JAGATH KUMAR REDDY KATAMA REDDY

Transportation Management Company Database

This database is designed to support the operational and business needs of a transportation company in India, focusing on road-based transportation services. The company operates in two main capacities: providing direct transport services to individual customers and acting as an intermediary for other service providers. This dual role allows the company to cater to a broad spectrum of customer requirements, including individual rides, group transport, goods transportation, or a combination of passengers and goods.

The primary users of this database include company employees and administrative staff. Employees, such as customer service representatives, drivers, and managers, use the system to handle day-to-day tasks like managing bookings, scheduling rides, tracking vehicles, and processing invoices. Administrative users have broader access to ensure data consistency and oversee operations, with the Admin having unrestricted access to manage data and configure user roles.

In addition to individual customers, the company also offers a Software as a Service (SaaS) platform to external organizations. By subscribing to this service, these organizations can optimize their internal transportation management, leveraging the company's infrastructure. Each subscribing organization is assigned an Organization Manager from the company, who is responsible for overseeing the organization's account and ensuring efficient use of the SaaS platform.

The database captures and manages key entities, including customers, bookings, rides, vehicles, service providers, drivers, and invoicing. It tracks customer details and allows for the management of multiple bookings, each associated with a single customer. Bookings are classified based on the requested service type, such as individual rides or vehicle rentals. Once a booking is made, a corresponding ride is created, with all relevant details recorded, including customer information, service type, and scheduled time.

The system also manages service providers and vehicles. Individual service providers can own one or two vehicles, while entity service providers must own at least two. Vehicles are linked to rides based on booking requirements, and while a vehicle may participate in multiple rides, it can only be assigned to one active ride at a time, ensuring smooth scheduling. This constraint helps avoid conflicts and ensures efficient operations.

Rides are assigned a specific vehicle and driver based on availability and the ride's requirements. Drivers can be employed by the company or contracted through service providers. For longer rides, such as those spanning overnight, up to three drivers may be assigned to ensure compliance with safety regulations. This driver assignment process is critical to maintaining operational safety and efficiency.

The database also supports invoicing and financial record-keeping. Invoices are generated for completed rides, detailing the services provided and the associated charges. For individual customers, invoices are billed directly, while for shared rides, each customer is billed separately based on the same ride ID. This flexibility allows the system to handle various billing scenarios and ensures transparent financial records.

External organizations using the SaaS platform subscribe to specific plans that define their access to different features and services. The database tracks these subscriptions and ensures that only the features permitted by each plan are accessible to the corresponding client. Each organization is also linked to an Organization Manager, who ensures proper oversight and support.

The database enforces critical constraints to ensure data integrity. One key constraint is temporal, preventing the double-booking of vehicles and ensuring that each vehicle is only assigned to one active ride at a time. Customers are also limited to one active ride at any given moment, preventing scheduling conflicts. The system incorporates role-based access controls, ensuring sensitive information is protected and only accessible to authorized users. The admin has full control over data access permissions, ensuring the security and integrity of the system.

Overall, the database is structured to support the diverse needs of both individual and organizational clients, offering scalable and flexible solutions for transportation management. By capturing and managing key operational data, enforcing business rules, and ensuring secure access controls, the database facilitates the smooth functioning of the company's transportation services.

DATA DICTIONARY

TABLE NAME	ATTRIBUTE NAME	CONTENTS	TYPE	FORMAT	RANGE	REQUIRED	P K OR FK	FK REFERENCE TABLE
CUSTOMER-INDIVIDUAL	CUSIN_ID	Unique ID for customer individual	CHAR (8)	XX999999		Y	PK	
	CUSIN_FNAME	Customer first name	VARCHAR(50)	Xxxxxx		Y		
	CUSIN_LNAME	Customer Last name	VARCHAR(50)	Xxxxxx		Y		
	CUSIN_MOBILENO	Customer Mobile	NUMBER(10)	9999999999		Y		
	CUSIN_MAILID	Customer email id	VARCHAR(20)	xxxx@xxx.xxx		Y		
	CUSIN_GENDER	Customer gender	CHAR(1)	X				
	CUSIN_ADDRESS	Customer Billing Address	VARCHAR(50)	Xxxxxx		Y		

	CUSIN_CITY	Customer Address City	VARCHAR(20)	Xxxxxx				
	CUSIN_ZIPCODE	Customer Address Zipcode	CHAR(6)	XXXXXX				
	CUSIN_STATE	Customer Address State	VARCHAR(20)	Xxxxxx				
CUSTOMER-ENTITY	CUSEN_ID	Customer Entity ID	CHAR(8)	XX999999		Y	PK	
	CUSIN_ID	Customer Individual ID	CHAR(8)	XX999999		Y	FK	CUSTOMER
	CUSEN_NAME	Entity name	VARCHAR(50)	Xxxxxx		Y		
	CUSEN_BRANCH	Entity branch, headquaters or a branch	VARCHAR(20)	Xxxxxx				
	CUSEN_CON_PERSON	Entity's person of contact, - Customer individual key(if the person of contact is different from person who is registering)	CHAR(8)	XX999999			FK	CUSTOMER

	CUSEN_ADDRESS	Entity main address	VARCHAR(50)	Xxxxxx				
	CUSEN_CITY	Entity address city	VARCHAR(20)	Xxxxxx				
	CUSEN_STATE	Entity address state	VARCHAR(20)	Xxxxxx				
	CUSEN_ZIPCODE	Entity address zipcode	CHAR(6)	XXXXXX				
	CUSEN_MOBILENO	Entity contact number	NUMBER(10)	9999999999		Y		
	CUSEN_GST_NO	Entity registered GST (Tax Number)	CHAR(15)	99XXXXX9999X9X9		Y		
EMPLOYEE	EMP_ID	Employee Unique ID	CHAR(8)	XX999999		Y	PK	
	EMP_FNAME	Employee First name	VARCHAR(50)	Xxxxxx		Y		
	EMP_LNAME	Employee Last Name	VARCHAR(50)	Xxxxxx		Y		
	EMP_MOBILE_NO	Employee Mobile number	CHAR(13)	XXXXXXXXXXXXX		Y		
	EMP_DOB	Employee date of birth	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099			

	EMP_GENDER	Employee Gender	CHAR(1)	X				
	EMP_ROLE	Employee's Job Title Code	CHAR (2)	XX		Y		
	EMP_MAILID	Employee Mail ID	VARCHAR(30)	Xxxxxx		Y		
	EMP_ADDRESS	Employee Living Address	VARCHAR(50)	Xxxxxx		Y		
	EMP_CITY	Address city	VARCHAR(20)	Xxxxxx				
	EMP_STATE	Address State	VARCHAR(20)	Xxxxxx				
	EMP_ZIPCODE	Address zipcode	CHAR(6)	XXXXXX				
	EMP_MONTHLY_PAY	Employee monthly salary	NUMBER(7,2)	999999.99				
CUSTOMER-ORGANISATION	CUSOG_ID	Customer Organisation unique ID	CHAR(8)	XX999999				
	CUSOG_NAME	Organisation Name	VARCHAR(50)	Xxxxxx				
	CUSOG_BRANCH	Organization Branch, whether Head Quarters or Branch	VARCHAR(20)	Xxxxxx				

	CUSOG_PERSON_CONTACT	Organisations' person of contact – must have registered as Customer Individual	CHAR(8)	XX999999		Y	FK	CUSTOMER
	SUBPLAN_CODE	Type of subscription Organization has enrolled for	CHAR(4)	XXXX		Y	FK	
	EMP_ID	External Manager EMP_ID	CHAR(8)	XX999999		Y	FK	EMPLOYEE
SERVICE_PROVIDER-INDIVIDUAL	SPIN_ID	Individual Service provider	CHAR(8)	XX999999		Y	PK	
	SPIN_FNAME	Service provider' First name	VARCHAR(20)	Xxxxxx		Y		
	SPIN_LNAME	Service Provider's Last name	VARCHAR(20)	Xxxxxx				
	SPIN_MOBILENO	Service provider	CHAR(10)	9999999999		Y		

	SPIN_MAILID	Service provider	VARCHAR(20)	Xxxxxx		Y		
	SPIN_GENDER	Service Provider' Gender	CHAR(1)	X				
	SPIN_ADDRESS	Service Provider Address	VARCHAR(50)	Xxxxxx		Y		
	SPIN_CITY	Service Provider Address	VARCHAR(20)	Xxxxxx				
	SPIN_ZIPCODE	Service Provider Address	CHAR(6)	XXXXXX				
	SPIN_STATE	Service Provider Address	VARCHAR(20)	Xxxxxx				
	SPIN_JOIN_DATE	Service Provider Date of Registration	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099	Y		
SERVICE_PROVIDER - ENTITY	SPIN_ID	Service Provider's Individual ID	CHAR(8)	XX999999		Y	FK	SERVICE PROVIDER INDIVIDUAL
	SPEN_ID	Service Provider as an Entity	CHAR(8)	XX999999		Y	PK	
	SPEN_NAME		VARCHAR(50)	Xxxxxx		Y		
	SPEN_BRANCH		VARCHAR(20)	Xxxxxx				

	SPEN_CON_PERSON	If the person of contact is different from individual registering entity	CHAR(8)	XX999999		Y	FK	SERVICE_PROVIDER_INDIVIDUAL
	SPEN_ADDRESS	Entity Address	VARCHAR(50)	Xxxxxx		Y		
	SPEN_CITY	Entity Address City	VARCHAR(20)	Xxxxxx				
	SPEN_STATE	Entity Address	VARCHAR(20)	Xxxxxx				
	SPEN_ZIPCODE	Entity Address	CHAR(6)	XXXXXX				
	SPEN_MOBILE_NO	Entity contact number	NUMBER(10)	9999999999		Y		
	SPEN_GST_NO	Entity registered GST (Tax) Number	CHAR(15)	99XXXXX9999X9X9		Y		
	SPEN_JOIN_DATE	Entity registered Date	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099	Y		
VEHICLE	VEHICLE_ID	Vehicle ID	CHAR(8)	XX999999		Y	PK	
	VEHICLE_NUM_PLATE	Vehicle number plate(natural key)	CHAR(10)	XX99XX9999		Y		

	SPIN_ID	Vehicle owner ID	CHAR(8)	XX999999		Y	FK	SERVICE_PROVIDER_INDIVIDUAL
	VEHICLE_POLICY NO	Insurance policy Number	CHAR(10)	999999999		Y		
	VEHICLE_MODEL	Vehicle company and model name	VARCHAR(50)	Xxxxxx		Y		
	VEHICLE_TYPE	Type of vehicle Mini-van etc	VARCHAR(20)	Xxxxxx				
	VEHICLE_USE	Used for rentals or regular transportation	VARCHAR(20)	Xxxxxx		Y		
DRIVER	SPIN_ID	Service provider ID	CHAR(8)	XX999999		Y	FK	SERVICE PROVIDER
	DRIVER_LICENSE_NO	Govt driving license number/code	CHAR(16)	XX99999999999999		Y		
	DRIVER_SPEN_ID	Is he affiliated to an entity	CHAR(8)	XX999999		Y	FK	SERVICE PROVIDER ENTITY
	DRIVER_OPENAGREE	Agreement between Entity and Driver	VARCHAR(3)	Xxx		Y		

RIDE	RIDE_ID	Unique ride for each Ride	CHAR(8)	XX999999		Y	PK	
	INVOICE_NO	Invoice number if generated	NUMBER(8)	99999999		Y	FK	INVOICE
	DRIVER_ID	Driver of the ride	CHAR(8)	XX999999		Y	FK	DRIVER
	VEHICLE_NO_PLATE	Vehicle number	CHAR(10)	XX99XX9999		Y	FK	VEHICLE
	RIDE_START_DATE	Ride journey start date	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099	Y		
	RIDE_END_DATE	Ride journey end date	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099	Y		
	RIDE_START_TIME	Ride journey start time	TIME	HH:MM:SS:mm	00:00:00:01-23:59:59:99	Y		
	RIDE_END_TIME	Ride journey end time	TIME	HH:MM:SS:mm	00:00:00:01-23:59:59:99	Y		
	RIDE_MEANS	Was it rental or regular or goods	VARCHAR(10)			Y		
	RIDE_START_LOC_LON	Ride journey start(GPS)-LONGITUDE – in decimal degrees	DECIMAL(8,6)		-90 TO +90	Y		

	RIDE_START_LOC_LAT	Ride journey start(GPS)-LATITUDE – in decimal degrees	DECIMAL(9,6)		-179.999999 TO +179.999999	Y		
	RIDE_END_LOC_LOG	Ride journey end(GPS)-LONGITUDE – in decimal degrees	DECIMAL(8,6)		-90 TO +90	Y		
	RIDE_END_LOC_LAT	Ride journey END(GPS)-LATITUDE – in decimal degrees	DECIMAL(9,6)		-179.999999 TO +179.999999	Y		
	BOOKING_ID	Unique Booking ID	CHAR(8)	XX999999		Y	FK	BOOKING
BOOKING	BOOKING_ID	Automatic generated Booking ID	CHAR(8)	XX999999		Y	PK	
	CUSIN_ID	Customer individual ID	CHAR(8)	XX999999		Y	FK	CUSTOMER
	BOOK_TYPE	Rental or pick and drop Based on type	VARCHAR(20)			Y		
	BOOK_TIME	Booking time	TIME	HH:MM:SS:mm	00:00:00:01-23:59:59:99	Y		

	BOOK_DATE	Booking Date	DATE	DD-MM-YYYY	31-12-1999 TO 31-12-2099	Y		
SUB_TYPE_FOR_BOOKING-RENTAL	BOOK_TRIP_PURPOSE	Reason for rental	VARCHAR (50)	Xxxxxx		Y		
	VISITING PLACE	Destination place	VARCHAR(20)	Xxxxxx		Y		
	PICK_PLACE	Vehile pick up location	VARCHAR(20)	Xxxxxx		Y		
	DROP_PLACE	Vehicle drop location	VARCHAR(20)	Xxxxxx		Y		
	VEHICLE_TYPE_REQUESTED	Type of vehicle requested by customer can be cars, trucks,etc	VARCHAR(20)	Xxxxxx		Y		
	VEHICLE_ID	Assigned vehicle ID	CHAR(8)	XX999999		Y	FK	VEHICLE
SUB_TYPE_FOR_BOOKING – PICK AND DROP	PICK_UP_LOC_LON	Pick up location GPS form of data - LOGITUDE	DECIMAL(8,6)	99	-90 TO +90	Y		
	PICK_UP_LOC_LAT	Pick up location	DECIMAL(9,6)	199.999999	-179.999999	Y		

		GPS form of data -LATITUDE			TO +179.999999			
	DROP_OFF_LOC_LON	Dropping location GPS – LONGITUDE- in decimal degress	DECIMAL(8,6)	99	-90 TO +90	Y		
	DROP_OFF_LOC_LAT	Dropping location GPS – LATITUDE- in decimal degress	DECIMAL(9,6)	199.999999	- 179.999999 TO +179.999999	Y		
	VEHICLE_TYPE_REQUESTED	Type of vehicle requested by customer can be cars, trucks,etc	VARCHAR(20)	Xxxxxx				
INVOICE	INVOICE_NO	Invoice number generated from 1	NUMBER(6)	999999	1-999999	Y	PK	
	RIDE_ID	Ride ID of the invoice	CHAR(8)	XX999999		Y	FK	RIDE
	REFERENCE_ID	Reference ID is used to have a common ID for two companies to access it	NUMBER(10)	9999999999	1000000000 - 9999999999			

	CUSTOMER_ID	Customer ID to which the Invoice is billed	CHAR(8)	XX999999		Y	FK	CUSTOMER
	SPEN_ID	If its valid else SPIN_ID	CHAR(8)	XX999999		Y	FK	SERVICE-PROVIDER - INDIVIDUAL
	INVOICE_BILL_AMOUNT	Total amount of the bill generated	NUMBER(8,2)	99999999.99	0.01-99999999.99	Y		
	INVOICE_STATUS	Invoice status either Complete or Pending	CHAR(8)	XXXXXXX		Y		
SUBSCRIPTION_PLAN	SUBPLAN_CODE	Unique code for each subscription plan	CHAR(4)	XXXX		Y	PK	
	SUBPLAN_DESC	Description about the plans	VARCHAR(100)	Xxxxxx				
	SUBPLAN_PRICE	Amount of payment due	NUMBER(8,2)	99999999.99				

BUSINESS RULES:

CUSTOMER / BOOKING

1) A CUSTOMER can have NO BOOKING or MANY BOOKINGs
2) A BOOKING must have only ONE CUSTOMER

SERVICE PROVIDER – INDIVIDUAL /VEHICLE

1) An INDIVIDUAL SERIVE PROVIDER can own either ONE or TWO VEHICLES.
2) A VEHICLE must be owned by ONLY ONE SERIVE PROVIDER (either Individual or entity).

SERVICE PROVIDER – ENTITY /VEHICLE

1) An ENTITY SERVICE PROVIDER must own at least TWO VEHICLES and can have MANY VEHICLES
2) A VEHICLE must have ONLY ONE SERIVE PROVIDER (either Individual or entity).

RIDE/VEHICLE

1) A RIDE must be associated to ONLY ONE VEHICLE
2) A VEHICLE can be associated with ZERO or MANY RIDEs
3) A VEHICLE can be running ZERO or ONE RIDE at single time instance*

INVOICE/RIDE

1) An INVOICE must be associated to only ONE RIDE
2) A RIDE must have ONE or MANY INVOICEs associated to it.

RIDE/CUSTOMER

1) A CUSTOMER can have ZERO or MANY RIDEs.
2) A CUSTOMER can only have ZERO or ONE RIDE at single instance in time*
3) A RIDE can carry ONE or MORE CUSTOMERS.

INVOICE/CUSTOMER

1) An INVOICE can be billed to ONLY ONE CUSTOMER
2) A CUSTOMER can have NO INVOICE or MANY INVOICES associated to them.

DRIVER/SERVICE PROVIDER -ENTITY

1) A DRIVER must be associated ZERO or ONE ENTITY-SERVICE PROVIDER
2) An ENTITY-SERVICE PROVIDER must have at least ONE DRIVER associated.

DRIVER/RIDE

1) A DRIVER can have 0 RIDE or MANY RIDES in their account
2) A RIDE can have NO DRIVERS and up to THREE DRIVERS (if ride is overnight)

RIDE/BOOKING

1) A RIDE can have ONE BOOKING only.
2) A successful BOOKING can have only ONE RIDE.

BOOKING/VEHICLE-RENTAL

1) A successful BOOKING for Rental must be associated to only ONE RENTAL-VEHICLE
2) A RENTAL-VEHICLE can have ZERO or MANY BOOKING (including past BOOKING)
3) A RENTAL – VEHICLE can have ZERO BOOKING or ONE BOOKING at a single instance of time*.

SERVICE PROVIDER/INVOICE

1) A SERVICE PROVIDER can generate NO INVOICE or MANY INVOICE
2) An INVOICE has to be generated by ONLY ONE SERVICE PROVIDER.

EMPLOYEE-ORGANISATION_MANGAER/CUSTOMER-ORGANISATIONS

1) AN ORGANISATION_MANAGER must manage at least ONE CUSTOMER_ORGANISATION and can manage MANY CUSTOMER_ORGANISATION
2) An ORGANISATION has ONLY ONE ORGANISATION MANAGER (from the company)

CUSTOMER-ORGANISATION/SUBSCRIPTION_PLAN

1) CUSTOMER-ORGANISATION can only subscribe to ONE SUBSCRIPTION PLAN.
2) A SUBSCRIPTION PLAN can have ZERO or MANY CUSTOMER-ORGAINSATION as subscribers.

ERM MODELING

ENTITY	REALTIONSHIP	CONNECTIVITY	ENTITY
CUSTOMER	can have	1:M	BOOKING
DRIVER	drives	M:N	VEHICLE
SERVICE PROVIDER	generates	1:M	INVOICE
CUSTOMER	has to pay	1:M	INVOICE
RIDE	generates	1:M	INVOICE
RIDE	Has a	1:1	BOOKING
SERVICE PROVIDER	Owns	1:M	VEHICLE
VEHICLE	Associated to	1:M	BOOKING
RIDE	Associated with	M:N	CUSTOMERS
RIDE	Can have	M:N	DRIVERS
EXTERNAL MANAGER	Manages	1:M	ORGANISATION
ORGANISATION	Subscribes to	1:1	SUBSCRIPTION_PLAN