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
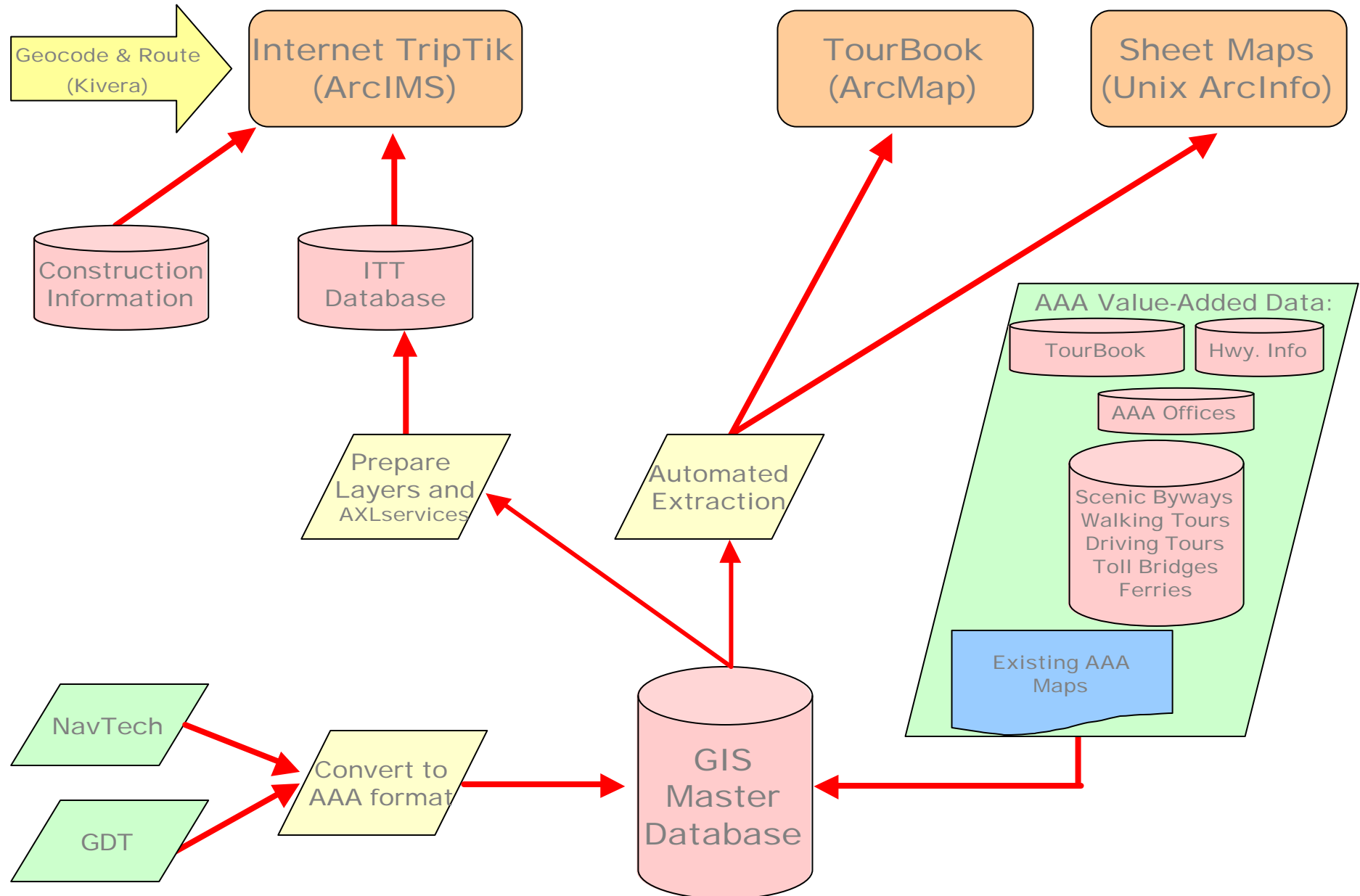 - At this point, product layers only carry symbol item, not full attribution

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
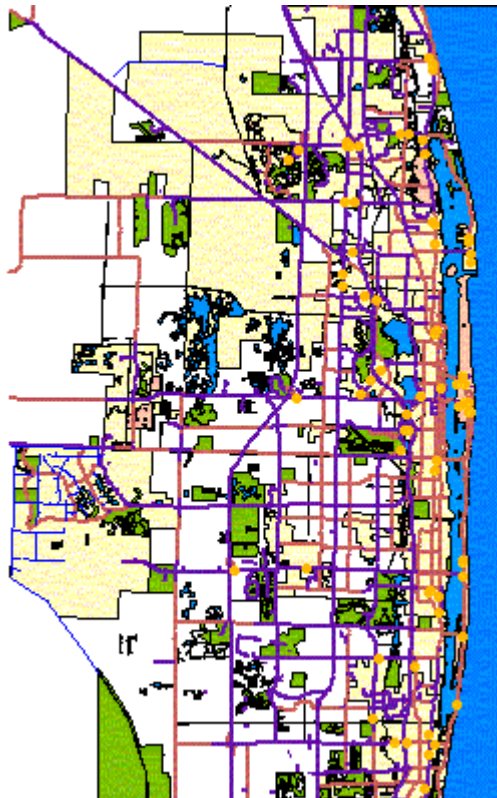   - Add full attribution ?

GIS Master Database

Geocode & Route (Kivera) →

Internet TripTik (ArcIMS)

TourBook (ArcMap)

Sheet Maps (Unix ArcInfo)

Construction Information

ITT Database

Prepare Layers and AXLservices

Automated Extraction

AAA Value-Added Data:

TourBook

Hwy. Info

AAA Offices

Scenic Byways
Walking Tours
Driving Tours
Toll Bridges
Ferries

Existing AAA Maps

NavTech

GDT

Convert to AAA format

GIS Master Database

Automated Extraction (Pre-selection)

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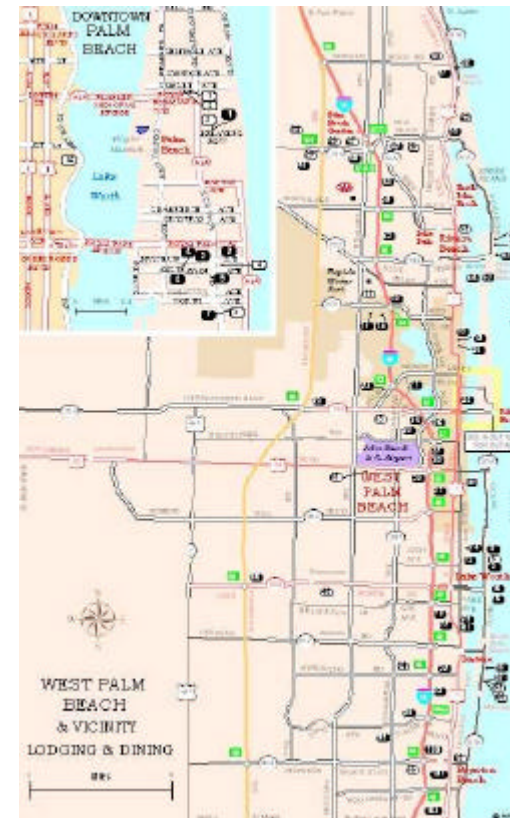- Extraction AMLs
- Content Management

  Maintenance...

Results of Automated Extraction

Automated Extraction

Final Map

Generalization issues

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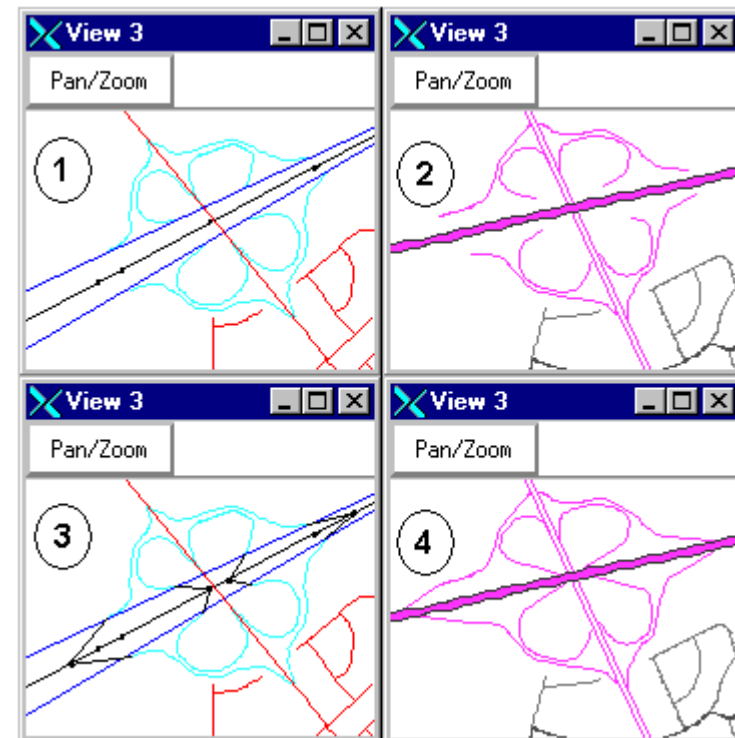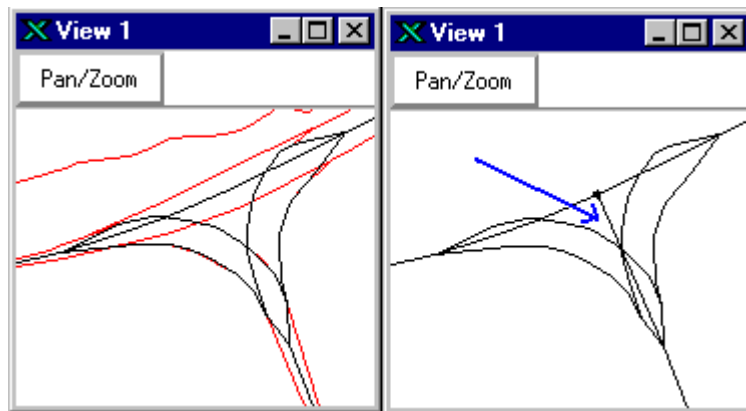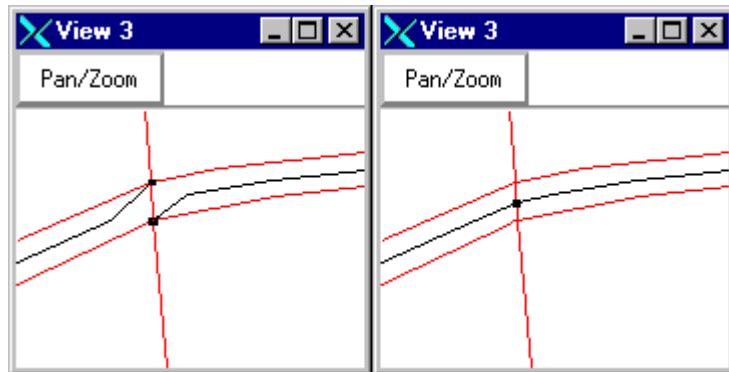- Barrier Islands
- City Tints
- City Line Weights

Centerlines

- Only show doubly digitized arcs at downtown inset level.

- Generate centerline for display at all other levels

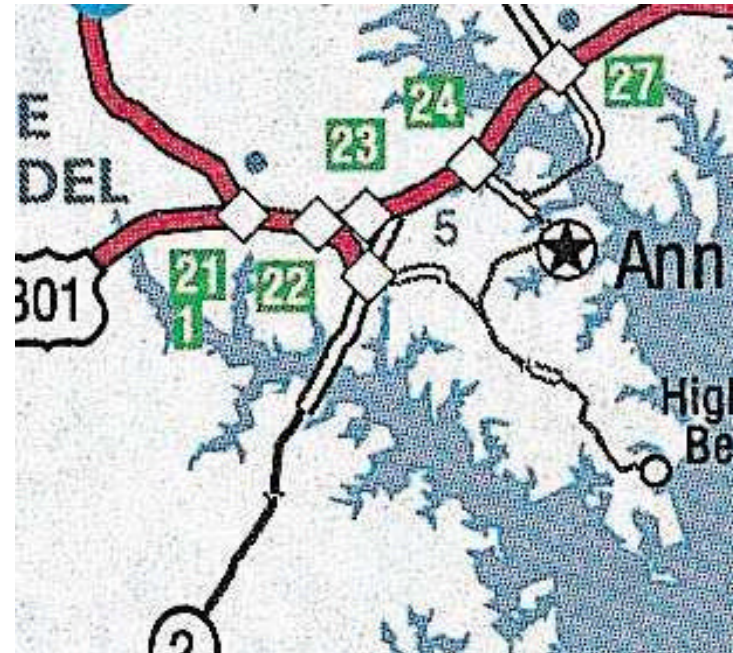- Wrote our own C routines to create centerlines. Interactive cleanup
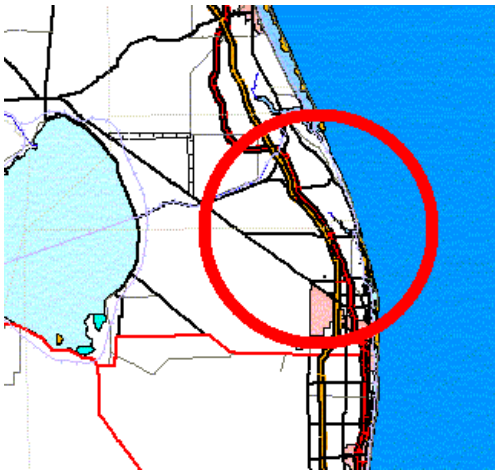
Centerline Cleanup

Line Simplification

- In general, simplify for performance, not necessarily appearance

Road Convergence

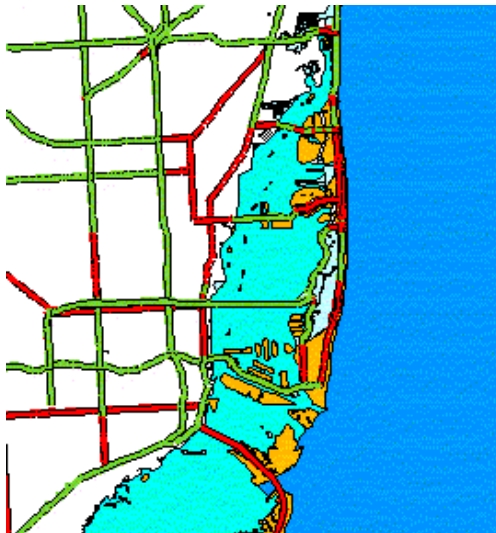
Actual positions without generalization

Generalized on State Map
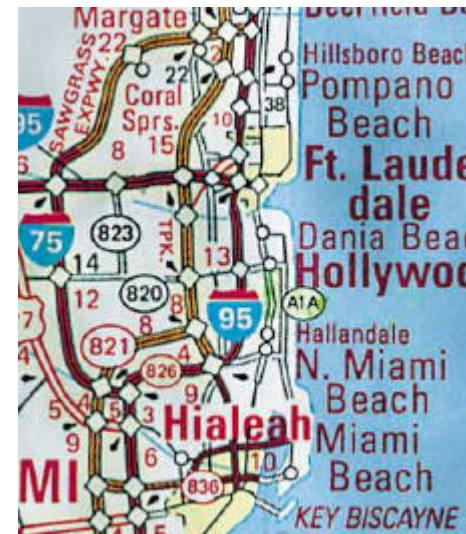
Generalized on Regional Map

Barrier Islands

Offshore Islands
without generalization

Generalized roads and
islands on State Map

Generalized roads and
islands on Regional Map
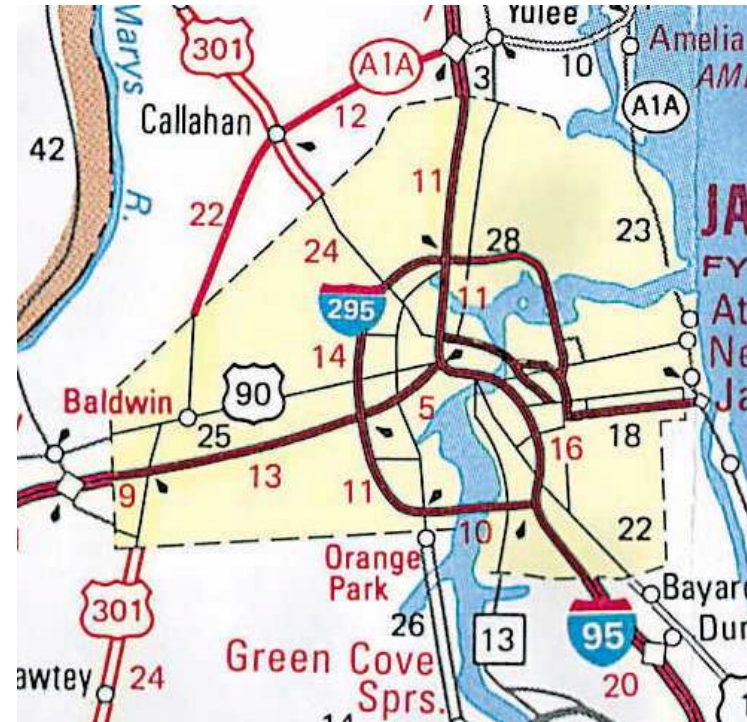
City Tints

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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