

A Model For A Spatial Data Marketplace

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A Marketplace For Spatial Data

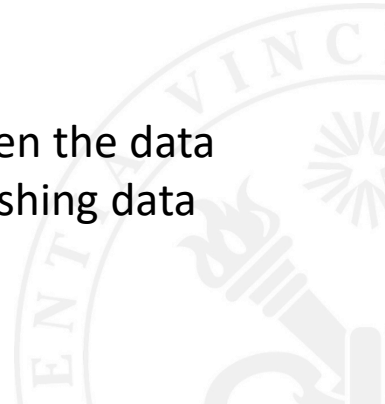
- A marketplace is a platform for online data trading.
- Sellers: publish, price, authorize, data contracts.
- Buyers: search, price query, consume, pay-per-use.
- Outsource DaaS functionality.
- Spatial data lack proposals for a marketplace.



Data Marketplace Concerns

We have spot the following concerns:

- Data concerns.
- Data Service Integration/Mashups.
- Data Contracts.
- Service Pricing:
 - Direct data, derived data, and aggregates differ in their pricing models.
 - A pricing function need to be: non-disclosive, arbitrage-free, regret-free, ...
- Privacy:
 - DaaS, in contract to Web services, distinguishes between the data provider and the service provider. It also involves publishing data from multiple sources.



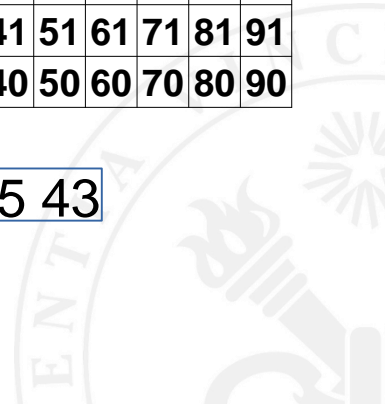
A Marketplace For Spatial Data

09	19	29	39	49	59	69	79	89	99
08	18	28	38	48	58	68	78	88	98
07	17	27	37	47	57	67	77	87	97
06	16	26	36	46	56	66	76	86	96
05	15	25	35	45	55	65	75	85	95
04	14	24	34	44	54	64	74	84	94
03	13	23	33	43	53	63	73	83	93
02	12	22	32	42	52	62	72	82	92
01	11	21	31	41	51	61	71	81	91
00	10	20	30	40	50	60	70	80	90

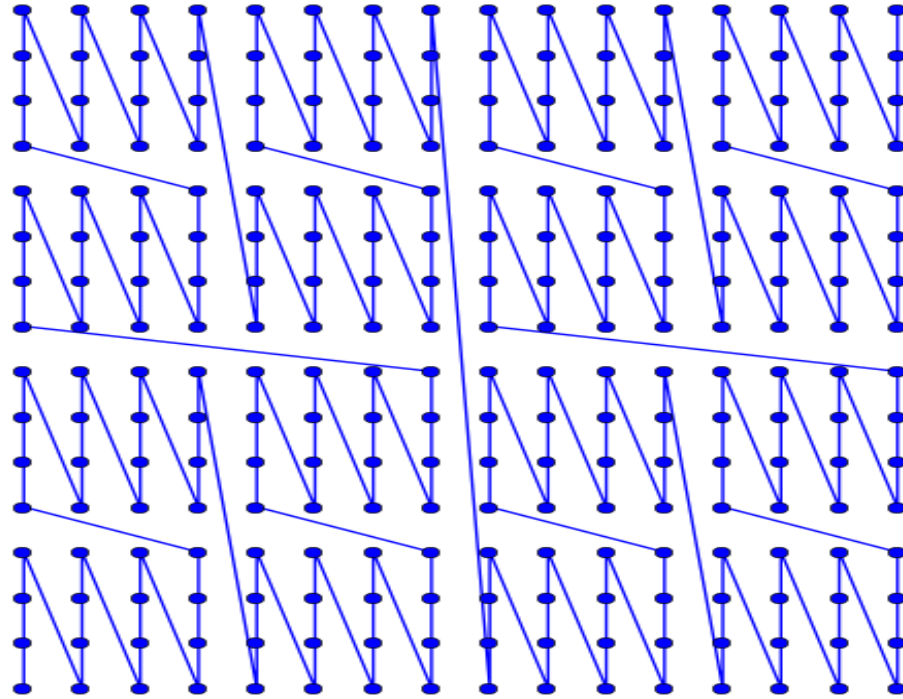
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00	10	20	30	40	50	60	70	80	90

- This grid is meant to discretized the space, into a finite set of cells.
- Fits well in key-value stores.
- Currently I am prototyping on CouchDB, and MongoDB.

85 43



Z-Order



Model

Data

09	19	29	39	49	59	69	79	89	99
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Price

09	19	29	39	49	59	69	79	89	99
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Authorization

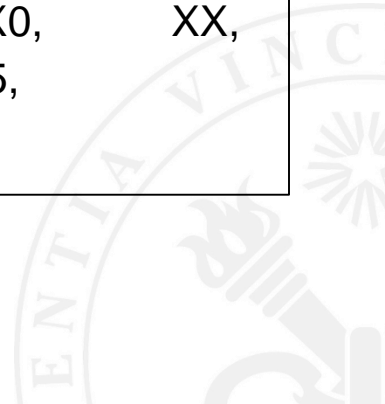
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01	11	21	31	41	51	61	71	81	91
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```

foreach c in query-window
  If user-authorized(u, c) then
    Total-price += Price(c)
    Result = Result U Data(c)
  
```

```

Rule:
35,      9X,      X0,      XX,
AB & 3<A<6 & 1<B<5,
Composite rule
  
```



```

{
  "_id": "57180335233688",
  "_rev": "1-b243723443ad1141",
  "content": {
    "landuse": [
      "111682785"
    ]
    "landmark": [
      "824352996"
    ]
  }
}

```

X,Y= Deshuffle _id

$$\text{Lon} = X * dx,$$

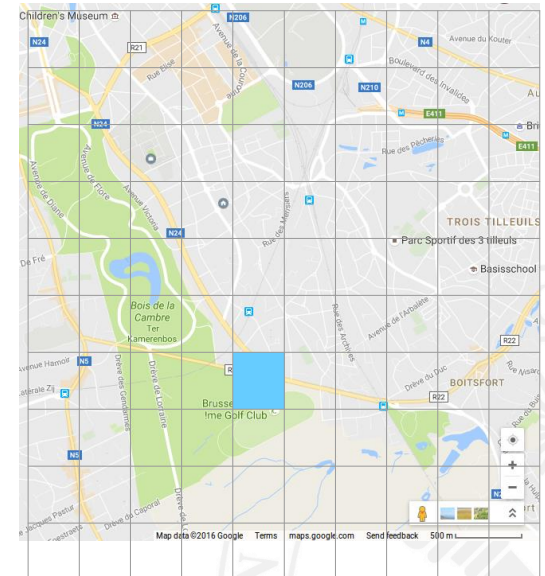
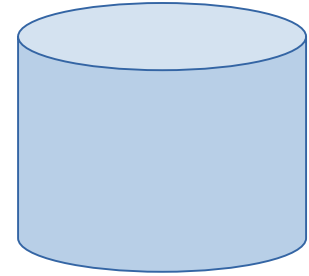
$$\text{Lat} = Y * dy$$

5	1	0	3	2	3	8
7	8	3	5	3	6	8
<hr/>						
57	18	03	35	23	36	88

_id= Shuffle X,Y

$$X = \text{Lon}/dx,$$

$$Y = \text{Lat}/dy$$



Insertion, Query

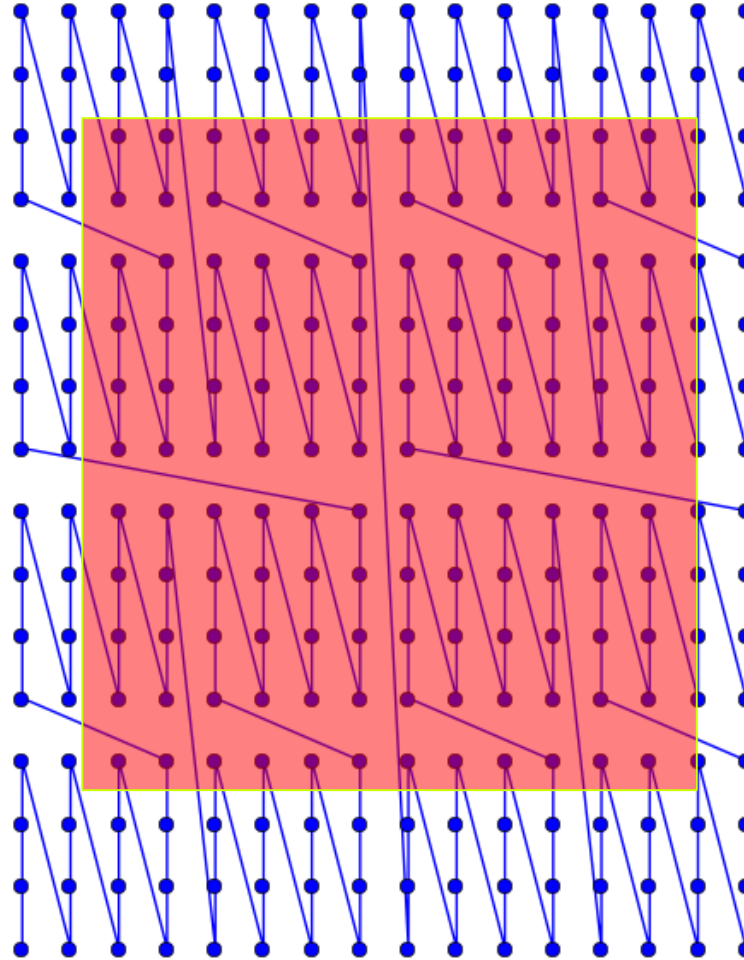
- **A cell is either fully inside or outside and object (approximation).**
- **Point features:**
 - One-to-one mapping, feature to grid cell.
 - Insertion: shuffle, store ObjectID.
 - Query: objectID.
- **Region features:**
 - One-to-many.
 - Insertion: intersection, store objectID in every cell, and store cell count.
 - Query: collect and count the objectID, then compare with the stored count.

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23, 24, 33, 34, 35, 43, 44, 45, 53, 54,
55, 63, 64, 65, 73, 74

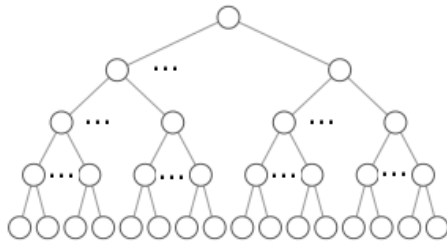


Z-Order Range Query

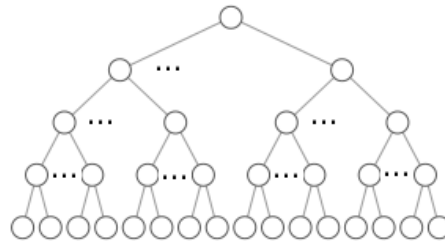


Optimization - Caching

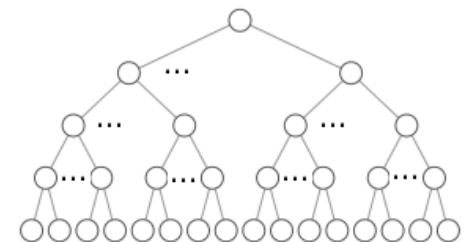
Data



Price



Authorization



Issues

- A spatial index.
- Privacy & Security.
- Data contracts.
- Query histories (pay once ?).
- Online updates.
- Data description language.
- Visual queries / data management.

