SA_OSM+H3+PostGIS

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1 High-Level Roles

Component	Role
OpenStreetMap	Source of rich, raw geographic data (roads, POIs, buildings, land use)
PostGIS	Storage & querying of OSM geometries (polygons, lines, points)
H3	Discretization layer: index space into hexagons for fast lookup, clustering, aggregation

2 Typical Workflow

2.1 Load OSM Data into PostGIS

- Tools: osm2pgsql, osmium, imposm3.
- Import OSM `.pbf` files into PostGIS with schemas like: `planet_osm_point`, `planet_osm_line`, `planet_osm_polygon`.

→ Rich relational tables with PostGIS geometry columns.

2.2 Attach H3 Indexes to Features

Typically:

- Choose a suitable H3 **resolution** (e.g. `res = 9` neighborhood)
- Compute the **H3 hex index** for each geometry

Examples:

- For POIs:

```
SELECT *, h3_geo_to_h3(ST_Y(geom), ST_X(geom), 9) AS h3_index
FROM planet_osm_point;
```

- For polygons (e.g. parks, neighborhoods), use `ST_AsGeoJSON` to feed into `polyfill`, or apply `h3_polyfill` if you have a PostGIS extension

→ Data has H3 indexes for fast grouping, filtering, and joins.

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