Data Design to Support the Tools

1 Flight Schedule Table

flight_id	origin	destination	sched_dep	sched_arr	aircraft_type	delay_minutes	status	gate	remarks
UA123	ORD	SFO	2024-08-10 08:00	2024-08-10 11:00	B737	210	delayed	C5	ground stop
UA456	SFO	DEN	2024-08-10 12:00	2024-08-10 14:00	B737	0	ontime	B12	

2 Crew Roster Table

crew_id	name	role	base	qualified_aircraft	assigned_flight_id	duty_start	duty_end	rest_until	status
C001	Jane Doe	captain	ORD	B737	UA123	2024-08-10 07:00	2024-08-10 15:00	2024-08-10 23:00	active
C002	John Roe	FO	ORD	B737	UA123	2024-08-10 07:00	2024-08-10 15:00	2024-08-10 23:00	active
C010	Sam Lee	FO	SFO	B737	none	none	none	2024-08-10 06:00	active
C011	Alex Kim	FO	DEN	B737	none	none	2024-08-10 04:00	active	

3 Spare Crew Pool View

Same as Crew Roster filtered where:

- `assigned_flight_id = none`
- `status = active`
- `rest_until` ≤ current time

4 Hotel Inventory Table

hotel_id	name	location	capacity	available_rooms
H001	ORD Airport Hotel	ORD	200	0
H002	ORD Downtown Inn	ORD	150	10
H003	SFO Airport Hotel	SFO	100	5
H004	DEN Airport Hotel	DEN	120	8

5 Repositioning Flights

flight_id	origin	destination	sched_dep	sched_arr	seats_available
UA9001	DEN	SFO	2024-08-10 10:00	2024-08-10 12:00	true
UA9002	DEN	ORD	2024-08-10 11:00	2024-08-10 13:00	false
UA9003	SFO	ORD	2024-08-10 09:00	2024-08-10 15:00	true

6 Duty / Rest Rules

This may live in logic or small RAG snippet:

- Max duty: 8 hours
- Min rest: 10 hours
- Extensions: only under exceptional conditions with approval
- Pairing: must be qualified for aircraft type

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7 Policy Snippets (for `policy_retriever`)

Examples:

- *"If no legal crew can be found, escalate to ops center for override authorization."*
- *"Hotel overflow: crew must be provided transport to alternative accommodation within 50 miles."*

How these feed your tools

- `query_flight_status` → reads from Flight Schedule
- `query_crew_roster` → reads from Crew Roster
- `query_spare_pool` → filters Crew Roster
- `duty_hour_checker` → uses Crew Roster + Flight Schedule + Duty Rules
- `book_hotel` → Hotel Inventory
- `arrange_transport` → logic (no table needed — mock success/failure)
- `policy_retriever` → Policy Snippets
- `reposition_flight_finder` → Repositioning Flights