



GEORGEJAMES

S O F T W A R E

Use of GT.M for a large-scale open-source geospatial database

GT.M + PIP Technology Exchange :: October 16, 2008

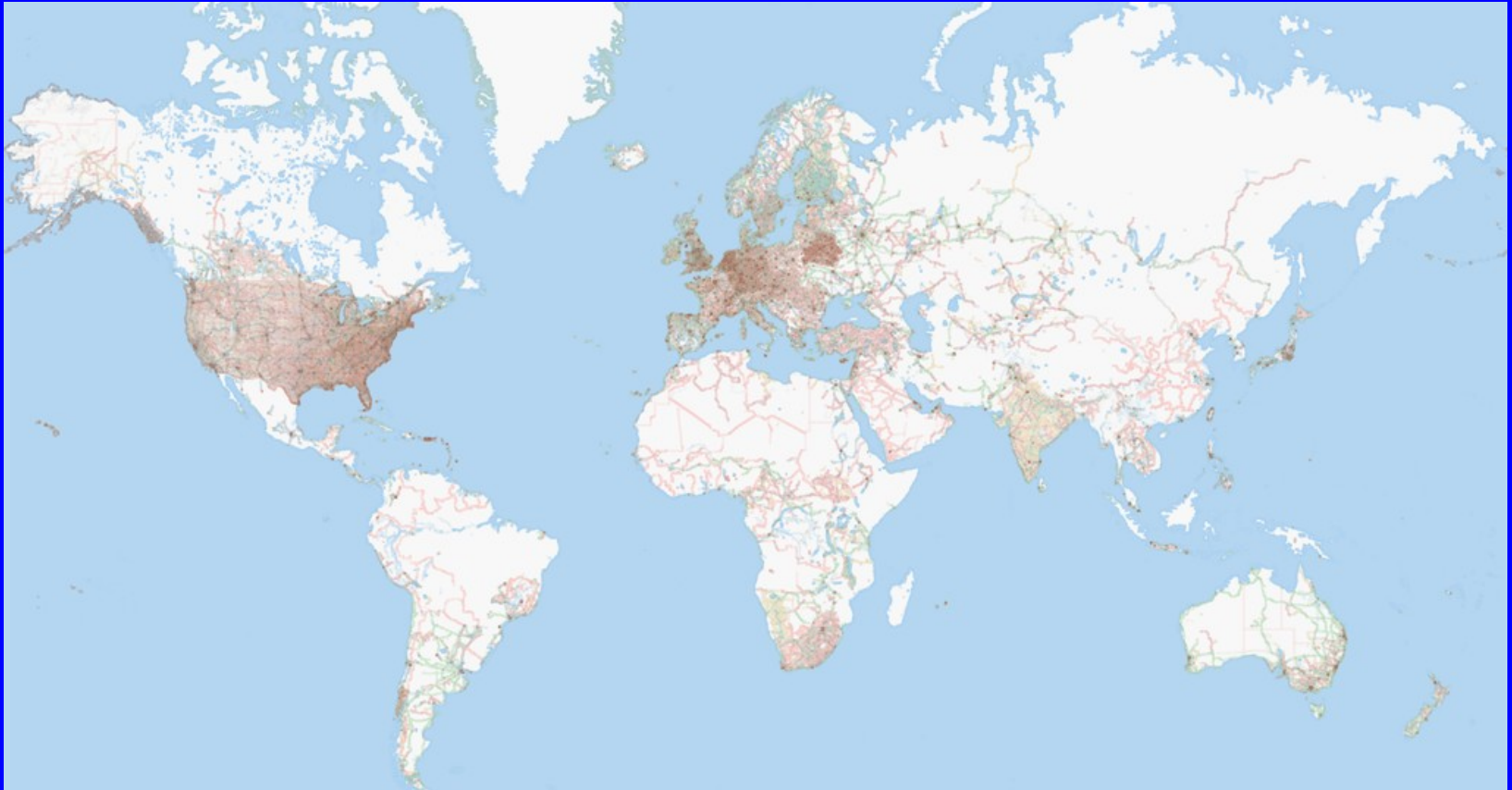


The Project

- OpenStreetMap
- A free map of the planet
 - Free geospatial data
 - Licensed under CC-BY-SA
- Created from
 - Crowd-sourced contributions
 - 70,000 registered users
 - 1,000+ contributors per day
- Used for:
 - Wikipedia
 - OpenCycleMap.org
 - YourNavigation.org (route planning)
 - Mobile devices



Coverage





The Main Database

- MySQL
- Nodes: 271,647,458
- Ways: 22,267,773
- Tags:
 - highway=motorway
 - name=Broadway
 - foo=bar



Interfaces

- API
 - For updates (1,000 users per day)
 - Queries of up to 0.25 square degrees
- Weekly Planet Dump
 - 100Gbyte XML file
- Diffs
 - Feed of changes
 - Daily / Hourly / Minutely
 - One file per minute (~10Kb compressed)



- GT.M
- 250Gbyte database
 - Nodes: 27Gb
 - Node tags: 115Gb
 - Node indexes: 73Gb
 - Ways: 12Gb
 - Way tags: 8Gb
 - Way indexes: 17Gb
- Apache + serverLink
- Licensed as AGPL



XAPI Service

- Queries of up to 100 square degrees
- Query by tags and tag values
- Scalable
- REST style interface
 - `http://xapi.openstreetmap.org/api/0.5/*`
 - `[tourism=hotel][bbox=-75.7,40.0,-75.4,40.2]`
- Import planet dump
- Import minute diff



XAPI Service

- Geospatial Index – quadstrings





XAPI Service

```
GTM>zwr ^way(27016525,*)
^way(27016525)="adaabdcabaadab"
^way(27016525,1)=296138118
^way(27016525,2)=296138119
^way(27016525,3)=296138120
^way(27016525,4)=296138121
^way(27016525,5)=296138118
```

```
GTM>zwr ^waytag(27016525,*)
^waytag(27016525,"addr:housenumber")=2
^waytag(27016525,"building")="yes"
```

```
GTM>zwr ^wayx("building","*", "adaabdcabaadab",*)
^wayx("building","*", "adaabdcabaadab",27016525)=""
^wayx("building","*", "adaabdcabaadab",27028298)=""
^wayx("building","*", "adaabdcabaadab",27028299)=""
^wayx("building","*", "adaabdcabaadab",27028326)=""
^wayx("building","*", "adaabdcabaadab",27028327)=""
^wayx("building","*", "adaabdcabaadab",27035972)=""
^wayx("building","*", "adaabdcabaadab",27035973)=""
^wayx("building","*", "adaabdcabaadab",27035974)=""
^wayx("building","*", "adaabdcabaadab",27035975)=""
^wayx("building","*", "adaabdcabaadab",27035984)=""
```

```
GTM>
```

```
<way id='27016525'>
  <nd ref='296138118'/>
  <nd ref='296138119'/>
  <nd ref='296138120'/>
  <nd ref='296138121'/>
  <nd ref='296138118'/>
  <tag k='addr:housenumber' v='2'/>
  <tag k='building' v='yes'/>
</way>
```



Deployment

- Currently 3 instances:
 - London
 - Paris
 - San Diego
- More servers welcome:
 - Internet connectivity
 - 300Gb disk storage



- Debian
- Apache web-server
- REST
 - URI represents a resource
 - Xpath flavoring
- serverLink
 - Minimal WebLink emulator
- GT.M
 - POM
- AGPL



Future

- Load Sharing
- Generic indexing service
- Benchmark against postgres/postgis



Thank you

Questions?