Generalization of Multiple Scale Maps from a Single Master Database

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Objectives for GIS Map Production

• Create seamless nationwide master database
• Support paper and electronic travel products
• Multiple map products from single database
• Master edits: update features only once in master, propagate changes to all products
• Carto edits: only on products, not master
• Map updates must combine latest master data and previous product edits.
Updating Database and Map Products

• Fringe issue?
• Database Update: Preserve all value-added work when loading new vendor data
• Map Update: Preserve last year’s work while accessing latest information
  – Re-extract
  – Change Detection (new vs. old extraction)
Data Duplication: Visibility vs. Product Layers

• ArcStorm Visibility Files
  Pointers to Master data (no duplication of data)
  • WRITESELECT/READSELECT
  • MAPPROJECTION (on the fly)

• SDE Product Layers
  Features extracted from Master as Product Layers
  • Product projection applied to extracted data
  • At this point, product layers only carry symbol item, not full attribution
Data Duplication

• Should we continue to try to avoid duplication of data?
  – How to handle the exceptions, displacements?

• Or should we go further with product layers?
  – Currently just Permanent ID and symbol item
  – Add full attribution?
GIS Master Database

- Internet TripTik (ArcIMS)
- TourBook (ArcMap)
- Sheet Maps (Unix ArcInfo)

- Construction Information
- ITT Database
- Automated Extraction
- GIS Master Database

- Geocode & Route (Kivera)
- Prepare Layers and AXLservices
- Convert to AAA format

- NavTech
- GDT

- AAA Value-Added Data:
  - TourBook
  - Hwy. Info
  - AAA Offices
  - Scenic Byways
  - Walking Tours
  - Driving Tours
  - Toll Bridges
  - Ferries

- Existing AAA Maps
Automated Extraction (Pre-selection)

- Feature Matrix - occurrence of all feature types in all product types
- Extraction Rules - pseudocode, parameters
- Extraction AMLs
- Content Management

Maintenance...
Results of Automated Extraction

Automated Extraction

Final Map
Generalization issues

- Road Centerlines
- Line simplification
- Road Convergence
- Barrier Islands
- City Tints
- City Line Weights
Centerlines

• Only show doubly digitized arcs at downtown inset level.
• Generate centerline for display at all other levels
• Wrote our own C routines to create centerlines. Interactive cleanup
Centerline Cleanup
Line Simplification

• In general, simplify for performance, not necessarily appearance
Road Convergence

Actual positions without generalization

Generalized on State Map

Generalized on Regional Map
Barrier Islands

Offshore Islands without generalization

Generalized roads and islands on State Map

Generalized roads and islands on Regional Map
City Tints

City Tints enlarged for visibility
City Line Weight

- Road thickness knocked down in urban areas
UNIX and Desktop Arcinfo

UNIX Arcinfo:
• Large Sheet map production
• Data crunching
• Automated Extraction

ArcGIS ArcMap
• Sheet Map Design / Compilation
• Tourbook maps (small format)
• *Automated Extraction*
• *Sheet Map Production*?
Ideal: Live Generalization from Master Database

• Map generalized in real time, in its own projection, with minimal interactive work
• No duplication of data, point to master data
• Cartographic adjustments to product
  – carto edits ‘remembered’ next time map is made
Ideal: Carto edits without duplicating data

• Series of files stored locally in map directory that held all exceptions or offsets.
  – Store product modifications relative to master features.
  – Similar to the way dynamic segmentation events are defined (as relative to a starting point).
ArcMap Wish List

• Objects know whether to include and how to represent themselves in different products at different scales
• Sophisticated behavior, consider relationships between objects
• Real Time performance in production environment for large map sizes
• Smart objects that update themselves in products
Questions / Feedback

• Duplication of data
• Update
• Live generalization
• ArcMap capabilities

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