

MetroGIS

Business Object Modeling Follow-up Session

Final Turn Around Document

December 4, 1996
St. Paul, Minnesota

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*** Due to the size of the business object model, the diagram and text are each contained in separate documents.*

Opening Comments

- David Arbeit, the Chair of the MetroGIS Coordinating Committee, opened the session by thanking everyone for their participation and updating everyone on the progress of the model.
- He stated that Advanced Strategies has taken the 750 business questions and has broken them into 84 macro questions. This shows up in a list of tables that the project team and the Data Content Advisory Team began to analyze on November 27 and December 3.
- The MetroGIS community will be surveyed sometime in early 1997 to find the most urgent and pertinent business questions so that priorities can be set.
- The key to today's session is to verify that all the business questions get answered. The rest of the day will be spent on verifying the model.

- Steve Clowse, the JDA facilitator, gave an overview of where we stand in the process. He stated that we have three goals for today:
 1. Confirm the model that was developed at the last session.
 2. Further the model using the 750 identified information needs.
 3. Further the model based on newly identified issues.

- Steve announced that after the session another turn-around document will be produced and distributed. The document will include the newly consolidated model.

- Steve reminded everyone of the Focus Statement and then reviewed the symbology used in the model.

- RHC asked a question on how best to read the model and how does the model tie back to GIS?
- Richard Branton, the JDA coach, answered this by saying the best way to read the model is to look at it like a map of the United States. To read the map, you don't look at it all at once; you read an individual route.
- The model ties back to GIS by having business questions answered by using pieces of the model.

Focus StatementSM

This is the same Focus Statement which was presented and accepted by the group in the October 30-31 JDA. It was presented again in the session and is replicated here:

Definition -- Geographical Characteristics: Physical characteristics of a geographical area, location or feature including those on, below, or above the surface of the land or water; and characteristics of other items of interest "organized" or "analyzed" by geographical areas, locations or features.

- ◆ Some examples of physical characteristics include:
 - ⇒ Area: The extent of a city.
 - ⇒ Location: The location of a street, waterfall, or a fire hydrant.
 - ⇒ Feature: The presence of minerals in an area, the width of a street, or the depth of a lake.

- ◆ Some examples of items “organized” or “analyzed” by geographical area include:
 - ⇒ The crime rate in a neighborhood.
 - ⇒ The pollution level at a specific location at a point in time.
 - ⇒ The species of wild flowers in a certain area.

Scope:

- ◆ We are interested in all geographical characteristics (as defined above) of the seven county Twin City Metropolitan area that is relevant to improving:
 - ◆ The effectiveness, efficiency, and/or completeness of results at participant operations (public and private),
 - ◆ The understanding of the dynamics of the area's people, places and things.

Perspectives:

Primarily, we want to include the point of view of:

- ◆ Individuals within units of government responsible for providing services within the Twin City Metropolitan area.
- ◆ Individuals in government agencies seeking to improve the quality of living and/or economic competitiveness of the Twin City Metropolitan area.
- ◆ Individuals making decisions about public policies servicing the Twin City Metropolitan area.
- ◆ Individuals responsible for operation of the governments of the Twin City Metropolitan area.
- ◆ Individuals concerned with improving government's effectiveness using geographical information.
- ◆ Individuals interested in maximizing sharing of geographical information.
- ◆ Individuals representing non-government organizations who might collaborate with government entities on geographical data of common interest.
- ◆ Individuals in non-government organizations who provide essential public services and who might benefit from geographical information.

Secondarily, we want to consider the point of view of:

- ◆ Individuals interested in geographical information within the Twin City Metropolitan area including:
 - ◆ Researchers
 - ◆ Educators
 - ◆ Private organizations (including utilities)
 - ◆ Private citizens
 - ◆ Non-profit organizations

At this time, we will not specifically address the needs of:
Individuals within business seeking to locate in the area.

Universality:

- ◆ We are interested in geographical information covering the Twin City Metropolitan area, extensible into impacts on and from neighboring areas.
- ◆ We are interested in a sufficient level of generality so that the models and resulting systems will achieve use among the widest array of participating organizations.
- ◆ We expect the models and resulting systems to be:
 - ◆ Stable for 6 months
 - ◆ Extensible for 24 months
 - ◆ Have a demonstrable life span of 60 months

Level of Detail:

- ◆ Sufficient detail to be able to identify commonly needed data sets of geo-referenced data.

Participants

The participants who attended the session are captured in the following table. Whether they attended in the morning, afternoon, or both is used to indicate if we missed representatives from a key functional area during part of the day.

Group Key:

HS = Human, Social, Educational Services; Public Health; Libraries

PS = Public Safety; Judicial

PR = Property Records

CD = Community Development; Planning; Demographics; Housing; Research

PW = Public Works, Transportation, Telecommunications

PEN = Parks and Recreation; Environmental Protection; Natural Resources

MG = MetroGIS Coordinating Committee

ID	Name	Organization/Role	Group	AM/PM
DA	David Arbeit	Land Mgmt Information Center	MG	AM/PM
DC	Dennis Carlson	Anoka-Hennepin School District Community Education	HS	AM/PM
DC1	David Claypool	Ramsey County Surveyor	PR	AM/PM
DD	Dave Drealan	Carver County	PR	AM/PM
DW	David Windle	City of Roseville GIS Coordinator	CD	AM/PM
JC	John Connelly	St. Paul/Ramsey Co. Charter Commission	PR	AM/PM
JH	Jane Harper	Washington County Physical Development	CD	AM/PM
KC	Kurt Chatfield	Dakota County Planning	CD	AM/PM
KR	Kevin Roggenbuck	MetCouncil Planning/Forecasting	PW	AM/PM
LL	Laura Lambert	Minneapolis Planning Department	CD	AM/PM
MJ	Marcel Jouseau	MetCounciil Environmental Services	PEN	AM/PM
MK	Mark Kotz	MetCouncil GIS Technician	PR	AM/PM
NR	Nancy Read	Metropolitan Mosquito Control	PEN	AM/PM
PL	Paul Leegard	Anoka County	CD	AM/PM
R/G	Rick Gelbmann	MetCouncil GIS	MG	AM/PM
RHC	Roger H. Carlson	Hennepin County	HS	AM/PM

ID	Name	Organization/Role	Group	AM/PM
RLC	Roger L. Carlson	Minneapolis Assessors Office	PR	PM
RP	Rick Person	City of St. Paul Public Works/Mapping	PW	AM
SS	Steve Schellenberg	St Paul Schools	HS	AM/PM
TK	Tim Kirchoff	Anoka County Public Transportation	PW	AM/PM
TM	Tim Morehead	US West Forecaster	PW	AM/PM
TZ	Tim Zimmerman	Hennepin County Planning/GIS	CD	AM/PM
WC	Will Craig	Univeristy of MN CURA	CD	AM/PM

Support Team

Name	Organization	Role
Steve Clowse	Advanced Strategies	Facilitator
Richard Branton	Advanced Strategies	Coach
Chris Cialek	LMIC	Coach
Karl Olmstead	Mn/DOT	Data/Recording Analyst
Bruce Abbott	DNR	Data/Recording Analyst
Robert Maki	DNR	Data/Recording Analyst
Michael Baker	LMIC	Data/Recording Analyst
Randy Johnson	Met Council	Project Manager
Jim Chiquist	Met Council	Observer
Tanya Mayer	Met Council	Observer
David Vessel	Met Council	Observer
Heidi Welsch	Met Council	Observer

Model Enhancement Discussion

In the morning, the group first reviewed and enhanced a fragment of the model which addressed transportation and networks. Here are some key points/issues which were raised during the discussion:

Transportation/Network

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Need to improve the definition of route systems within the model. There are many application areas related to transportation that can be used to refine and provide additional depth to the model	route/location	DA/ PL/ NR/ KR/ other
2	Need to record predefined routes: bus routes, evacuation routes, bike routes, emergency routes. Uncertainty as to whether routes should be predefined or simply attributes of existing routes. Does predefinition into separate entities make sense? or do we derive these entities on the fly within applications?	route/location	SC/ JH/ DA
4	The complexity of maintenance processes are not really reflected in the model. There are temporal/ historical elements to entities. Historical scenarios can greatly influence land rights and uses. Much of this information is lost and land status may have to be re-evaluated on an on-going basis. This is a very dynamic phenomena.	Transportation/ routes/sections	RC/ DCI
5	The concept of a segment requires definition in both conceptual and physical terms. The emphasis in the modeling session is on the conceptual. Ultimately, physical data structures must be defined which are capable of linking business needs with actual data elements and associated structures. For example, attributes vary by location along segments. Advanced Strategies advocates the definition of a minimum set of physical segments from which the network can be built.	Transportation/ segments	LL/ DCI/ DA

Model Enhancement Discussion

During the afternoon, the facilitator presented proposed enhancements to the original business object model. These were generated by Advanced Strategies from two sources.

- *First, Advanced Strategies reviewed the original 750 information needs to see which could not be answered by the model. Enhancements were drafted so all 750 could be answered by the model. Most proposed modifications were created from this analysis.*
- *Secondly, Advanced Strategies reviewed other models it has developed to see if fragments could enhance the original model.*

*After the enhancements were proposed, the group evaluated and discussed them. Points/issues which were raised are captured below. We attempted to address some of these by modifying the model in the JDA. However, most could not be addressed in the session. The participants also submitted additional points/issues when we ran out of time in the JDA. These are also included and are noted with a * next to the source ID.*

Natural Resources

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Need to consider water within the context of hydrologic networks. Watersheds are not merely areas, they are active networks.	Water drains at location	RP
2	Are rivers or streams boundaries or spaces?		??
3	Flood plains, watersheds, forests, and prairies are examples of other areas. Why are they not called out as their own entities? These are to be treated as surfaces.	Surfaces	JH
4	Acquifers are 3-D volumes that are not addressed in the current model. Are they water spaces?	Volumes	NR
5	Water system		TK
6	Minerals are handled apart from land records. Why?		??
7	Are minerals substances? Why are they handled separately		JH
8	Geology/bedrock is missing in the model (including soil, soil properties, and land cover)		WC
9	Landcover		WC
10	Animal movement patterns are very dynamic and are associated with a wide variety of conditions (nesting, feeding, etc.). Not just permanent or migratory.		WC

#	Point of Discussion/Issue	Model Fragment	Src ID
11	Weather: wind, precipitation, humidity, temperature, sunlight, lightning strikes, soil temperature, prevailing winds, ...		R/G
12	Topography is missing (elevation, slope, aspect)		WC
13	Prairie as defined space--not necessarily a given bounded area		??
14	Disposal of hazardous materials (is this different from storage?). What about when disposal involves other things, such as burning?		JH
15	Fire		RB
16	Acts of nature		??
17	Substance vs. Material--problems of semantics--natural vs. man-made?		JH
18	Wellhead protection areas (access point for water), a declared boundary		RHC
19	Depth to bedrock		LL
20	Prevailing winds		LL
21	Links between utility and water network		NR
22	The term water boundary doesn't seem like a river or stream, but the boundary of a waterway.		MK*
23	Where does water network (ex: run off, streams, storm sewer) fit in?		MK*
24	Habitats (animal and plant): a classification system of space. Need to link to land use.		NR*
25	Natural events: earthquakes, fire, smoke, haze, smog, dust, flood, hail, tornado, hurricane, straight line winds, ice, thunderstorms, freezing rain, snow cover, ice out/freeze over (lakes), ...		R/G*
26	Add wetland to waterspace		WC*
27	Is a water boundary (river, stream, etc.) a subtype of water space (watershed, flood plain, lake, etc.)?		TZ*
28	Where is hazardous waste or substance in the model?		DW*
29	How is disease of animal or plant handled in the model?		??*
30	Water boundary and water area/space are both needed. River is a space; where it serves as a boundary (ex: County), then it should be defined as a boundary.		??*
31	Plants and animals and types/species and densities		MJ*

#	Point of Discussion/Issue	Model Fragment	Src ID
32	Water: volume appropriated and discharged; quality parameters		MJ*
33	Resource characteristics: <ul style="list-style-type: none"> • Geologic stratigraphy and characteristics of geological units (thickness, etc.) • Soil characteristics for hydrology, building, agriculture, source of material, erodibility,... • Aquifer characteristics (potentiometric levels, recharge rate, vertical and horizontal movements, saturation) • Lake bathymetric characteristics • Lake watershed 		MJ*
34	Does water boundary or water space include water towers and the enclosed piped water system? How is this connected to the water network?		KR*
35	Mineral deposits are the same as substance		JH*
36	Material is disposed at ...		JH*
37	A water space is a lake or wetland. Floodplains and watersheds are declared spaces. How are these different from forest, prairie, etc.?		JH*

Land Definition

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Physical space and physical boundaries should not be separate (same with declared space and declared boundaries)		WC
2	Should Location attributes be moved to Space or Structure. Location should be reserved for well-defined features.		R/G
3	Unique sites should be added as a feature type		WC
4	Declared space and the relationships among them, such as zoning and comprehensive planning		DW
5	Percolation rate should be moved to Natural resources as an attribute of soil		NR
6	Where do we put “address” attribute in the model?		All
7	Survey, photographs, maps (addressed by a model revision in the session)		NR
8	Survey monument		PL*
9	Caves? Part of topography?		NR*

#	Point of Discussion/Issue	Model Fragment	Src ID
10	How is declared space different from boundary?		NR*
11	Archeological could be materials, structure, feature,...not exactly a location		NR*
12	Drop all attributes of location except name, address, xyz coordinate. Make "unique sites" for historical, archeological, rare plant, etc.		WC*
13	Need to note that declared spaces can overlap		DW*
14	Some declared spaces follow common boundaries with each other		DW*
15	School districts and water management districts are both important and should be included.		??*
16	Caves, historic, archeological seem inappropriate as attributes of Location. Should be a feature or its own entity that exist at a location.		??*
17	Cave, etc. Why not surface?		RLC*
18	Address is not point specific; xyz coordinate is point specific. Tie both to location?		RLC*

Property

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Tax forfeiture is the result of non-payment, not a petition. Legal entity declares forfeiture. [addressed by model revision]		RLC
2	Outcomes of above ex: transfer of property rights. [addressed by model revision]		RLC
3	New assets/rights created (change Legal Entity owns Asset to Legal Entity has rights to Asset)		R/G
4	Transfer-subdivision of land		RJ
5	Is right restricted?		JH
6	Ex: The state gives tax \$ back to other jurisdictions		LL
7	Tax terms in model are muddled (income vs. property, etc)		DC
8	Subdivisions, platting land		MK/ DA
9	Asset forfeitures may not involve declared space		DA
10	Classification of property tax rate (commercial and industrial; residential/home)		DC

#	Point of Discussion/Issue	Model Fragment	Src ID
11	Classification of space is a missing attribute (Department of Revenue determines this)		RLC
12	Tax forfeiture - transfers property right		WC*
13	Exemptions aren't for declared space; only hit for specific assets		??*

Land Use

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Why is earth and space separated in the model? Sometimes it is surface vs. air vs. water vs. airtraffic (which is a 3D view)	Space/Earth	DA/ NR
2	Land Use (shows existing/current use); future inventory, too. [addressed by model revision]		DW
3	Comprehensive Plans; shows blueprint for subdividing land. [addressed by model revision]		DW
4	Zoning (earth is subdivided by rule). [addressed by model revision]		DW
5	Other organized uses of land - forested habitat of a type of owls (where are different habitats) - wetland		NR
6	Subdivision is specific to parcels (i.e. subdivided parcels should be related to parcel, not to earth)		MK*
7	Project development has a tax value beyond value of property (or no tax value in the case of Tax Increment Fin.)		DC*
8	Earth = soil?		DC*
9	We are offering a regional (Midwest?) not a global model. We are describing a democracy in our area (Minnesota?).		DC*
10	Air needs to be added (ex: air pollution, air traffic). We have land and water.		DC*
11	Legal entity "subdivides" space		??*
12	Earth vs. space		??*
13	Is parcel number is attribute of declared space?		??*
14	Capacity use?		RLC*
15	Trails: context of use: recreation or network		??*

#	Point of Discussion/Issue	Model Fragment	Src ID
16	Develop space: ponds, utilities (water, sewer, storm), drainage (ponds, ditches), power lines, new property (new lots), etc.		Randy Johnson*
17	Comprehensive plan -- example state elements: future land use, housing, transportation, public facilities, utilities, finance, ...		Randy Johnson*
18	Develop structure: remodel, demolition, new construction		Randy Johnson*
19	Permits/rules: grading, zoning related (signs), building, subdivision, special district (shoreland, flood zone)		Randy Johnson*

Building

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Accessory structures-pool, garages, picnic shelters, gazebo, ice rink, pond		RJ
2	Permits for buildings, too		DW
3	Secondary/accessory use (e.g. barbershop in home, daycare in home)		RJ
4	Structure exists on location or space (center point vs. actual dimensions)		NR*
5	Facility serves space...or should it be facility serves people living in space.		NR*
6	What about "informal" service areas (people likely to use a park)		NR*
7	Different between facility vs. a dwelling unit?		NR*
8	Hazardous waste		R/G*
9	Fire fighting access (water, stairs, alarms)		R/G*
10	Not sure about the distinction of a public facility being owned by more than one person and private facility being owned by one. Some private facilities (ex: a home) can be owned jointed and some public facilities can be owned by one person.		TZ*
11	Address		DW*
12	Necessity to differentiate space within structure		RLC*
13	Outdoor structure -- necessary structure can be associated with all types of primary structures		Randy Johnson*

#	Point of Discussion/Issue	Model Fragment	Src ID
14	Accessory use of structure -- home occupation within a dwelling unit (barbershop within a house)		Randy Johnson*

Demographics and Behavior

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Residency (more than just where someone lives)		SS
2	Rules (ex: for voting, receiving AFDC, other social/human services, eligibility, etc.)		DC
3	Tracking people and where they live, including homeless, students in dorms, runaways, etc. (It is not just households.)		DC
4	Demographics of businesses (do they recycle tires, auto salvage yard, dry cleaners emitting substances, etc.)		NR
5	Aggregate demographic of spaces (sometimes privacy laws prevent individual reporting)		SS
6	Aggregate demographics by neighborhood, block, etc.		NR*
7	Add: time spent outdoors or outdoor recreation activities		NR*
8	Connection to economy (specifically jobs) needs to be articulated specifically (more than activity).		WC*
9	Need connection between voting district/polling places and jurisdiction.		WC*
10	Assets: cable TV, computer, telephone.		DC*
11	Ways they receive information.		DC*
12	Track mobility including immigrant workplace, travel time...		DC* / DW*
13	Attributes: AFDC, WIC, preschool screening.		DC*
14	Where is literacy rate an attribute in the model?		??*
15	Relationship "Legal Entity is citizen of Jurisdiction" does not help with migration. Migrants may not necessarily be citizens to reside in a location.		??*
16	Voting: Person votes in Election in Voting District		??*

Other

#	Point of Discussion/Issue	Model Fragment	Src ID
1	Route or segment might be throughout the air, ex: microwave or satellite	Utility	TM*
2	Telephone network is becoming information network. Data is transported from a variety of different means (satellite, cable, fiber, etc.). Therefore, routes and segments may not necessarily be known.	Utility	TM*
3	Definition of utility: a “government” controlled business to provide a service to the government’s citizens.	Utility	TM*
4	The basic utility model fragment enhancements looks OK.	Utility	TM*

Closing Comments

- Steve Clowse closed by saying this is one of the largest models he has seen. He appreciated everyone's active participation in developing it.
- Richard echoed Steve's comments and congratulates everyone for their support and tolerance while dealing with the cross jurisdictional issues.
- He also asked everyone to fill out the evaluation sheets because they will be used to fine tune the process.

- David Arbeit concluded the session by thanking the participants and saying that we will not get together in the large group setting again, but that smaller groups will get together to analyze and prioritize the results. In early 1997, there will be a pre-test of the results. Soon afterwards, there will be a followup and then, the Data Content Advisory Team will look at the results and fine tune if necessary.

- Jane Harper requested that all participants receive the full model and text.
- Randy Johnson said he will aim to distribute the turnaround document as soon as possible and that it will include the entire model and associated text.

“Parking Lot” Issues

During the course of the session, these issues were identified and put in the “parking lot” for addressing offline or in future sessions (if they are held).

#	Parking Lot Issue	Src ID
1	Segment definition. Changes with the business question. Done by stationing. Engineering departments do this.	LL/DC1
2	Hazardous waste transportation	NR
4	Air traffic, overall 3-D view is weak	DC
5	Environmental impact statements	DC
6	The model needs to be general enough to describe the world, but specific enough to allow us to get at some specific applications and requirements. Concern that the model exists at too broad a level.	DC
7	With an occurrence, is the “Occurrence impacts Segment” relationship the same as “...is involved in Occurrence”?	NR

Issues

The following issues were brought up during the session, but were deemed outside of today’s scope:

#	Issue	Src ID
1.	Data privacy is an on-going issue that is not reflected in the model. Ultimately, it must be addressed. (Ex: with legal entity and assets.)	SS/DC
2.		
3.		

Actual Agenda

Time	Activity
8:00	Refreshments
8:30	Opening Comments
	Review
	Enhance Business Object Model (open discussion)
10:05	BREAK
10:15	Enhance Business Object Model (Transportation fragment)
11:30	BREAK
11:40	Enhance Business Object Model (Transportation continued)
12:00	LUNCH
1:00	Enhance Business Object Model (Natural Resources & Land Definition fragments)
2:05	BREAK
2:15	Enhance Business Object Model (Recorded View, Property, and Land Use fragments)
3:25	BREAK
3:40	Enhance Business Object Model (Building and Demographics/ Behavior fragments)
4:35	Closing Comments
4:45	END OF DAY

Appendix

Business Object Model Legend

Business Object Model Diagram **

Business Object Model Text **

*** Due to the size of the business object model, the diagram and text are each contained in separate documents.*

Business Object Model Legend

The following legend gives an overview of the basic concepts of business object modeling. It should make it possible for users to read and interpret the model. Some complex topics are not discussed to avoid the technical details of the modeling technique.

Overview

- The Business Object Model is a view of your world of objects and their associations.
- The goal is that the model reads like English language sentences. The notation style supports non-modelers navigating the model with no formal training.

Entities

- Each rectangle represents an entity. This is a tangible or conceptual object in your scope of interest. Entities are named with nouns or noun phrases.
 - For example: Location, Network.
- The thick lines which show “branching” indicate an entity hierarchy. This means that occurrences of the supertype can be partitioned into groups of occurrences, i.e. the subtypes.
 - For example: Space is subtyped into Physical Space, Declared Space, and Vague/Informal Space. Legal Entity is subtyped into Person and Organization.

Relationships:

- Each diamond represents a relationship. This is an association of two or more entity occurrences. Relationships are named with verbs or verb phrases.
- To read a simple relationship (i.e. only two entities form the relationship), use the ‘*’ to start your sentence.
 - For example: Person belongs to Household.
- If it takes more than two entities to form the relationship, it is a complex relationship. Start with the ‘*’ and read to the blank entity link first. Then read to the entities with the additional words on the entity links.
 - For example: Person uses Network to go from Location to Location.
- The large dot on the model is a multi-member link, which means one occurrence from many entities could participate in a relationship. This is an ‘or’ condition.
 - For example: Legal Entity has rights to Space or Structure or Dwelling Unit or Network or Segment.
- In some cases, we need to treat a relationship like an entity. When this occurs, we create an associative entity which hangs off the relationship with a short, thick line. The associative entity and relationship represent the same requirement.
 - For example: Structure or Space or Feature or Network is used for Purpose based upon Rule (the associative entity Facility is represented by this relationship).
 - In other words, “a facility is a structure or space or feature or network used for a purpose based upon a rule.”