Protobuf Endpoints & Internal APIs

Google Maps Internal Protobuf API

Google Maps communicates with its backend using **Protocol Buffer (protobuf) encoding** over HTTP. Several internal endpoints have been documented.

tbm=map Search Endpoint

Adding `tbm=map` to a Google search returns protobuf-over-JSON instead of HTML. Single HTTP request, no browser rendering needed.

```
https://www.google.com/search?tbm=map&hl=en&q=restaurants+in+berlin&tch=1&ech=1
```

Returns: nested arrays parseable with JSON indexing — business names, ratings, review counts, categories, addresses, coordinates, thumbnails.

/maps/preview/place — Place Details

Returns protobuf-over-JSON place details via a `pb` parameter with feature ID embedded. More stable than HTML scraping — follows internal schema, not frontend layout.

/maps/vt/pb — Tile Endpoint

Map tile requests containing ~730 fields across ~125 protobuf messages. Uses `!`-separated text-based protobuf with type characters (s, i, d, f, j, u, v, x, y, g, h, n, o, e, z, B, b, m).

window.APP_INITIALIZATION_STATE

Google Maps embeds data in `window.APP_INITIALIZATION_STATE` in the HTML response. No headless browser needed:

```
JSON.parse(window.APP_INITIALIZATION_STATE[3][2].split("'\n")[1])
```

Source: r/webscraping

Protobuf Pagination Details

- **PSI parameter**: stored in `window.APP_OPTIONS[11]`, changes after each page reload — no static URL construction possible
- **Altitude formula**: `altitude = (27.3611 * 6371010 * 768 * cos(lat)) / (2^zoom * 256)`
- **Pagination**: `!7i20` = 20 results/page, `!8i[offset]` = offset (increments of 20)
- **Responses**: served through `f.txt` endpoint with "XHR1" signature

Data Available

Potentially *everything* visible in the Maps UI: full review text with timestamps, all photos, Q&A, popular times histograms, wait times, related places, owner responses — far exceeding the official API's 5-review limit.

Fragility Warning

Google's cryptographic constants rotate continuously. SearchGuard makes "reverse-engineered bypasses obsolete within minutes." One Reddit user reported successfully building a pure HTTP/protobuf scraper that reduced costs from $50K/mo to $1K/mo — but maintenance is constant.

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