

CARTO ●

# Geospatial Sovereignty in the Age of AI

Sovereignty without isolation  
A layered approach

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# Agentic GIS

AI Agent



## How can I help you?

Get fast, data-driven insights to identify the best locations for your next 5G towers. Ask about optimal sites, coverage reports, or download a summary with key metrics — all based on the current map view.

Where should we deploy our next 5G tower? ↑

Which areas have the highest coverage gaps? ↑

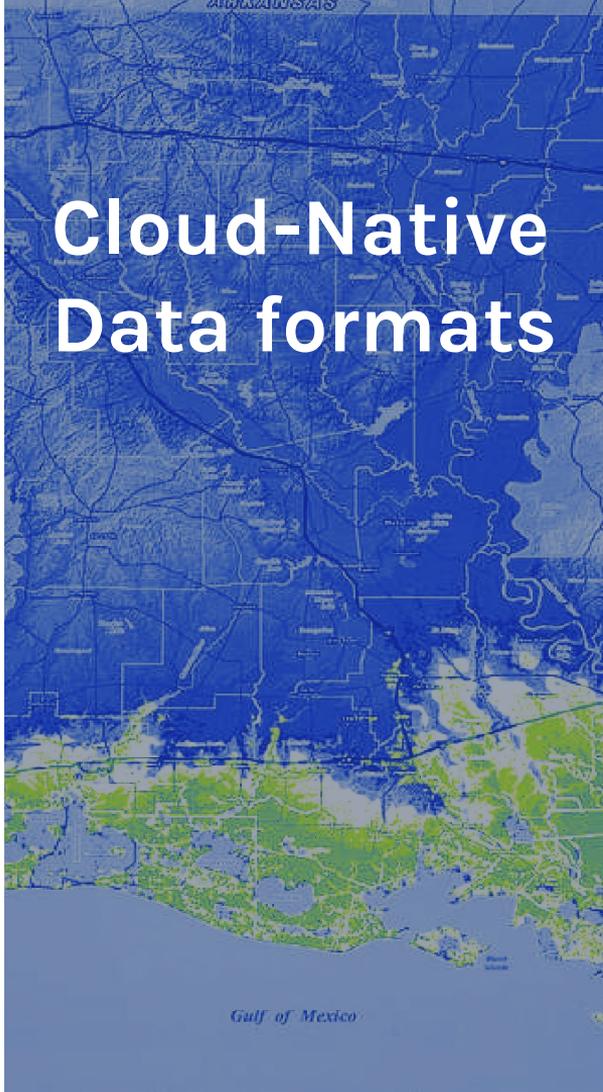
Can you suggest viable locations in this city? ↑

Download a report with the current map insights? ↑

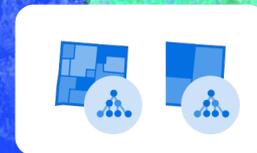
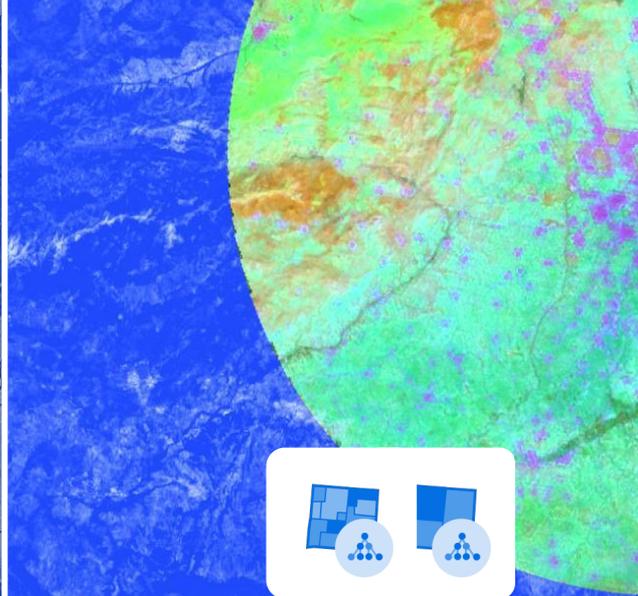
Message AI Agent...



# Cloud-Native Data formats



Gulf of Mexico



# Geospatial Foundation Models

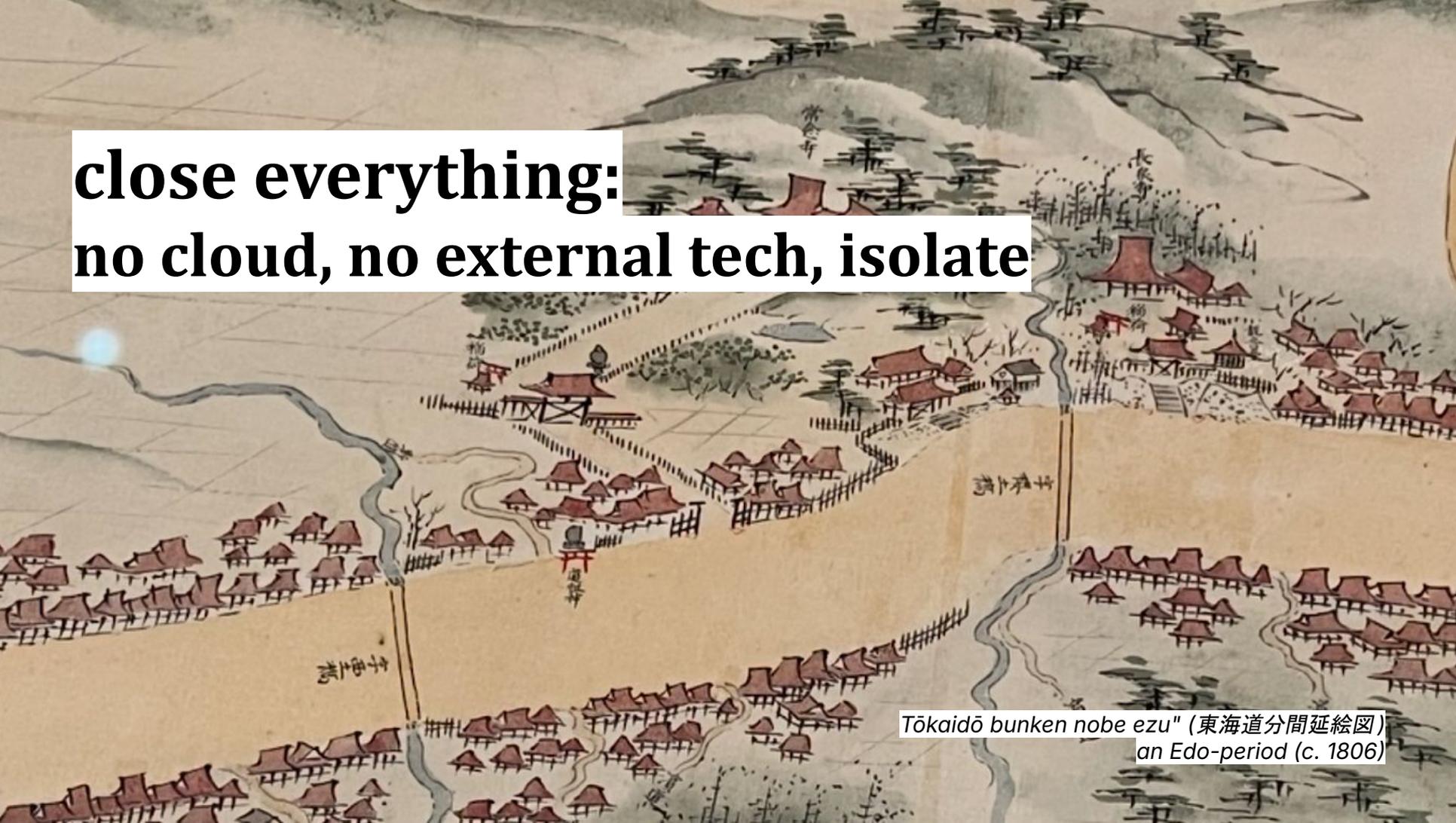
The background of the image is a stylized map of a city, likely Amsterdam, characterized by a dense network of yellow lines representing streets and a complex pattern of blue lines representing canals. The map is set against a solid blue background. The text 'Geospatial Sovereignty' is overlaid on the left side of the map in a large, white, serif font.

# Geospatial Sovereignty

# Why sovereignty matters now

- Geospatial underpins critical systems
- AI amplifies dependency + risk
- Outages + geopolitics are real

**close everything:  
no cloud, no external tech, isolate**



Tōkaidō bunken nobe ezu" (東海道分間延絵図)  
an Edo-period (c. 1806)

# Sovereignty ≠ Isolation

- Don't freeze your stack
- Avoid losing competitiveness
- Design for safe collaboration

**Isolation is the fastest way to fall behind**



Tōkaidō bunken nobe ezu" (東海道分間延絵図)  
an Edo-period (c. 1806)

# A layered reference architecture

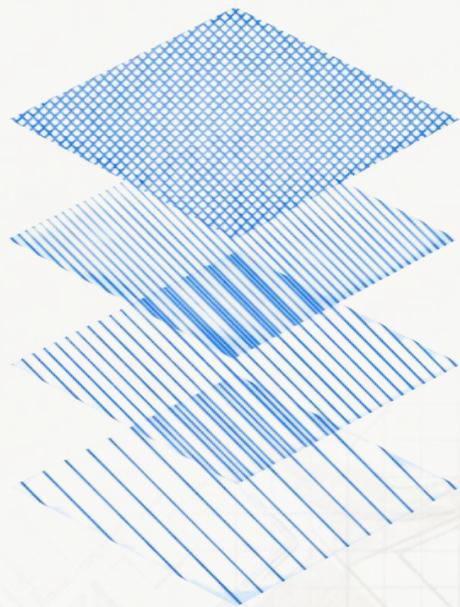
A blueprint for sovereignty without isolation

**Layer 1:** Data (own the formats)

**Layer 2:** Compute (own the execution choices)

**Layer 3:** AI (own the intelligence boundary)

**Layer 4:** Semantics & IDs (stay interoperable)



# Layer 1: Data (own the formats)

- Open Table Formats: GeoParquet + Iceberg (analytics-ready)
- Object storage: S3-compatible as the common substrate
- Avoid GIS silos with cloud-native specs





**It's Official:**

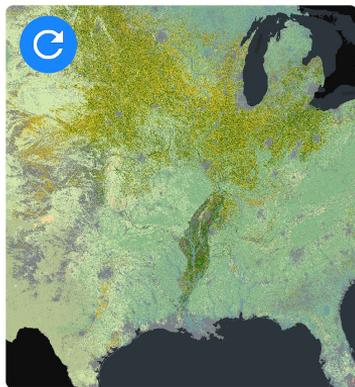
# **GEOMETRY** and **GEOGRAPHY** are just data types in Parquet and Iceberg

The End of Special Treatment: Spatial Joins the Cloud-Native Stack



## Vector Data

Points, polygons, lines, describing places, roads, geography...



## Raster Data

Array data representing models, imagery, weather, pollution...



## Trajectory Data

Trajectories. Vehicle telemetry, routes, boats, flights. Anything moving over time.



## LiDAR, BIM...

LiDAR from cars, radar, 3D buildings.

# Layer 2: Compute (own the execution choices)

- Multi-engine: DW / Spark / DB / Edge
- Multi-location: on-prem / sovereign / cloud
- Workload-based placement



Google  
Big Query



databricks



ORACLE



DuckDB



PostgreSQL



trino

ClickHouse

# Layer 3: AI (own the intelligence boundary)

- Model optionality (swap providers) OpenAI Compatible API
- Tool standardization (MCP-style)
- Guardrails: provenance + policy



# Layer 4: Semantics & IDs (stay interoperable)

- Common models + stable IDs
- OGC APIs (Features/Tiles/Records/Processes)
- Collaboration with OSM/Overture (GERs IDs)



# Beyond tech: what must accompany it

- People + training
- Procurement + governance
- Legal + licensing (incl. AI training)

# Sovereignty without isolation

- Build on standards (OGC APIs + open table formats)
- Design for multi-cloud + on-prem (portable by default)
- AI optionality: frontier today, local tomorrow
- No single points: resilience + exit strategy

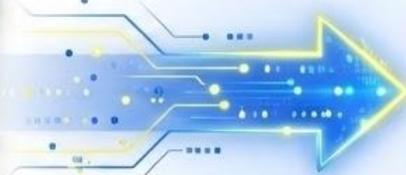
# The BIG migration towards Agentic GIS is the opportunity!

## TRADITIONAL GIS

If you have a traditional GIS application with hundreds of layers and options...

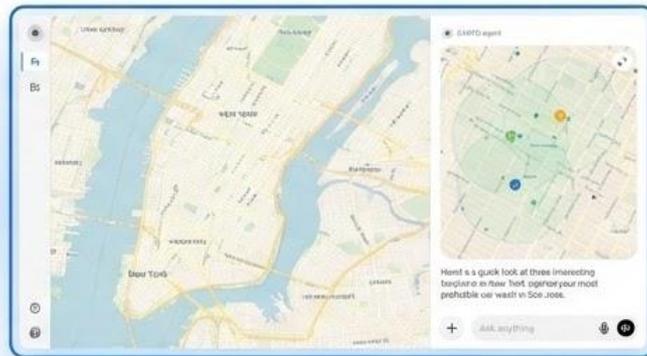


## MIGRATION & MODERNIZATION



## AGENTIC GIS (SOVEREIGN)

Now is the time to modernize it taking into consideration sovereignty





CARTO

**Thanks!**

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