



Making Open Source Sing

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Open Source, is it for me?



Sounds like it can do a lot BUT,

- Can it scale to meet my needs?
- Can I get new features added?
- Can I get support?



It works for these guys!

The multi-colored Google logo in its classic font.

“There are viable Open Source solutions, with vibrant and active communities, that are capable of doing many of the same things proprietary software can do, and in some cases, do it better!”

Michael McQuade, CTO, Zonar Systems



Overview

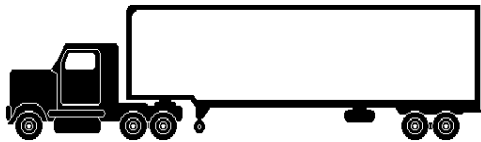
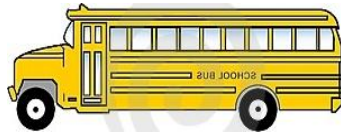
- How Zonar uses Open Source
- Some reasons why
- Problems and solutions
- Additional examples and advice



Zonar from 50,000 Feet




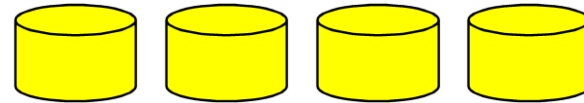
GPS



100,000 vehicles X ~2,000 points/day

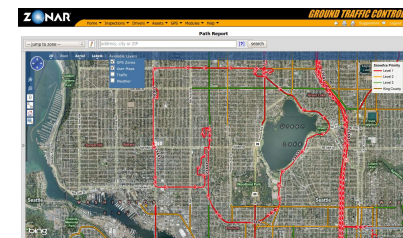
Total: 200,000,000 points/day

PostGIS Databases



Date	Asset No.	Make/Model	Mileage	Mile Cost
Wed 17 Apr 2013	88-AP-10000	AP-10000	10000	10000
Wed 17 Apr 2013	88-AP-10001	AP-10001	10001	10001
Wed 17 Apr 2013	88-AP-10002	AP-10002	10002	10002
Wed 17 Apr 2013	88-AP-10003	AP-10003	10003	10003
Wed 17 Apr 2013	88-AP-10004	AP-10004	10004	10004
Wed 17 Apr 2013	88-AP-10005	AP-10005	10005	10005
Wed 17 Apr 2013	88-AP-10006	AP-10006	10006	10006
Wed 17 Apr 2013	88-AP-10007	AP-10007	10007	10007
Wed 17 Apr 2013	88-AP-10008	AP-10008	10008	10008
Wed 17 Apr 2013	88-AP-10009	AP-10009	10009	10009
Wed 17 Apr 2013	88-AP-10010	AP-10010	10010	10010
Wed 17 Apr 2013	88-AP-10011	AP-10011	10011	10011
Wed 17 Apr 2013	88-AP-10012	AP-10012	10012	10012
Wed 17 Apr 2013	88-AP-10013	AP-10013	10013	10013
Wed 17 Apr 2013	88-AP-10014	AP-10014	10014	10014
Wed 17 Apr 2013	88-AP-10015	AP-10015	10015	10015
Wed 17 Apr 2013	88-AP-10016	AP-10016	10016	10016
Wed 17 Apr 2013	88-AP-10017	AP-10017	10017	10017
Wed 17 Apr 2013	88-AP-10018	AP-10018	10018	10018
Wed 17 Apr 2013	88-AP-10019	AP-10019	10019	10019
Wed 17 Apr 2013	88-AP-10020	AP-10020	10020	10020

Reports



Maps



Maps

The screenshot displays the ZONAR Ground Traffic Control software interface. At the top, the ZONAR logo is on the left, and the text "GROUND TRAFFIC CONTROL™" is on the right. Below the logo is a navigation menu with items: Home, Inspections, Drivers, Assets, GPS, Modules, Help. On the right side of the menu are icons for home, print, suggestions, and a logout button.

The main window is titled "Path Report". It features a search bar with the placeholder text "address, city or ZIP" and a search button. Below the search bar is a map of Seattle, Washington, showing an aerial view with a red path overlaid. The path is labeled with the number "73691" at various points. A legend on the right side of the map, titled "Snow/ice Priority", lists four levels: Level 1 (red), Level 2 (orange), Level 3 (green), and King County (yellow). The map also shows various streets, parks, and landmarks like Green Lake and Woodland Park. The bottom of the map has a scale bar for 0.5 miles and a "Map Mode" selector with options for Short, Medium, Tall, and Full.

Vehicle GPS data and customer vector layer over BING aerial photos



Mapping/GIS Ecosystem

- PostGIS to store and analyze data
- MapServer to render and serve map graphics
- Microsoft BING Maps API
- OpenLayers for specialized needs
- QGis and Google Earth for visualization



So does it work?

- PostGIS systems are dealing with 200 million points a day
- MapServer serving hundreds of thousands of tiles daily

Heck yes, it works!





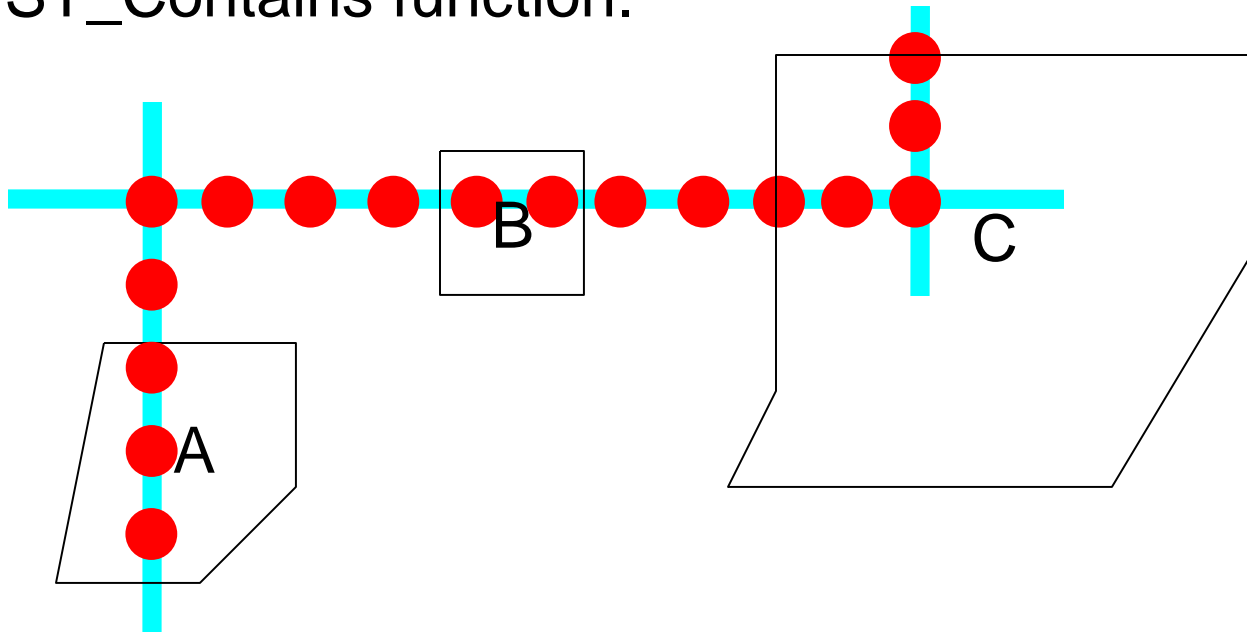
Previous Problems

- Slow PostGIS spatial query
- Bad map tiles



Slow PostGIS queries

Happened when millions of points were spatially joined to a few, large polygons. For every single point, every polygon had to have its geometry built and sent into the ST_Contains function.





PreparedGeometry

Solution was for Zonar to fund the development of “PreparedGeometry” in JTS/Geos and PostGIS.

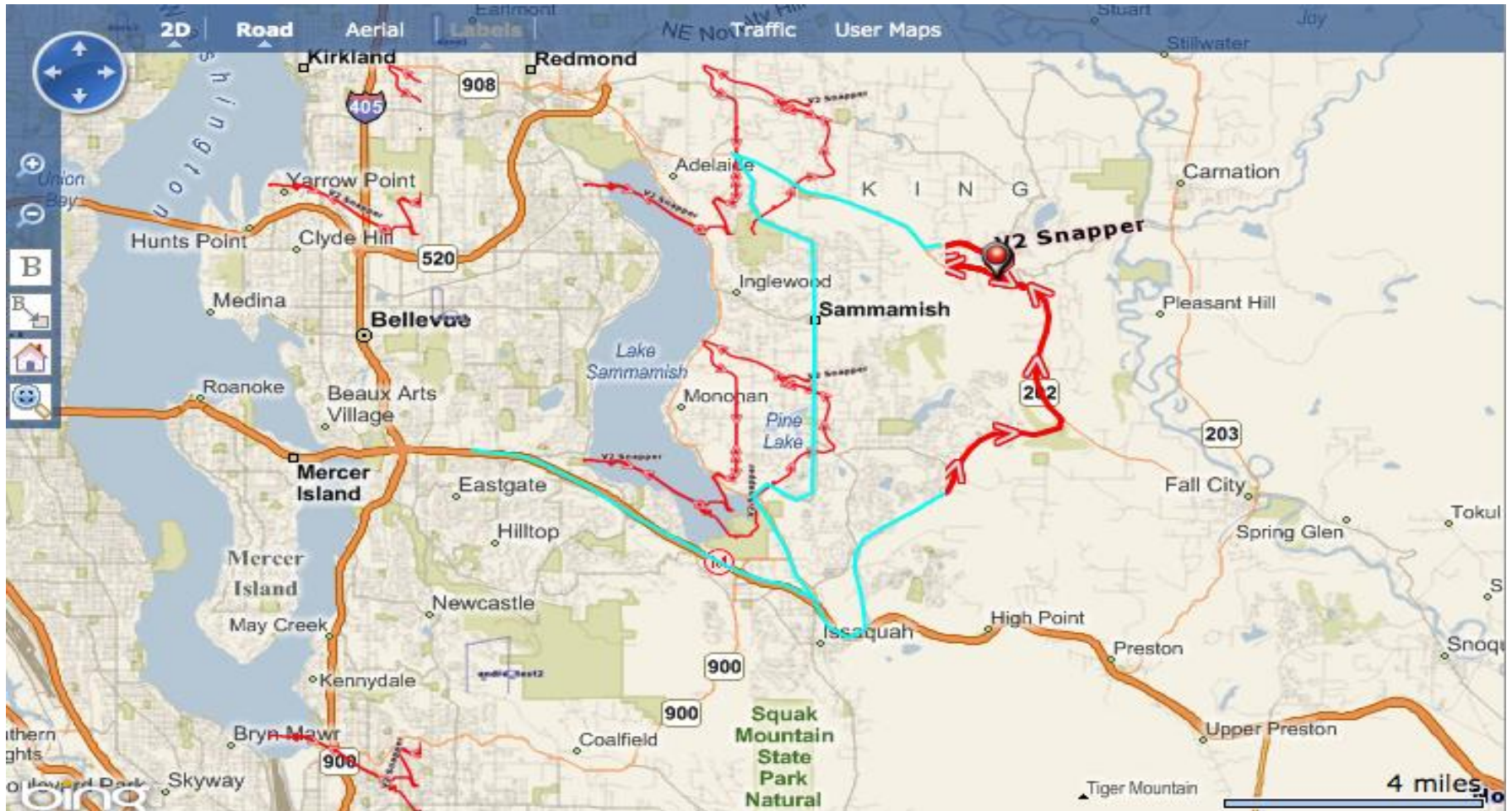
PreparedGeometry creates an indexed polygon that gets used, instead of building the geometry every time. This feature is present since GEOS 3.1.0 and PostGIS 1.3.4.

Result:

5x performance improvement!!!



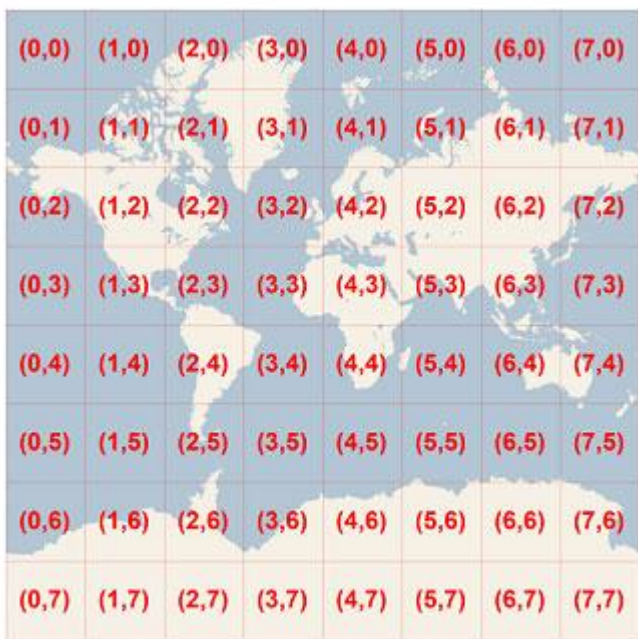
Bad Map Tiles



Multiple bad tiles, repeated across map



Cause



BING map tile structure

- Caching dynamically generated layer
- Side-effect of horizontal scaling
- Legacy tile caching service

Solution

- Don't cache dynamic layers!!!
- Fund MapServer metatiling



MapServer metatiling

- Will be available in MapServer 6.0, later this Summer
- Allows map tiles to be created from “metatiles” w/gutter

Results:

- Eliminates bug
- Greatly simplifies web map code
- Reduces I/O load on servers
- Allows use of excellent MapServer 8-bit output
- Deprecates in-house caching code



Why do it this way?

- We believe in the Open Source idea
- We benefit from the advice of experts in this field
- We don't have to maintain these solutions, they just work
- We are not tied to someone else's development calendar
- We get access to an extremely large beta-test group



Some other examples

- GeoServer connector for MS SQL Server
- Improved support of MrSID format in GDAL libraries
- Support for ArcGIS and ArcIMS in OpenLayers
- Vertical coordinate system support in liblas (lidar library)
- DXF read/write driver for OGR



Advice for getting what you want

- Do your research and find who the main contributors are
- Use the mailing lists and forums to ask questions
- Be clear about WHAT you want, don't mandate HOW
- Be clear that you're willing to pay for development work
- If you want them to be flexible, you should be flexible too
- These people's careers depend on their reputations, respect that!