

Business Rules:

Sr. No.	Entity A	Entity B	Relationship Type	Biz Rules	Notes	Verb Summary
1	User	Passenger	1:1	<ul style="list-style-type: none"> One user account is linked to one passenger profile Each passenger profile belongs to one user 	One user maps to one passenger profile	<ul style="list-style-type: none"> A passenger belongs to one user A user may have zero or one passenger
2	User	Booking	1:N	<ul style="list-style-type: none"> One user can make many bookings Each booking is created by one user 	One user can make many bookings	<ul style="list-style-type: none"> A user makes one or more bookings Each booking belongs to one user
3	Booking	Train	N:1	<ul style="list-style-type: none"> One train can be booked many times Each booking is for one train 	Each booking is for one train	<ul style="list-style-type: none">
4	Schedule	Booking	1:N	<ul style="list-style-type: none"> One schedule can have many bookings Each booking is for one schedule 	Each booking is for one schedule	<ul style="list-style-type: none"> A schedule has many bookings Each booking is made for one schedule
5	Booking	Seat	M:N	<ul style="list-style-type: none"> One booking can include many seats One seat can be reserved in many bookings (on different dates) 	A booking may reserve many seats; a seat can be reused across schedules	<ul style="list-style-type: none">
6	Booking	Booking Details	1:N	<ul style="list-style-type: none"> One booking can include multiple booking details Each booking detail is linked to one booking 	One booking includes one or more booking details	<ul style="list-style-type: none"> A booking includes one or more booking details Each booking detail belongs to one booking
7	Seat	Booking Details	1:N	<ul style="list-style-type: none"> One seat can be associated with one or more booking detail records Each booking detail must reference one seat 	One seat may appear in one or more booking details	<ul style="list-style-type: none"> A seat may appear in one or more booking details Each booking detail references one specific seat
8	Booking	Ticket	1:N	<ul style="list-style-type: none"> One booking can generate one or more tickets Each ticket is linked to one booking 	A booking generates one or more tickets	<ul style="list-style-type: none"> A booking can generate one or more tickets Each ticket is issued for one booking

9	Booking	Payment	1:1	<ul style="list-style-type: none"> One booking has one payment Each payment is made for one booking 	Each booking has one payment	<ul style="list-style-type: none"> A booking is associated with exactly one payment A payment is made for one booking only
10	Passenger	TravelHistory	1:N	<ul style="list-style-type: none"> One passenger can have many travel history records Each travel history record is linked to one passenger 	Every completed trip is logged here	<ul style="list-style-type: none"> A passenger has many travel history records Each travel history record belongs to one passenger
11	Booking	TravelHistory	1:N	<ul style="list-style-type: none"> One booking can result in one or more travel records Each travel record is linked to one booking 	Each travel record is tied to a booking	<ul style="list-style-type: none"> A travel history record logs one booking A booking can be referenced in many travel history records
12	Ticket	TravelHistory	1:1 (indirect)	<ul style="list-style-type: none"> A ticket is tied to a seat via the booking Travel history reflects that ticket indirectly through booking 	Seat selected on the ticket is reflected in travel history	<ul style="list-style-type: none"> No direct FK needed — info flows through existing relationships
13	TravelHistory	Payment	1:N (indirect)	<ul style="list-style-type: none"> A travel history entry can reference multiple payments for reporting Each payment may relate to a specific trip (travel history) 	Travel history may include summaries of related payments	<ul style="list-style-type: none"> Indirect link through booking; not modeled directly in schema
14	Ticket	Seat	1:N	<ul style="list-style-type: none"> One ticket may include one or more seats Each seat may be listed on one ticket 	A ticket may include multiple seat numbers	<ul style="list-style-type: none">
15	Train	Schedule	1:N	<ul style="list-style-type: none"> One train can have many schedules Each schedule is associated with one train 	One train appears in one or more schedules	<ul style="list-style-type: none"> A train can appear in one or more schedules Each schedule is for one train
16	Route	Train	1: N	<ul style="list-style-type: none"> One train follows one route One route can be assigned to many trains 	Each train follows one route	<ul style="list-style-type: none"> One route can be assigned to multiple trains Each train follows one route
17	Route	Station	M:N	<ul style="list-style-type: none"> One route passes through many stations One station can be part of many routes 	A route consists of multiple stations, in sequence	<ul style="list-style-type: none">

18	Route	RouteStation	1:N	<ul style="list-style-type: none"> • One route is linked to multiple route-station records • Each route-station record belongs to one route 	A route includes one or more route-station entries	<ul style="list-style-type: none"> • Each route lists the ordered stations it passes through • The station order is defined by station_order in the linking table
19	Station	RouteStation	1:N	<ul style="list-style-type: none"> • One station can be part of multiple route-station entries • Each route-station record references one station 	A station appears in one or more route-station mappings	<ul style="list-style-type: none"> • This enables the reuse of a station across multiple routes • The order of appearance is defined in the route-station entry
20	Schedule	Train	N:1	<ul style="list-style-type: none"> • One schedule is assigned to one train • One train can have many schedules 	A schedule belongs to one train	<ul style="list-style-type: none"> •
21	Schedule	Booking	1:N	<ul style="list-style-type: none"> • One schedule can be booked many times • Each booking is for one schedule 	Each booking is made for a specific schedule	<ul style="list-style-type: none"> •
22	Schedule	Seat	1:N	<ul style="list-style-type: none"> • One schedule has many seats available for booking • Seat availability is tracked by schedule and train 	Each schedule defines the seat layout and class types (AC/SL) available for booking. Seats are uniquely tied to a schedule, enabling passenger seat selection for a specific date and train.	<ul style="list-style-type: none"> • A schedule has many seats • Each seat belongs to one schedule
23	Route	Station	M:N	<ul style="list-style-type: none"> • One route can include many stations • One station can be part of many routes 	A route includes multiple stations; one station may appear in multiple routes	<ul style="list-style-type: none"> •

ERD:

