reliability. The reliability of the CloudTables-Service subsystem is an important quality attribute that guarantees the system continuously performs its intended functions under specified conditions. It has a direct impact on the restaurant staff's capacity to provide consistent service, keep customers satisfied, and get rid of inefficiencies. A comprehensive strategy to establish and execute reliability requirements is required to meet these objectives.

The CloudTables-Service subsystem's reliability is defined as the system's ability to function continuously without failure, recover quickly from unexpected disruptions, and manage error scenarios. This subsystem must deal for a variety of real-world situations, including inconsistent internet connectivity, user faults, and unanticipated increases in demand during peak service hours. By addressing these issues, the subsystem may reduce downtime and provide a consistent experience for the service workers. In order to achieve high reliability, the subsystem has to include fault tolerance techniques, such as implementing redundancy for important components and performing periodic health checks on both front-end and backend components. Error handling is another important part of reliability, with the CloudTables-Service interface built to identify and respond to issues in real time, offering clear feedback to users.

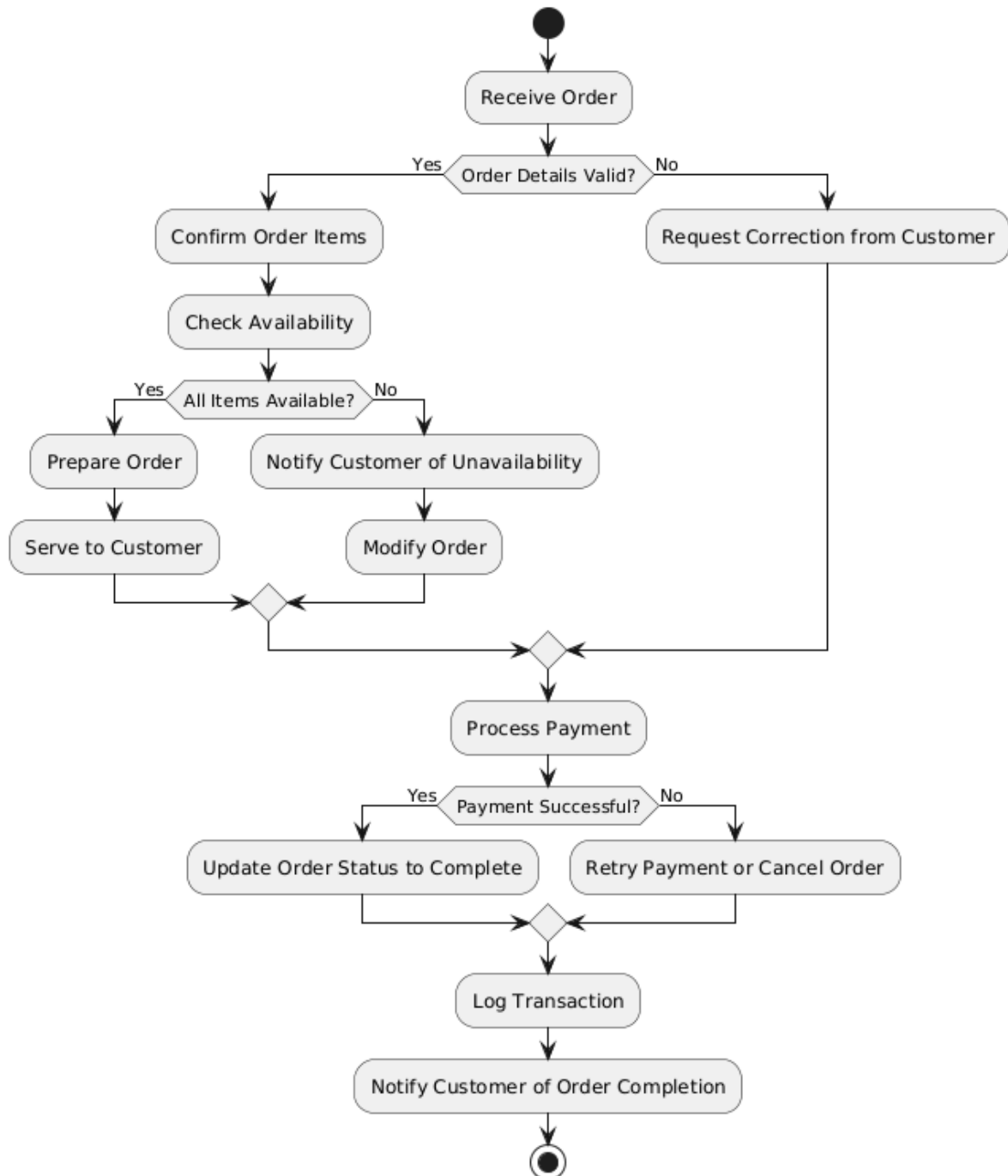
Data integrity is a critical component of system reliability, with the subsystem assuring proper capture and safeguarding of data such as table statuses, order details, and payment records using transactional processes in the cloud database. Regular automated backups of essential data offer further protection against data loss in the event of unexpected failures. System tracking and recording are critical components of ensuring long-term reliability. The subsystem will include tools for monitoring system health, tracking performance indicators, and logging events which allows for quick discovery and diagnosis of problems. Analysing logged data can also help to improve system structure and performance over time.

In short, the CloudTables-Service subsystem's reliability is a critical component of its quality, delivering a high level of functional stability. It will continue to maintain this reliability over time thanks to comprehensive testing and regular monitoring, giving restaurant staff a solid tool to support their jobs.

Task 3: Specification and Modelling Software Functional Requirements (20 Marks)

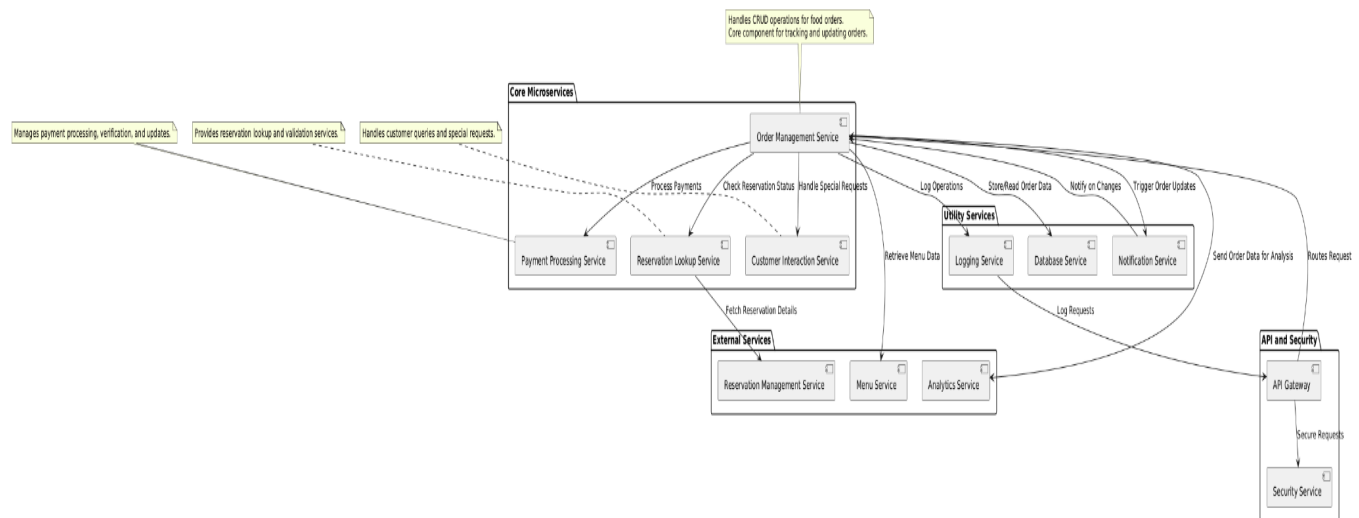


Creating a Use Case Diagram for the CloudTables-Service subsystem with an emphasis on user-system interactions was task A. As the main actor, the service staff was defined in the diagram along with the main use cases they would deal with, including receiving payments, processing food orders, managing table reservations, and attending to customer requests. To show the Service Staff actor's interaction with the system, each use case was linked to them. The objective was to provide an overview of the system's activities from the viewpoint of the support staff by clearly describing the subsystem's essential functionalities.



For Task B, an Activity Diagram was made to show how the CloudTables-Service subsystem's ordering food use case operates. It offers an illustration of the series of actions taken by staff when processing a food order. After the customer's order is received, the procedure begins with item confirmation, payment processing, and order status updating. Important decision points serve as conditional actions that guarantee adaptability and flexibility in handling different situations. The diagram serves as a useful guide for comprehending the workflow and spotting any possible holes or enhancements in the system's functionality since it clearly illustrates the interactions between service personnel and the system. Additionally, it contributes to improving the overall quality of the service.

Task 4: Software Architectural Design (20 Marks)



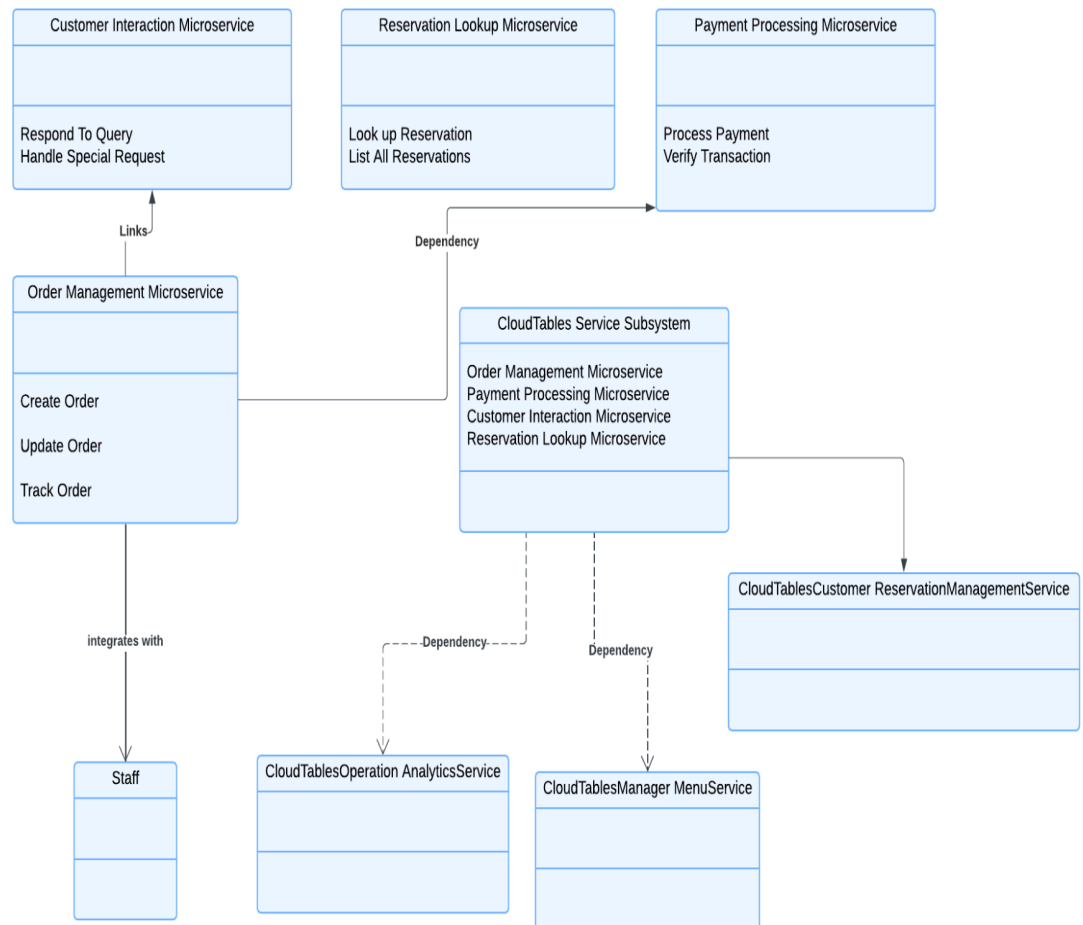
For Task 4, the CloudTables-Service subsystem was created using the microservices architecture method. The subsystem is separated into several separate microservices, each of which is in charge of a certain function. Order administration, payment processing, customer service, and reservation lookups are a few of these. The fundamental component that makes it easier to create, update, and track food orders is the Order Management Microservice. In order to guarantee accurate handling, it links with the service personnel. All payment-related operations, including transactions, verification, and record updating, are managed by the Payment Processing Microservice. The Customer Interaction Microservice helps the customer service representatives respond to questions and special requests from customers. The reservation booking details are accessible to the service staff using the Reservation Lookup Microservice.

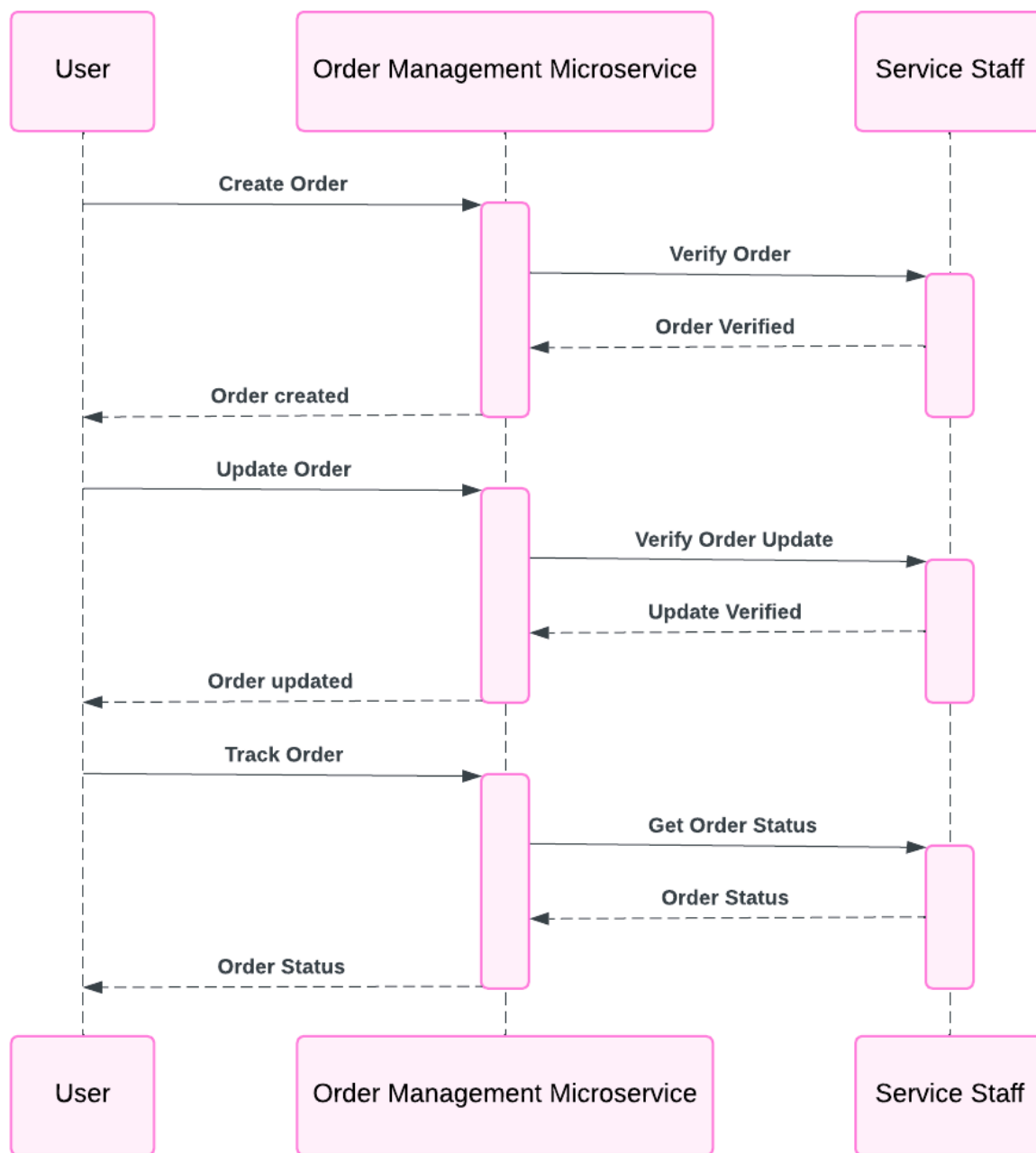
Additionally, the subsystem depends on other subsystems, including the CloudTables-Manager subsystem's Menu Service, the CloudTables-Customer subsystem's Reservation Management Service, and the CloudTables-Operation subsystem's Analytics Service. RESTful APIs (Representational State Transfer application programming interface. It is a way for systems to exchange information on the net.) provide communication between these microservices, increasing their flexibility. Essential data is stored and synced across subsystems using shared resources, such as a single cloud database.

Through integration with other system components, this architectural design guarantees that the CloudTables-Service subsystem operates as a stand-alone, maintainable component. Because each service can be independently deployed to meet demands, the microservices model promotes dependability and ease of operation.

Task 5: Software Detailed Design (20 Marks)

5a) Class Diagram





This assignment was an element of a group project in which I worked with three other people. We undoubtedly could have done better in a few areas. For instance, I believe that our initial communication was not as effective as it may have been. This resulted from the fact that at first, not everyone could meet at the same time. However, after we were able to meet on a regular basis, our communication and feedback improved significantly. Furthermore, this group project taught us the difficulties and abilities of working as a team, such as ensuring that our work aligned with one another. I was particularly thankful for the opportunity to support one another rather than attempt to complete the task alone. All things considered, the project was really beneficial and I'm glad I had the chance to work on it.

-

