Computable Geospatial Model

Concepts and Design

Jan Kolář, Ph. D.
Grifinor Project

General Purpose Software Infrastructure

Complexity

Standard
Specification
COMPONENT
Formalized
Idea

Compute elementary tasks

Vector libraries
Raster libraries
CityGML parser

Slippy map, Mobile apps

Standard
Specification
APPLICATION
Formalized
Idea

Tool with an effect greater than those provided by individual components involved

Text editor
Mail client
Calendar

GIS, Web browsers, IDE

Standard
Specification
PLATFORM
Formalized
Idea

Provider of a common computational context for various applications

.NET
Mac OS
Android

SAAS/PAAS/... solutions

Standard
Specification
INFRASTRUCTURE
Formalized
Idea

Scalable set of linked instances collaboratively providing an important computational context

TCP/IP → binary data, sending to IP address
WWW → web document, requesting linked URI address
Bitcoin → key to coins, transaction to wallet address

"Geospatial solution (GS)" → **"content units?", "computational context?"**

Let's think through GS

"Geospatial solution (GS)" → **"content units?", "<u>computational context?</u>"**

Do we have all the technology we need?

Would technology-related law help finding a GS?

Is ability to accommodate new types of models a primary requirement?

1. Do we have all the technology we need?

1. No evidence we have - no reference design available
2. Heterogeneous spectrum of data models
3. Several competing alternatives
4. Complex data models
5. Content unit is Geospatial Model
6. Unifying computational context is missing

“Geospatial solution” → **geospatial model, “<u>computational context?</u>”**

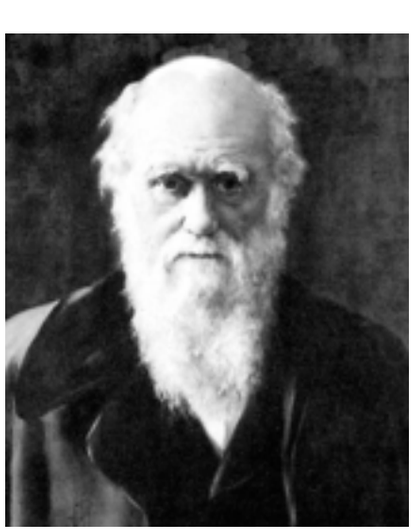
2. Would technology-related law help finding a GS?

1. From technological perspective it does NOT matter
2. Technology is governed by laws of nature
3. Tendency to use what works best
4. From financing perspective YES
5. From political perspective YES

“Geospatial solution” → **geospatial model, “<u>computational context?</u>”**

3. Is ability to accommodate new types of models a primary requirement?

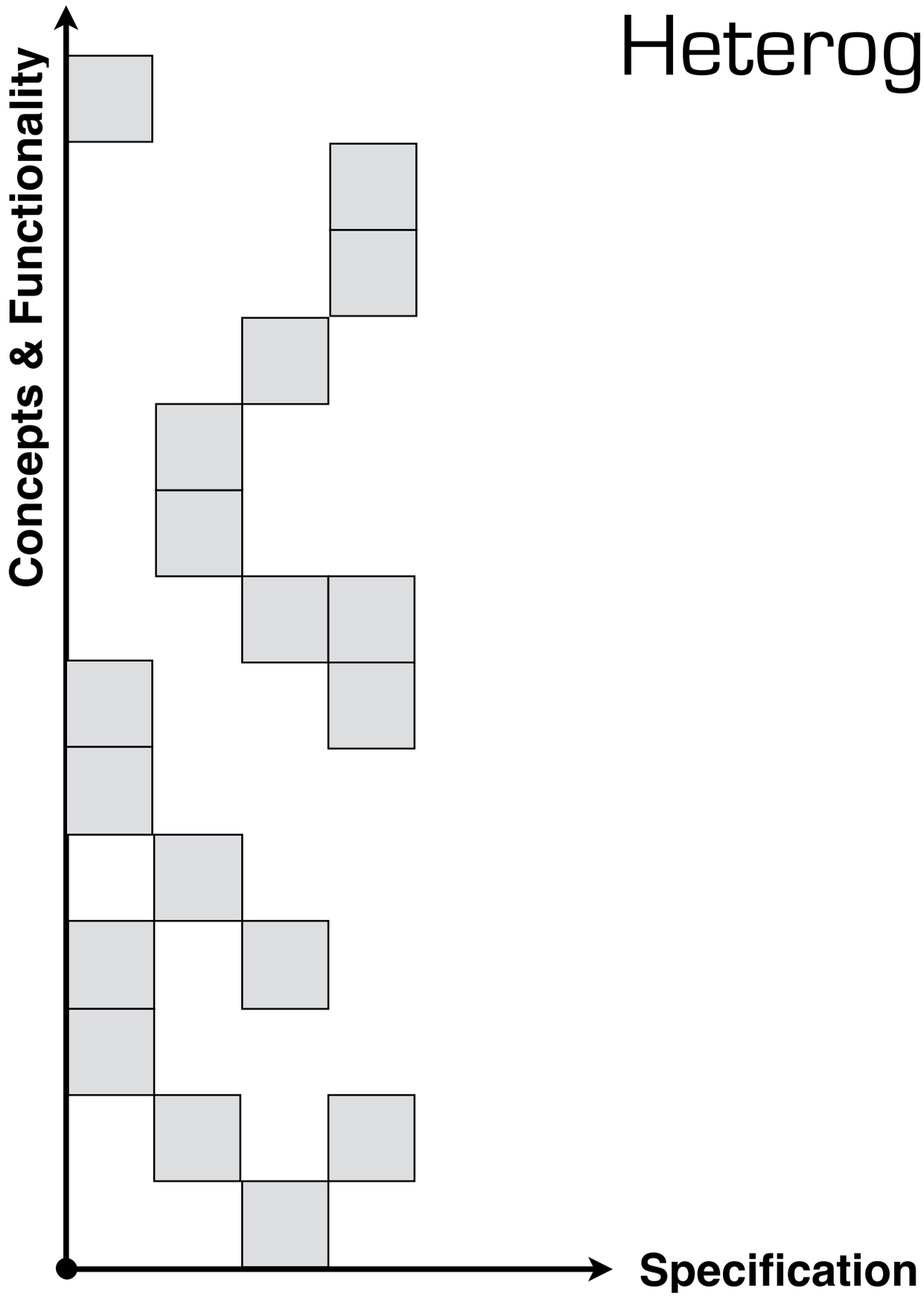
1. If we want flexible solution >> YES
2. Solution that "survives" for longer time >> YES



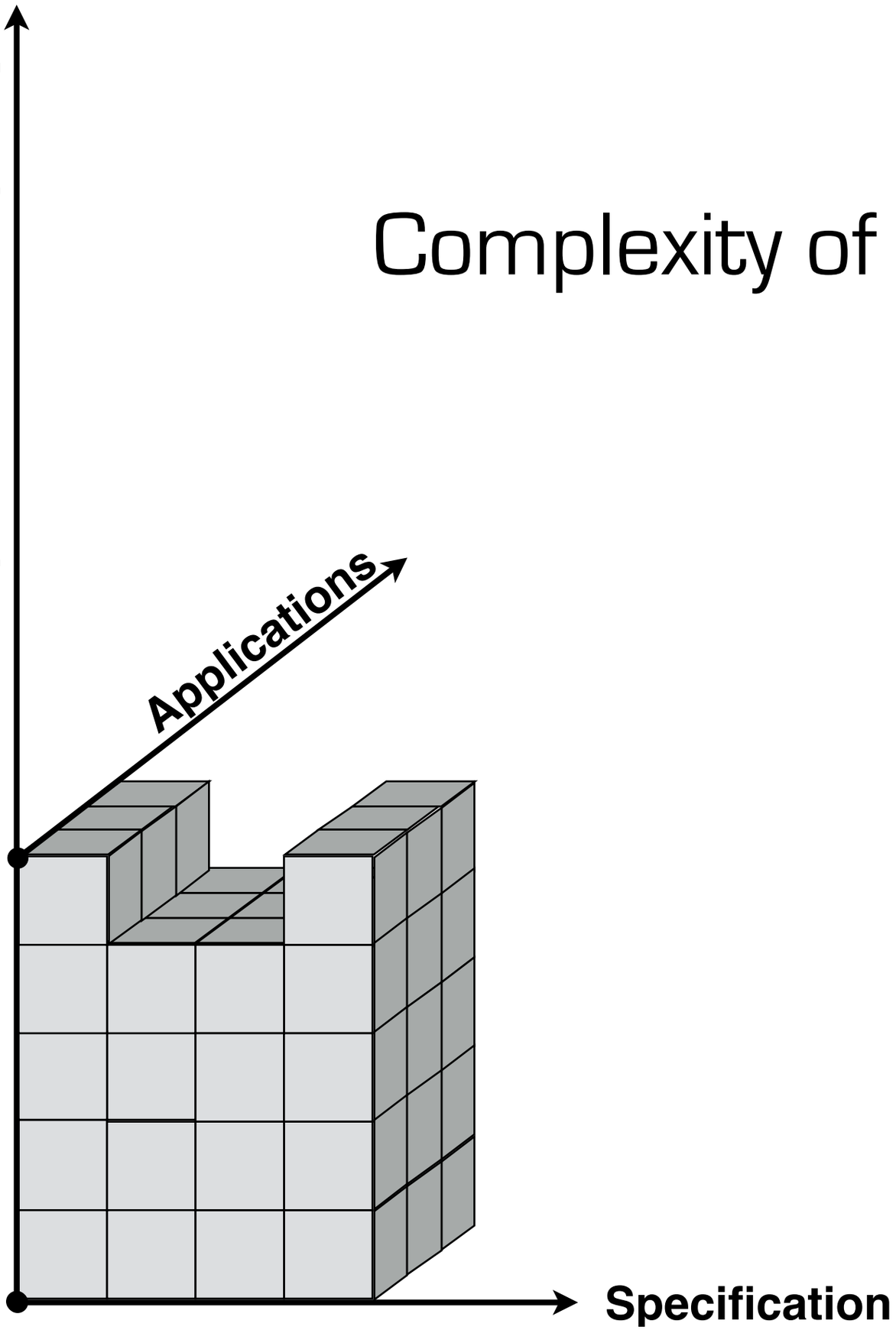
It is not the strongest nor the most intelligent who survives, but the one most adaptable to change. — Charles Darwin

- Handling both complexity change is hard

Heterogeneity & Complexity of Data Models



Complexity of Implementation



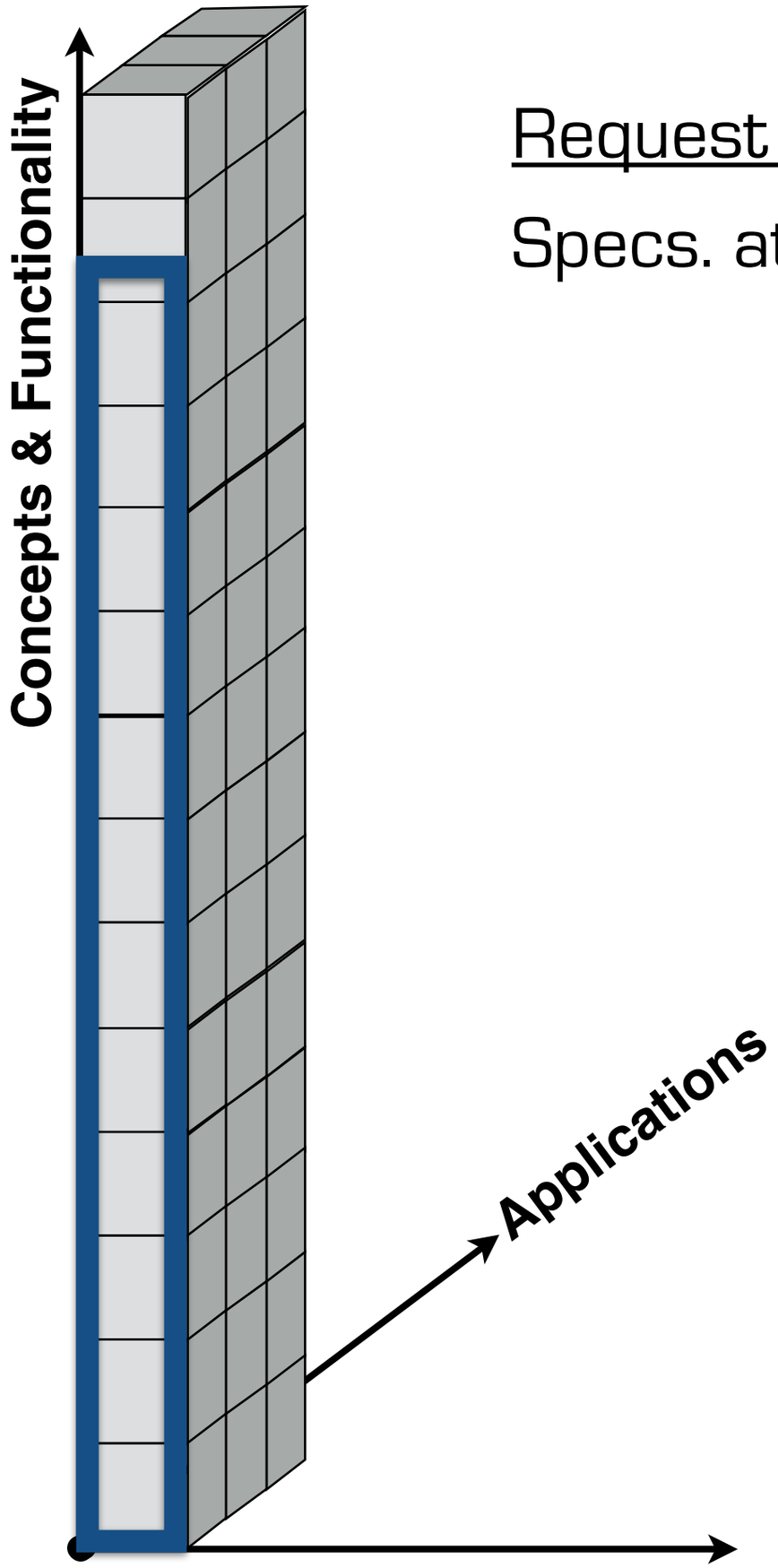
3. Is ability to accommodate new geospatial models a primary requirement?

1. If we want flexible solution >> YES
2. Solution that survives for longer time >> YES

It is not the strongest nor the most intelligent who survives,
but the one most adaptable to change. — Charles Darwin

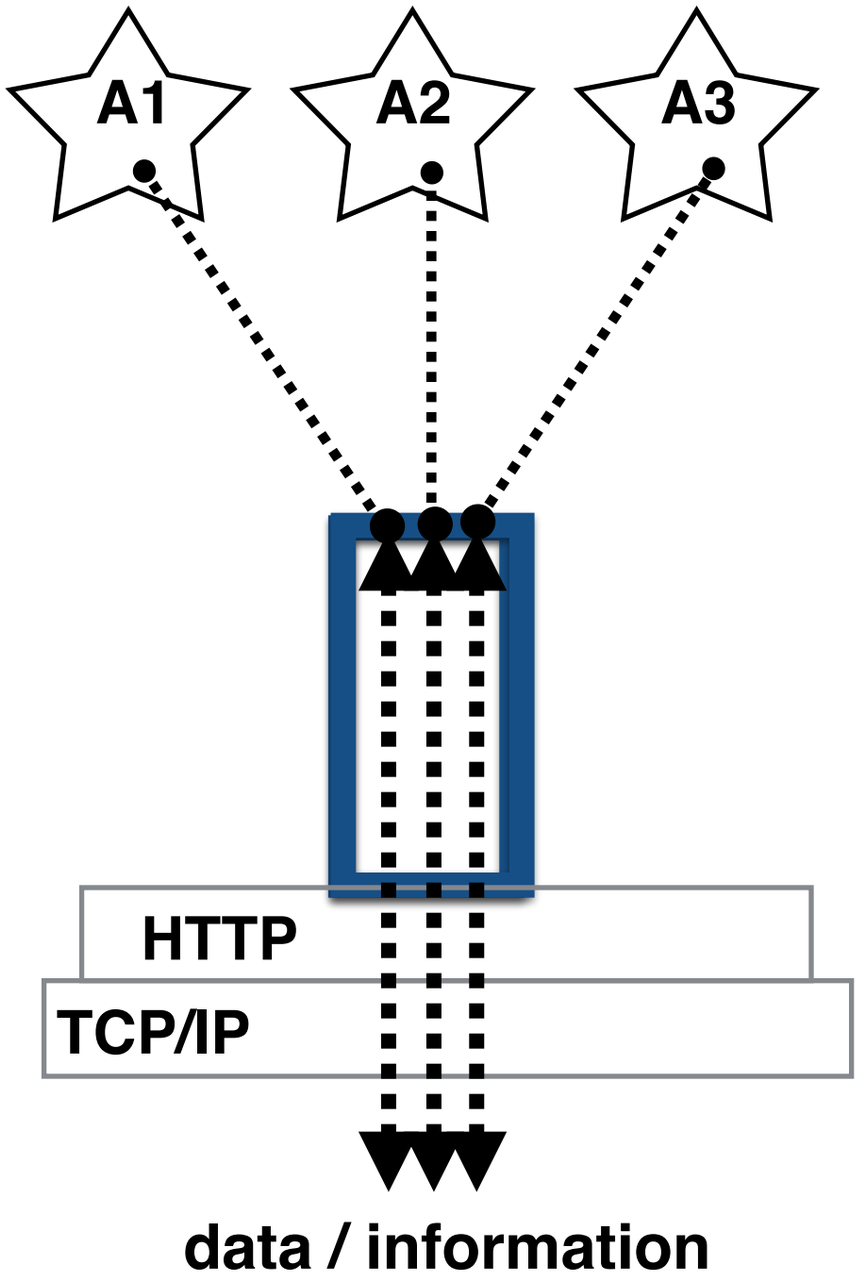
- Handling complexity is a problem
- GS must address COMPLEXITY and CHANGE

"Geospatial solution" → **geospatial model, "<u>computational context?</u>"**



Request typed link via URI address

Specs. at the level of data model (ontology)



GS on top of Linked Data

<u>Request typed link via URI address</u>

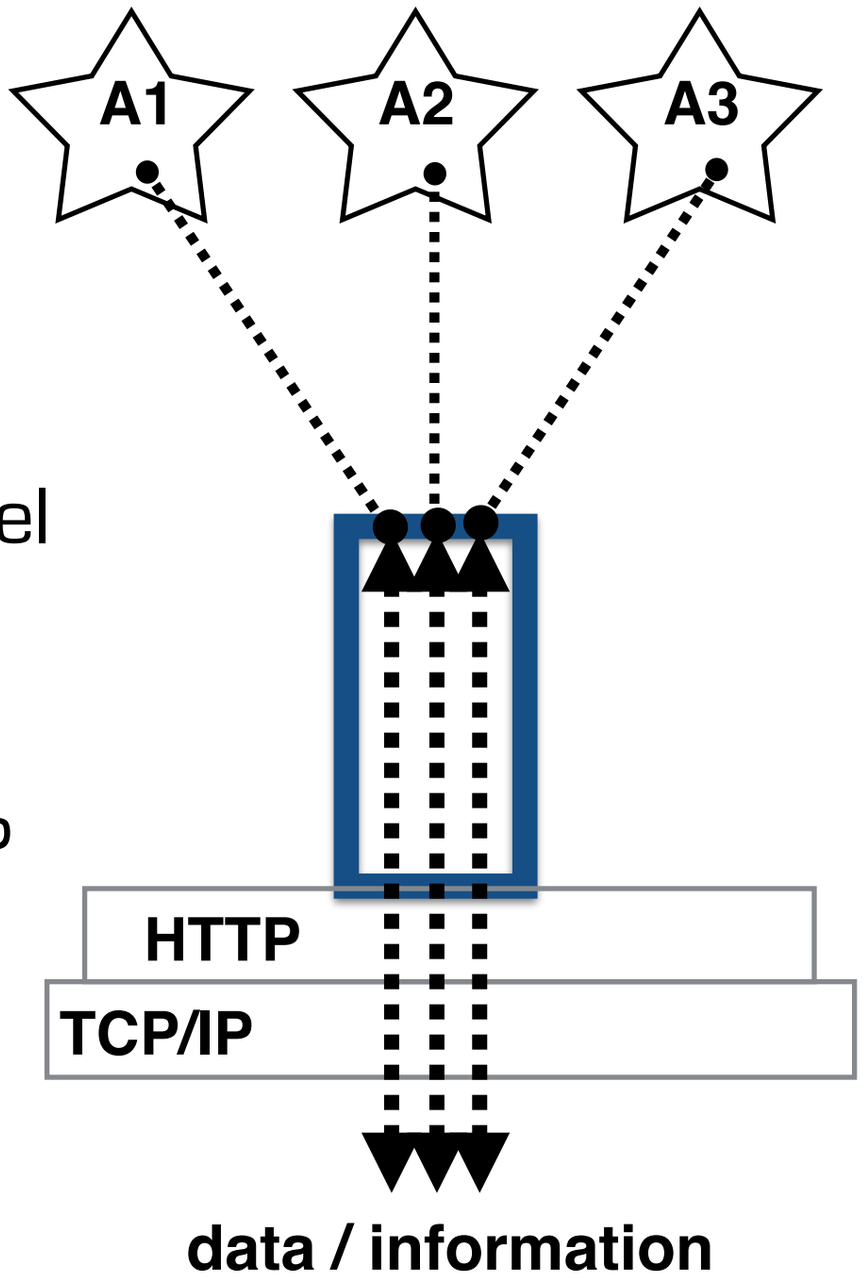
Specs. at the level of data model (ontology)

Solves distribution of data with complex model

Change is NOT solved at application level

What is contained in the GS 'software stack?

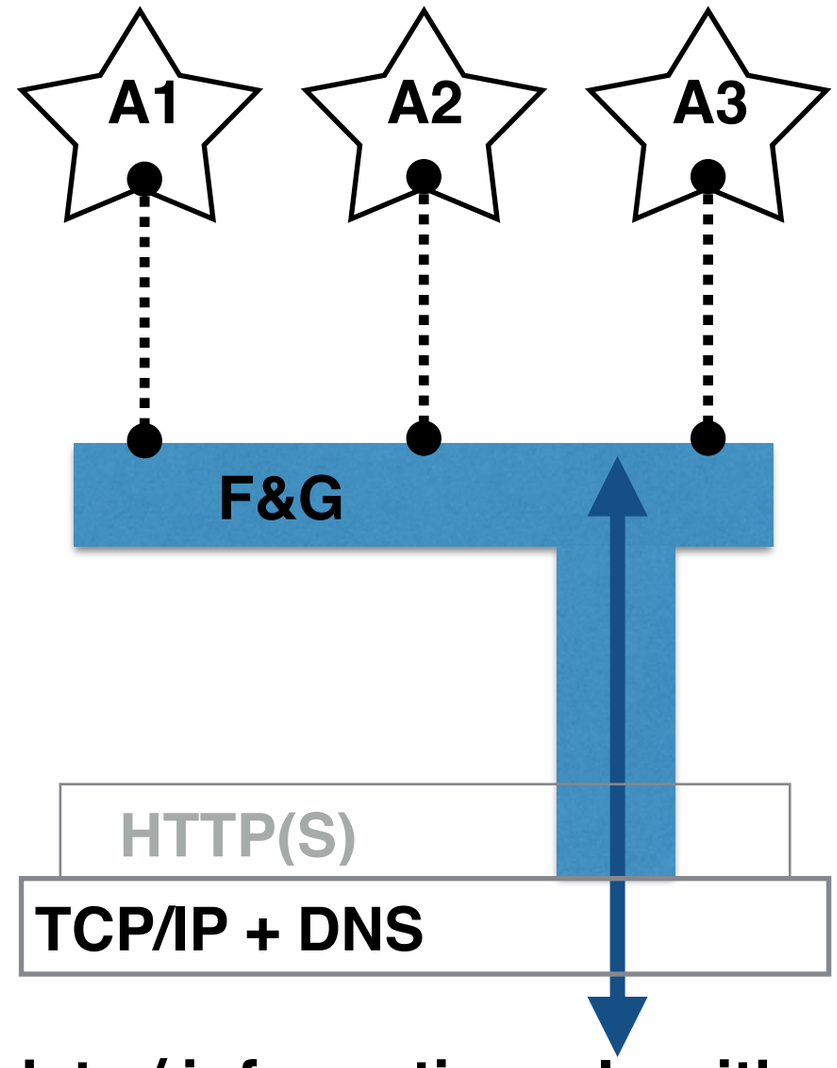
How to enforce a single coordinates sys.?

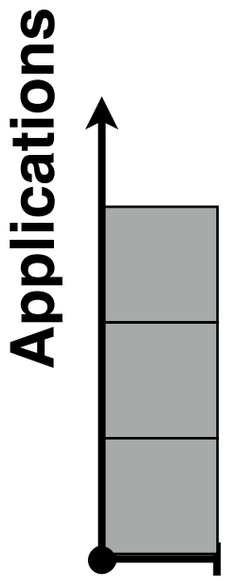


GS using Computable Geospatial Model

Specs. on the level of
computation and geographic space

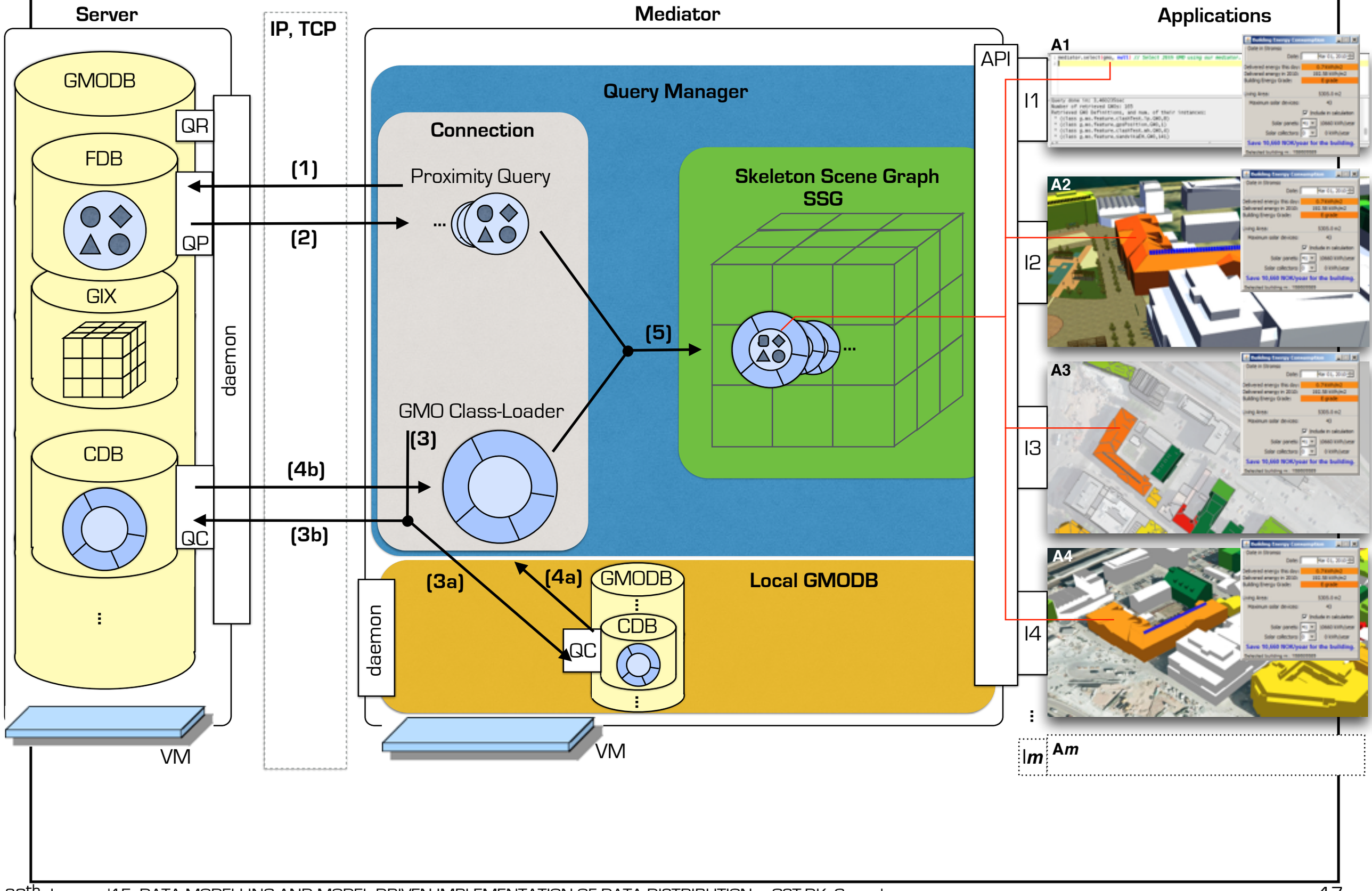
<u>Implicit reference</u>
<u>via points in geographic space</u>





Specification of Functionality and of Geospatial

GS using Computable Geospatial Model



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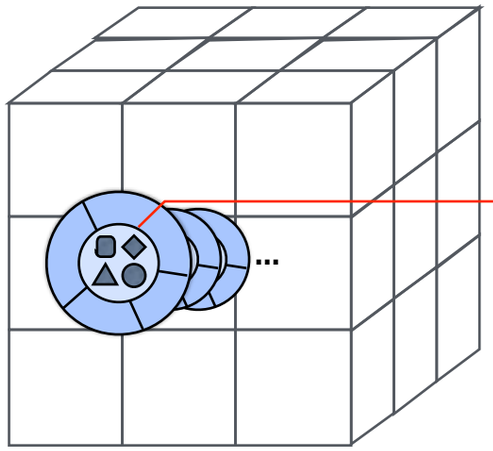
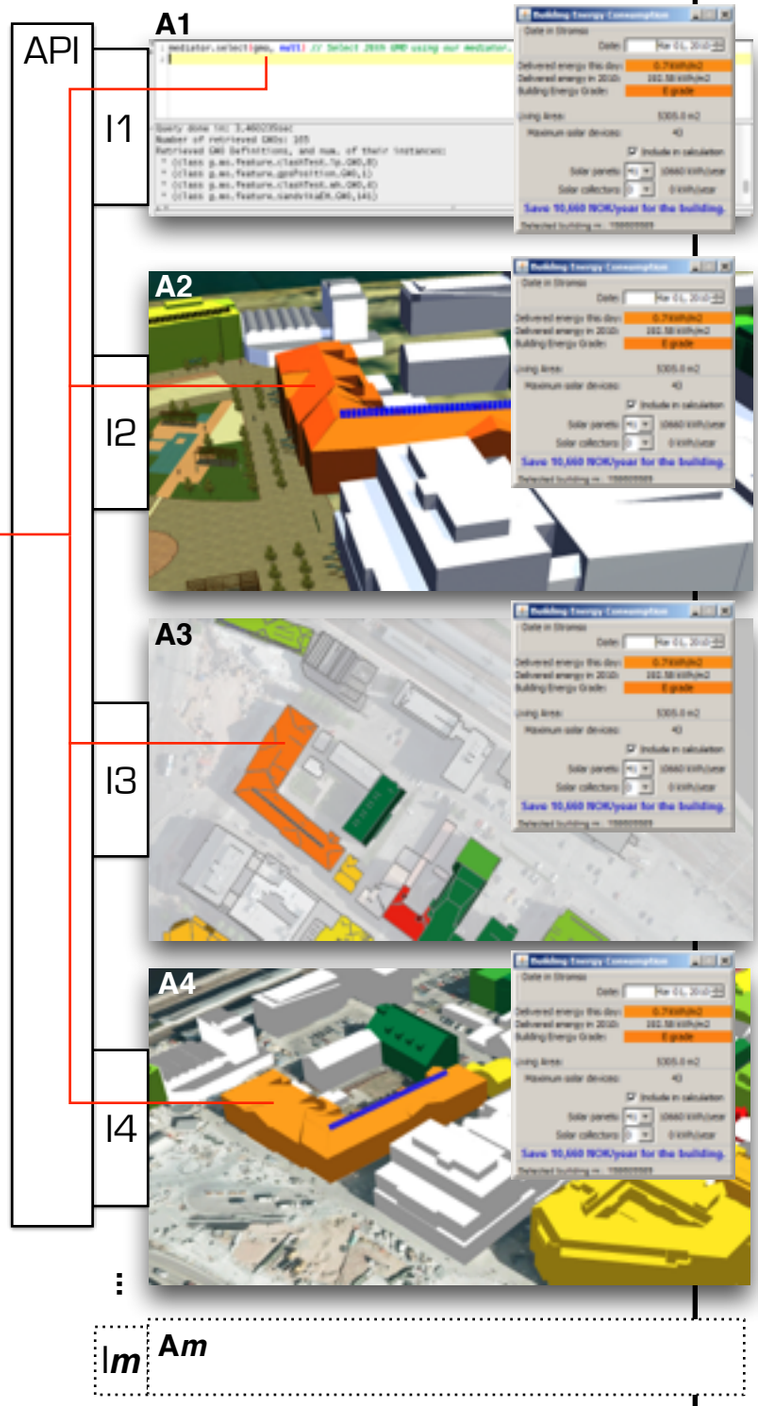


Applications



Computable Geospatial Model

Security
Time
2d / 3d
ArcGIS support
Performance
Mobile devices

INSPIRE
Source code
Scale
Spatial queries
WWW
Competitive adv.
Supported apps.

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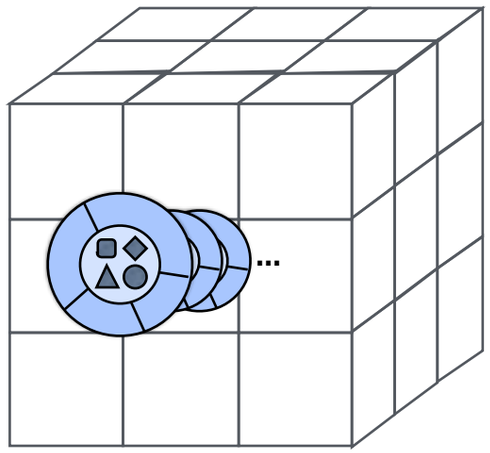

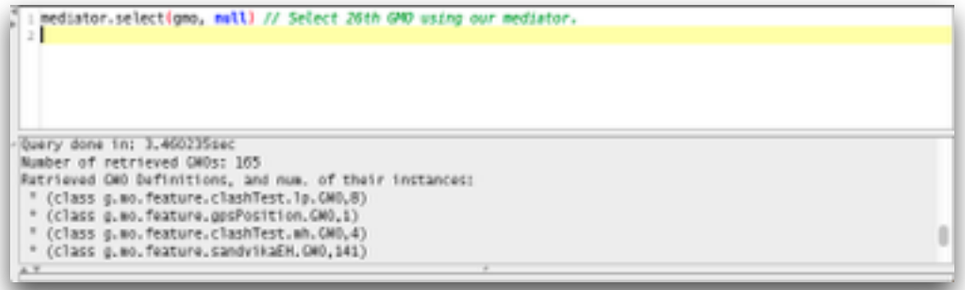

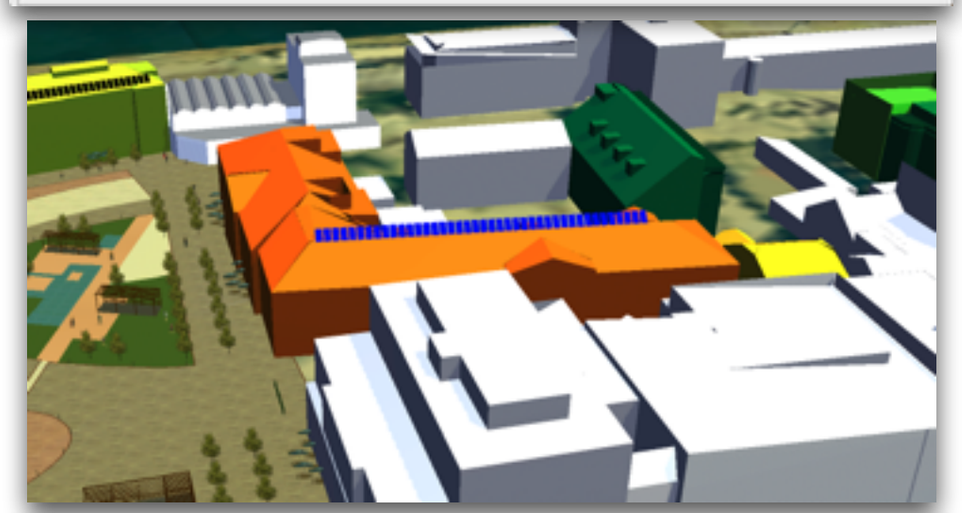

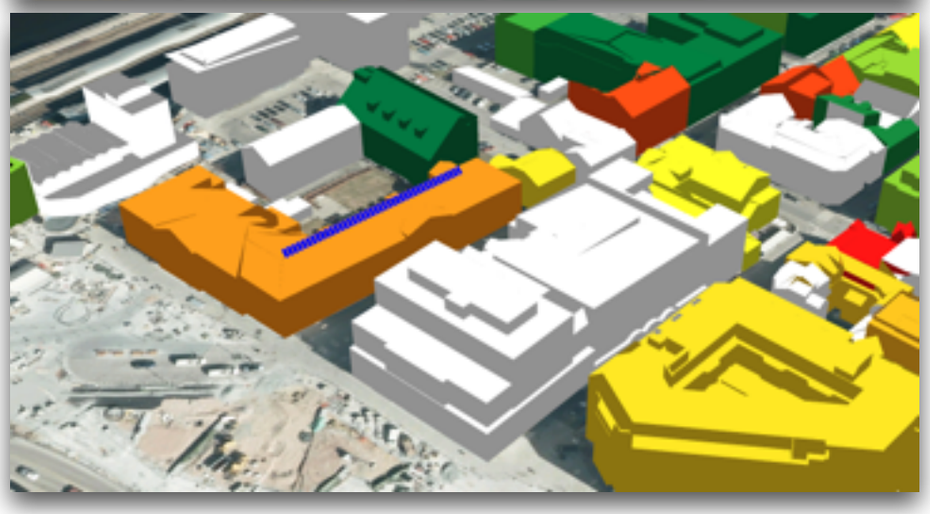

Conclusions

- Unifying geo computational context is missing

1. Request typed link via URI address
   Specs. on the level of data model (ontology)

2. Implicit reference via points in geographic space
   Specs. on the level of computation and geographic space

- Think for long-term solution
- Seek leadership
- Not ways to enforce geospatial solutions.

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