CUGOS · NOVEMBER 18, 2026

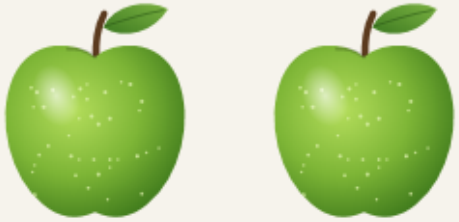
GeoProof and ProofSimple

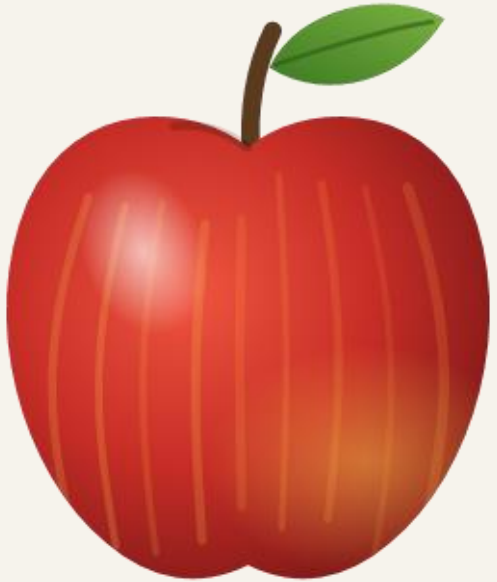
Getting AI to answer GIS questions the way a good analyst would

Adam Cabrera · MapSimple · mapsimple.org/cugos


Happy GIS Day

Which is more?





Two small Granny Smiths, or one big Honeycrisp

It depends what they’re for

COUNTING

Two is more than one.

EATING

The Honeycrisp is more… delicious.

Even if the two small ones weigh more together.

BAKING

The two Granny Smiths are more.

They’re baking apples, and I’m baking.

The AI isn’t wrong. It just never asks what you need it for.

Tonight

1. The hole I found
2. What I built to fill it
3. What happens when you ask it a question
4. You give it a try

I need more eyes on this before I open it up. That’s why I’m here.

THE HOLE

“Is there a wetland on this property?”

How would a good GIS analyst answer that?

Two answers

AN AI

“No.”

One confident answer, like a math problem.

A GOOD GIS ANALYST ASKS FIRST

- How accurate is this data?
- Is it exhaustive, and does it say so?
- Who is the permitting agency?
- What do the other layers show?

The AI answers. The analyst asks questions first. I saw a hole.

LIVE

proofsimple.mapsimple.org

Let’s ask it. Is there a wetland on this property?

What I built

THE CONCIERGE UP FRONT

ProofSimple

A chat page. Its AI reads your question and decides what to ask GeoProof for.

→

THE SERVER THAT DELIVERS

GeoProof

Does the GIS work and returns the answer with its caveats attached. No AI inside.

Both are part of the MapSimple suite. Open source is the plan, after a stability and security review.

Get a key: **mapsimple.org/cugos**

Every answer carries five things

The apple question	What GeoProof attaches
Is it ripe?	Freshness
Did you check every basket?	Completeness
Is it really an apple, and how big is it?	Accuracy
Where did it come from?	Provenance
Who says so?	Authority

Accuracy and authority are declared by a person, not measured by software. GeoProof's job is to carry them on every answer so they can't be dropped.

Who builds the response

Part of the answer	Where it comes from
Banner	GeoProof’s words, placed by code
Card	Built by code from GeoProof’s default fields
Paragraph	Written by the AI
Caveats	From GeoProof, one or more on every call
Data and process	GeoProof’s raw record of what it did

The AI can skip a caveat in its paragraph. It can’t take it off the screen.

What happens when you ask

1

The question

Plain English, typed into ProofSimple.

2

The concierge

The AI reads GeoProof's list of functions and picks.

3

The call

ProofSimple makes the call. The AI never talks to GeoProof.

4

The real work

GeoProof runs the GIS on its own local copy of the data. No AI.

5

The answer

Code builds the cards. The AI writes the paragraph.

This one took 15.2 seconds. The AI: 14.6. GeoProof: 0.3. A typical answer is about 10.

The pieces

A QUESTION

Client app
ProofSimple today. The AI lives here, not in GeoProof.

→

The door
One small Linux VM. Answers from its own local copy of the index.

→

The answer
The result, the five things, and a step-by-step record.

A DATA UPDATE

The console
Sources, the scheduler, Tiro, and access keys.

→

Build workers
Start on a message, pull the sources, build, then stop.

→

The index
One SQLite file: every layer, its indexes, and the GeoStamps.

→

A new door
Copies and checks the new index, then takes over.

Answering a question is self-contained within GeoProof.

Tiro: the console’s assistant. **GeoStamps:** relationships worked out ahead of time.

Built on open source

THE INDEX

SQLite

R*Tree for spatial indexing, FTS5 for text search. Geometry stored as WKB. Plain SQLite, no SpatiaLite.

THE GEOMETRY

Shapely over GEOS

Overlay, intersection area, distance, nearest, and repair of invalid geometry.

COORDINATES

pyproj over PROJ

Data is reprojected once, at build time, into one working coordinate system.

THE PLUMBING

Python 3.12

The MCP Python SDK, pydantic, FastAPI, and httpx. Served by gunicorn and uvicorn, behind Caddy.

No AI model in the answer path. Same question, same data, same answer.

LIVE, AGAIN

Back to the demo

- Start with a click: a synthetic eagle nest notice
- Find me in the sales records
- Explore from there: schools, restaurants, sales history

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WHAT I LEARNED

Three tries

1

I let the AI choose

Too inconsistent. The order changed from run to run, and fields came and went. Cheaper models were worse.

2

I put constraints on the AI

The wrong move. It got slow, and the AI didn’t know when something was held back or when a notice appeared that it hadn’t written.

3

I fixed the tools

GeoProof does the work and tells the AI plainly what it can ask for. Default fields and cards keep the screen the same.

Don’t fight the model. Give it better tools.

BUILD TOOLS SO THE MODEL GUESSES LESS

Helping the AI pick the right function

Written for the model

Each function says what it answers, what it is not for, and which one to use instead.

A wrong call teaches

A refusal says what was wrong and lists what exists.

Nothing is guessed

The AI can ask what layers and fields exist before it asks a real question.

The recipe is in code

“How many within a mile” is one call. No chained steps, no unit math.

Candidates, not picks

A fuzzy name returns scored candidates. Close calls go back to the person.

I measure by the misses. When I don’t get the answer I expect, I fix the tool, not the prompt.

Three kinds of no

1

Nothing there

It checked, and found nothing.

2

Coverage gap

The data doesn’t cover this, or a layer couldn’t be checked. It names what failed.

3

Not my question

This source doesn’t answer that.

GeoProof never merges these, and every answer lists the layers it checked.

WHERE IT STANDS TODAY

By the numbers

65
data sources loaded

18
functions an AI can call

67 ms
typical GeoProof call

15 s
full answer, usually less

Nearly all the wait is the AI writing. The servers run about $200 a month. The AI costs about half a cent per answer.

You have to start somewhere

JULY 1

0.1

One honest answer, end to end, running locally.

WITHIN THREE WEEKS

0.3x

ProofSimple calling it in Azure.

TONIGHT

0.101

What you’re looking at, many iterations later.

I set the direction and the architecture. AI did most of the typing.

Solid today, and still open

Solid

- Live in Azure, and stable
- Caveats on every answer
- Three kinds of no
- Parcels as full boundaries, never center points
- Each source updates on its own schedule, and the console warns me if one falls behind
- Access keys with hard limits

Still open

- The AI still makes the pick. Every miss I find becomes a tool fix, but nothing checks it automatically
- Server swaps are the newest piece. Since the stable release, not one has failed
- The console is being redesigned around the assistant
- Not packaged for others yet: no public repo, and a security review is underway

Built for your data, not just mine

Declare a source

Point it at a feature service or upload a file, and state its accuracy and authority.

It stays current

Each source updates on its own schedule. The scheduler was one of the first things I built.

Tiro helps

An assistant in the console that drafts and proposes changes. A person approves every one.

King County’s public data is the proof of concept. One person can keep it running. When it opens up, you deploy it yourself.

YOUR TURN

Give it a try.

Get a key: mapsimple.org/cugos

- Tell me where it gets something wrong or leaves out a caveat.
- What caveat does your data always need that an AI would miss?
- Would you send an answer like this to someone outside your office?
- Want to be an early tester when it opens up? Tell me tonight.

BACK TO THE APPLE

What I told you

- **The hole:** AI gives you an answer. A good analyst asks questions first.
- **What I built:** GeoProof carries those details on every answer.
- **How it works:** The AI asks. GeoProof answers. Code builds the screen.
- **Where it stands:** Version 0.101, stable, and ready for you to poke holes in.

Someone hands you an answer. What’s the first thing you’d ask?

Thank you · mapsimple.org · Also from MapSimple: FuseSimple and FeedSimple

WHAT COMES NEXT IS UP TO YOU

I welcome your feedback

Try it first. Then tell me what worked, what didn’t, and what you’d need before you’d run it yourself.

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