BUSINESS INTELLIGENCE

DB to DWH Activity

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Task 1: Review Project

Review Your Database Project and create a suitable data mart.

Database Project Review: Write a summary of your original database project schema indicating the business scenario. Attach a snapshot of your original database schema diagram.

The Travel Management System (TMS) is a database-driven application designed to streamline the booking process for customers seeking travel packages. It enables users to search, view, and book travel options while providing an administrative platform for managing packages, user accounts, and vendor collaborations. The system ensures seamless operations by providing structured processes for user registration, package management, booking, payment processing, and feedback collection.

Customers can register, browse travel packages, make bookings, process payments, and provide feedback. Vendors can create and modify travel packages, ensuring they meet approval criteria. Administrators oversee vendor approvals, package approvals, and overall system integrity, ensuring smooth transactions and compliance with business rules.

The relational schema includes entities such as Customers, Vendors, Packages, Bookings, Payments, Feedback, and supporting tables like Travel Seasons, Package Availability, and Payment Modes. The system enforces business rules through triggers, functions, and stored procedures, ensuring data integrity, validation, and automation of tasks such as dynamic pricing and package management.

- Customer Management:
    - Users register with unique credentials, and their details are validated (e.g., SSN/CNIC, email, phone number).
- Package Management:
    - Administrators must approve packages, include base and dynamic pricing, and support vendor collaboration.
- Booking System:
    - Customers book available packages, and bookings must be confirmed 48 hours before the travel date. Customers can modify or cancel their bookings up to 7 days before departure.
- Payment Processing:
    - Payments are linked to bookings, and bookings remain in "pending" status until full payment is confirmed. The system tracks overpayments, refunds, and pending amounts dynamically.

- Feedback & Reviews:
    - Customers can submit ratings and reviews for their booked travel packages.

- Triggers and Functions:
    - The system automates seat availability validation, payment status updates, and dynamic pricing adjustments based on seasonal factors and remaining availability.
- Booking Validations:
    - Ensures package availability, customer eligibility, and real-time seat tracking.
- Cancellation & Refund Management:
    - When a booking is canceled, seats are reallocated, and applicable refunds are processed.
- Security Features:
    - Login functions for admins, vendors, and customers enforce password complexity, unique credentials, and secure authentication mechanisms.

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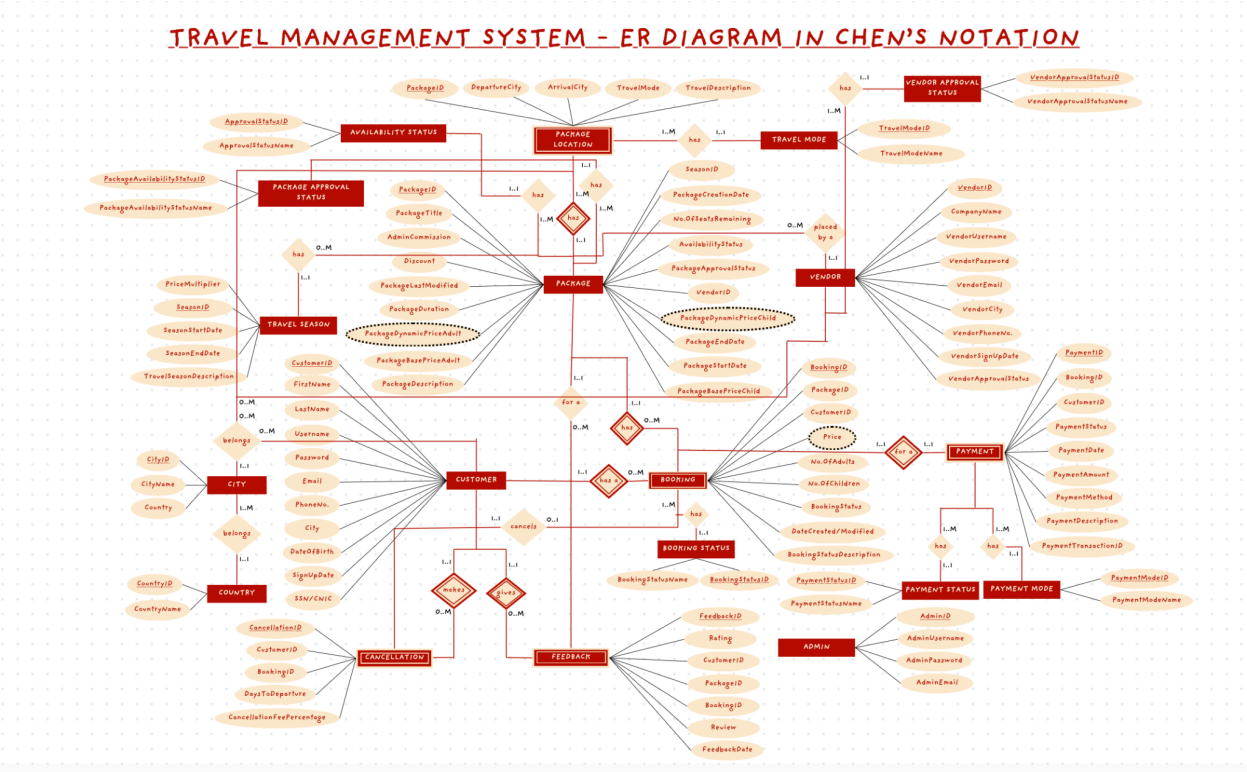
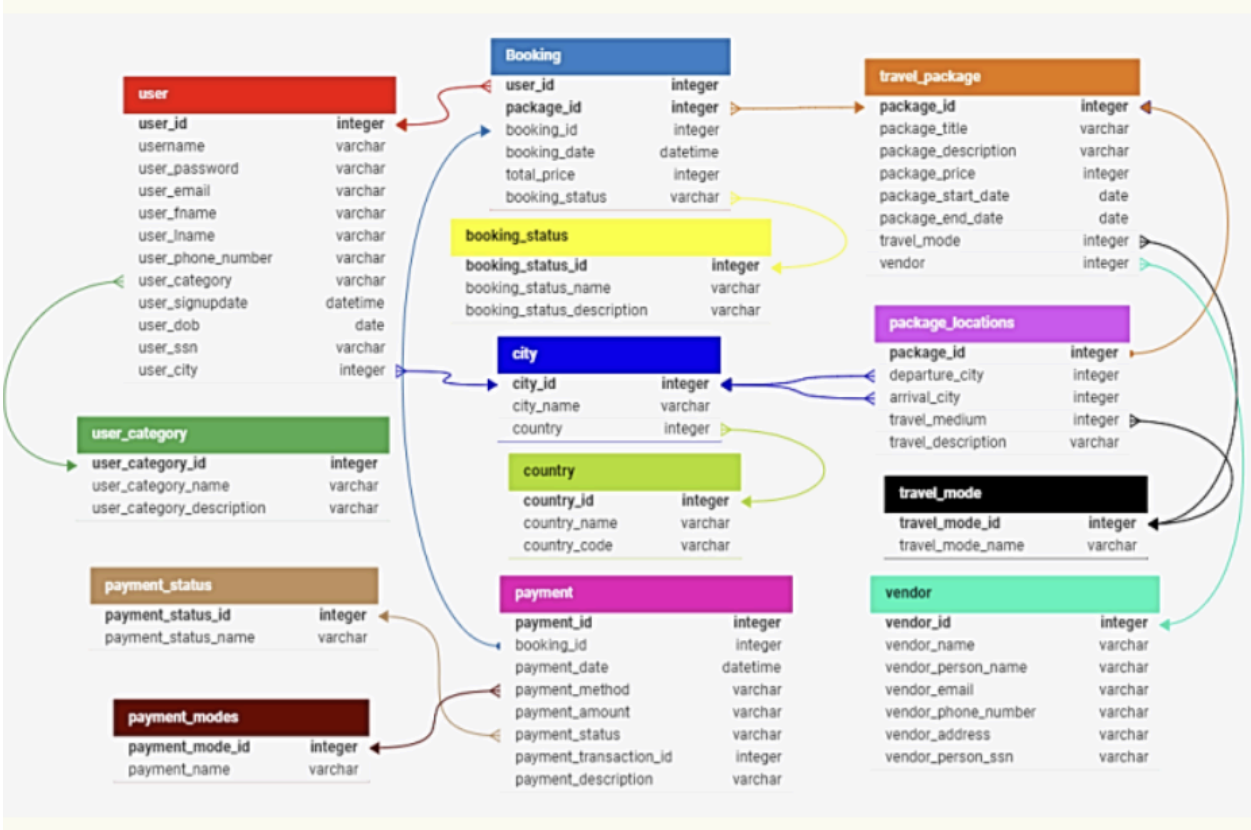




Task 2: Identify Business

Business Process Identification: Clearly define the selected business process.

The Booking and Payment Process in the Travel Management System (TMS) follows a structured workflow to ensure seamless transactions between customers, vendors, and administrators. The process begins when a registered customer selects a travel package, after which the system verifies package availability by checking the PACKAGE_AVAILABILITY_STATUS and ensuring that enough seats remain. If the package is unavailable or fully booked, the system rejects the booking request. Once a valid package is selected, the system stores booking details in the BOOKING table with the status set to "PENDING", automatically calculating the total price based on the number of adults and children. The system then reduces the available seats in the PACKAGES table, ensuring real-time updates. Customers must confirm their bookings by completing payment at least 48 hours before the travel date, and if they fail to do so, the booking remains pending.

To finalize the booking, the customer proceeds to payment processing, selecting a preferred payment method stored in the PAYMENT_MODE_TABLE. The system then verifies the payment and updates the PAYMENT_STATUS, categorizing it as

"CONFIRMED", "DECLINED", or "PARTIALLY PAID". If the full amount is received, the BOOKING_STATUS is updated to "CONFIRMED", and a confirmation email is sent to the customer. All transaction details, including the PAYMENT_TRANSACTION_ID, are stored in the PAYMENT table for tracking purposes. In cases where customers wish to cancel their booking, they can do so up to 7 days before departure. Upon cancellation, the BOOKING_STATUS is updated to "CANCELED", and a record is added to the CANCELLATION table, applying any relevant cancellation fees. If eligible, the system processes partial refunds and increases SEATS_REMAINING in the PACKAGES table.

After the travel is completed, customers can provide feedback on their experience by submitting ratings and reviews, which are stored in the FEEDBACK table, linking the CUSTOMER_ID, PACKAGE_ID, and BOOKING_ID. These insights help vendors and administrators assess package quality and customer satisfaction. Overall, the Booking and Payment Process ensures real-time validation, transaction security, and an optimized customer experience by integrating automated seat management, payment tracking, and feedback collection. This structured workflow not only enhances the efficiency of the travel management system but also makes it the ideal process for data mart development, enabling business intelligence insights such as revenue forecasting, customer spending analysis, and seasonal demand trends.

The selected business process for the data mart is Booking and Payment Processing, which plays a central role in the Travel Management System (TMS). As mentioned, the system enforces strict booking rules, requiring customers to confirm bookings at least 48 hours before the travel date, while also allowing modifications and cancellations up to 7 days before departure. Payments are tightly integrated, ensuring that a booking remains in "pending" status until the full amount is successfully processed, with additional mechanisms for overpayments, refunds, and transaction tracking.

This business process is chosen for the data mart because it generates the most critical and high-volume transactional data, influencing financial performance, customer behavior, and operational efficiency. Compared to other processes like user registration or package management, Booking and Payment Processing provides the most valuable insights for revenue forecasting, seasonal demand trends, customer spending patterns, vendor performance analysis, and fraud detection. A data mart for this process will enable faster analytical queries, optimize real-time decision-making, and support business intelligence efforts for travel agencies, administrators, and vendors.

Task 3: Specify Grain

Grain Specification: Describe the level of detail for the fact table.

Fact_Table	
ID	**integer**
Customer_Foreign_Key	integer
Package_Foreign_Key	integer
Date_Foreign_Key	integer
Booking_Foreign_Key	integer
Payment_Foreign_Key	integer
Total_Price	decimal
Amount_Paid	decimal
Booking_Count	integer
Commission_Earned	decimal
Average_Spending_Per_Customer	decimal
Popular_Destination	integer

Each row defines A single person travelling through our Travel Management App. Example: If a single Booking had 5 members travelling together, the fact table will have 5 rows, 1 for each member.

Task 4: List Facts

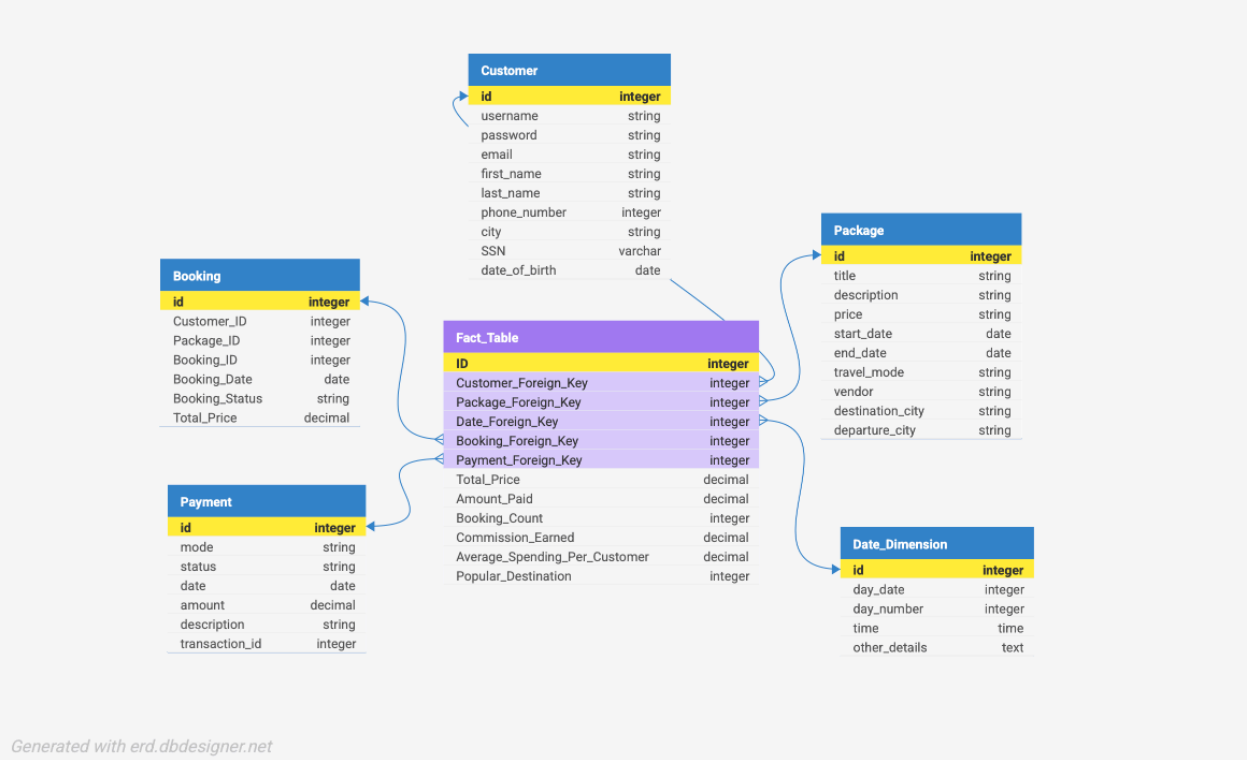
Facts & Dimensions: List and justify the chosen facts and dimensions.

Name of Attribute	Type of Attribute	Description of Attribute	Justification of Attribute
ID	Degenerate Dimension	used as the primary key for our fact table to uniquely identify each row	in our travel management system, a booking could have had several members, here we are breaking it down further at atomic level, so we can't use the same primary key as Booking Table
Customer Foreign Key	Dimension	foreign key which links to other tables	links to the Customer table
Package Foreign Key	Dimension	foreign key which links to other tables	links to the Package table
Date Foreign Key	Dimension	foreign key which links to other tables	links to the Date table
Booking Foreign Key	Dimension	foreign key which links to other tables	links to the Booking table
Payment Foreign Key	Dimension	foreign key which links to other tables	links to the Payment table
Total Price	Fact	the sum of each customer's booking	allows us to see the total cost of the customer, helps us calculate revenue and also allows us to compute the average of each customer
Amount Paid	Fact	amount paid by the customer for that booking	allows us to see how much customer is left to pay, what our total receivables are, and whether or not the customer booking should be confirmed. it also facilitates financial forecasting by tracking outstanding payments and helps detect fraudulent activities if discrepancies arise in payments

Booking Count	Fact	(running count) how many bookings have happened till now for that customer	allows us to see if this is a first time customer, or an old customer and allows us to make decisions on how confirm their order will be
Commission Earned	Fact	how much commission is charged by the admin on each booking	helps in revenue projection by analyzing commission trends and can be used to evaluate the profitability of different packages and booking sources
Average spending per customer	Fact	(running average) recomputes average of customer on every row	allows us to see how much we should price our costs to maximize our profit

Task 5: Star Schema

Create a data mart diagram (star schema)—either hand-drawn neatly or using a DB designer tool clearly indicating PK, FK and cardinalities.



Key	
Yellow	The primary Key for a table
Purple	Foreign Key(s) referenced in a table