REQUIREMENTS DEFINITION: SCOPE AND CONTENT

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Example of a software project aimed at developing a mobile application for a retail company.

- Here's how the requirements definition phase might unfold:

- **1. Conducting Interviews and Group Sessions:**

- The project team conducts interviews with stakeholders including retail managers, sales staff, and potential customers to understand their needs and expectations from the mobile application.

- Group sessions may be held to brainstorm ideas and gather feedback on potential features and functionalities.

- **2. Reviewing Existing Documentation:**
- The team reviews any existing documentation such as business requirements documents, user stories, and technical specifications related to the project.
- This helps in understanding the context of the project and identifying any gaps or inconsistencies in the requirements.
- **3. Gathering Sufficient Material:**
- Information collected includes details about the company's current retail operations, target audience demographics, competitor analysis, and any regulatory requirements.
- Feedback from stakeholders regarding desired features, user experience preferences, and performance expectations is also gathered.

- **4. Skipped Detailed Documentation:**
- Despite gathering substantial information, the team skips detailed documentation of the requirements definition phase, perhaps due to time constraints or a perceived lack of importance.

Reasons to Commit Results:

- Formal documentation of the requirements definition phase is crucial for several reasons:

- **Basis for Next Phases:** The requirements definition document serves as the foundation for subsequent phases of the project, including design, development, testing, and deployment.

- **Knowledge Preservation:** Formal documentation ensures that vital project knowledge is retained within the project documentation rather than being solely reliant on individual team members. If team members leave the project, the knowledge they've gathered is preserved.

- **Validation with Users:** Formal documentation provides a structured way to validate findings with stakeholders and users, ensuring that their needs and expectations are accurately captured and addressed in the project's deliverables.

Suggested Outline for Requirements Definition Document:

- The team plans to create a formal requirements definition document, which will include:
  - Introduction: Overview of the project and its objectives.
  - Stakeholder Analysis: Identification of key stakeholders and their roles.
  - Business Requirements: Details about the retail company's operations, target audience, and regulatory requirements.
  - Functional Requirements: Specific features and functionalities expected from the mobile application.
  - Non-Functional Requirements: Performance, security, and usability criteria.
  - User Stories: Scenarios describing how different types of users will interact with the application.
  - Acceptance Criteria: Criteria that must be met for the project to be considered successful.
  - Sign-Off: Confirmation from stakeholders that the requirements are complete and accurate.

Let's consider an example scenario where a retail company wants to develop a data warehouse to analyze sales data from various sources:

- **1. Available Data Sources:**
- **Point of Sale (POS) Systems:** These systems record sales transactions at retail stores.
- **Online Sales Platform:** The company's e-commerce website generates online sales data.
- **Customer Relationship Management (CRM) System:** Stores customer information and sales interactions.
- **Inventory Management System:** Tracks inventory levels and product information.
- **Marketing Analytics Platform:** Collects data on marketing campaigns and customer engagement.

- **2. Data Structures within the Data Sources:**
- **POS Systems:** Transactional data structured into tables with fields such as timestamp, product ID, quantity sold, and total sales amount.
- **Online Sales Platform:** Similar to POS data but with additional fields for online transactions such as customer email, shipping address, and payment method.
- **CRM System:** Customer data organized by fields like name, contact information, purchase history, and demographics.
- **Inventory Management System:** Inventory data structured by product ID, quantity on hand, and location.
- **Marketing Analytics Platform:** Marketing campaign data categorized by campaign type, audience demographics, engagement metrics, etc.

- **3. Location of the Data Sources:**
- **POS Systems:** Data stored on on-premises servers at each retail store.
- **Online Sales Platform:** Data stored on cloud servers managed by the e-commerce platform provider.
- **CRM System:** Data stored on a centralized server at the company's headquarters.
- **Inventory Management System:** Data stored on a cloud-based inventory management platform.
- **Marketing Analytics Platform:** Data stored on a cloud-based analytics platform.

- **4. Operating Systems, Networks, Protocols, and Client Architectures:**
- **POS Systems:** Running on Windows-based terminals connected to the company's local network.
- **Online Sales Platform:** Utilizing a cloud-based service accessible via web browsers.
- **CRM System:** Accessed through a web-based interface using standard HTTP protocols.
- **Inventory Management System:** Utilizing a cloud-based service accessed through RESTful APIs.
- **Marketing Analytics Platform:** Accessed through a web-based dashboard using HTTPS protocols.

- **5. Data Extraction Procedures:**
- **POS Systems:** Data extracted daily using automated scripts that connect to each store's database.
- **Online Sales Platform:** Data extracted in real-time via API calls to the e-commerce platform.
- **CRM System:** Data extracted weekly using scheduled data exports from the CRM software.
- **Inventory Management System:** Data extracted monthly using batch processes that retrieve data from the inventory platform's API.
- **Marketing Analytics Platform:** Data extracted monthly via scheduled exports or API calls.

- **6. Availability of Historical Data:**
- **POS Systems:** Sales data available for the past five years.
- **Online Sales Platform:** Online sales data available for the past three years.
- **CRM System:** Customer interaction history available for the past ten years.
- **Inventory Management System:** Inventory data available for the past two years.
- **Marketing Analytics Platform:** Marketing campaign data available for the past five years.
- In this example, the requirements definition document for the data warehouse project would detail each data source's characteristics, including its structure, location, extraction procedures, and historical data availability. This information is crucial for designing an effective data integration process to populate the data warehouse accurately.

Data Transformation

- Data transformation with an example scenario of a retail company building a data warehouse to analyze sales data from multiple sources:

- **1. Listing Relevant Data Sources and Structures:**

- **Point of Sale (POS) System:** Transactional data structured with fields like timestamp, product ID, quantity sold, and total sales amount.

- **Online Sales Platform:** Similar structure to POS data but with additional fields for online transactions such as customer email, shipping address, and payment method.

- **Customer Relationship Management (CRM) System:** Customer data structured by fields like name, contact information, purchase history, and demographics.

- **2. Determining Data Transformation Requirements:**
- **Mapping Source Data to Data Warehouse:**
  - POS and online sales data need to be mapped to a unified schema in the data warehouse, considering differences in field names and formats.
  - Customer data from the CRM system needs to be integrated with sales data, linking customer IDs to transactions.
- **Metrics and Business Dimensions:**
  - Metrics such as total sales, average order value, and customer retention rate need to be calculated from transactional data.
  - Business dimensions such as product categories, customer segments, and geographic regions need to be derived from the source data.
- **Merging, Conversion, and Splitting:**
  - Merging: Combining data from different sources into a single dataset, ensuring consistency and integrity.
  - Conversion: Converting data types and formats as needed (e.g., converting timestamps to a standardized format).
  - Splitting: Breaking down complex data structures into simpler, more manageable entities (e.g., splitting address fields into street, city, state, and zip code).

- **3. Example Data Transformation Steps:**
- **Merge POS and Online Sales Data:**
  - Combine transactional data from both sources into a single dataset, ensuring alignment of fields and data types.
- **Link Customer Data with Transactions:**
  - Use customer IDs from the CRM system to associate transactions with customer information, enabling analysis of customer behavior.
- **Calculate Metrics:**
  - Calculate total sales amount, average order value, and customer retention rate based on transactional data.
- **Derive Business Dimensions:**
  - Extract product categories, customer segments, and geographic regions from transactional data for analysis.

- **4. Documenting Data Transformation in the Requirements Definition Document:**
- Detail the specific steps and logic involved in each data transformation process.
- Provide mappings between source data fields and corresponding fields in the data warehouse.
- Describe any business rules or calculations applied during data transformation.
- Specify the tools and technologies to be used for data integration and transformation.

Data Storage

- Data storage requirements with an example scenario of a retail company developing a data warehouse for sales analysis:
- **1. Level of Detailed Data:**
- Through interviews with users, it's determined that the data warehouse needs to store detailed transactional data from various sources, including point-of-sale systems and online sales platforms. This includes granular information such as individual sales transactions, customer interactions, and product details.
- **2. Number of Data Marts:**
- Users express the need for multiple data marts to support different analytical needs across departments. For instance, there may be separate data marts for sales analysis, marketing effectiveness, inventory management, and financial reporting.

- **3. Metrics and Business Dimensions:**
- Users identify key metrics such as total sales revenue, average order value, customer acquisition cost, and inventory turnover rate. Business dimensions include product categories, customer segments, geographic regions, and time periods.
- **4. Types of Analyses:**
- Users typically conduct analyses such as sales trend analysis, customer segmentation, product performance analysis, and marketing campaign effectiveness. These analyses require various types of aggregations, including sum, average, count, and percentage calculations.

- **5. Additional Storage Requirements:**
- Aggregations: The data warehouse needs to store pre-computed aggregations to support efficient querying and reporting. For example, aggregations may include monthly sales totals by product category or quarterly revenue by geographic region.
- Historical and Archived Data: Users require access to historical data for trend analysis and forecasting. The data warehouse must store both current and historical data, with older data being archived to optimize storage space.
- **6. Documenting Storage Requirements:**
- The requirements definition document should include:
  - Detailed descriptions of the types of data to be stored (e.g., transactional data, aggregated data).
  - Estimations of storage needs for detailed and summary data based on the volume and complexity of the data sources.
  - Guidelines for archiving historical data, including retention policies and storage management procedures.
  - Consideration of scalability requirements to accommodate future growth in data volume and user demand.

- **7. Example Estimate:**
- Transactional Data: 10 GB per month
- Aggregated Data (e.g., monthly sales totals): 1 GB per month
- Historical Data (archived after 5 years): 500 GB per year
- Total Estimated Storage: 12 TB for 5 years
- By documenting storage requirements in the requirements definition document, the project team ensures that the data warehouse infrastructure is designed to meet the organization's analytical needs while optimizing storage resources and scalability.