Road networks and populated places: generalization through scale

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US topographic series
Treatment of roads

Density partition

Thin the road network

Python–based labeling scheme
Density partition

TIGER/Line Urban Areas shapefile (TUA), clip to area of interest
Density of dense areas: 3.08 km/km²

Partitions by TUA
Buffer 1000m, aggregate 1000m, simplify 1000m
Add field "gridcode," set to "2" for dense
Intersect with road layer
Run script to create fields for labeling scheme

Join road network to Importance Level table

Spatial join (type: intersect) with TUA; NULL gridcode values (outside urban areas) reassigned to "1" for sparse

Ramps originally set to "2", just below expressways

Tradeoff between showing ramps at large scales; "knots" at small scales

1:100,000
Processing road networks

Thin Road Network
from 2km to 30km minimum length

Merge Divided Roads
(30m) and
Collapse Road
Detail
(75m)

Thin Road Network
to 1.5km minimum length

Des Moines
Two feature classes: **large scale** (to 1500m) and **small scale** (to 30km)

Two group layers: **dense** and **sparse**

Example definition query:
```
“IH_LABEL_TYPE” IS NOT NULL AND “gridcode” = 2 AND “visible_m” >= 4000
```

Goal: **one** min length (visible_m) threshold per scale range per density type
Minimum length decisions

Scale by minimum length - dense

visible m

scale
1M
630-999K
400-599K
250-399K
150-249K
100-149K
60-99K
40-59K
24-39K

visible m

scale
1M
630-999K
400-599K
250-399K
150-249K
100-149K
60-99K
40-59K
24-39K

visible m

scale
1M
630-999K
400-599K
250-399K
150-249K
100-149K
60-99K
40-59K
24-39K

CO
FLGA
IA
MO
TX
UT
WV

CT
FLGA
IA
MO
STL
ATL
Road labeling

Point symbols at intersections of roads to push shields away.

SQL queries (road type & min length) for label classes

Python label expressions for multiple route numbers:

- **Array 0**: 1st route number in list (all routes)
- **Array 1**: 2nd route number (2, 3, or 4 route #s)
- **Array 2**: 3rd route number (3 or 4 route #s)
- **Array 3**: 4th route number (4 route #s)
- **1sb**: 1 business/bypass shield
- **2sb**: 2 business/bypass shields
Python label expressions

Array 0:  def FindLabel ( [COUNTY_ROUTE] ):  
          arr = [COUNTY_ROUTE].split(",")  
          return arr[0]

Array 1:  def FindLabel ( [COUNTY_ROUTE] ):  
          arr = [COUNTY_ROUTE].split(",")  
          return arr[1]

Cleanname: Clean_Street_name field

1sb & 2sb left:  def FindLabel ( [US_ROUTE] ):  
                   arr = [US_ROUTE].split(",")  
                   return arr[0] + "\n" + arr[1]

2sb right:  def FindLabel ( [US_ROUTE] ):  
              arr = [US_ROUTE].split(",")  
Road thin map series
Road thin map series
Road thin map series
Incorporated/Unincorporated Places + CDP (from TIGER/LINE, prejoined with population data)

GNIS points for U4/U6 (Unincorporated Places that aren't CDP) at large scales

Split urban/rural places by intersection with TUA

Places symbolized by outline up to 399K, then use fill; GNIS points are invisible dots