An Object-Oriented Data Model for Regional Planning

DRCOG's Approach

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Three things

1) Contemporary GIS carries ontological baggage that's getting in the way

2) Object-oriented data modeling (OODM) offers a distinct way of thinking about geospatial data that helps

3) DRCOG is working to overcome point 1 using point 2!

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Outline

1) Context
2) Ontological baggage of contemporary GIS
3) Object-oriented data model as a way forward
4) DRCOG's efforts
5) Concluding Thoughts

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Context

- Denver Regional Council of Governments
  - 52 members
  - Approx. 6,000 sq miles
  - Population of 2.6 million
  - Accounts for 62% of productive capacity of CO.
- Forum for collaborative decision making
- Area Agency on Aging
- Elevator Inspections and other services

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Context

- Data management
  - Ad hoc
    - Problem/issue focused
  - Programmatic
    - "Stove pipes"
- Lots of duplication and redundancy
  - The problem we're trying to fix
- We become data rich, while remaining information poor!

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Point 1:
Contemporary GIS has baggage!

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What's wrong with this picture?

- Problematic ontology of space
  - Outline has primacy
    - Space occupied by the object, rather than the object occupying space
  - Framed by technology
    - Old technology at that!

- **Need to put the ontological horse back in front of the technological cart**

Point 2:
Object-oriented data modeling as a way forward

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OODM as a way forward

- Distinct "object-oriented" way of thinking
  - Nouns rather than verbs
    - Identified through bottom-up, inductive process
- World populated by objects
  - Unique, independent and autonomous agents
  - Do nothing but be themselves!

OODM as a way forward

- "Ecosystemic" in its thinking
  - Agents are distinct and autonomous (individual)
  - Collective agency is distinct (species-level)
  - Species interaction with and within surrounding environment is distinct (ecosystem)

OODM

- Paradigmatically different from existing ontologies of space
- Object is primary
  - Object occupying space rather than space occupied by the object
  - Geometry is a trait, rather than the defining feature

Point 3:
DRCOG's efforts

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DRCOG's design approach

- Tackling our data management challenge holistically
  - "Enterprise" wide
- Tackling it organically
  - "The region" as an "ecosystemic" entity
- Tackling it pragmatically

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Design guides

- Comprehensive in scope
- Inductively defined
- Technologically independent
- Modeled holistically
- Realistic spatial ontology

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OO deconstruction of DRCOG's region

- Physical entities
  - The specific sites of "action" in our region
  - Deconstructed into three constituent parts:
    - Structures
    - Paths
    - Bodies
  - 4288 Green Ct
    - Structures: House, garage
    - Paths: driveway, sidewalk, front walk
    - Bodies: front yard, back yard

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Deconstructing our region

- Conceptual entities
  - Social units making decisions that give our region its dynamic character
    - Firms
    - Residences
  - Characteristic information about these units
    - Attributes
    - Geography

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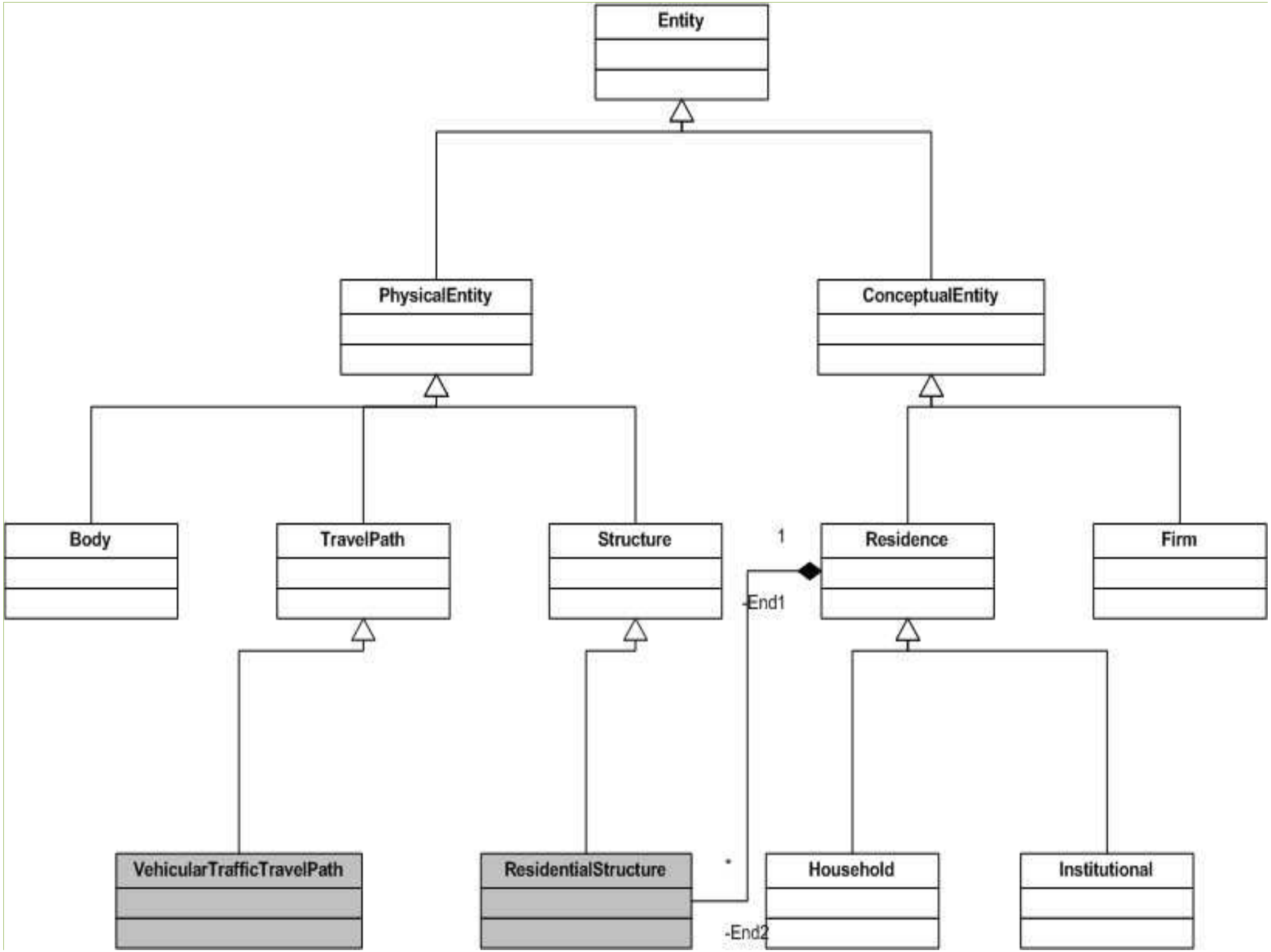
Entity
PhysicalEntity
ConceptualEntity
Body
TravelPath
Structure
1
Residence
Firm
-End1
VehicularTrafficTravelPath
ResidentialStructure
*
Household
Institutional
-End2

What does this do for us?

- Holistic representation of the region
- Organic representation
  - Not thematic; not problem specific
  - True to the "things" that make our region what it is
- Technology free representation
  - "Things," not layers!
    - Deployable in more contexts
- More sophisticated ontological perspective

Next steps

- Populate (Current)
- Serve current pop/employment estimation and forecasting processes (Spring 07)
- Regional dynamics (Summer 07/08)

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Concluding thoughts

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Concluding thoughts

- Question established "geo-ontologies"
  - Cheap representation of a much richer reality
  - One that we need to get beyond
- Shift perspective
  - From "space of objects" to "objects in space"
- Model data organically
  - OODM
- Stop thinking about this stuff!
  - It gives you a headache

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THANK YOU

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