Data Warehousing with IBM Cloud Db2 Warehouse

**Phase 2 Submission Document**

**Introduction:**

In this submission, we present the progress and plans for Phase 2 of the Data Warehousing project, leveraging IBM Cloud Db2 Warehouse. Our project aims to create an efficient data warehousing solution that supports data collection, storage, and analysis. Phase 2 focuses on detailed system architecture, database design, user authentication, data modeling, testing, optimization, deployment, and continuous improvement.

**Step 1: Detailed System Architecture**

**Frontend Architecture:**

* Selected a frontend framework (e.g., React) to create a responsive and user-friendly interface for data access and reporting.
* Designed a modular structure for components (e.g., Dashboard, Data Exploration, Reporting) to enhance scalability.

**Backend Architecture:**

* Leveraged IBM Cloud Db2 Warehouse's capabilities for hosting the data warehousing application.
* Implemented a microservices architecture to ensure flexibility and scalability in data processing.

**Step 2: Database Design and Implementation**

**Database Schema:**

* Designed a relational database schema to efficiently store and manage structured data from various sources.
* Ensured the schema accommodates product attributes, user profiles, and transaction records.

**Data Storage:**

* Utilized IBM Cloud Db2 Warehouse for robust and secure data storage, maintaining data integrity and reliability.

**Step 3: User Authentication and Authorization**

**User Registration:**

* Developed user registration functionality for authorized data access.
* Implemented user roles (e.g., data analysts, administrators) for controlled access.

**Authentication Protocols:**

* Employed secure authentication protocols (e.g., OAuth) to protect user credentials and data.

**Authorization Levels:**

* Defined authorization levels to regulate access to specific data and functionalities based on user roles.

**Step 4: Data Modeling and Integration**

**Data Modeling:**

* Created data models to ensure the efficient organization of data in the warehouse, supporting analytical queries and reporting needs.

**Data Integration:**

* Integrated data from various sources into a unified format compatible with the data warehouse schema.

**Step 5: Testing**

**Functional Testing:**

* Conducted thorough testing of each functionality, including data extraction, transformation, loading, and querying.

**Performance Testing:**

* Assessed the platform's performance under various data volumes and user loads, ensuring responsiveness and scalability.

**Step 6: Optimization and Scaling**

**Performance Optimization:**

* Identified and addressed performance bottlenecks to optimize query execution and data processing.

**Step 7: Deployment**

**Deployment:**

* Deployed the fully functional data warehousing solution on IBM Cloud Db2 Warehouse for production use.

**Step 8: Continuous Improvement**

**Feedback Mechanism:**

* Set up feedback mechanisms for users and stakeholders to provide insights and suggestions for system improvement.

**Iterative Development:**

* Planned regular updates and enhancements to adapt to changing business needs and emerging data trends.