

Documentation for Part 1

Entity-Relationship Diagram:

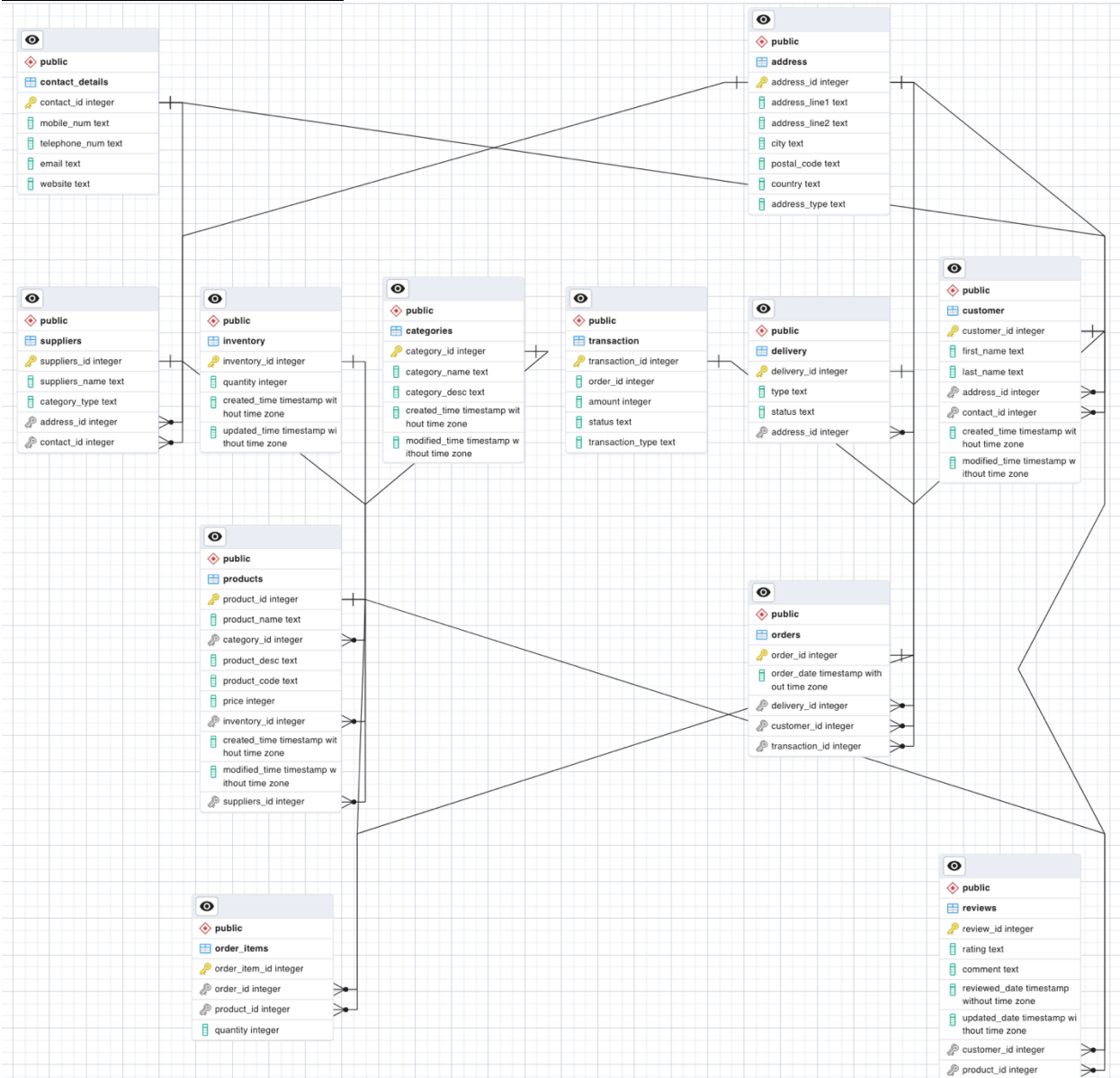


Table Definitions:

- Table Name:** Categories
Columns: category_id, category_name, category_desc, created_time, modified_time
Data Types: category_id INT, category_name TEXT NOT NULL, category_desc TEXT, created_time TIMESTAMP, modified_time TIMESTAMP
Constraints: Primary Key- category_id; NOT NULL- category_name

- Table Name: Inventory

Columns: inventory_id, quantity, created_time, updated_time

Data Types: inventory_id INT, quantity INT NOT NULL, created_time TIMESTAMP, updated_time TIMESTAMP

Constraints: Primary Key- inventory_id; NOT NULL- quantity
- Table Name: Transaction

Columns: transaction_id, order_id, amount, status, transaction_type

Data Types: transaction_id INT, order_id INT, amount INT, status TEXT, transaction_type TEXT

Constraints: Primary Key- transaction_id
- Table Name: Address

Columns: address_id, address_line1, address_line2, city, postal_code, country, address_type

Data Types: address_id INT, address_line1 TEXT, address_line2 TEXT, city TEXT, postal_code TEXT, country TEXT, address_type TEXT

Constraints: Primary Key- address_id
- Table Name: Contact_Details

Columns: contact_id, mobile_num, telephone_num, email, website

Data Types: contact_id INT, mobile_num TEXT, telephone_num TEXT UNIQUE, email TEXT UNIQUE, website TEXT

Constraints: Primary Key- contact_id; UNIQUE- email
- Table Name: Customer

Columns: customer_id, first_name, last_name, address_id, contact_id, created_time, modified_time

Data Types: customer_id INT, first_name TEXT, last_name TEXT, address_id INT, contact_id INT, created_time TIMESTAMP, modified_time TIMESTAMP

Constraints: Primary Key- customer_id, Foreign Key- address_id references Address (address_id), contact_id references Contact_Details (contact_id)
- Table Name: Suppliers

Columns: suppliers_id, suppliers_name, category_type, address_id, contact_id

Data Types: suppliers_id INT, suppliers_name TEXT NOT NULL, category_type TEXT, address_id INT, contact_id INT

Constraints: Primary Key- suppliers_id, Foreign Key- address_id references Address (address_id), contact_id references Contact_Details (contact_id); NOT NULL- suppliers_name
- Table Name: Delivery

Columns: delivery_id, type, status, address_id

Data Types: delivery_id INT, type TEXT NOT NULL, status TEXT, address_id INT

Constraints: Primary Key- delivery_id, Foreign Key- address_id references Address (address_id); NOT NULL- type

- Table Name: Products

Columns: product_id, product_name, category_id, product_desc, product_code, price, inventory_id, created_time, modified_time, suppliers_id

Data Types: product_id INT, product_name TEXT, category_id INT, product_desc TEXT, product_code TEXT, price INT, inventory_id INT, created_time TIMESTAMP, modified_time TIMESTAMP, suppliers_id INT

Constraints: Primary Key- product_id, Foreign Key- category_id references Categories (category_id), inventory_id references Inventory (inventory_id), suppliers_id references Suppliers (suppliers_id)

- Table Name: Orders

Columns: order_id, order_date, delivery_id, customer_id, transaction_id

Data Types: order_id INT, order_date TIMESTAMP, delivery_id INT, customer_id INT, transaction_id INT

Constraints: Primary Key- order_id, Foreign Key- delivery_id references Delivery (delivery_id), customer_id references Customer (customer_id), transaction_id references Transaction (transaction_id)

- Table Name: Order_Items

Columns: order_item_id, order_id, product_id, quantity

Data Types: order_item_id INT, order_id INT, product_id INT, quantity INT

Constraints: Primary Key- order_item_id, Foreign Key- order_id references Order (order_id), product_id references Products (product_id)

- Table Name: Reviews

Columns: review_id, rating, comment, reviewed_date, updated_date, customer_id, product_id

Data Types: review_id INT, rating TEXT, comment TEXT, reviewed_date TIMESTAMP, updated_date TIMESTAMP, customer_id INT, product_id INT

Constraints: Primary Key- review_id, Foreign Key- customer_id references Customer (customer_id), product_id references Products (product_id)

Possible Data Distribution Plan:

The distributed database system for our E-commerce platform will handle real-time data updates and queries while ensuring data consistency and availability. We are planning to focus on Replication and Partitioning.

- Replication:

- Description: In this strategy, each piece of data is replicated across multiple nodes. Updates to one replica are propagated to others to maintain consistency.
- Advantages:

- High availability: If one node fails, another can take over.
- Load balancing: Read operations can be distributed among replicas.
- *Considerations:*
 - Increased storage requirements due to replication.
 - The need for mechanisms to handle consistency among replicas (e.g., eventual consistency or consensus algorithms).
- *Partitioning:*
 - *Description:* Data is divided into partitions based on certain criteria, such as range partitioning (e.g., dividing data based on a specific range of values) or list partitioning (e.g., dividing data based on a predefined list of values).
 - *Advantages:*
 - Efficient for range-based queries.
 - Easy to understand and implement.
 - *Considerations:*
 - Uneven data distribution if not done carefully.
 - May lead to hotspots if there is high access to specific partitions.

Snapshots of Data Retrieval:

Categories				
category_id	category_name	category_desc	created_time	modified_time
1	Electronics	Electronic products	2023-11-25 04:00:46	2023-11-25 04:00:46
2	Clothing	Apparel and fashion	2023-11-25 04:00:46	2023-11-25 04:00:46
3	Books	Literature and publications	2023-11-25 04:00:46	2023-11-25 04:00:46
4	Home Appliances	Household gadgets	2023-11-25 04:00:46	2023-11-25 04:00:46
5	Toys	Children playthings	2023-11-25 04:00:46	2023-11-25 04:00:46

Inventory			
inventory_id	quantity	created_time	updated_time
1	100	2023-11-25 04:00:46	2023-11-25 04:00:46
2	200	2023-11-25 04:00:46	2023-11-25 04:00:46
3	50	2023-11-25 04:00:46	2023-11-25 04:00:46
4	320	2023-11-25 04:00:46	2023-11-25 04:00:46
5	75	2023-11-25 04:00:46	2023-11-25 04:00:46

Transaction				
transaction_id	order_id	amount	status	transaction_type
1	101	50	Completed	Sale
2	102	75	Pending	Refund
3	103	120	Completed	Sale
4	104	40	Completed	Sale
5	105	90	Pending	Refund

Address						
address_id	address_line1	address_line2	city	postal_code	country	address_type
1	123 Main St		Cityville	12345	USA	Billing
2	456 Elm St	Apt 23H	Townsville	54321	USA	Shipping
3	789 Oak St		Villagetown	98765	Canada	Billing
4	101 Pine Rd	Apt 5J	Hamlet City	45678	USA	Shipping
5	321 Cedar Ave		Forestville	65432	USA	Billing
6	611 Rural Rd		Cityville	12345	USA	Billing
7	654 Forest Ave	Apt 2B	Townsville	54321	USA	Shipping
8	987 Farmer Ave		Villagetown	98765	Canada	Billing
9	201 Salado Rd	Suite 100	Hamlet City	45678	USA	Shipping
10	712 Jentily Dr		Forestville	65432	USA	Billing

Contact_Details				
contact_id	mobile_num	telephone_num	email	website
1	123-456-7890	789-123-4567	john.doe@example.com	www.johndoe.com
2	555-555-5555		jane.smith@example.com	www.janesmith.com
3	987-654-3210	123-987-6543	james.wilson@example.com	www.jameswilson.com
4	111-222-3333	333-222-1111	emily.jones@example.com	www.emilyjones.com
5	777-888-9999	999-888-7777	michael.brown@example.com	www.michaelbrown.com
6	113-466-7880	999-133-4167	tech.cod@example.com	www.techco.com
7	565-565-5665		fashion.world@example.com	www.fashionworld.com
8	917-454-3110	613-917-6443	furniture.emporium@example.com	www.furnitureemporium.com
9	121-422-1353	353-232-1010	book.haven@example.com	www.bookhaven.com
10	747-818-9397	929-484-1117	toy.universe@example.com	www.toyuniverse.com

Customer						
customer_id	first_name	last_name	address_id	contact_id	created_time	modified_time
1	John	Doe	1	1	2023-11-25 04:00:46	2023-11-25 04:00:46
2	Jane	Smith	2	2	2023-11-25 04:00:46	2023-11-25 04:00:46
3	James	Wilson	3	3	2023-11-25 04:00:46	2023-11-25 04:00:46
4	Emily	Jones	4	4	2023-11-25 04:00:46	2023-11-25 04:00:46
5	Michael	Brown	5	5	2023-11-25 04:00:46	2023-11-25 04:00:46

Suppliers				
suppliers_id	suppliers_name	category_type	address_id	contact_id
1	TechCo	Electronics	6	6
2	Fashion World	Clothing	7	7
3	Furniture Emporium	Furniture	8	8
4	Book Haven	Books	9	9
5	Toy Universe	Toys	10	10

Delivery			
delivery_id	type	status	address_id
1	Standard	Shipped	1
2	Express	Delivered	2
3	Standard	In Transit	3
4	Express	Shipped	4
5	Standard	Delivered	5

Products									
product_id	product_name	category_id	product_desc	product_code	price	inventory_id	created_time	modified_time	suppliers_id
1	iPhone 15	1	High-end smartphone	PRD001	799	1	2023-11-25 04:00:46	2023-11-25 04:00:46	1
2	HGM T-shirt	2	Cotton T-shirt	PRD002	19	2	2023-11-25 04:00:46	2023-11-25 04:00:46	2
3	The Alchemist	3	Best-selling novel	PRD003	12	3	2023-11-25 04:00:46	2023-11-25 04:00:46	3
4	GE Appliances Washing Machine	4	Front-load washer	PRD004	789	4	2023-11-25 04:00:46	2023-11-25 04:00:46	4
5	Hot Wheels Toy Car	5	Remote-controlled car	PRD005	29	5	2023-11-25 04:00:46	2023-11-25 04:00:46	5

Orders				
order_id	order_date	delivery_id	customer_id	transaction_id
1	2023-11-25 04:00:46	1	1	1
2	2023-11-25 04:00:46	2	2	2
3	2023-11-25 04:00:46	3	3	3
4	2023-11-25 04:00:46	4	4	4
5	2023-11-25 04:00:46	5	5	5

Order_Items			
order_item_id	order_id	product_id	quantity
1	1	1	1
2	2	2	4
3	3	3	1
4	4	4	1
5	5	5	3

Reviews						
review_id	rating	comment	reviewed_date	updated_date	customer_id	product_id
1	5 stars	Great product!	2023-11-25 04:00:46	2023-11-25 04:00:46	1	1
2	4 stars	Nice quality.	2023-11-25 04:00:46	2023-11-25 04:00:46	2	2
3	3 stars	Average book.	2023-11-25 04:00:46	2023-11-25 04:00:46	3	3
4	5 stars	Best washer ever!	2023-11-25 04:00:46	2023-11-25 04:00:46	4	4
5	4 stars	Fun toy!	2023-11-25 04:00:46	2023-11-25 04:00:46	5	5