HARNESSING THE POWER OF POSTGRES FOR GIS

@AvinashDalvi_

@LearnwithAvinashDalvi

WHO I am ?

Avinash Shashikant Dalvi (Avi)

Senior Software Engineer @Eagleview

Full Stack Developer

AWS Community Builder

Supporting co-organiser of Docker Bangalore and Collabnix meetup

www.internetkatta.com

avinashdalvi.com

@AvinashDalvi_

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TODAY'S ROADMAP

FACT about GIS

According to Waldo Tobler, is "everything is related to everything else, but near things are more related than distant things

Waldo R. Tobler
American geographer and cartographer

FACT about GIS

GIS (Geographic Information System) is like a special tool that helps us understand and analyse this spatial data. It helps us answer questions like:

- Which houses are closest to the park?
- What's the fastest route to deliver pizzas?
- Where are the best places to plant trees?

Spatial refers to anything related to positions, distances, shapes, and sizes on that map

GIS market forecast to 2025

GIS is evergreen trend

Govt banks on GIS mapping for realistic RR rates in 2024

Nisha Nambiar / TNN / Updated: Nov 5, 2023, 07:09 IST

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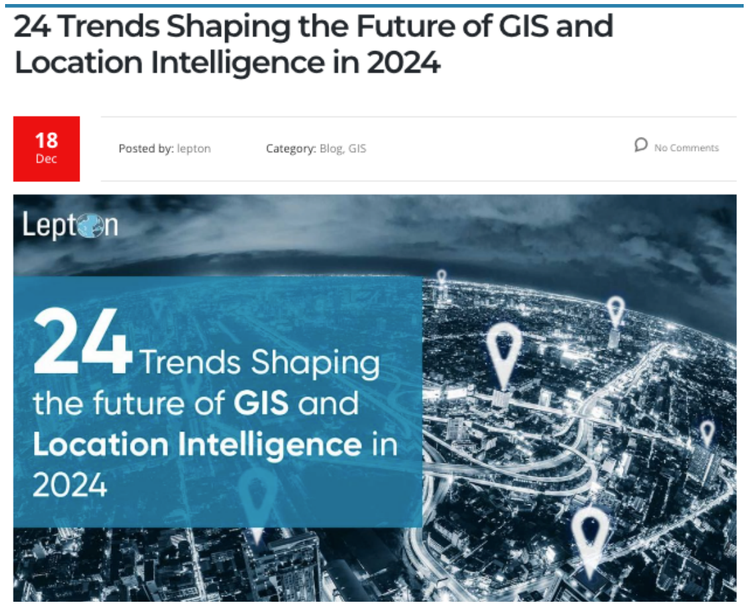
Can debt-burdened India sustain guaranteed MSP

The Ready Reckoner (RR) rates in Pune are expected to become more accurate with the completion of GIS mapping of all land parcels by January 2024. The integration of Geographic Information System (GIS) data with the registration website ...Read More



24 Trends Shaping the Future of GIS and Location Intelligence in 2024

18 Dec

Posted by: lepton Category: Blog, GIS No Comments

Geospatial Horizons 2024: Trends and transformations in GIS

Novel innovations in 2024 will take Gen AI to new levels of maturity, bringing out important dimensions that will help businesses reshape the way they operate.

Written by Guest

January 5, 2024 15:32 IST

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GIS is evergreen trend

Mahaveer Singhvi IFS
@MahavirSinghvii

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NEST Division @MEAIndia organised a round table on #Geospatial Industry in India: #Opportunities for #Trade, #Commerce & #Tech Collaboration Globally. Presentations were made by @GWChamber and industry reps. Officers from several Indian missions attended virtually.

DARPG
@DARPG_GoI

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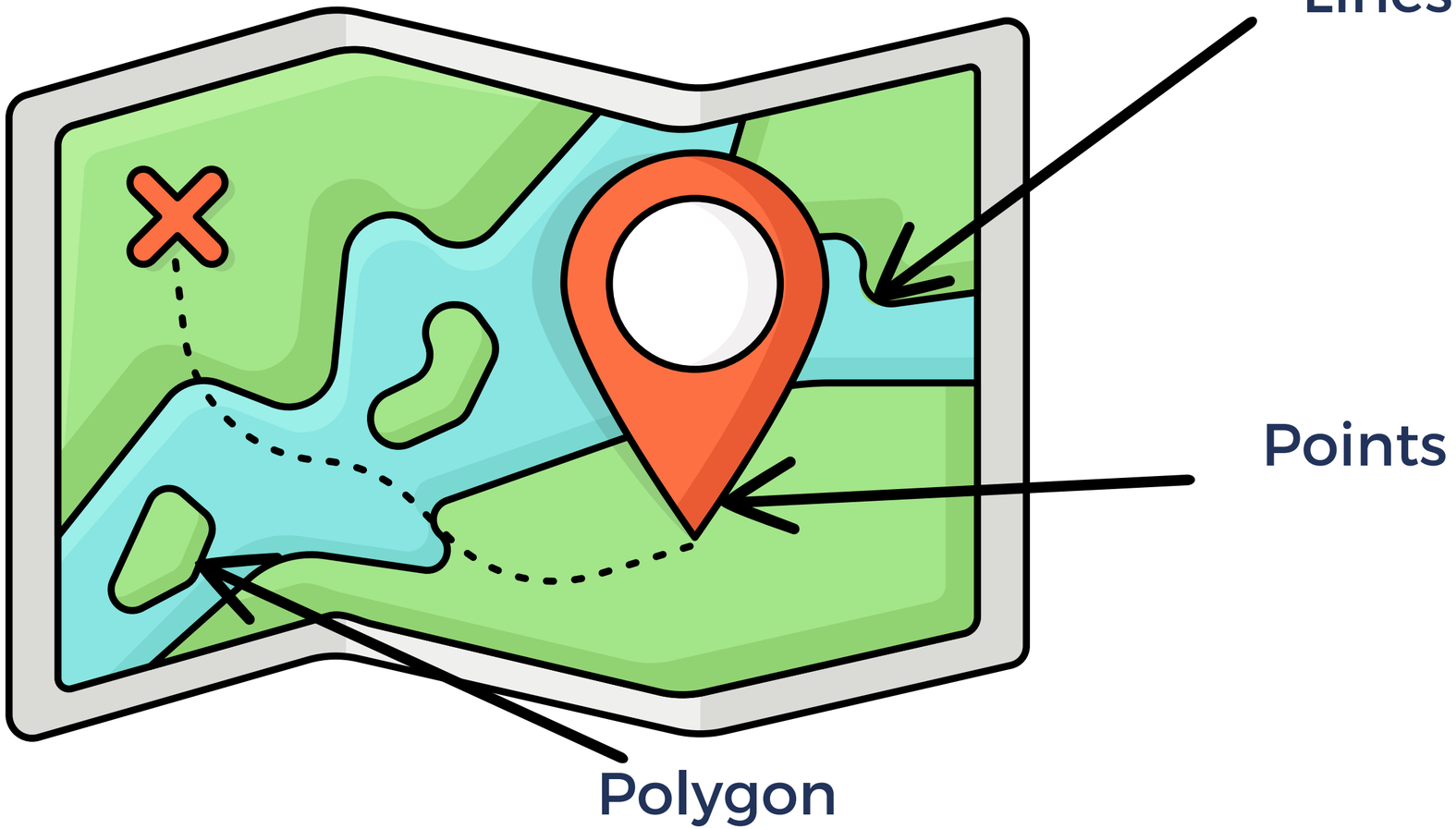
Effective use of Geospatial Technology for e-Governance in Madhya Pradesh

The Government of Madhya Pradesh launches a coffee table book on its e-governance initiatives at the 26th National e-Governance Conference.

#DigitalIndia #ViksitBharat
#EmpoweringCitizens #NCeG2023

Spatial Data Types



Data format

- **GeoJSON**
- **KML**
- **SHP**
- **Many more...**

https://geojson.io/#map=7.18/0.622/102.694

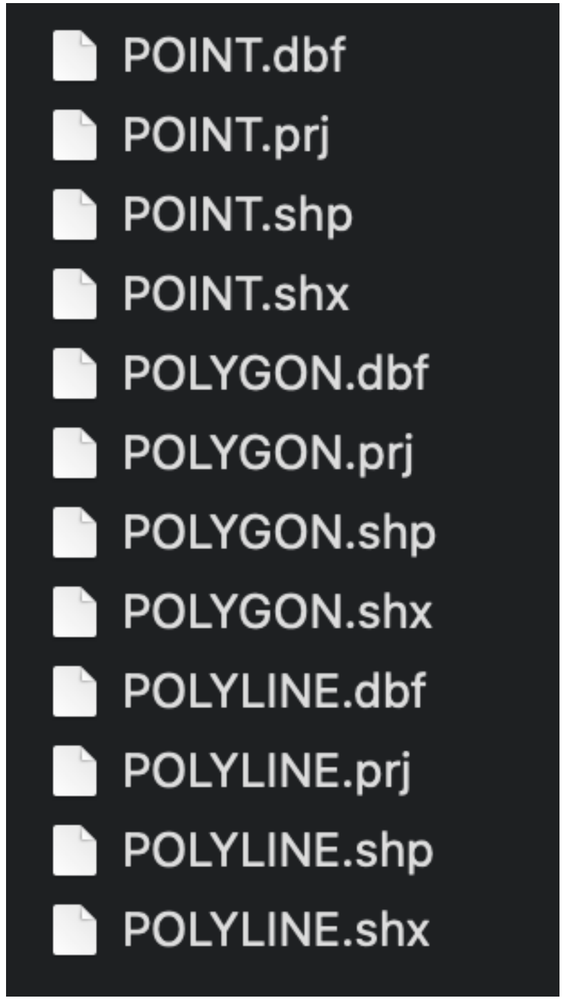
Data format

GeoJSON

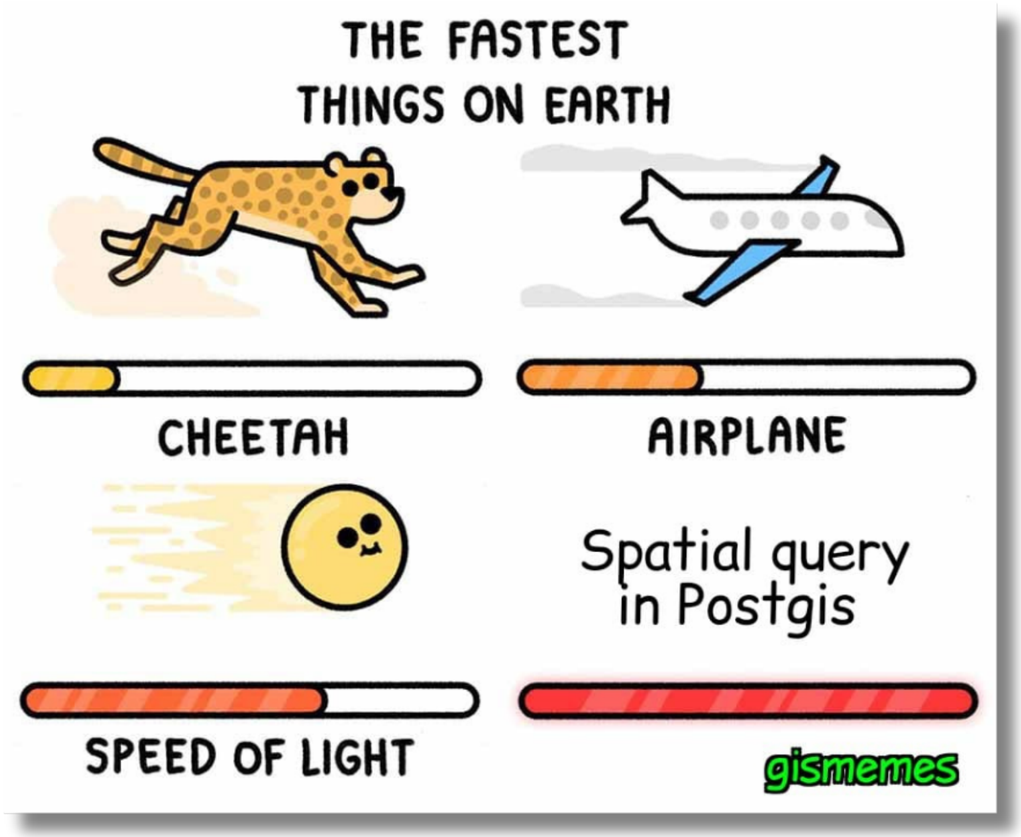

```
{ "type": "FeatureCollection",
  "features": [
    { "type": "Feature",
      "geometry": {"type": "Point", "coordinates": [102.0, 0.5]},
      "properties": {"prop0": "value0"}
      },
    { "type": "Feature",
      "geometry": {
        "type": "LineString",
        "coordinates": [
          [102.0, 0.0], [103.0, 1.0], [104.0, 0.0], [105.0, 1.0]
          ]
        },
      "properties": {
        "prop0": "value0",
        "prop1": 0.0
        }
      },
    { "type": "Feature",
       "geometry": {
         "type": "Polygon",
         "coordinates": [
           [ [100.0, 0.0], [101.0, 0.0], [101.0, 1.0],
             [100.0, 1.0], [100.0, 0.0] ]
           ]

       },
       "properties": {
         "prop0": "value0",
         "prop1": {"this": "that"}
         }
       }
    ]
  }
```

Data format

SHP



PostGIS


THE FASTEST
THINGS ON EARTH
CHEETAH
AIRPLANE
Spatial query
in Postgis
SPEED OF LIGHT
gismemes

PostGIS

PostGIS turn PostgresSQL database management system into a spatial database by adding support for three functions spatial types, indexes and functions

PostGIS

BEFORE POSTGIS – 2000

- PostgreSQL already has “geometric types”.
- Are too limited for GIS data and analysis.
- They were built for academic research purposes and are more suitable for computer graphics than GIS use

PostGIS Functions

Earth is the primary key

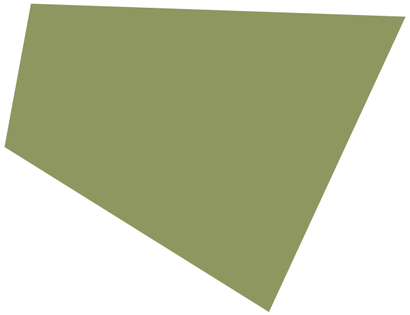
Spatial is universal key by itself.

PostGIS Functions

```
ST_Area()                ST_DWithin()

ST_Contains()            Many more...
```

PostGIS Functions

ST_Area()



Find the area of polygon in desire measurement units

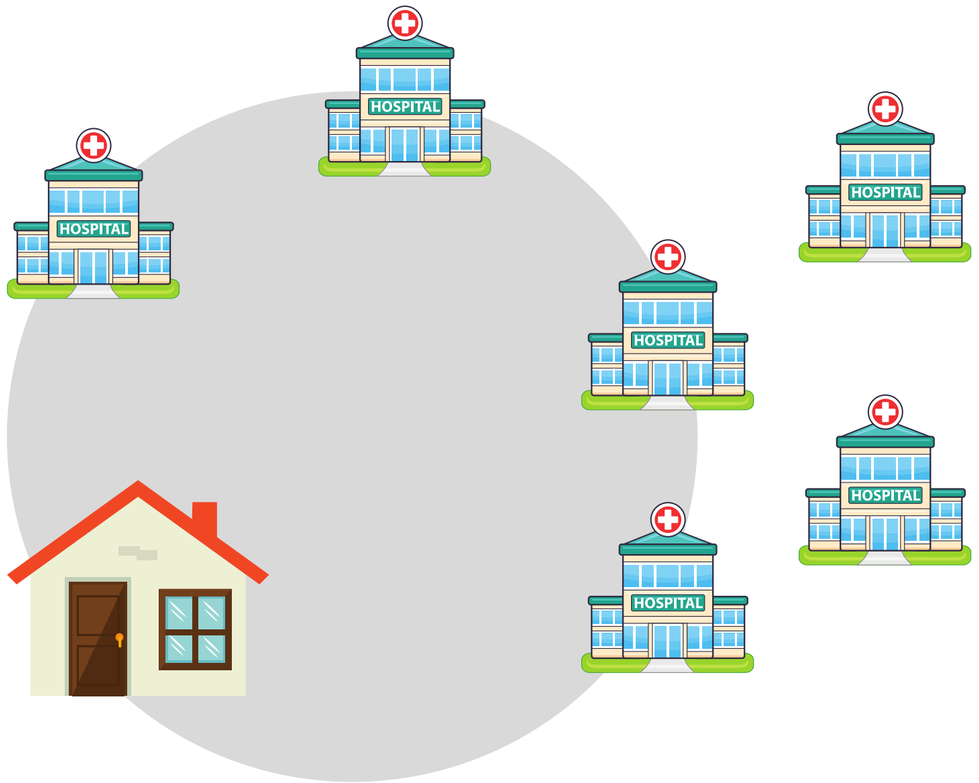
```
select ST_Area(geom) sqft,
    ST_Area(geom) * 0.3048 ^ 2 sqm
from (
         select 'SRID=2249;POLYGON((743238 2967416,743238 2967450,
                                    743265 2967450,743265.625 2967416,743238 2967416))' :: geometry geom
     ) subquery;
```

sqft	sqm
928.625	86.27208552

PostGIS Functions

ST_DWithin()

- Find the nearest hospital to each school
- That is within 3000 units of the school.



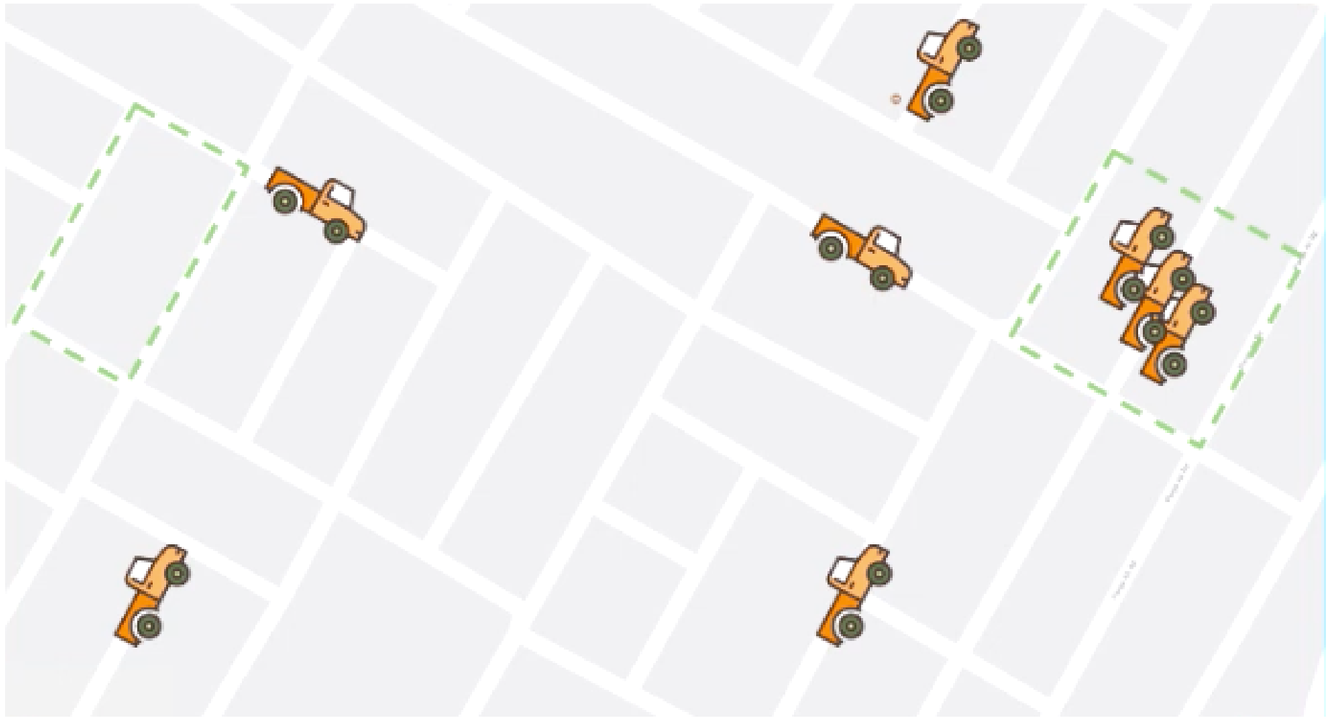
PostGIS Functions

```
SELECT DISTINCT ON (s.gid) s.gid, s.school_name, s.geom, h.hospital_name
FROM schools s
LEFT JOIN hospitals h ON ST_DWithin(s.geom, h. geom, 3000)
ORDER BY s.gid, ST_Distance(s.geom, h.geom);
```

PostGIS Functions

ST_Contains()

What trucks are in the service depots?



PostGIS Functions

```
SELECT yards. id, trucks.*
FROM trucks t
JOIN yards y
ON ST_ Contains (y.geom,
t.geom)
WHERE Y.code =
'service'
```

PostGIS Functions

- ST_Intersects()
- ST_CoveredBy()
- ST_Covers()
- ST_Disjoin()
- ST_Equals()
- ST_Overlaps()
- ST_Touches()
- ST_ConvexHull()
- ST_Union()

Many...

PostGIS Table

```
CREATE TABLE my_table (
geog GEOGRAPHY (Point, 4326);


CREATE TABLE my_table (
id INTEGER SERIAL PRIMARY KEY, name VARCHAR (28), geom GEOMETRY (Point, 26910);
```

Real World of GIS

Geographic Information System (GIS) Market Segmentation by Product Type:

- Hardware
- Software

Geographic Information System (GIS) Market Segmentation by Product Application:

- Agriculture
- Construction
- Transportation
- Utilities
- Mining
- Oil & Gas

Real World of GIS

Healthcare: Enhancing Accessibility and Planning

- Mapping hospitals, diseases, and people helps us:
- Place new hospitals where they're needed most.
- Fight disease outbreaks faster.
- Manage healthcare resources efficiently.

Real World of GIS

Agriculture: Transforming Farming Practices

India's farmers are using maps to:

- Grow better crops: See soil health, water needs, and predict yields.
- Plan smarter: Decide where to plant what, manage resources, and avoid waste.
- Fight problems: Track pests, diseases, and weather threats.

Real World of GIS

Agriculture: Transforming Farming Practices

The Indian government is working on these maps to help farmers succeed and boost food production.

Resources

https://bit.ly/42PyURq

Feedback

Thank you

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