advertising-database-project

My project for my mini project in database systems class

Stage 1:

Proposal

Problem & Goal

A travel agency runs many marketing campaigns across multiple media (newspapers, web, social, email). Each campaign can use several vendors and creatives, must stay within a budget, and needs performance tracking to see which spend actually drives bookings.
Goal: design a normalized database that supports planning (budgets, dates), execution (placements on channels via vendors), and measurement (daily metrics tied to bookings/leads).

Why these entities?

- **Campaign** – The organizing unit for marketing work (e.g., "Summer Greece 2025"). Holds objectives, timing, and status so teams can plan and report at the right level.
- **Channel** – Normalized lookup for the medium (Newspaper, Instagram, Google Search, Email, etc.). Lets us compare performance across channels without repeating text.
- **Vendor/Publisher** – The external company selling ad inventory (e.g., Haaretz, Meta). Needed for billing terms and accountability (who actually ran the ad).
- **CreativeAsset** – The concrete ad unit (image, text, video). Kept separate to avoid duplication because a single creative can be reused in many placements.
- **Placement** – The execution record that **connects Campaign + Channel + Vendor + CreativeAsset** with flight dates and plans; this resolves the many-to-many between Campaign and Channel.
- **BudgetAllocation** – Planned spend at campaign level.
- **PerformanceMetric** – Daily (or periodic) results per placement (impressions, clicks, conversions, spend, leads, bookings, revenue).

How the design supports the workflow

1. **Plan** – Create a *Campaign*, allocate money in *BudgetAllocation*, set start/end dates and target regions/seasons.

2. **Execute** – For each *Placement*, pick a *Channel*, *Vendor*, and *CreativeAsset*, then set flight dates and targeting.

3. **Measure** – Load daily rows into *PerformanceMetric* for each placement. Analysts compare **planned vs. actual** across channels/vendors.

Normalization choices

- Lookup/reference tables (**Channel, Vendor, CreativeAsset**) avoid duplicated names and attributes.
- "Planned" budgets are separate from "Actual" results (BudgetAllocation vs. PerformanceMetric).
- Keys and dates ensure integrity (campaign/flight windows, one performance row per placement/day).

Target users

- **Marketing Managers:** create campaigns, book placements, and view performance by channel/vendor.
- **Finance/Operations:** allocate budgets, track currency/spend, and reconcile against results.
- **Analysts/Data Team:** evaluate funnels (leads → bookings → revenue).

Files for Stage 1

- **ERD (image)**: `ERD.png` (embedded below).

- **ERD (JSON source)**: `ERD.erdplus` (in repo).

- **DSD (image)**: 'DSD.png'
- **SQL schema**: `schema.sql` (PostgreSQL `CREATE TABLE` statements).

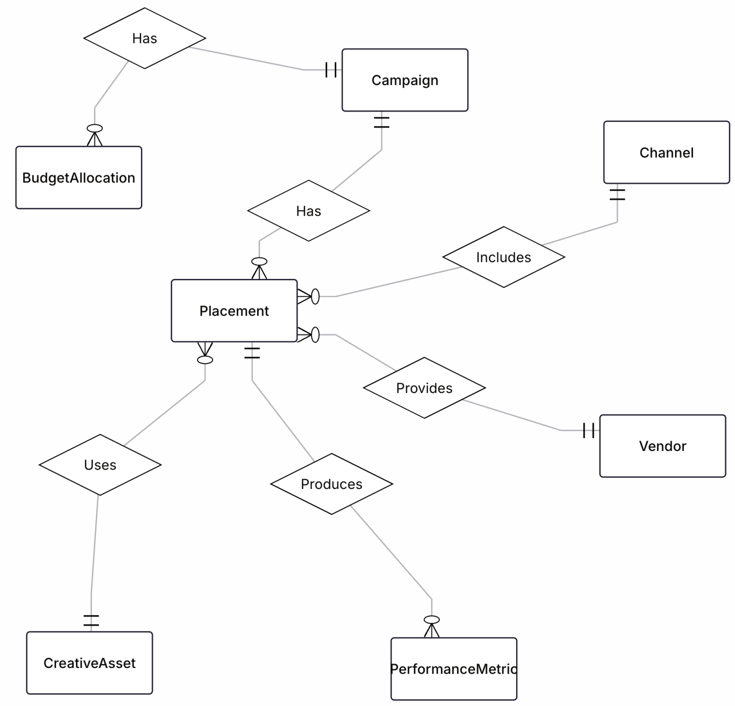


Figure 1: ERD Diagram

Data Generation Process

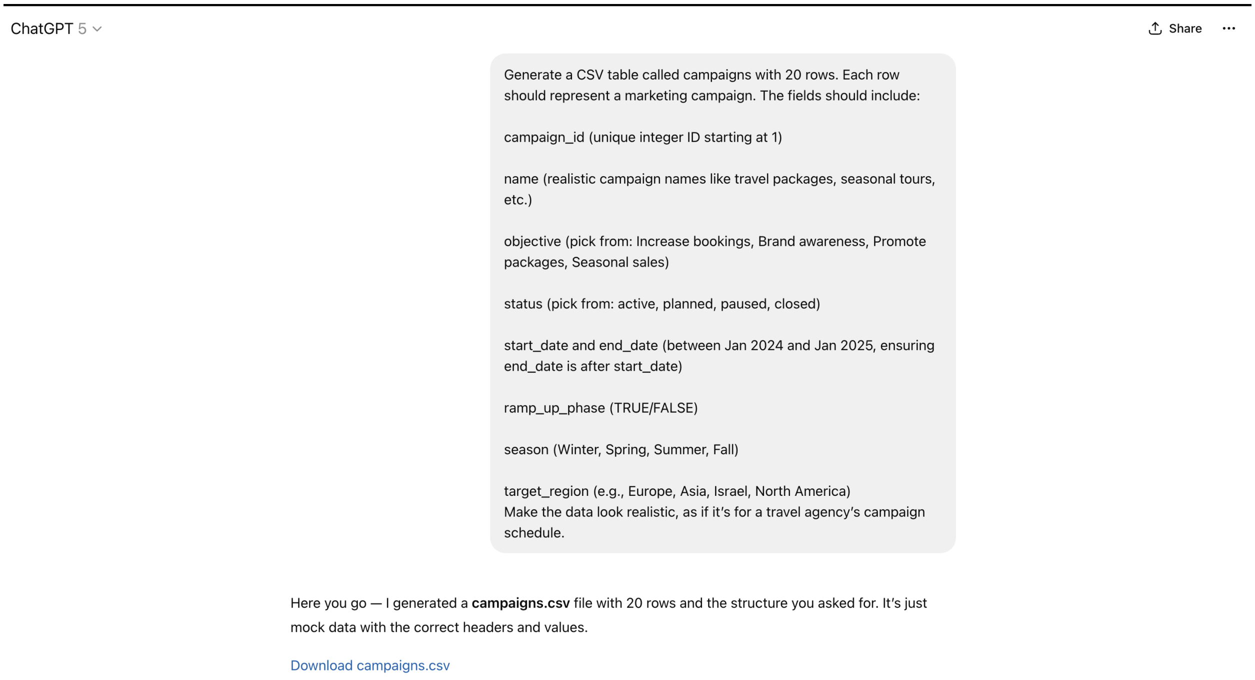
To populate the database with realistic but synthetic data, I used a prompt-driven approach with ChatGPT. For each table, I wrote a natural-language prompt describing: - Table name - Fields and their types - Constraints (unique IDs, foreign keys, value ranges, correlations) ChatGPT then generated CSV files following those rules. Each CSV was downloaded and checked in Excel before being imported into the database. I documented this process with screenshots of prompts and results, showing how the data was generated step by step. This ensures transparency in how the synthetic dataset was created.

Dataset Sizes

- **Campaigns**: 20 rows
- **Channels**: 10 rows
- **Vendors**: 25 rows
- **CreativeAssets**: 200 rows
- **Placements**: 1,000 rows
- **BudgetAllocations**: 20 rows
- **PerformanceMetrics**: 200,000 rows
- **Total**: ~201,275 rows across all tables

Screenshots

Campaign Prompt



Generate a CSV table called campaigns with 20 rows. Each row should represent a marketing campaign. The fields should include:

campaign_id (unique integer ID starting at 1)

name (realistic campaign names like travel packages, seasonal tours, etc.)

objective (pick from: Increase bookings, Brand awareness, Promote packages, Seasonal sales)

status (pick from: active, planned, paused, closed)

start_date and end_date (between Jan 2024 and Jan 2025, ensuring end_date is after start_date)

ramp_up_phase (TRUE/FALSE)

season (Winter, Spring, Summer, Fall)

target_region (e.g., Europe, Asia, Israel, North America)
Make the data look realistic, as if it's for a travel agency's campaign schedule.

Here you go — I generated a **campaigns.csv** file with 20 rows and the structure you asked for. It's just mock data with the correct headers and values.

Download campaigns.csv

Figure 2: Campaign Prompt

Channels Prompt

Vendors Prompt

CreativeAssets Prompt

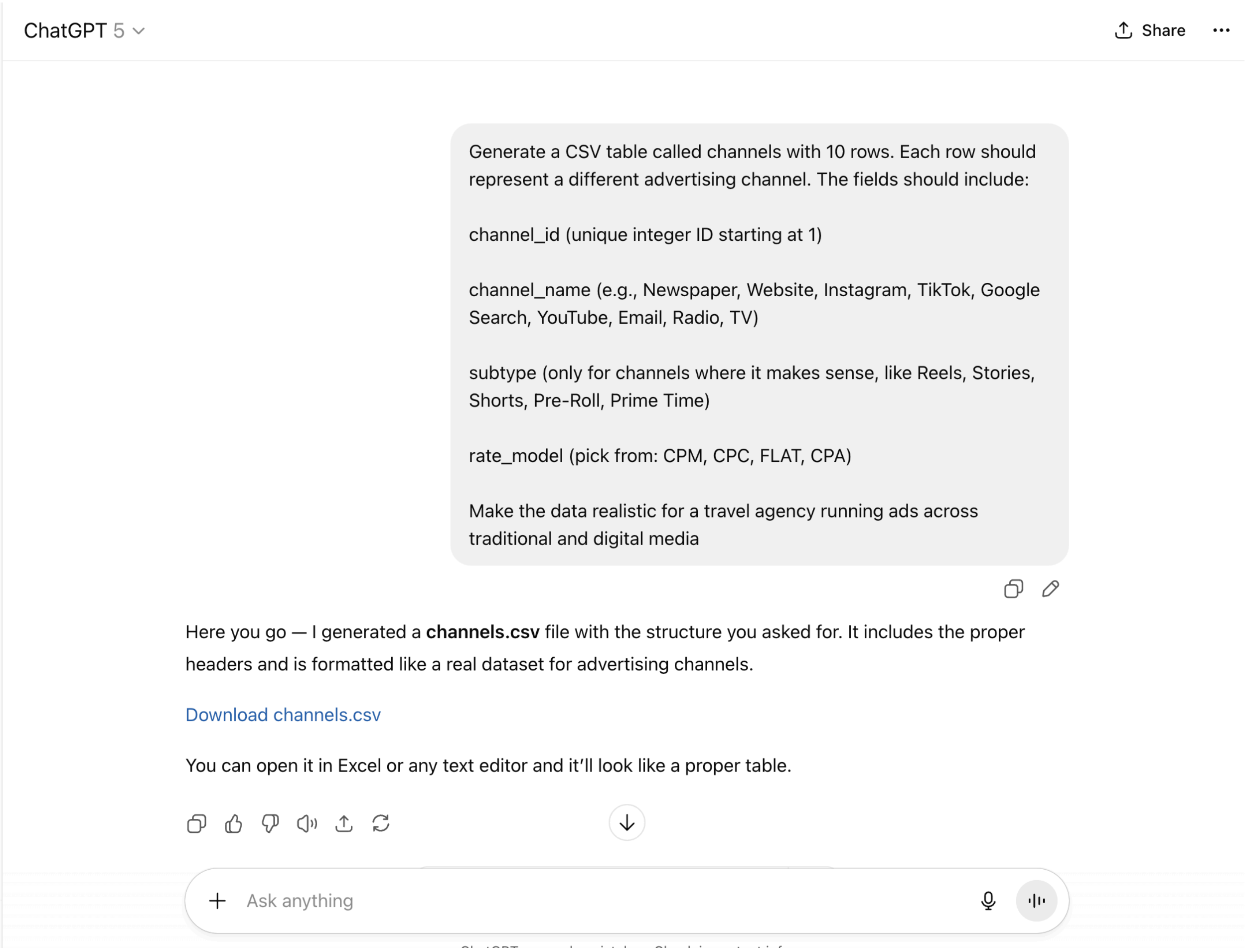
Placements Prompt

BudgetAllocations Prompt

PerformanceMetrics Prompt

Creating Tables and Inputing CSV data I created

- ***Schema.sql*** : includes all the "CREATE TABLES" for my schema and ran it.



Generate a CSV table called channels with 10 rows. Each row should represent a different advertising channel. The fields should include:

channel_id (unique integer ID starting at 1)

channel_name (e.g., Newspaper, Website, Instagram, TikTok, Google Search, YouTube, Email, Radio, TV)

subtype (only for channels where it makes sense, like Reels, Stories, Shorts, Pre-Roll, Prime Time)

rate_model (pick from: CPM, CPC, FLAT, CPA)

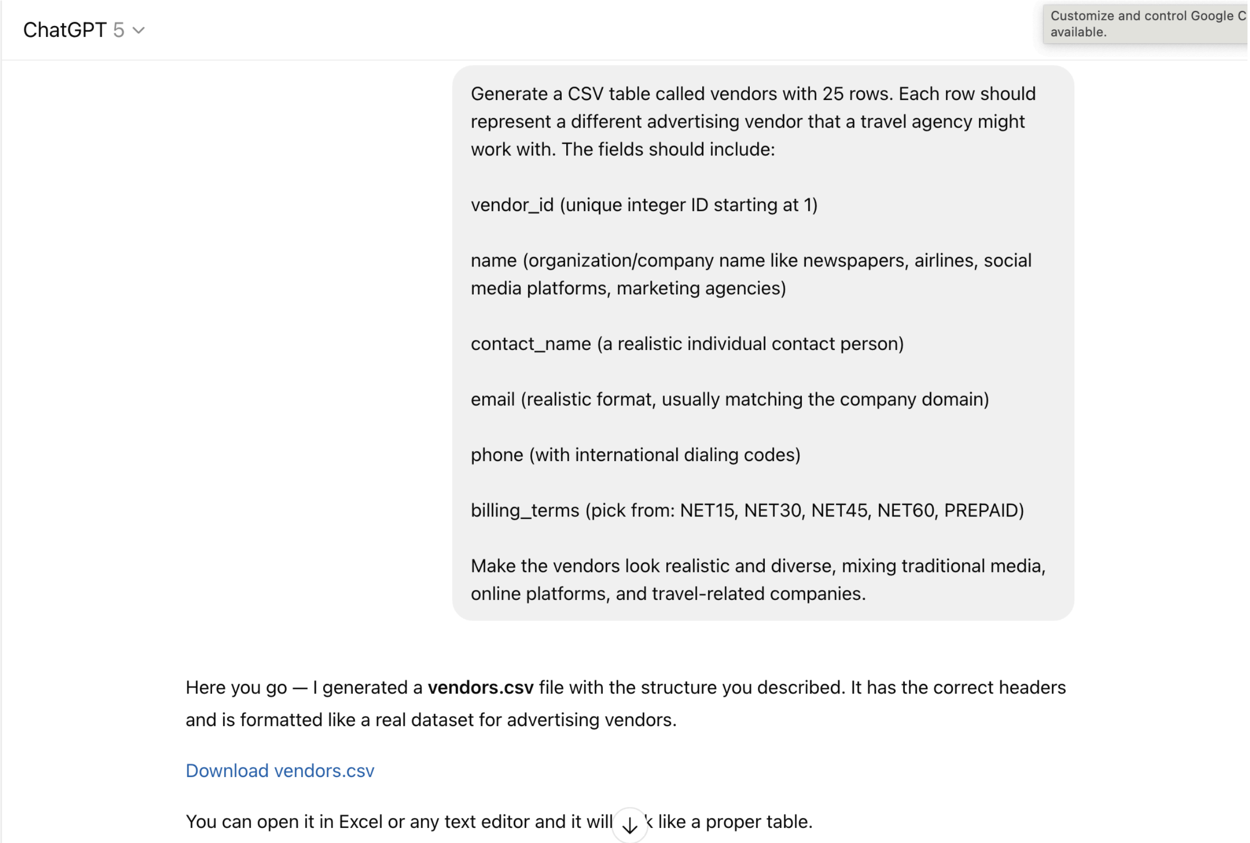
Make the data realistic for a travel agency running ads across traditional and digital media

Here you go — I generated a **channels.csv** file with the structure you asked for. It includes the proper headers and is formatted like a real dataset for advertising channels.

Download channels.csv

You can open it in Excel or any text editor and it'll look like a proper table.

Figure 3: Channels Prompt



Generate a CSV table called vendors with 25 rows. Each row should represent a different advertising vendor that a travel agency might work with. The fields should include:

vendor_id (unique integer ID starting at 1)

name (organization/company name like newspapers, airlines, social media platforms, marketing agencies)

contact_name (a realistic individual contact person)

email (realistic format, usually matching the company domain)

phone (with international dialing codes)

billing_terms (pick from: NET15, NET30, NET45, NET60, PREPAID)

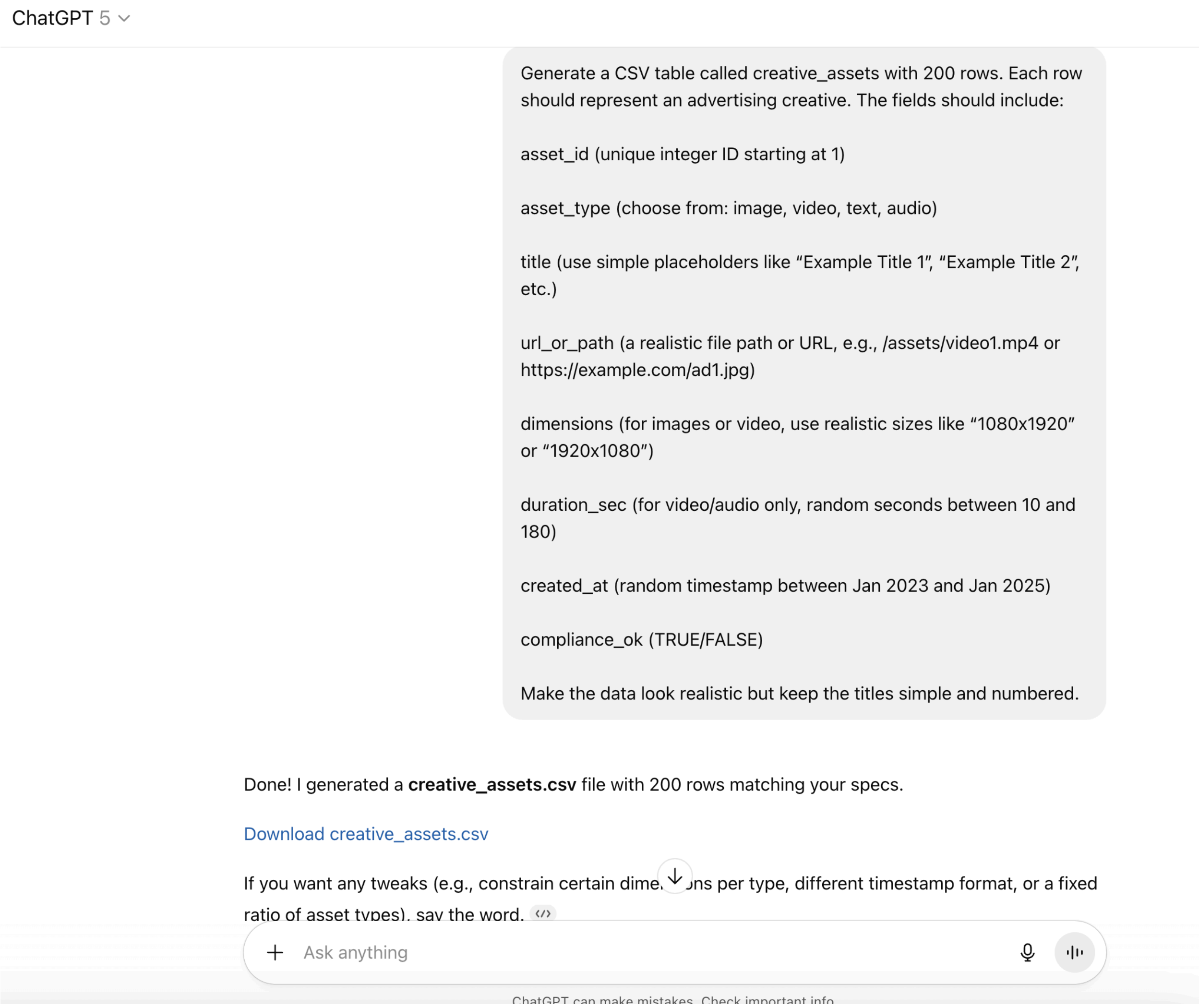
Make the vendors look realistic and diverse, mixing traditional media, online platforms, and travel-related companies.

Here you go — I generated a **vendors.csv** file with the structure you described. It has the correct headers and is formatted like a real dataset for advertising vendors.

Download vendors.csv

You can open it in Excel or any text editor and it will k like a proper table.

Figure 4: Vendors Prompt



Generate a CSV table called creative_assets with 200 rows. Each row should represent an advertising creative. The fields should include:

asset_id (unique integer ID starting at 1)

asset_type (choose from: image, video, text, audio)

title (use simple placeholders like “Example Title 1”, “Example Title 2”, etc.)

url_or_path (a realistic file path or URL, e.g., /assets/video1.mp4 or https://example.com/ad1.jpg)

dimensions (for images or video, use realistic sizes like “1080x1920” or “1920x1080”)

duration_sec (for video/audio only, random seconds between 10 and 180)

created_at (random timestamp between Jan 2023 and Jan 2025)

compliance_ok (TRUE/FALSE)

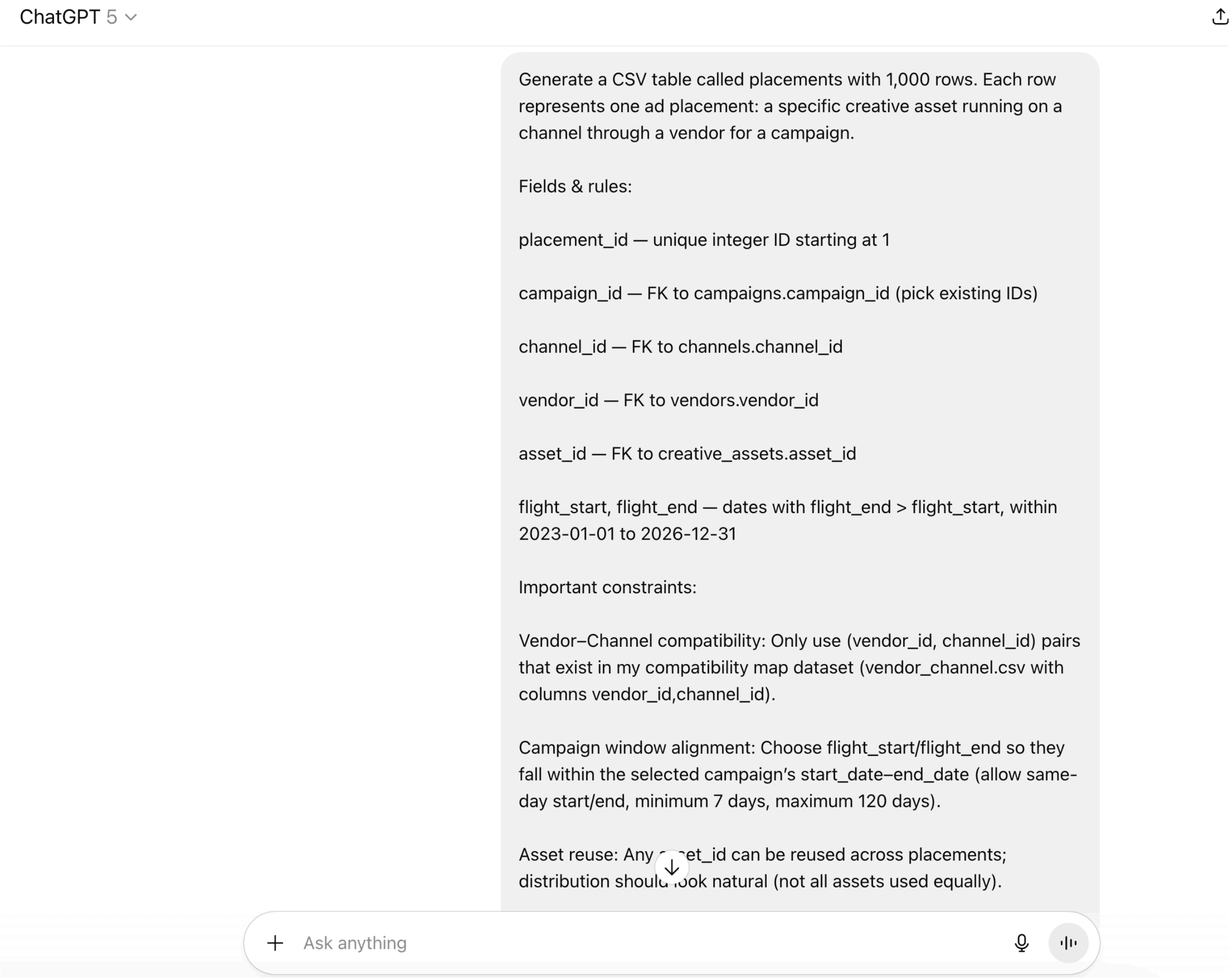
Make the data look realistic but keep the titles simple and numbered.

Done! I generated a **creative_assets.csv** file with 200 rows matching your specs.

Download creative_assets.csv

If you want any tweaks (e.g., constrain certain dime ons per type, different timestamp format, or a fixed ratio of asset types), say the word.

Figure 5: CreativeAssets Prompt



Generate a CSV table called placements with 1,000 rows. Each row represents one ad placement: a specific creative asset running on a channel through a vendor for a campaign.

Fields & rules:

placement_id — unique integer ID starting at 1

campaign_id — FK to campaigns.campaign_id (pick existing IDs)

channel_id — FK to channels.channel_id

vendor_id — FK to vendors.vendor_id

asset_id — FK to creative_assets.asset_id

flight_start, flight_end — dates with flight_end > flight_start, within 2023-01-01 to 2026-12-31

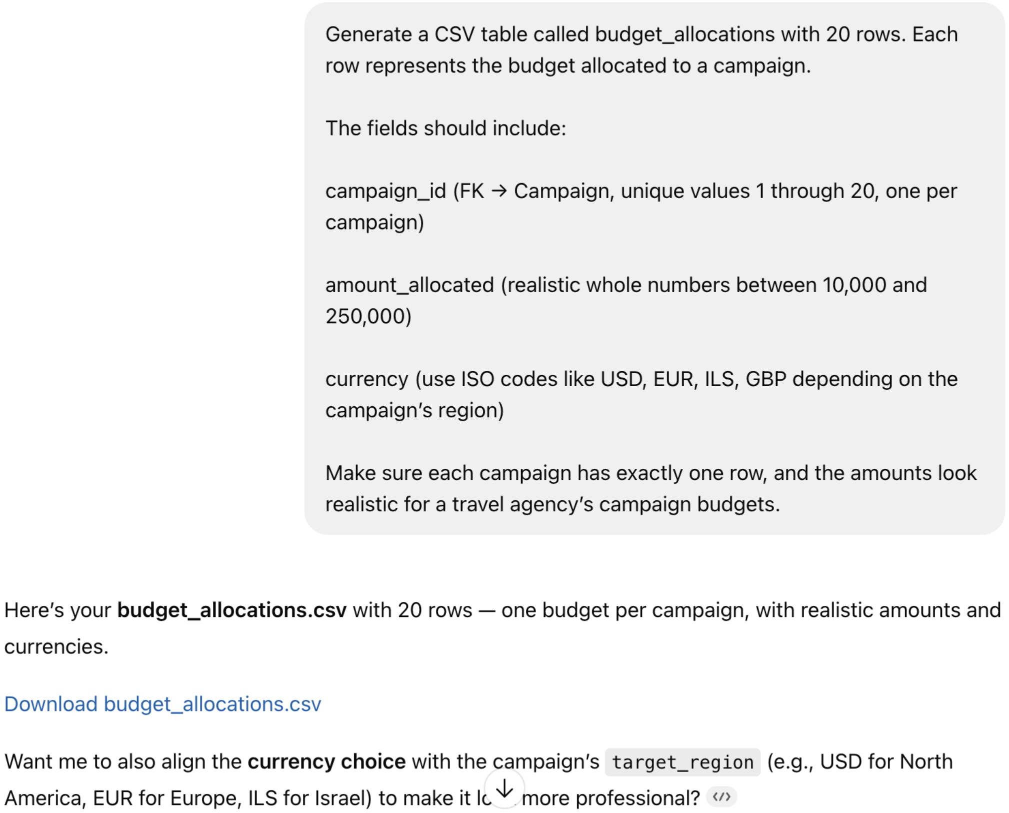
Important constraints:

Vendor–Channel compatibility: Only use (vendor_id, channel_id) pairs that exist in my compatibility map dataset (vendor_channel.csv with columns vendor_id,channel_id).

Campaign window alignment: Choose flight_start/flight_end so they fall within the selected campaign's start_date–end_date (allow same-day start/end, minimum 7 days, maximum 120 days).

Asset reuse: Any asset_id can be reused across placements; distribution should look natural (not all assets used equally).

Figure 6: Placements Prompt



Generate a CSV table called budget_allocations with 20 rows. Each row represents the budget allocated to a campaign.

The fields should include:

campaign_id (FK → Campaign, unique values 1 through 20, one per campaign)

amount_allocated (realistic whole numbers between 10,000 and 250,000)

currency (use ISO codes like USD, EUR, ILS, GBP depending on the campaign's region)

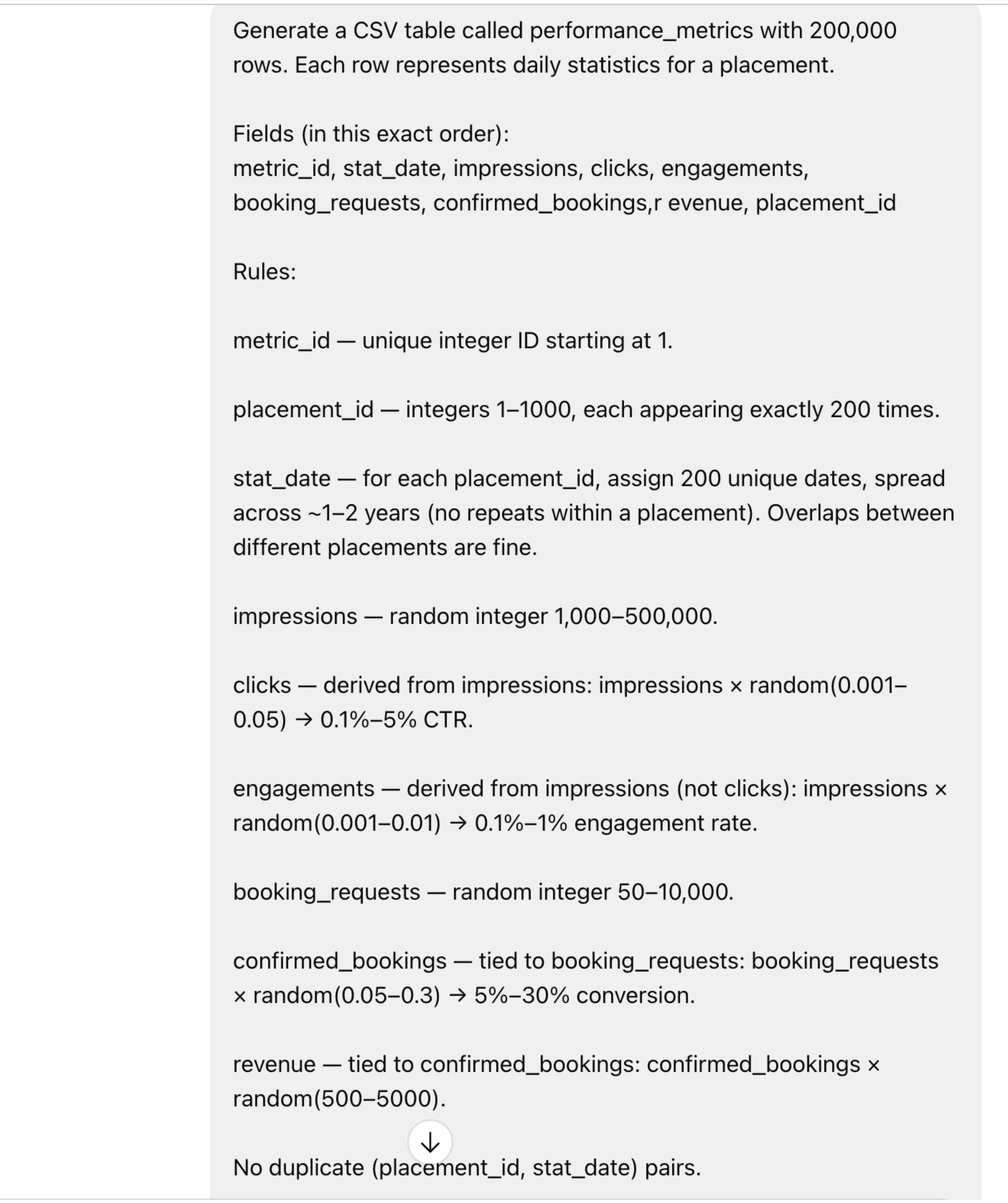
Make sure each campaign has exactly one row, and the amounts look realistic for a travel agency's campaign budgets.

Here's your **budget_allocations.csv** with 20 rows — one budget per campaign, with realistic amounts and currencies.

Download budget_allocations.csv

Want me to also align the **currency choice** with the campaign's `target_region` (e.g., USD for North America, EUR for Europe, ILS for Israel) to make it look more professional?

Figure 7: BudgetAllocations Prompt



Generate a CSV table called performance_metrics with 200,000 rows. Each row represents daily statistics for a placement.

Fields (in this exact order):
metric_id, stat_date, impressions, clicks, engagements, booking_requests, confirmed_bookings,r evenue, placement_id

Rules:

metric_id — unique integer ID starting at 1.

placement_id — integers 1–1000, each appearing exactly 200 times.

stat_date — for each placement_id, assign 200 unique dates, spread across ~1–2 years (no repeats within a placement). Overlaps between different placements are fine.

impressions — random integer 1,000–500,000.

clicks — derived from impressions: impressions × random(0.001–0.05) → 0.1%–5% CTR.

engagements — derived from impressions (not clicks): impressions × random(0.001–0.01) → 0.1%–1% engagement rate.

booking_requests — random integer 50–10,000.

confirmed_bookings — tied to booking_requests: booking_requests × random(0.05–0.3) → 5%–30% conversion.

revenue — tied to confirmed_bookings: confirmed_bookings × random(500–5000).

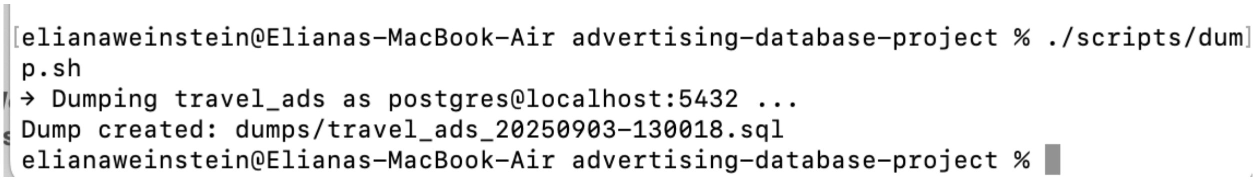
No duplicate (placement_id, stat_date) pairs.

Figure 8: PerformanceMetrics Prompt

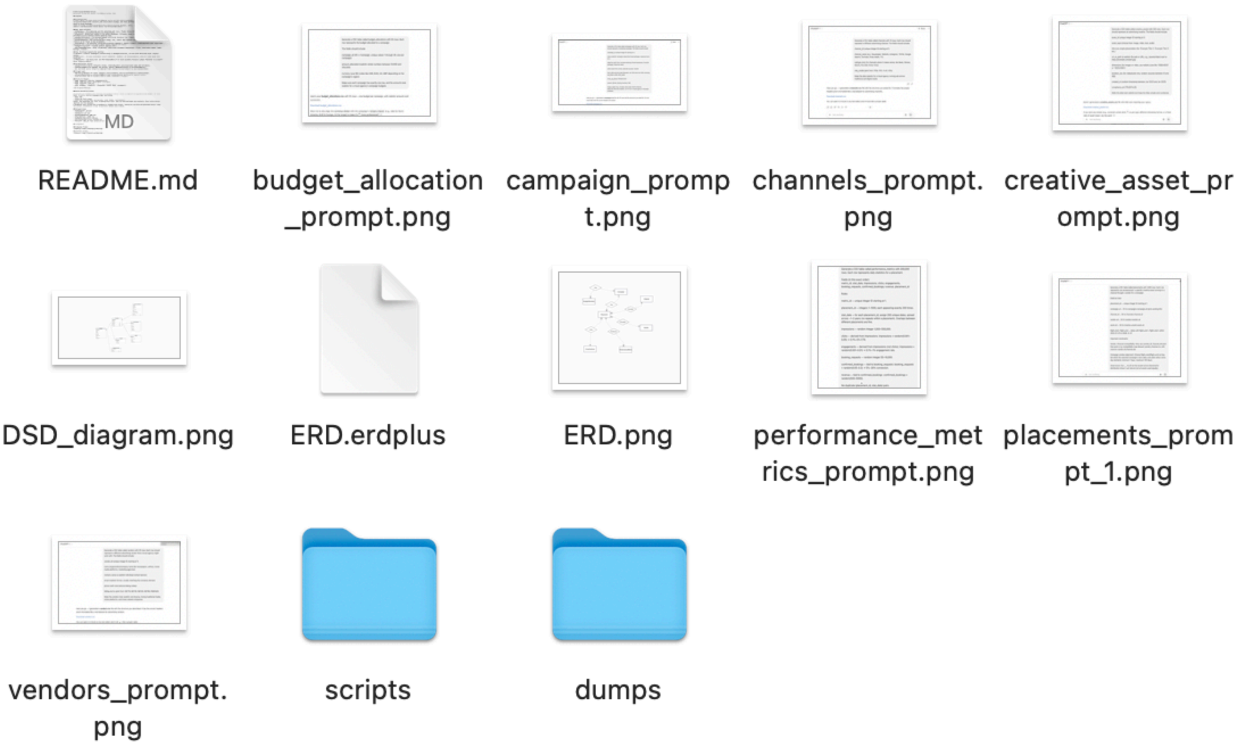
- I then added all my Csv's to my project folder
- ***Copying CSV tables into my sql***: i ran these commands

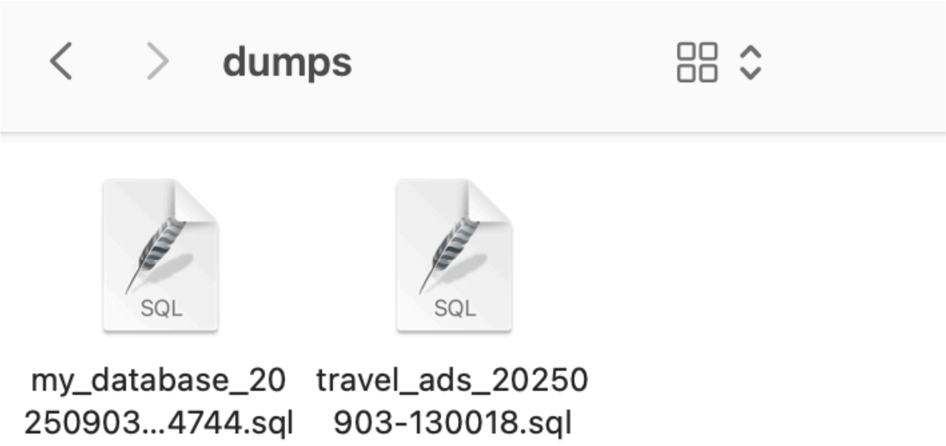
```
\copy campaigns           FROM 'campaigns.csv'           CSV HEADER;
\copy channels            FROM 'channels.csv'            CSV HEADER;
\copy vendors             FROM 'vendors.csv'             CSV HEADER;
\copy creative_assets     FROM 'creative_assets.csv'     CSV HEADER;
\copy placements          FROM 'placements.csv'          CSV HEADER;
\copy budget_allocations  FROM 'budget_allocations.csv'  CSV HEADER;
\copy performance_metrics FROM 'performance_metrics.csv' CSV HEADER;
```

Dump



```
elianaweinstein@Elianas-MacBook-Air advertising-database-project % ./scripts/dum
p.sh
→ Dumping travel_ads as postgres@localhost:5432 ...
Dump created: dumps/travel_ads_20250903-130018.sql
elianaweinstein@Elianas-MacBook-Air advertising-database-project % 
```




dumps
SQL
SQL
my_database_20250903...4744.sql
travel_ads_20250903-130018.sql

Stage 2

Backups and Restore

- In this stage, I prepared scripts to back up and restore the PostgreSQL database.
- I put my backup/restore commands into small shell scripts under scripts/ so the process is repeatable (same command every time) and portable (works on my machine and any other computer)
- I also use a .env file for connection settings (PGHOST, PGPORT, PGUSER, PGDATABASE), so the scripts don't hardcode credentials. This makes it easy to run on another computer by just changing .env.

1. Plain SQL Backup

- Command: `./scripts/backup_sql.sh`
- Output file: ***backupSQL.sql***
- Log file: ***backupSQL.log*** (includes pg_dump output and timing statistics)

2. Custom Format Backup & Restore

- Command: ./scripts/backup_psql.sh
- Output file: ***backupPSQL.sql***
- Log file: ***backupPSQL.log*** (includes pg_dump output and timing statistics)

Restore tested with:

I first clear the schema to prove the restore works: - DROP SCHEMA public CASCADE; - CREATE SCHEMA public; Then I run pg_restore from the custom backup to rebuild schema + data. - `./scripts/restore_psql.sh`

Queries and Parameterized Queries

This section documents the user-driven queries written for the database inlcuding joins, aggregates, grouping, ordering, subqueries, and constraints.

Queries.sql

I wrote eight queries that reflect user needs: four SELECT, two UPDATE, and two DELETE. Each query was written, executed, and timed using `\timing on`. Updates and deletes were wrapped in BEGIN …

ROLLBACK so they could be tested safely without altering the data.

SELECT Queries

1) Top 5 campaigns by total revenue

- Aggregates revenue per campaign across placements and performance metrics.
- Groups by campaign and orders by revenue descending.
- Business need: Management wants to quickly see which campaigns are the most profitable. ### 2) Impressions, clicks, and CTR by channel
- Summarizes impressions and clicks by channel, computes CTR (click-through rate).
- Uses NULLIF to prevent division by zero errors.
- Business need: Marketing team monitors effectiveness of each channel. ### 3) Vendor revenue totals (ranked highest to lowest)
- Groups revenue by vendor to see which vendors deliver the most return.
- Business need: Vendor management decisions (contract renewals, scaling partnerships). ### 4) Daily confirmed bookings for one campaign
- Groups daily confirmed bookings for a single campaign (parameterized with campaign_id).
- Business need: Track booking performance trends over time for a given campaign.

UPDATE Queries

5) Close campaigns that already ended

- Sets status = 'closed' where end_date < CURRENT_DATE.
- Ensures `campaigns` don't remain active beyond their intended run. ### 6) Increase budget by +5% for active campaigns
- Finds active `campaigns` and applies a 5% budget increase to their allocations.

DELETE Queries

7) Remove performance metrics for one placement in a date range

- Deletes all metrics for a given `placement` within a specific month. ### 8) Transaction rolled back.
- Remove creative assets not tied to any `placement`.
- Helps prevent storage bloat from unused assets.

ParamQueries.sql

I also wrote four parameterized queries to demonstrate dynamic query execution with PREPARE and EXECUTE. Each query uses joins, grouping, and aggregates.

1) Creative assets created after a given date

- Lists assets newer than a parameterized date.
- Ordered by creation time for easy review.
- Example input: 2024-01-01. ### 2) Campaigns by vendor name
- Finds `campaigns` linked to a specific `vendor`.
- Example input: 'Google Ads'. ### 3) Impressions + clicks for a channel
- Summarizes performance for one `channel` by ID.
- Example input: channel_id = 2. ### 4) Average revenue per placement for a campaign
- Aggregates revenue at `placement` level and averages across a `campaign`.
- Example input: campaign_id = 5.
- Helps determine revenue consistency within `campaigns`.

Files:

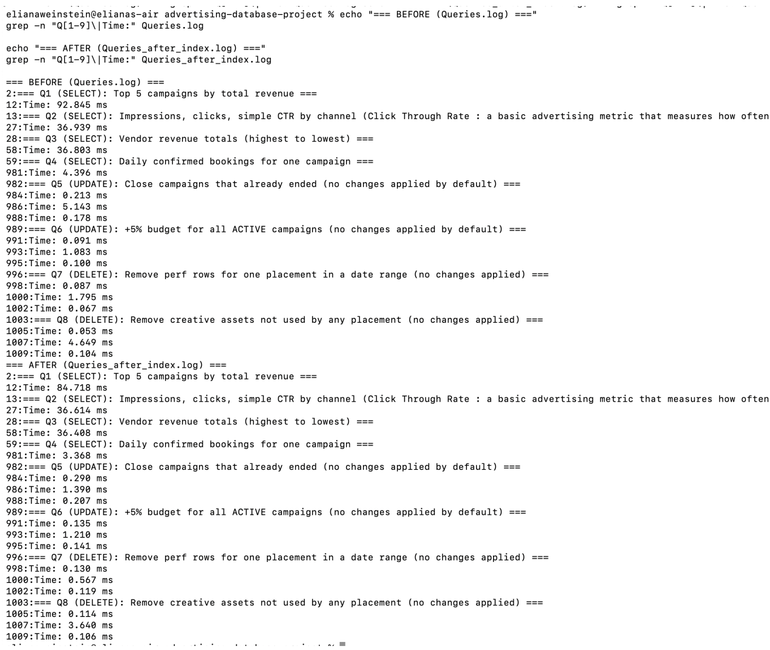
- Queries.sql: creation of queries.
- queries.log: output log of creation.
- ParamQueries.sql: creation of queries with parameters.
- ParamQueries.log: output log of creation.

Indexing & Query Performance Phase

I identified three queries from my project that could benefit from indexes: - Q1 (Top `campaigns` by revenue) - Q2 (CTR by `channel`) - Q3 (`Vendor` revenue totals) - Q4 (Daily bookings by `campaign`) - Q7 (DELETE rows for one `placement` in a date range) These queries involve joins and grouping, which are often slow on large datasets without indexes. I created three custom indexes in Constraints.sql: - ***performance_metrics(placement_id, stat_date)*** → speeds joins & date filters (Q1, Q4, Q7). - ***placements(campaign_id)*** → speeds filtering/grouping by `campaign` (Q1, Q4). - ***placements(channel_id, vendor_id)*** → speeds grouping & joins by `channel/vendor` (Q2, Q3). - These were chosen because primary keys are already indexed automatically, so I focused on foreign keys and join columns, as recommended in class. - I used `\timing on` in PostgreSQL to measure execution times before and after adding indexes.

How I Measured

- Ran ***Queries.sql*** first (without my custom indexes): "psql -h localhost -p 5432 -U postgres -d travel_ads -f Queries.sql > Queries.log 2>&1"
- Logged results into ***Queries.log***.
- Then ran ***Constraints.sql*** to create indexes: "psql -h localhost -p 5432 -U postgres -d travel_ads -f Constraints.sql > Constraints.log 2>&1"
- Logged results into ***Constraints.log***
- Re-ran queries into ***Queries_after_index.log***: "psql -h localhost -p 5432 -U postgres -d travel_ads -f Queries.sql > Queries_after_index.log 2>&1"



```
elianaweinstein@elianas-air advertising-database-project % echo "=== BEFORE (Queries.log) ==="
grep -n "Q[1-9]\|Time:" Queries.log

echo "=== AFTER (Queries_after_index.log) ==="
grep -n "Q[1-9]\|Time:" Queries_after_index.log

=== BEFORE (Queries.log) ===
2:=== Q1 (SELECT): Top 5 campaigns by total revenue ===
12:Time: 92.845 ms
13:=== Q2 (SELECT): Impressions, clicks, simple CTR by channel (Click Through Rate : a basic advertising metric that measures how often
27:Time: 36.939 ms
28:=== Q3 (SELECT): Vendor revenue totals (highest to lowest) ===
58:Time: 36.803 ms
59:=== Q4 (SELECT): Daily confirmed bookings for one campaign ===
981:Time: 4.396 ms
982:=== Q5 (UPDATE): Close campaigns that already ended (no changes applied by default) ===
984:Time: 0.213 ms
986:Time: 5.143 ms
988:Time: 0.178 ms
989:=== Q6 (UPDATE): +5% budget for all ACTIVE campaigns (no changes applied by default) ===
991:Time: 0.091 ms
993:Time: 1.083 ms
995:Time: 0.100 ms
996:=== Q7 (DELETE): Remove perf rows for one placement in a date range (no changes applied) ===
998:Time: 0.087 ms
1000:Time: 1.795 ms
1002:Time: 0.067 ms
1003:=== Q8 (DELETE): Remove creative assets not used by any placement (no changes applied) ===
1005:Time: 0.053 ms
1007:Time: 4.649 ms
1009:Time: 0.104 ms
=== AFTER (Queries_after_index.log) ===
2:=== Q1 (SELECT): Top 5 campaigns by total revenue ===
12:Time: 84.718 ms
13:=== Q2 (SELECT): Impressions, clicks, simple CTR by channel (Click Through Rate : a basic advertising metric that measures how often
27:Time: 36.614 ms
28:=== Q3 (SELECT): Vendor revenue totals (highest to lowest) ===
58:Time: 36.408 ms
59:=== Q4 (SELECT): Daily confirmed bookings for one campaign ===
981:Time: 3.368 ms
982:=== Q5 (UPDATE): Close campaigns that already ended (no changes applied by default) ===
984:Time: 0.290 ms
986:Time: 1.390 ms
988:Time: 0.207 ms
989:=== Q6 (UPDATE): +5% budget for all ACTIVE campaigns (no changes applied by default) ===
991:Time: 0.135 ms
993:Time: 1.210 ms
995:Time: 0.141 ms
996:=== Q7 (DELETE): Remove perf rows for one placement in a date range (no changes applied) ===
998:Time: 0.130 ms
1000:Time: 0.567 ms
1002:Time: 0.119 ms
1003:=== Q8 (DELETE): Remove creative assets not used by any placement (no changes applied) ===
1005:Time: 0.114 ms
1007:Time: 3.640 ms
1009:Time: 0.106 ms
```

- Used grep to extract query times for easy comparison

Indexing Results Summary

Query	Before (ms)	After (ms)	Speedup	Notes
Q1: Top 5 campaigns by revenue	~92.8	~84.7	~9%	Joins between `performance_metrics`, `placements`, and `campaigns` slightly faster
Q2: CTR by channel	~36.9	~36.6	<1%	Minimal improvement
Q3: Vendor revenue totals	~36.8	~36.4	~1%	Minimal improvement
Q4: Daily bookings by campaign	~4.4	~3.4	~23%	Index on `(placement_id, stat_date)` + `(campaign_id)` helped grouping/filtering
Q7: DELETE rows in date range	~1.795	~0.567	~68%	Biggest win — index matches `placement_id` + `stat_date` filter perfectly

Key Takeaways

- Composite indexes gave the most benefit for queries with strong filtering (`Q7` and `Q4`).
- Revenue/CTR queries improved only slightly, as they are more aggregation-heavy.
- Deleting by placement + date range is now **3× faster**.

Constraints

In this stage of the project, I strengthened the database schema by adding ancillary constraints using ALTER TABLE. These constraints ensure data integrity beyond just primary and foreign keys. I then wrote test queries (INSERT, UPDATE, DELETE) that intentionally violate the constraints to confirm they are enforced. Finally, I captured all inputs and outputs (including error messages) into a log file for documentation (constraints.log).

Step 1: I added the following constraints across multiple tables:

1) Campaigns

- chk_campaign_dates: Ensures end_date >= start_date.

2) Vendors

- chk_vendor_email: Validates email format with regex.

3) Creative Assets

- chk_asset_duration: Only videos can have a positive duration, all other asset types must have NULL.

- chk_dimensions_format: Ensures dimensions are in WIDTHxHEIGHT format (e.g., 1920x1080) with nonzero values.

4) Budget Allocations

- chk_budget_positive: Ensures allocated budget is greater than 0.
- chk_currency_format: Enforces three uppercase letters (e.g., USD, ILS) for currency codes.

5) Performance Metrics

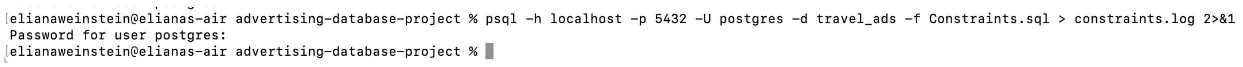
- chk_nonnegative_metrics: Ensures all numeric statistics (impressions, clicks, revenue, etc.) are non-negative.

Step 2: For each constraint, I wrote queries that deliberately fail:

- Campaign with end_date before start_date → violates 'chk_campaign_dates'.
- Vendor with invalid email → violates `chk_vendor_email`.
- Video asset with duration = 0 → violates `chk_asset_duration`.
- Image asset with duration → violates `chk_asset_duration`.
- Creative asset with invalid dimensions (1920*1080) → violates `chk_dimensions_format`.
- Negative budget allocation → violates `chk_budget_positive`.
- Currency not uppercase (usd) → violates `chk_currency_format`.
- Negative clicks in performance metrics → violates `chk_nonnegative_metrics`.
- Update vendor email to invalid string → violates `chk_vendor_email`.
- Cascade delete test: Inserted a campaign with related placement, then deleted the campaign to confirm that placements were automatically deleted (ON DELETE CASCADE).

Step 3: Captured Logs:

- I ran the script using: psql -h localhost -p 5432 -U postgres -d travel_ads -f Constraints.sql 2>&1 | tee constraints.log



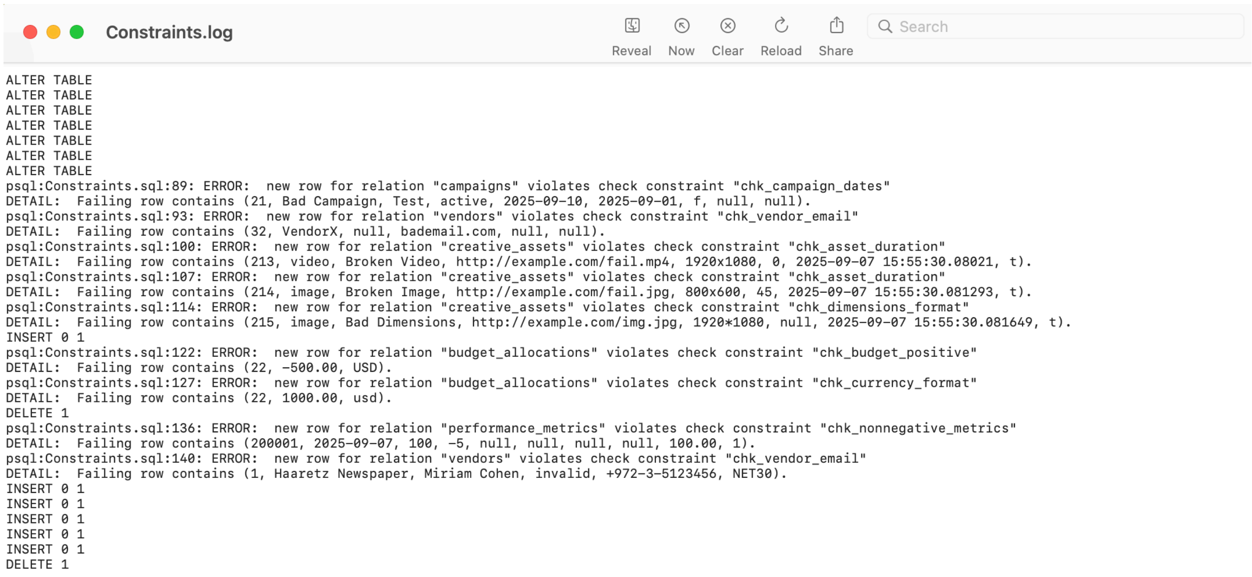
```
elianaweinstein@elianas-air advertising-database-project % psql -h localhost -p 5432 -U postgres -d travel_ads -f Constraints.sql > constraints.log 2>&1
Password for user postgres:
elianaweinstein@elianas-air advertising-database-project %
```

Figure 9: Constraints Screenshots

-
- This produced a log file (constraints.log) with both commands and error messages.
-

ERROR and message explanations (from constraints.log)

- ALTER TABLE (multiple lines) Meaning: All constraint DDL statements executed successfully (no errors here).
- psql:Constraints.sql:89: ERROR: new row for relation "relation" violates check constraint "chk_constraint" (multiple times). Meaning: the constraints that I added were violated (intentionally)
- INSERT 0 1 (right after the above) Meaning: The setup campaign for the budget tests inserted successfully.
- DELETE 1 Meaning: Cleanup delete of the test campaign succeeded (and cascades ran as defined). ### All failing statements intentionally triggered the new CHECK constraints, confirming they work; setup/cleanup statements behaved correctly, including cascade deletes.



```
ALTER TABLE
ALTER TABLE
ALTER TABLE
ALTER TABLE
ALTER TABLE
ALTER TABLE
ALTER TABLE
psql:Constraints.sql:89: ERROR:  new row for relation "campaigns" violates check constraint "chk_campaign_dates"
DETAIL:  Failing row contains (21, Bad Campaign, Test, active, 2025-09-10, 2025-09-01, f, null, null).
psql:Constraints.sql:93: ERROR:  new row for relation "vendors" violates check constraint "chk_vendor_email"
DETAIL:  Failing row contains (32, VendorX, null, bademail.com, null, null).
psql:Constraints.sql:100: ERROR:  new row for relation "creative_assets" violates check constraint "chk_asset_duration"
DETAIL:  Failing row contains (213, video, Broken Video, http://example.com/fail.mp4, 1920x1080, 0, 2025-09-07 15:55:30.08021, t).
psql:Constraints.sql:107: ERROR:  new row for relation "creative_assets" violates check constraint "chk_asset_duration"
DETAIL:  Failing row contains (214, image, Broken Image, http://example.com/fail.jpg, 800x600, 45, 2025-09-07 15:55:30.081293, t).
psql:Constraints.sql:114: ERROR:  new row for relation "creative_assets" violates check constraint "chk_dimensions_format"
DETAIL:  Failing row contains (215, image, Bad Dimensions, http://example.com/img.jpg, 1920*1080, null, 2025-09-07 15:55:30.081649, t).
INSERT 0 1
psql:Constraints.sql:122: ERROR:  new row for relation "budget_allocations" violates check constraint "chk_budget_positive"
DETAIL:  Failing row contains (22, -500.00, USD).
psql:Constraints.sql:127: ERROR:  new row for relation "budget_allocations" violates check constraint "chk_currency_format"
DETAIL:  Failing row contains (22, 1000.00, usd).
DELETE 1
psql:Constraints.sql:136: ERROR:  new row for relation "performance_metrics" violates check constraint "chk_nonnegative_metrics"
DETAIL:  Failing row contains (200001, 2025-09-07, 100, -5, null, null, null, null, 100.00, 1).
psql:Constraints.sql:140: ERROR:  new row for relation "vendors" violates check constraint "chk_vendor_email"
DETAIL:  Failing row contains (1, Haaretz Newspaper, Miriam Cohen, invalid, +972-3-5123456, NET30).
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
INSERT 0 1
DELETE 1
```

Figure 10: Constraints Screenshots

Files

- Constraints.sql: Contains all ALTER TABLE statements and test queries.
- constraints.log: Log file capturing all inputs and outputs.

Stage 3

3 More Queries (Select and Update)

`Q1` – Campaigns that ran on Instagram Reels

- ***What it does***: Finds all campaigns that ran on Instagram Reels, using channel_id = 3 (no need to join the channels table). Returns campaign name and the flight start/end dates.
- ***Time***: 4.873 ms

`Q2` – Increase budget by 10% for campaigns with bookings in last 30 days

- ***What it does***: Checks for campaigns that had at least one confirmed booking in the last 30 days and increases their budget by 10%. A transaction wrapper is used so we can test with ROLLBACK first.
- ***Time***: 87.242 ms

`Q3` – Bookings by campaign from newspaper ads

- ***What it does***: Aggregates confirmed bookings from placements that ran in newspaper ads (channel_id = 1), grouped by campaign. Shows which campaigns generated the most bookings from newspapers.
- ***Time***: 52.117 ms

Files:

- `Stage3_Queries.sql` : SQL code
- `stage3_queries.log` : output