



JTEAM

Spatial Search

Chris
Male

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- Using Google Maps to find restaurants *near* my house
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- Querying for Lucene Documents with lat/Ing within a radius of another lat/Ing

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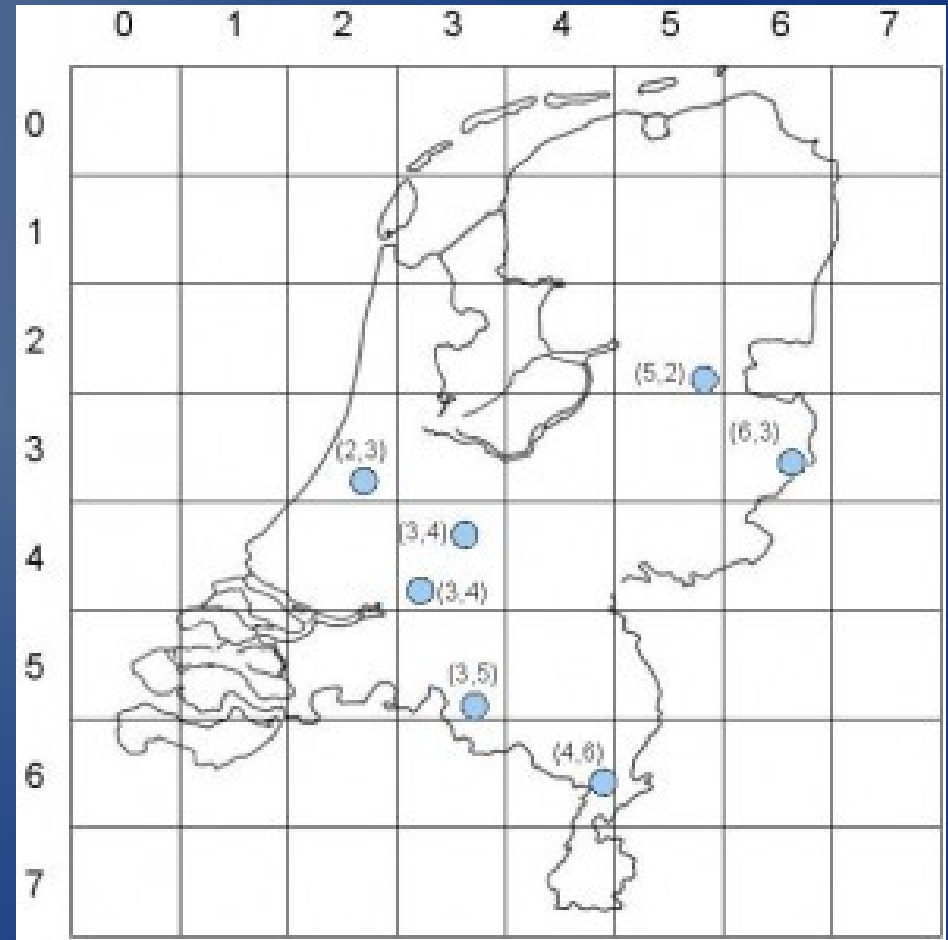
- Iterating over documents is expensive
 - How to use the index
- Geodetic calculations are expensive
 - Trigonometry hell
- Distance as relevance?

Spatial Lucene

- Lucene Contrib Module – Released 2.9
- Filter documents to those within radius of point
- 2-step filtering
 - Cartesian Tier
 - Distance Filtering
- Under heavy development

Cartesian Tier – Index Time

- Plot document lat/Ing on grids
 - Small grids for small radii
 - Big grids for big radii
- Store grid locations as fields

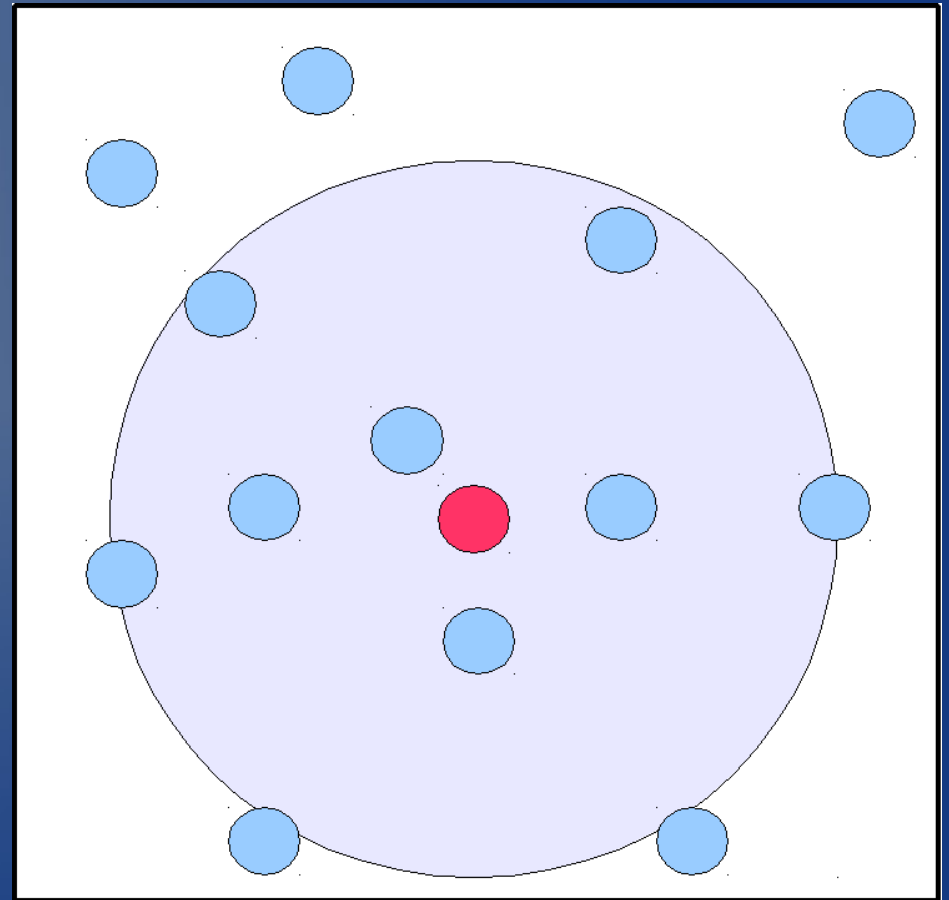


Cartesian Tier – Query Time

- Find grid locations that cover radius
- TermQuery documents with those locations
- Documents outside are instantly filtered

Distance Filtering

- Filter documents still outside of radius
- Calculate exact distance and compare
- Expensive!
- Multi-threading?



Spatial Solr Search



Solr Spatial Search

- Not yet completed
- SOLR-773
- Hide complexity from user
- Use existing Solr functionality

Solr Spatial Search - Indexing

- PointFieldType hides implementation
 - One user level field → multiple index fields
- Simple Lat/Lng, Tiles, Geohash
- Computation of tiles done inside FieldType

Solr Spatial Search - Querying

Simple querying done via FunctionQueries

```
dist(2, lat, lon, 44.794, -93.2696)
```

- Spatial Filtering via Spatial Lucene still to come

```
{!tier x=32 y=-79 dist=50 prefix=tier}
```

Solr Spatial Search - Sorting



Solr Spatial Search – Results



Solr Spatial Search

Watch this space

Demo

Links & Resources

- JTeam - <http://www.jteam.nl>
- Spatial Solr Plugin (SSP) -
<http://www.jteam.nl/news/spatialsolr>
- Me - chris@jteam.nl
- SOLR-773 -
<http://issues.apache.org/jira/browse/SOLR-773>