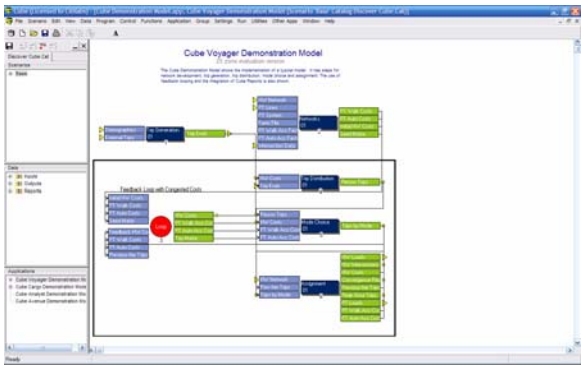
an overview of the Cube 5 release

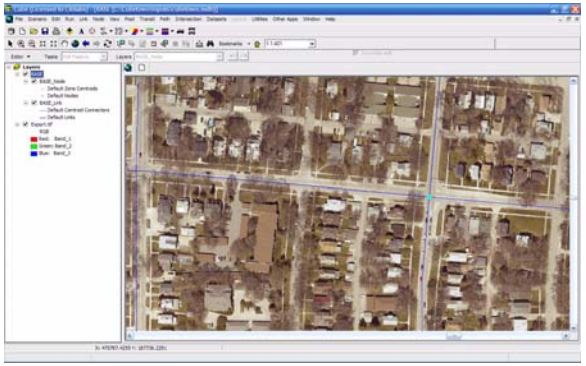
Wade White, AICP
Citilabs, Inc.

Agenda

- An Overview of the Cube 5.0 Release
- Introduction to UI
- Geodatabase Manager Functions
- High-level Discussion
  - Changes in Cube's fundamentals and framework
  - Break
  - How We can Take Advantage of the Changes
  - Implications to Florida modeling standards and development
  - Other Considerations
  - Group Discussion



Cube Base



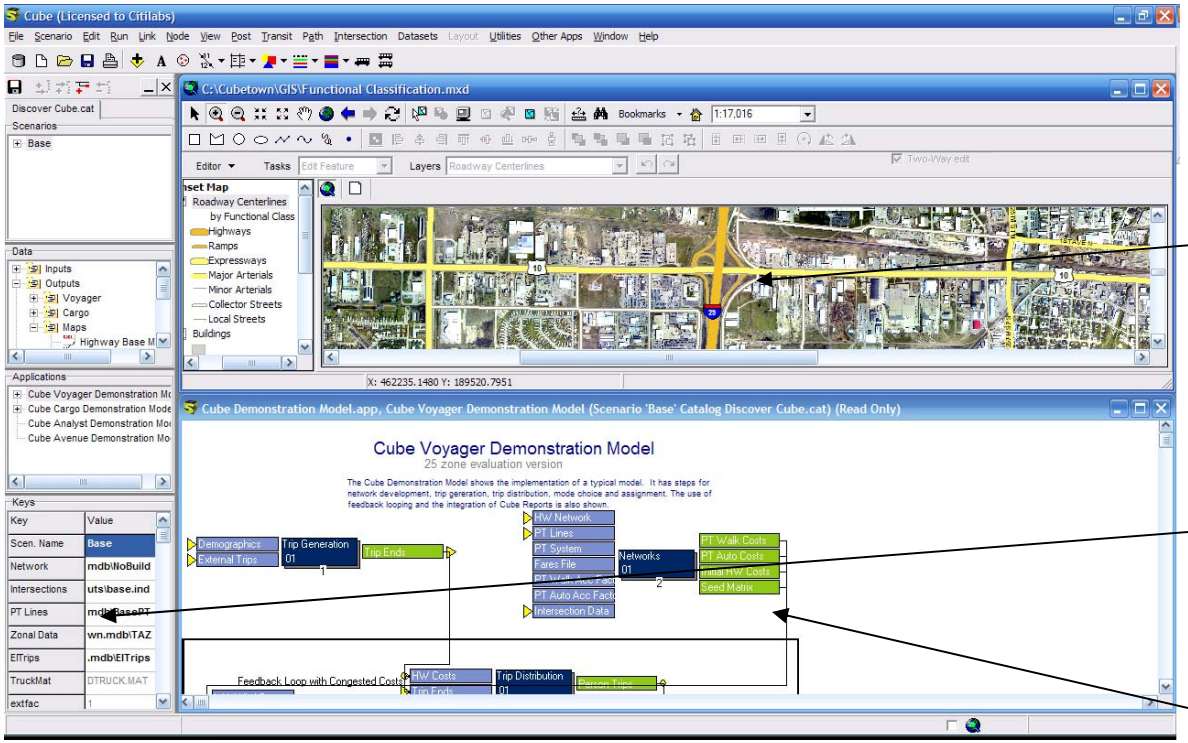
Cube Base

Major New GIS Features of Cube

- Cube Base
  - ARCGIS ENGINE capability for MXD, MDB, etc.
  - New geodatabase manager
  - Map view/layout view (like ArcView)
  - Advanced mapping and analysis features available if you have other ESRI/ARC products on your computer
  - Updated support for geoprocessing to calculate transit access
  - Full support of ESRI-supported data formats including major raster, CADD, etc.
  - Re-projection “on the fly”
- Cube Voyager
  - Geodatabase Read/Write
  - Scripting Support
  - Can call geoprocessing with PYTHON, VB or Voyager Script
  - Some text-based files still maintained that way (for now)

Cube Base

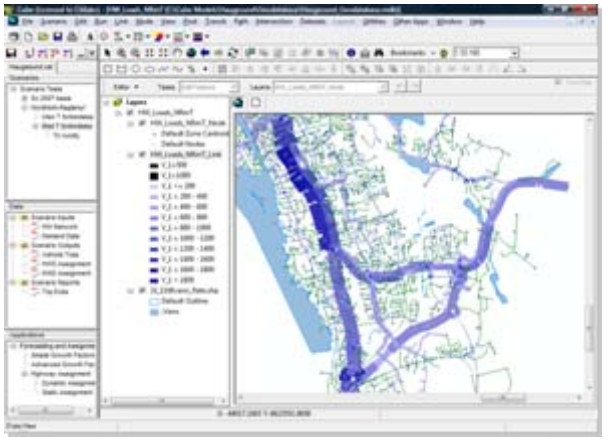
Build, Edit, Run, Present

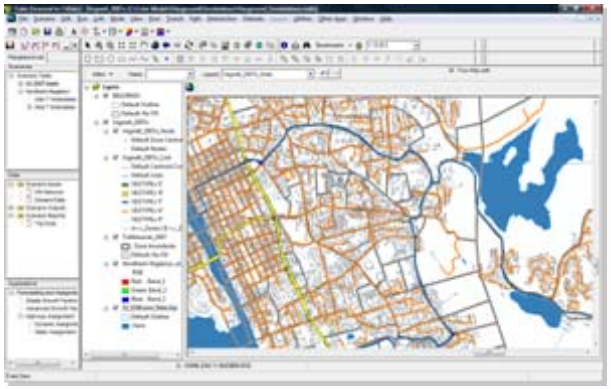


- The common user interface for all Citilabs libraries. Learn this once and you can use all existing and future libraries
- Cube GIS Window provides unlimited layering, signing, intersection coding and analysis, unmatched network editing and analysis, charting, links to digital media
- Scenario Manager makes creating, managing and running scenarios very easy to do
- Application Manager flow-chart provides model interface for building, running and documenting

Cube GIS Window

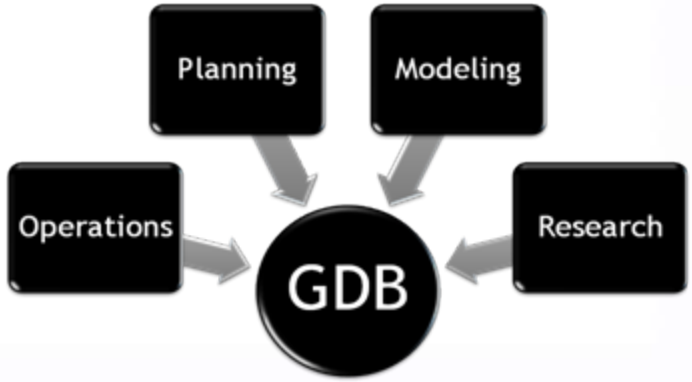
- Based on ArcObjects from ArcGIS Engine
- Provides enhanced GIS capabilities to Cube users at no additional cost
- Can take advantage of ArcGIS license and extensions already on your computer
- Stores data in geodatabase format
- 5.0- Personal geodatabase (MDB)
- 5.1- Enterprise geodatabase (SQL, Oracle …)
- Provides geo-processing functions based on ESRI Technology





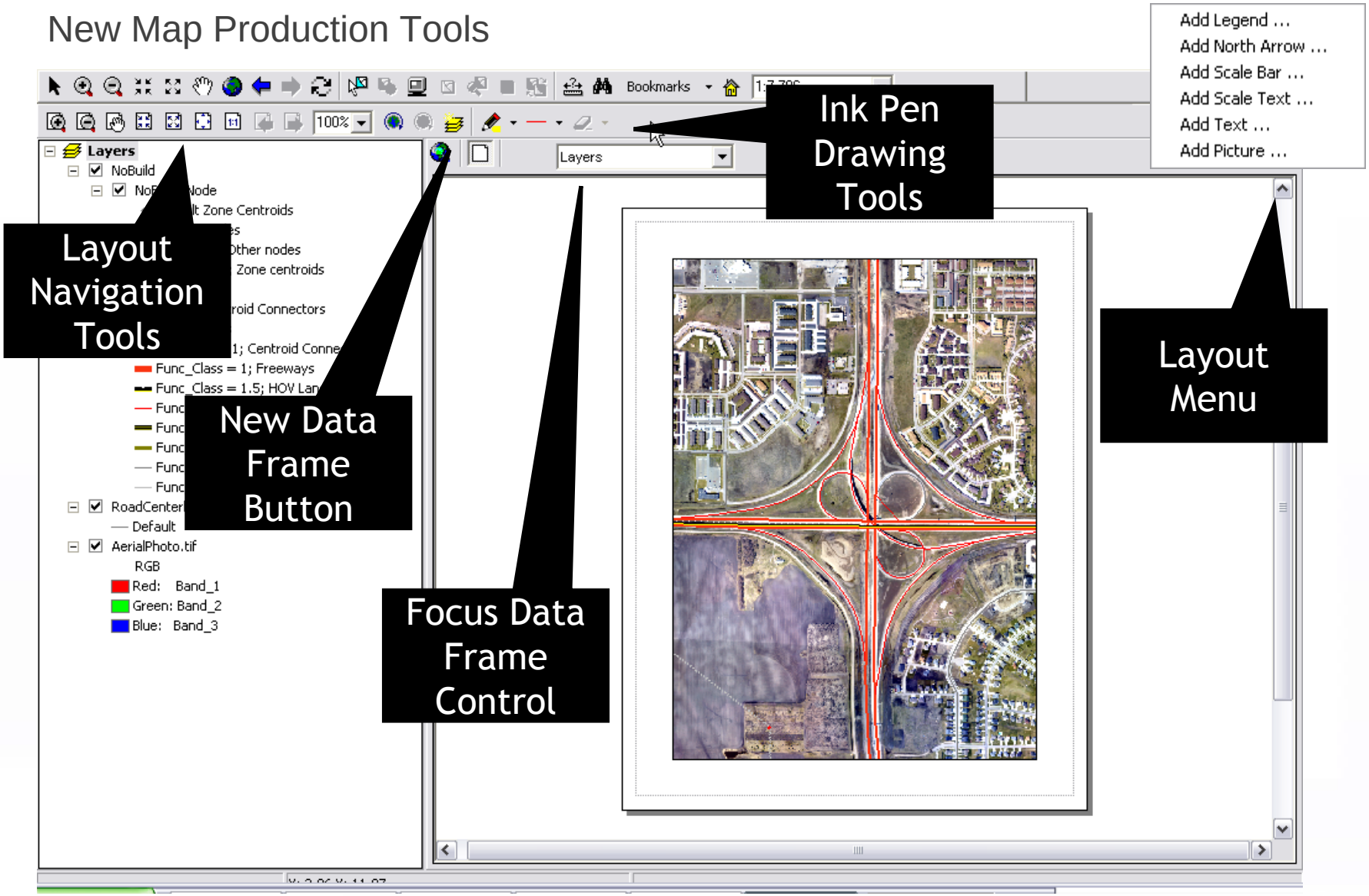
Cube GIS Window

- Runs in traditional mode or, if using geodatabase data, using ARCENGINE technology
- New Map Production Tools
- Can support all native formats supported by ESRI
- Includes New “Feature Explorer”
- Automatically re-projects known data projections on the fly
- Imports to / exports from MDB from Voyager-formatted or other standard formatted files
- Most common ESRI spatial functions can be scripted using Python or Cube Voyager or a combination of both



Cube GIS Window

New Map Production Tools



The GIS Toolbar: Navigation

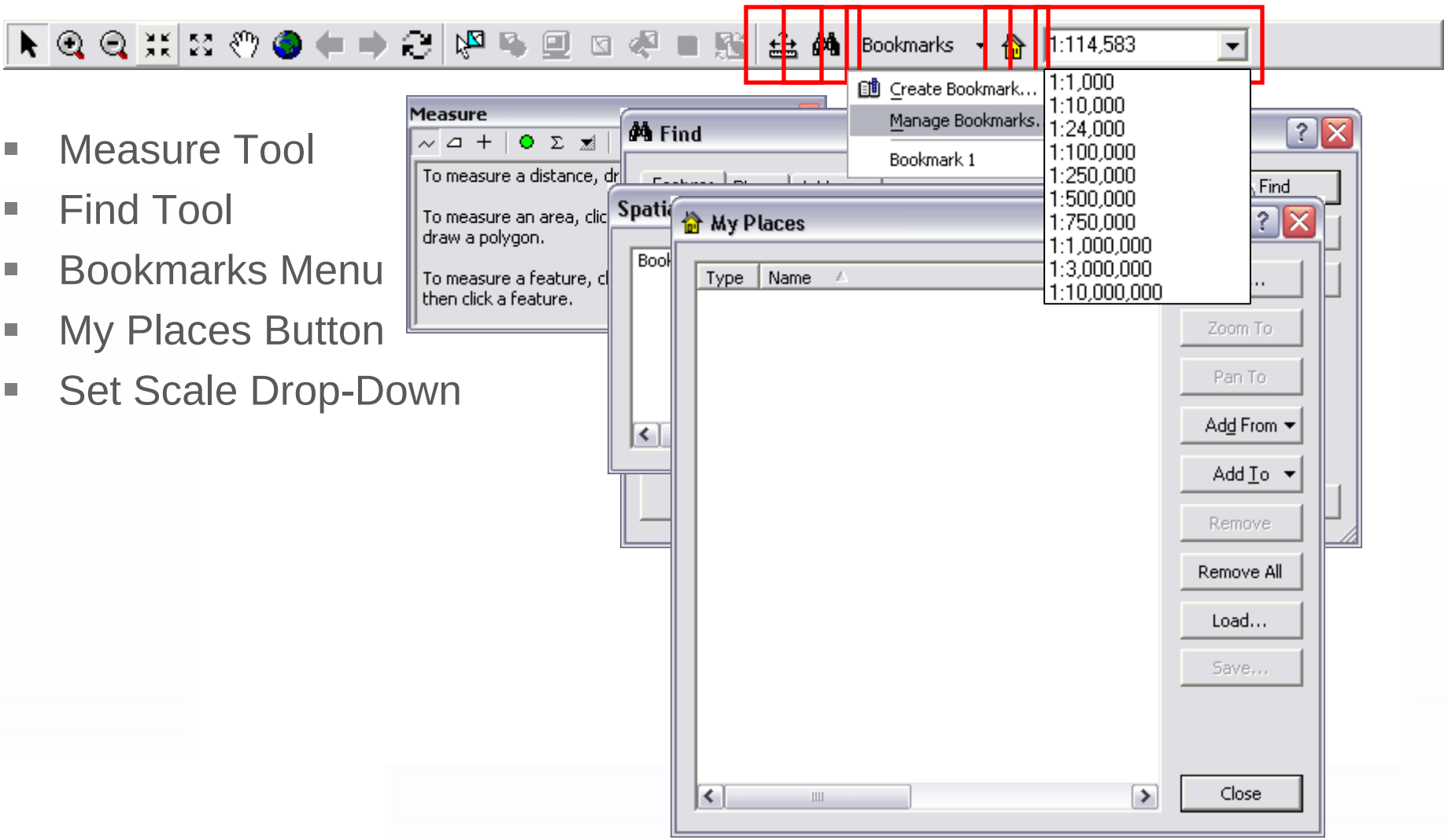
- Pointer tool
- Rectangular zoom in/out
- Fixed zoom in/out
- Pan tool
- Zoom to full extent
- Previous / next extent
- Refresh map window

The GIS Toolbar: Selection

- Select Features Pointer
- Select By Graphics Tool
- Select Features On Screen Button
- Clear Selection Button
- Zoom to Selection Button
- Select All Button
- Switch Selection Button

The GIS Toolbar: Search

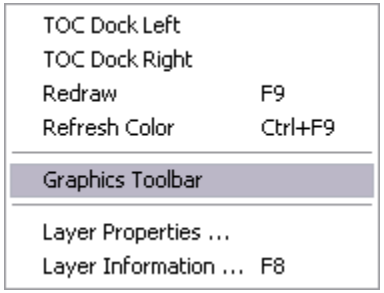
- Measure Tool
- Find Tool
- Bookmarks Menu
- My Places Button
- Set Scale Drop-Down



The Graphics Toolbar

- Enabled via “Graphics Toolbar” command on View menu

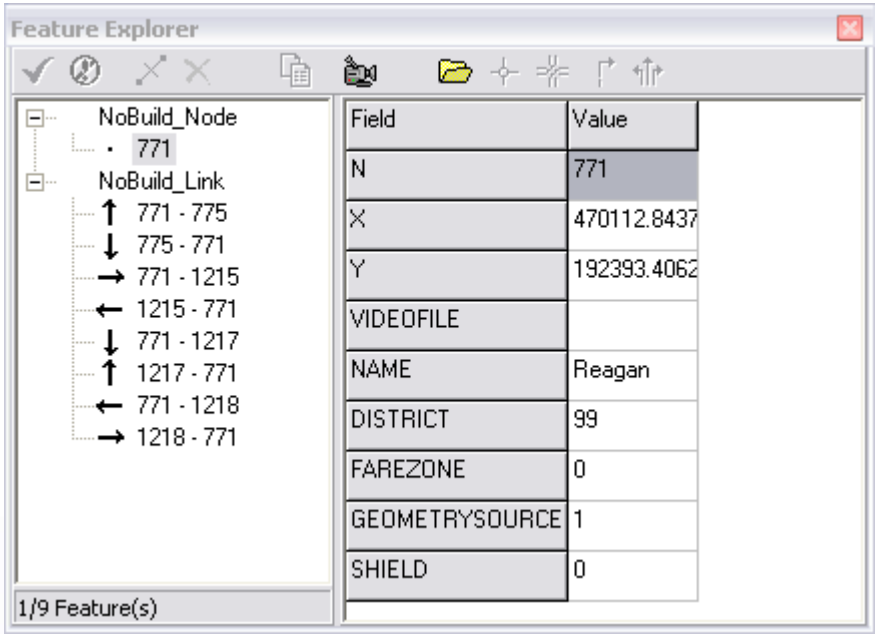
- Graphical shapes are non-geographic map elements
- Similar to Drawing Layer in Cube 4 Network Window
- Can be used to:
  - select features (polygon/screenline functions)
  - make annotation symbols (change color)
  - set / show view extent (using My Places)
- Draw graphical shapes
- Align graphical shapes (layout only)
- Adjust graphical drawing order & grouping
- Nudge & rotate graphical shapes



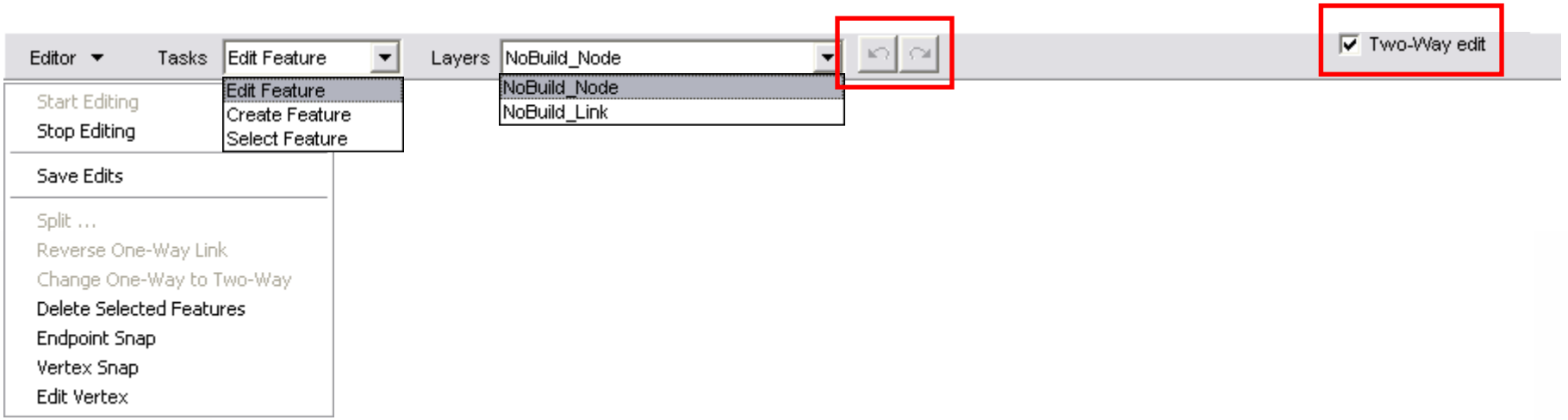
The Datasets Menu

- Feature Explorer:
  lists attributes of features you click on
- Select By Attributes:
  selects multiple features using a SQL query
- Set Selectable Layers:
  removes layers from selection (all included by default)

- Commands to add data
  - Geodatabase data (including model data)
  - Shapefiles
  - CAD data
  - Raster data (geo-referenced image files)



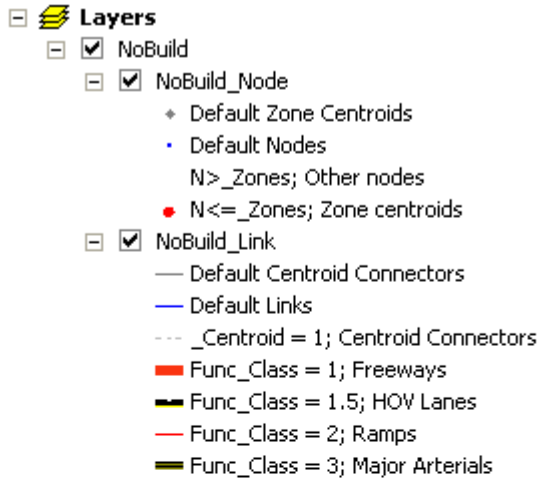
The Editing Toolbar



- Editor drop-down menu
- Tasks drop-down menu
- Layers drop-down menu
- Undo/redo buttons
- Two-way editing link editing option

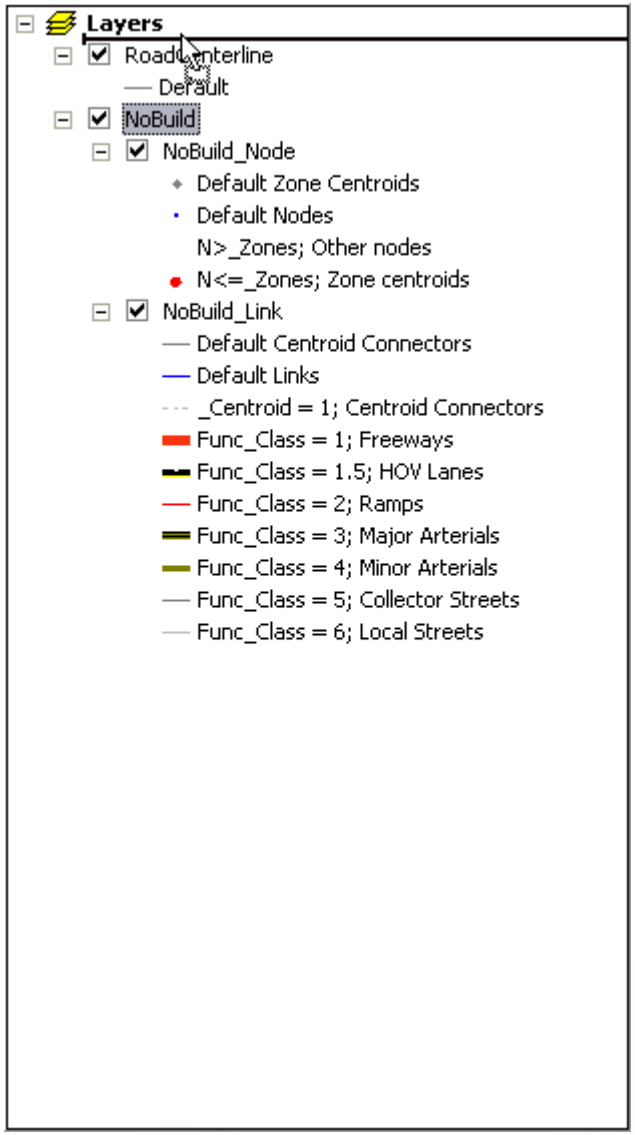
The Table of Contents

- The Table of Contents lists all the layers and symbol settings
- Right-click on the white-space in the Table of Contents to get a context menu you can use to add a layer.
- Select
  Add Geodatabase Data



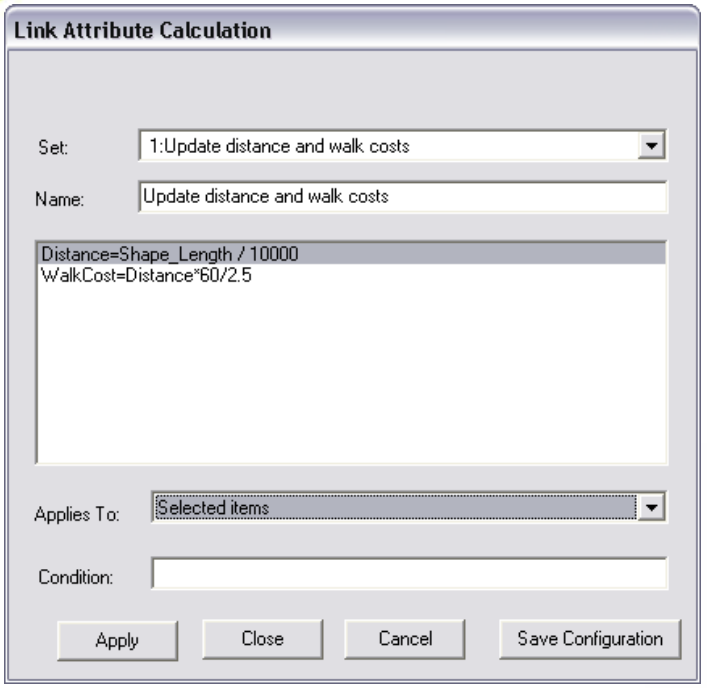
Managing Multiple Layers

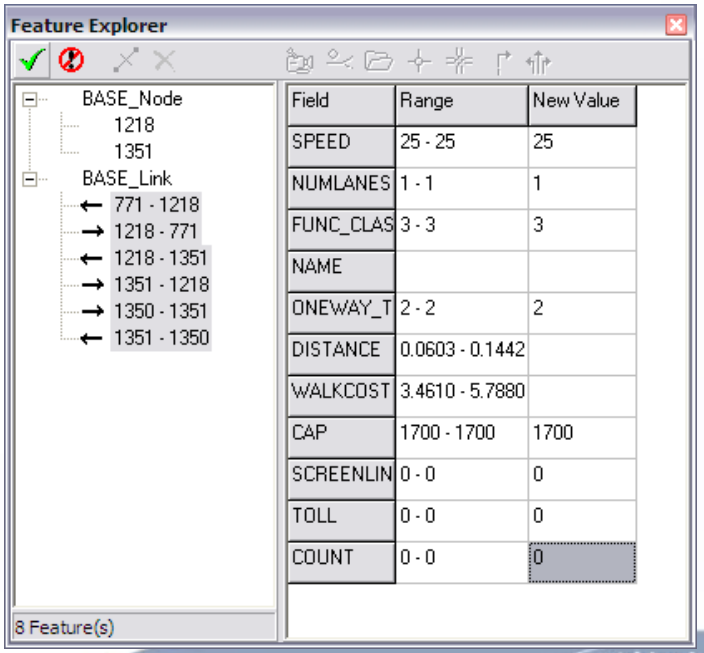
- Layers at the top of the Table of Contents
  are drawn after layers at the bottom
- You can drag and drop individual layers in
  the list to change the drawing order
- Always move the network layer as a group.
- If the network layer group is separated, the data linkage remains intact but the software will no longer recognize the feature classes as part of a network.



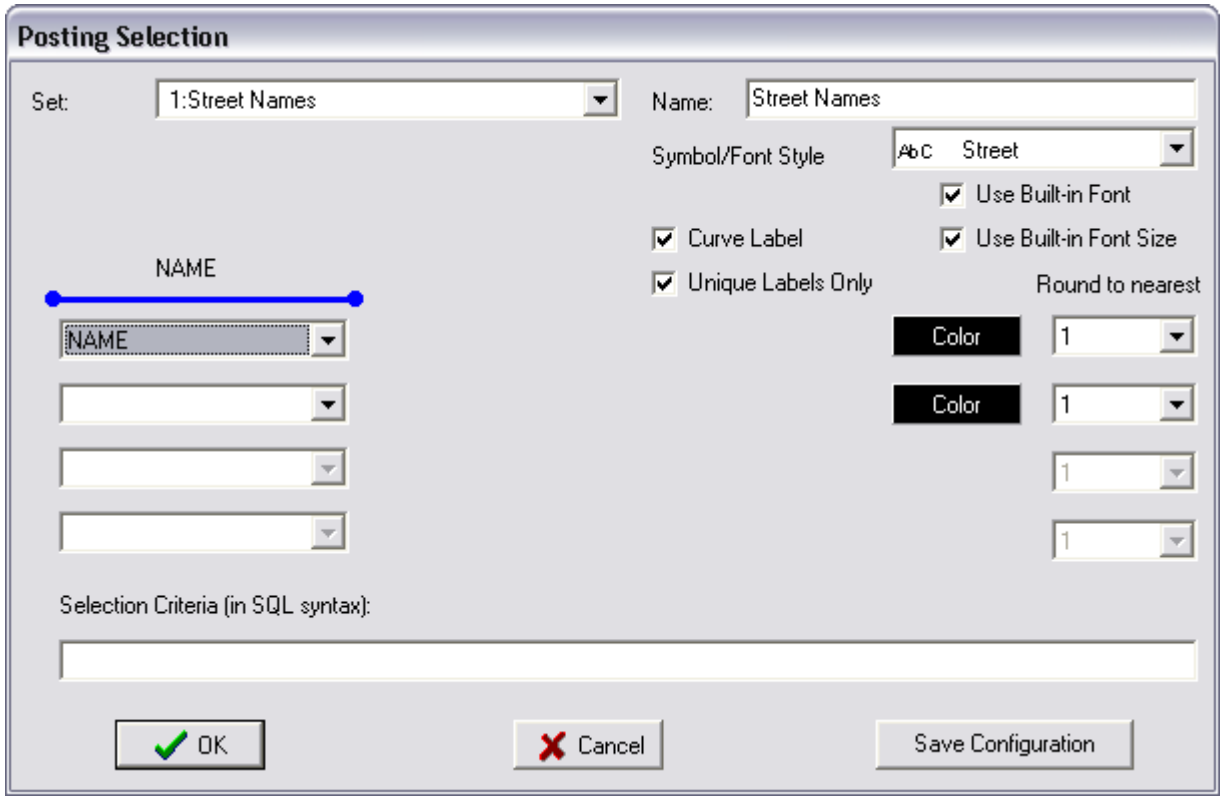
Making Attribute Calculations

- Cube now uses the built-in Shape-Length system attribute to re-calculate distances when editing network links.
- Other attributes can be calculated selectively or for an entire area
- Selections can be created using graphics objects such as polygons (subareas), polylines (cordons), and ovals/rectangles
- The feature explorer also has a “range” mode that allows you to select and update multiple features interactively

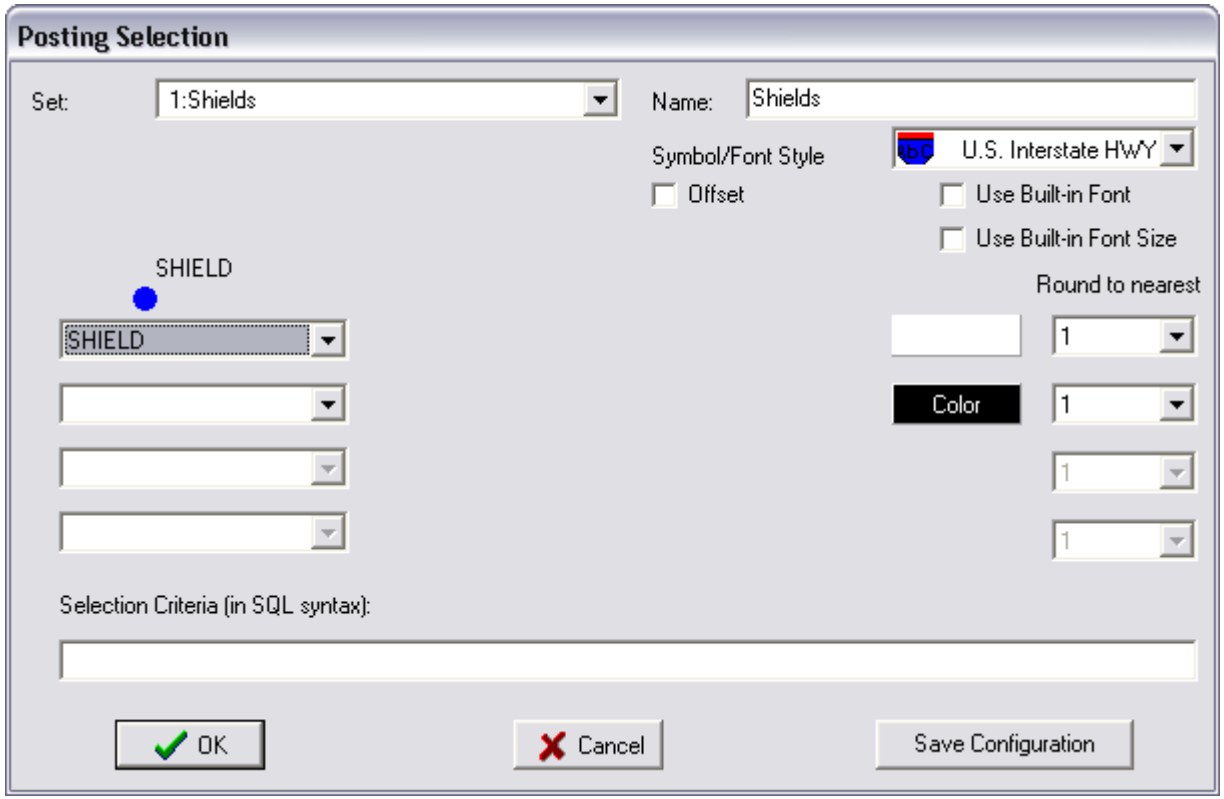




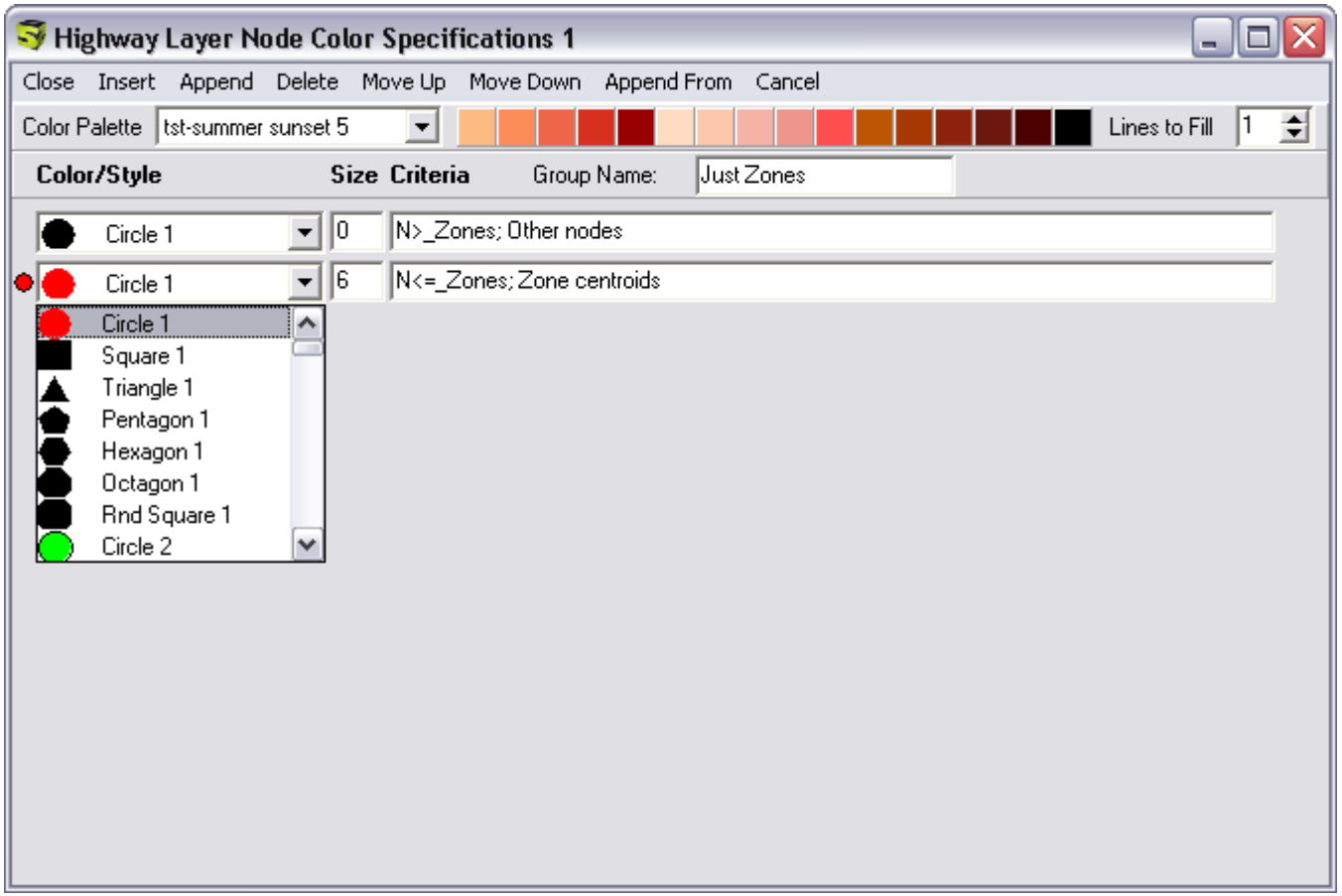
Link Posting Selection Options



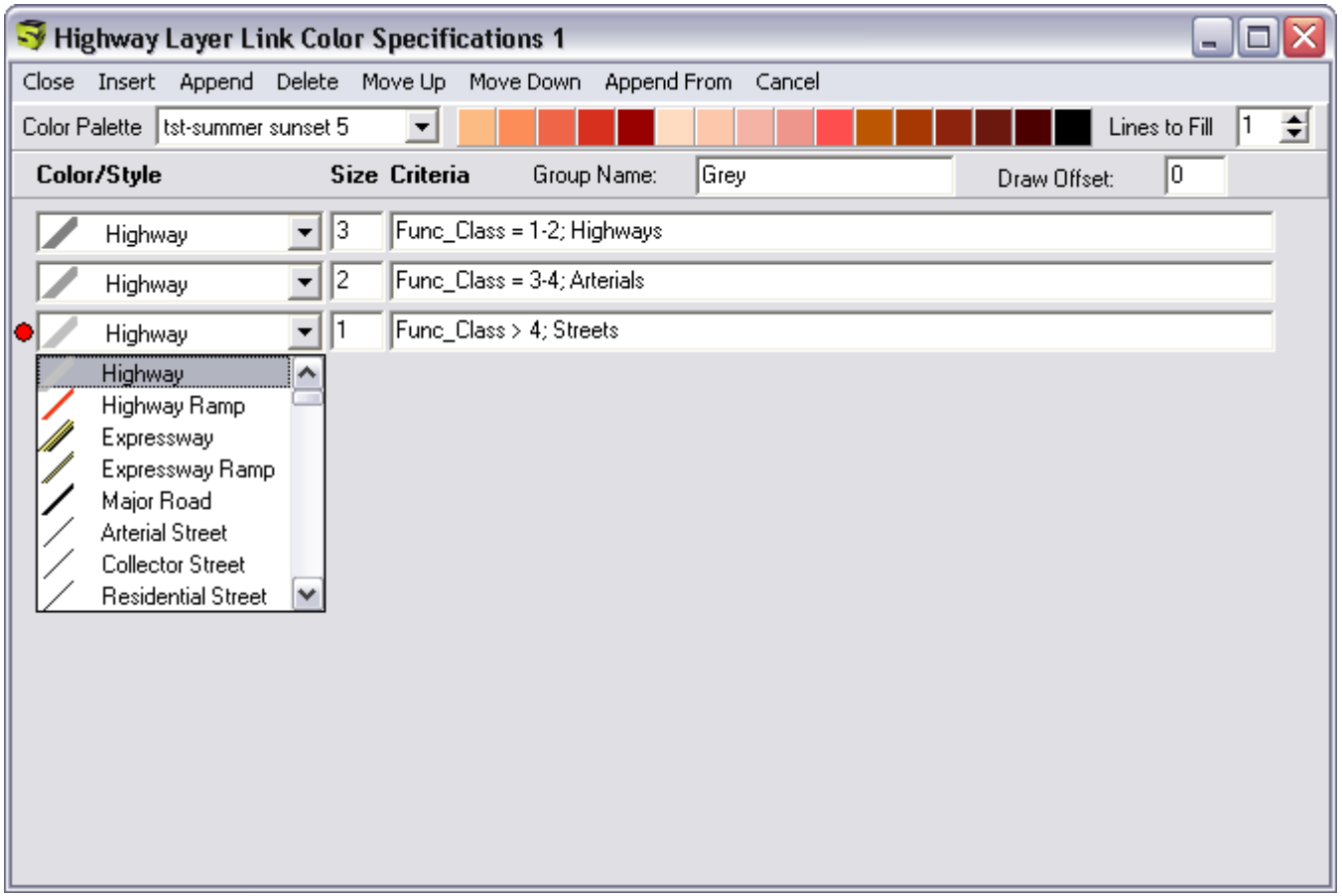
Node Posting Selection Options



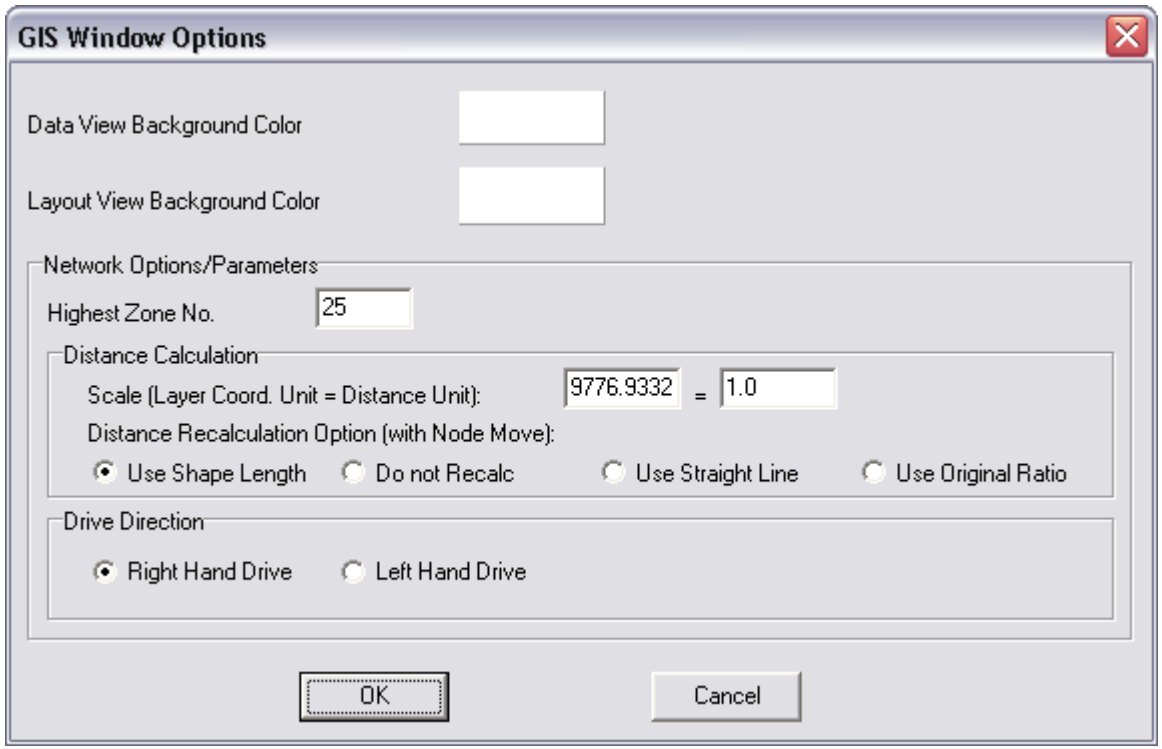
Node Color Specifications



Link Color Specifications



Network Options

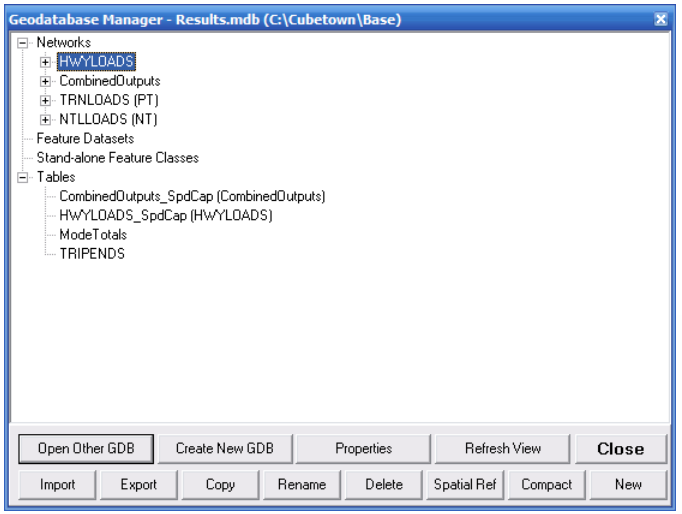


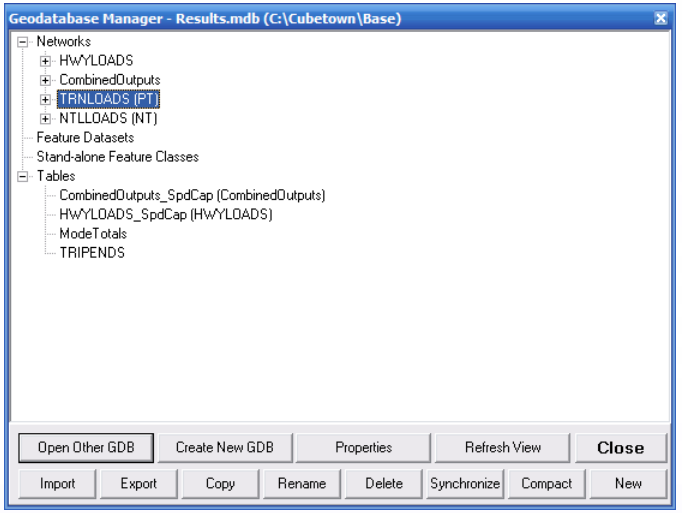
The roles of VPR and MXD files

- The Visual Project (VPR) file is still used in to track and store settings made in Cube 5, including:
  - Line/Node/Area color and symbol sets
  - Attribute posting and label symbol & style sets
  - Selection sets
  - Other network options
- A VPR is created for each MDB, with the same name as the MDB
- You can import settings from an existing VPR file for another MDB
- The MXD file is an ArcGIS-compatible map document, containing a “snapshot” of the current symbol style settings, with no link to VPR
- Changes stored in the VPR do not affect the MXD and vice versa!

Geodatabase Manager

- Provides Database Management Tools
  - Creates “Cube” Geodatabase
  - Provides Import/Export Capabilities
  - Provides Scenario Management
  - Allows Updates/Changes to Projections
  - Provides Property Information about Cube Networks
  - Allows Transit Networks to “Sync” with Other Infrastructure Networks
  - Provides Database Compaction Tool





Geodatabase Manager Functions

- Double-clicking a Feature Adds That Feature to a New Map Layer In The GIS Window or Opens a New Window
- Networks
  - Interconnected sets of points and lines that represent possible routes from one location to another. Includes Cube GIS transportation networks.
- Feature Datasets
  - Collections of feature classes stored together that share the same spatial reference. A feature class is a collection of geographic features with the same geometry type (such as point, line, or polygon), the same attributes, and the same spatial reference.
- Stand-alone Feature Classes
  - Independent feature classes, specified with a spatial reference.
- Tables
  - Sets of data elements, arranged in rows and columns. Includes tables imported from dBASE and other formats

Geodatabase Manager Functions

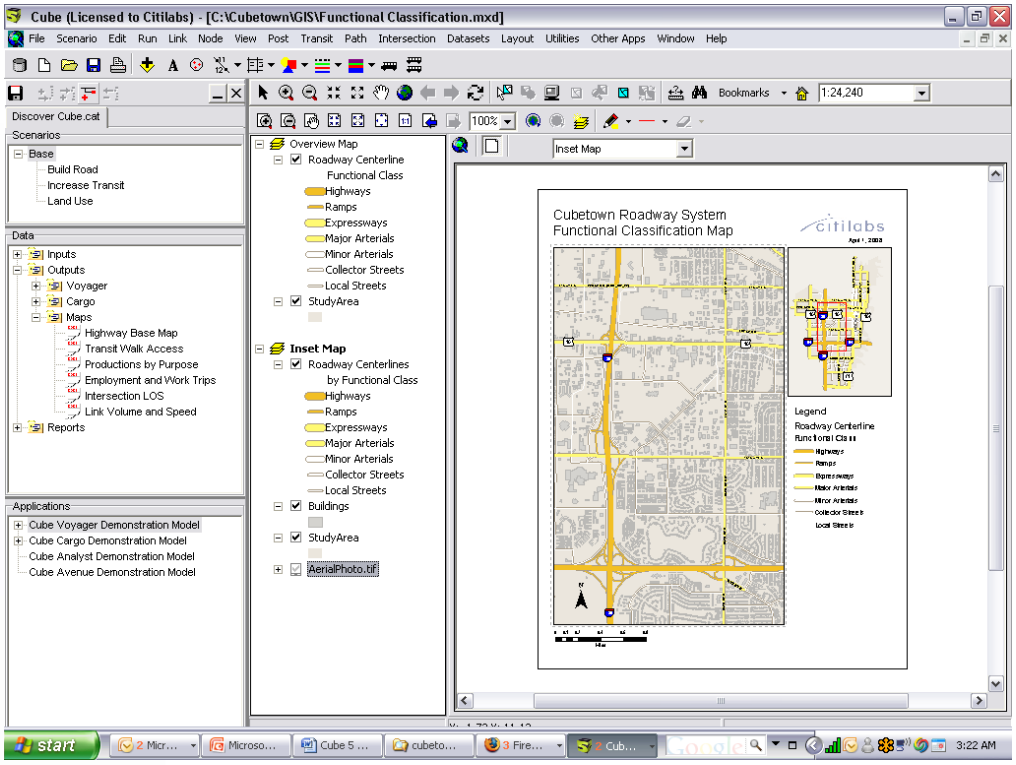
- Open Other GDB
  - Switch to another geodatabase.
- Create New GDB
  - Create a new geodatabase.
- Properties
  - View metadata about the geodatabase.
- Refresh View
  - Update the data tree to show changes.
- Close
  - Close Geodatabase Manager.
- Import
  - Import binary networks, Public Transport lines files, nontransit legs files, shapefiles, or DBF tables.
- Export
  - Save geodatabase data to a binary network file, Public Transport lines file, nontransit legs file, shapefile, or DBF file.

Geodatabase Manager Functions

- Copy
  - Copy data to the current or any other geodatabase.
- Rename
  - Change data name.
- Delete
  - Remove data from geodatabase.
- Spatial Ref
  - Alter coordinate system, projection, or domain.
- Compact
  - Compresses geodatabase to save disk space.
- New
  - Create new feature datasets, highway networks, or feature classes in the geodatabase.

Cube GIS Window

High-quality Mapping Using ESRI MXD Files



Map View

- Typical Working Environment

Layout View

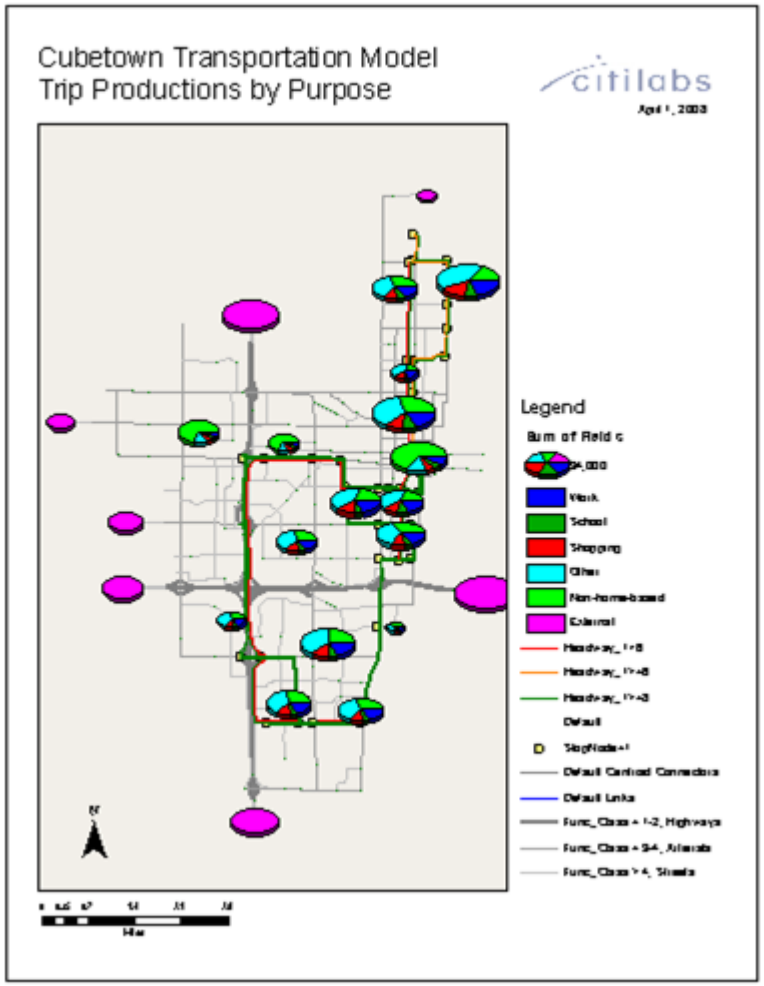
- Working Print Preview

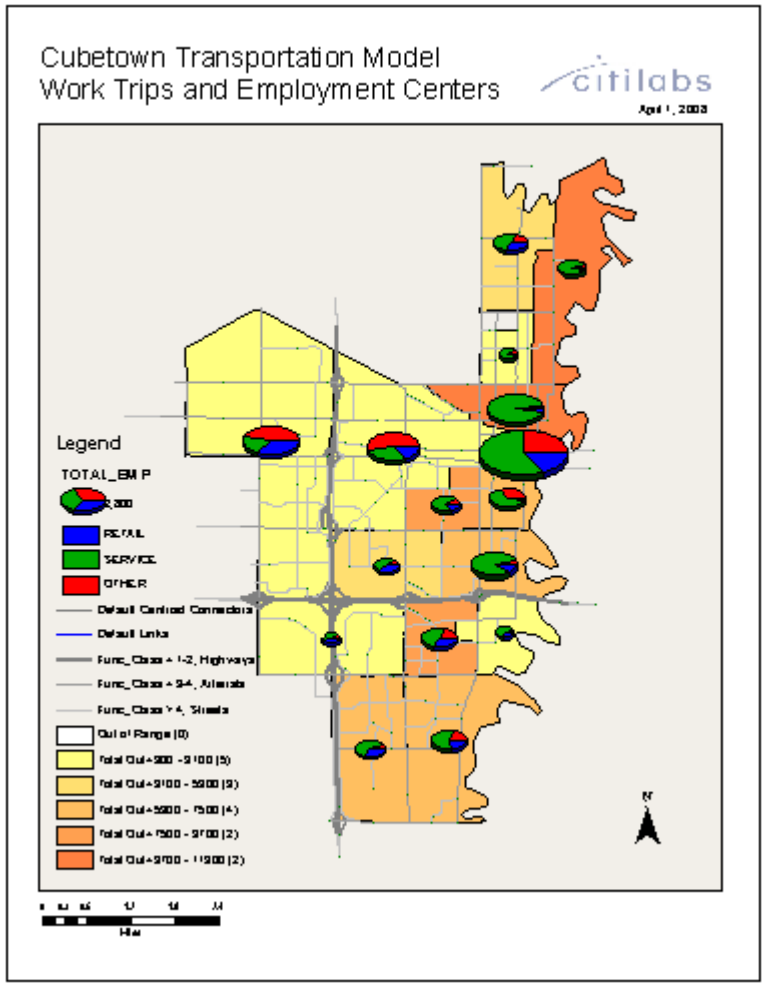
MXD Support

- Cube Creates
- Cube Writes
- Cube Reads

Cube GIS Window

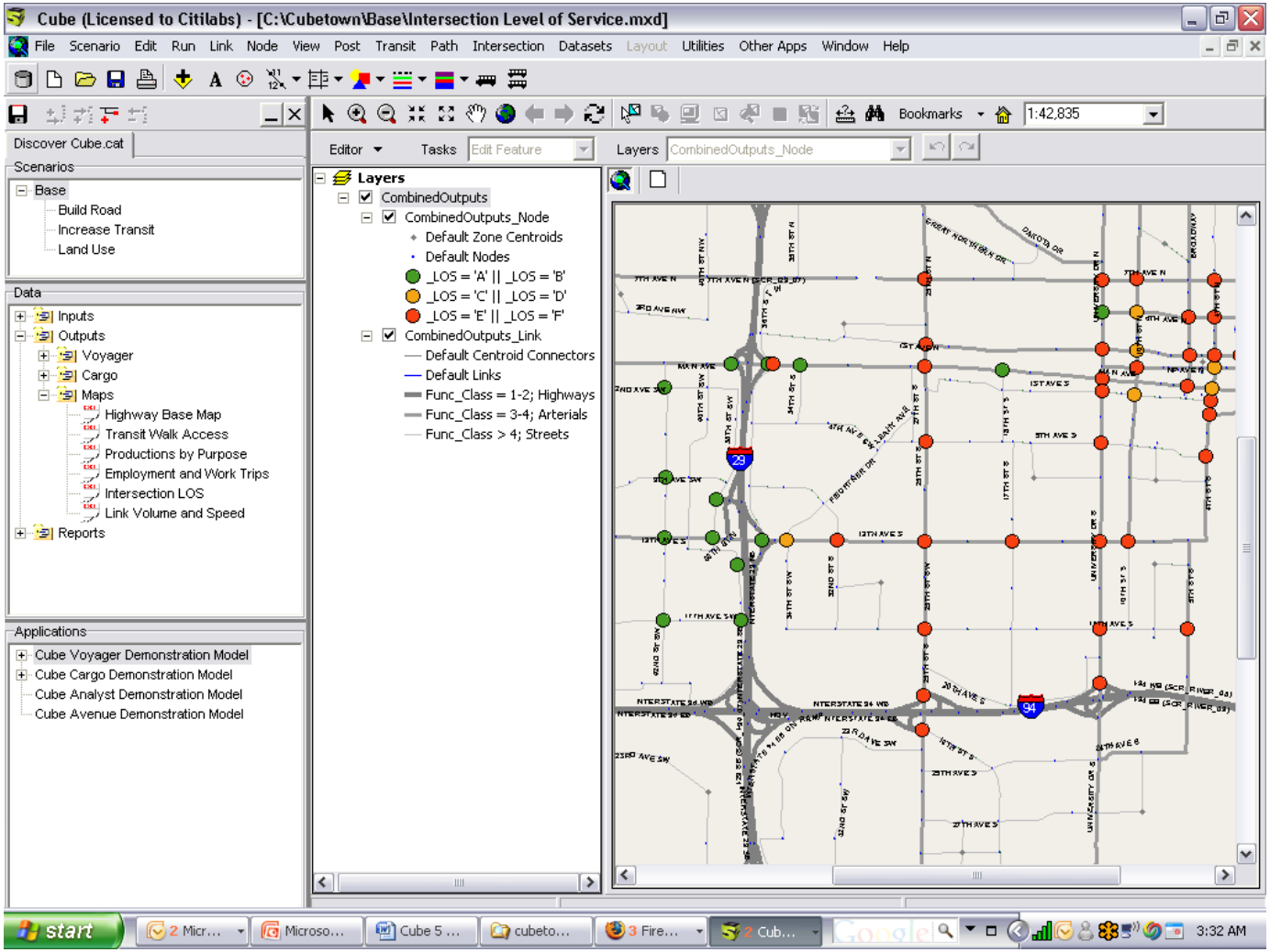
Node/Point Chart Graphics





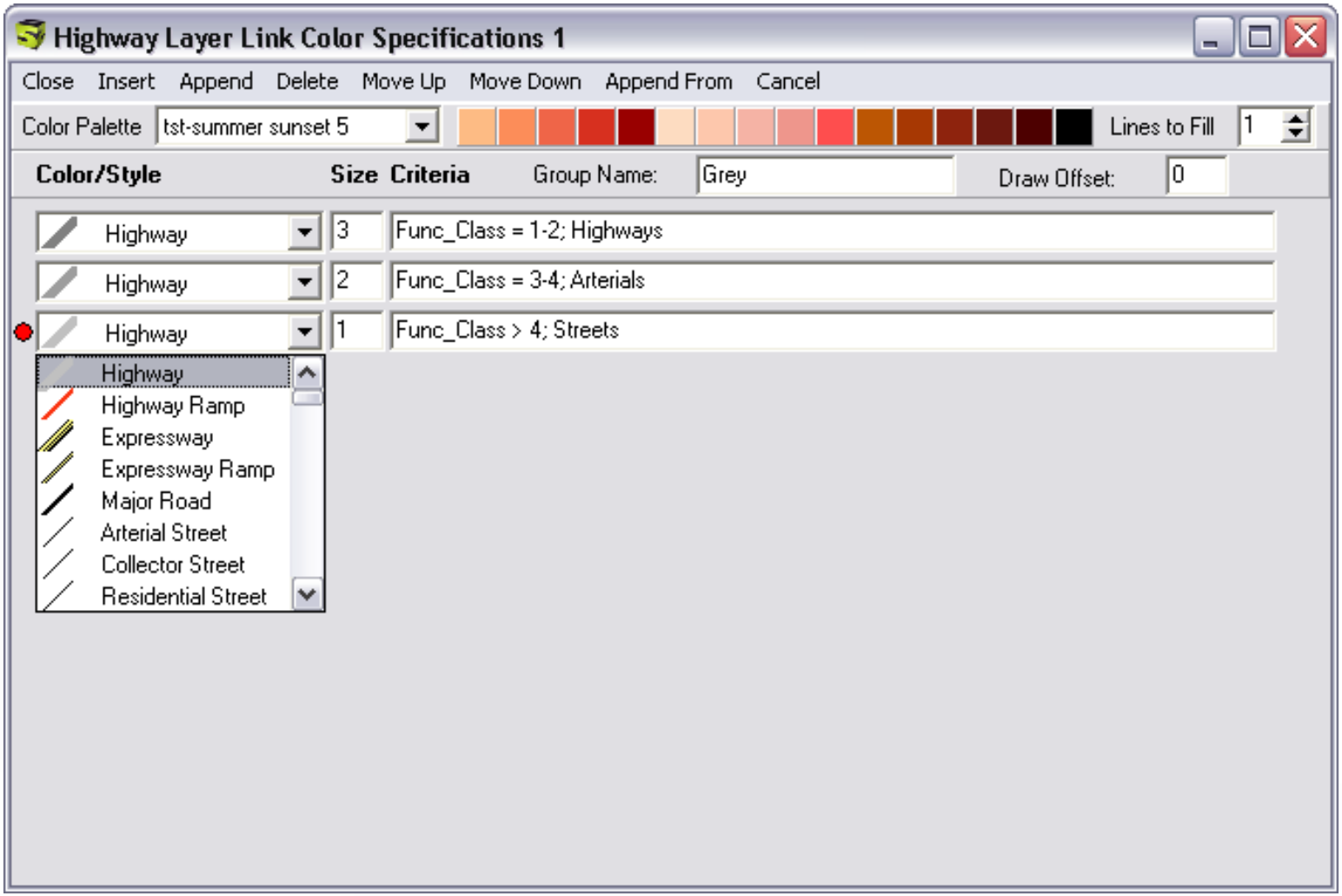
Cube GIS Window

HCM Level-of-Service Mapping



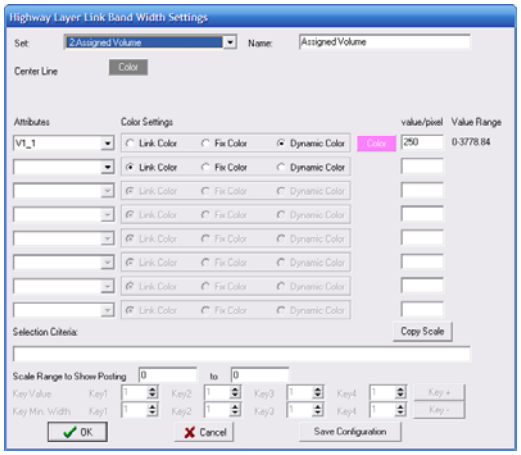
Cube GIS Window

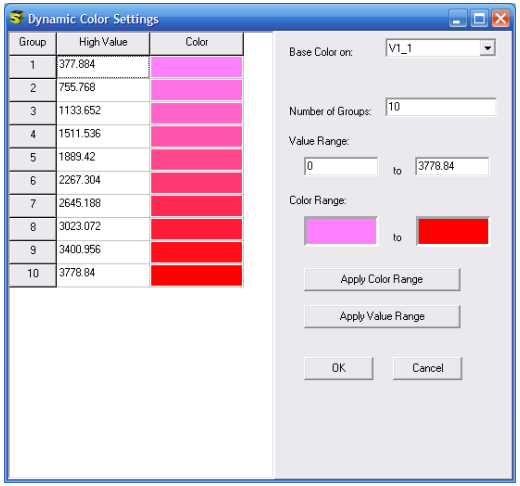
Full ESRI Symbology Library

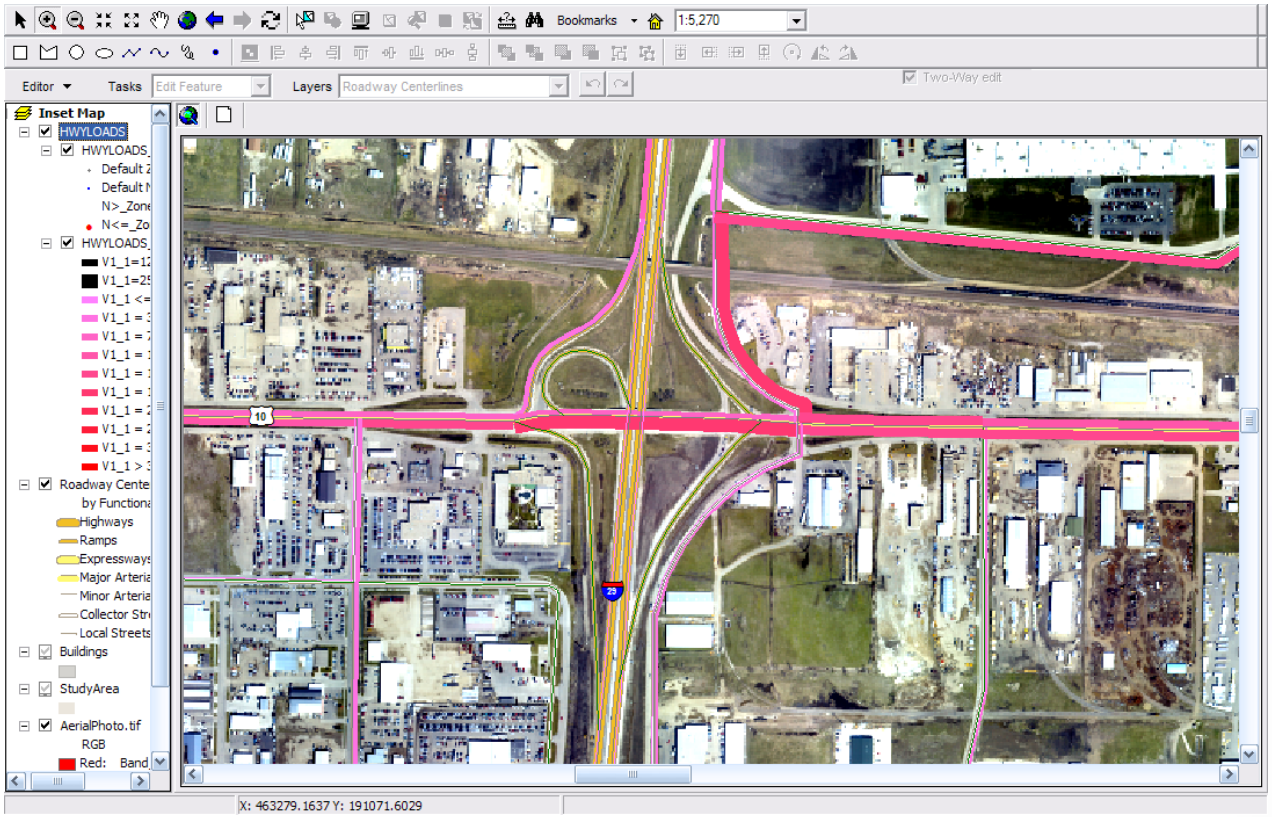


New in Cube GIS Window

Dynamic Bandwidth, Colors..



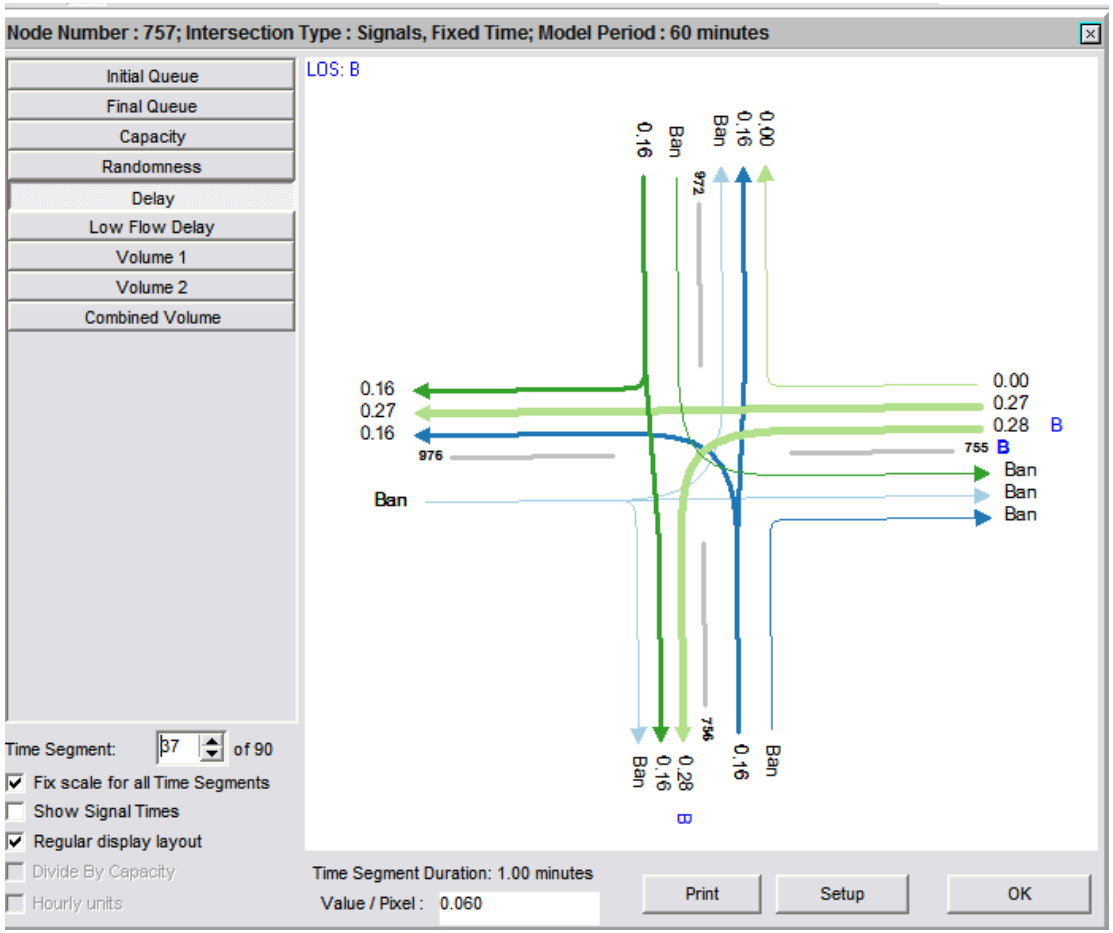




Display ‘keyed’ network attributes using bandwidth and color

New in Cube GIS Window

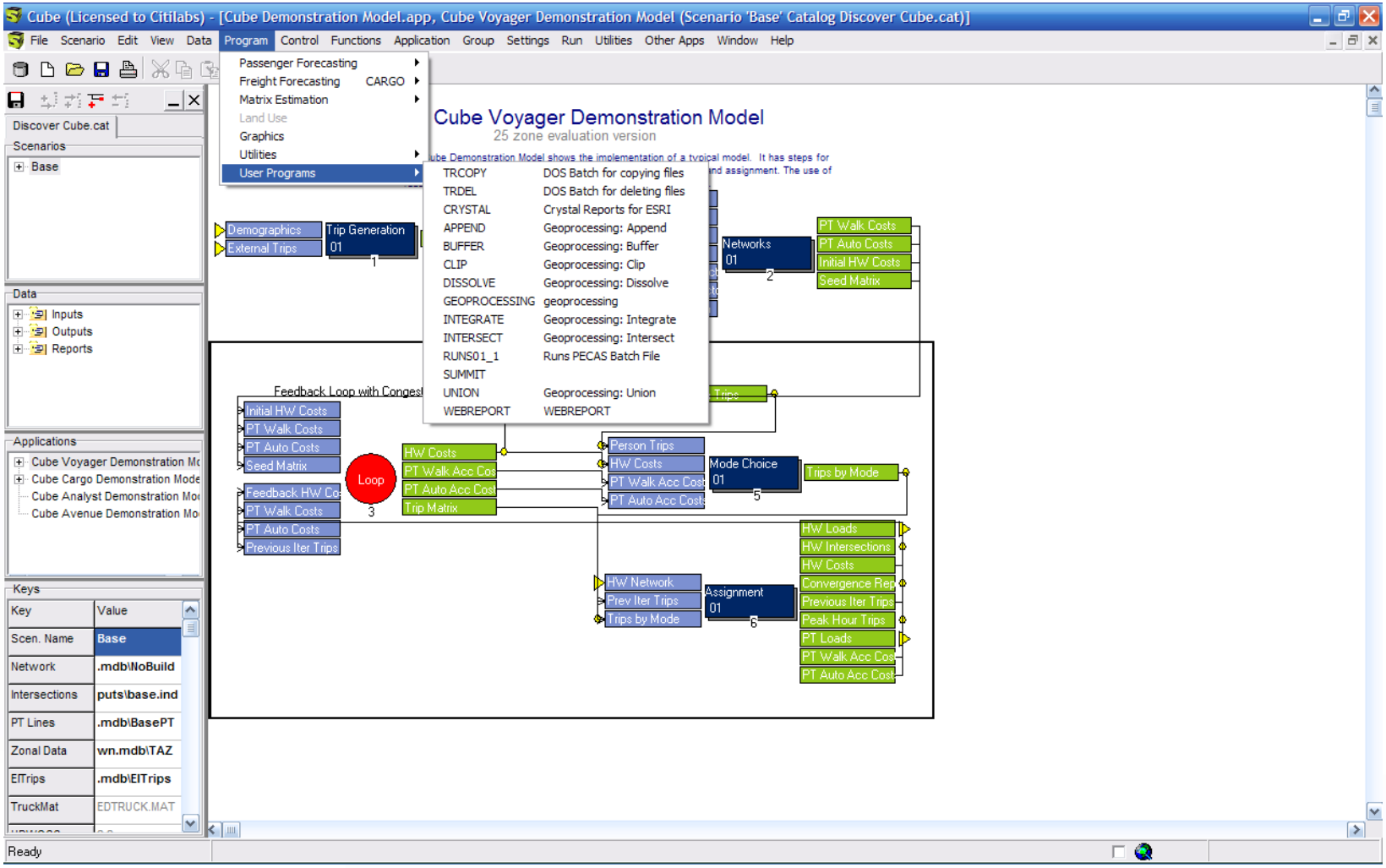
Dynamic Intersection Displays



Display queue, capacity, delay, volume by time period

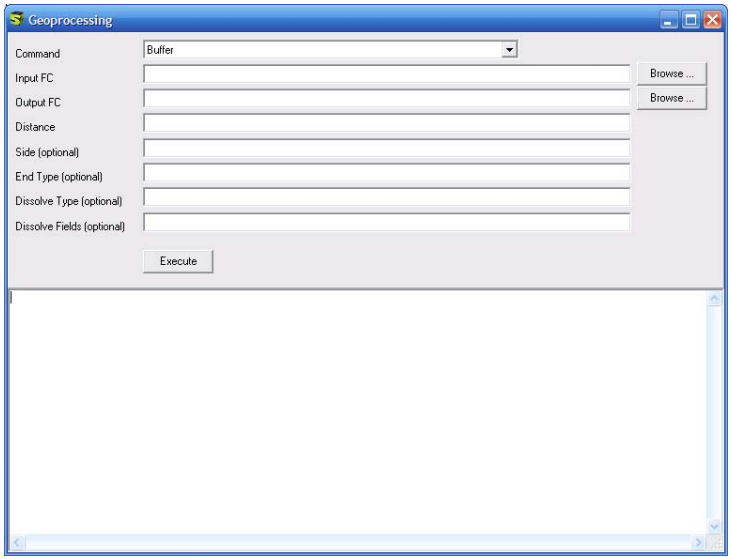
New In Application Manager

Sample Python Scripts for Spatial Analysis



Updated in Cube Base

Transit Access Geoprocessing

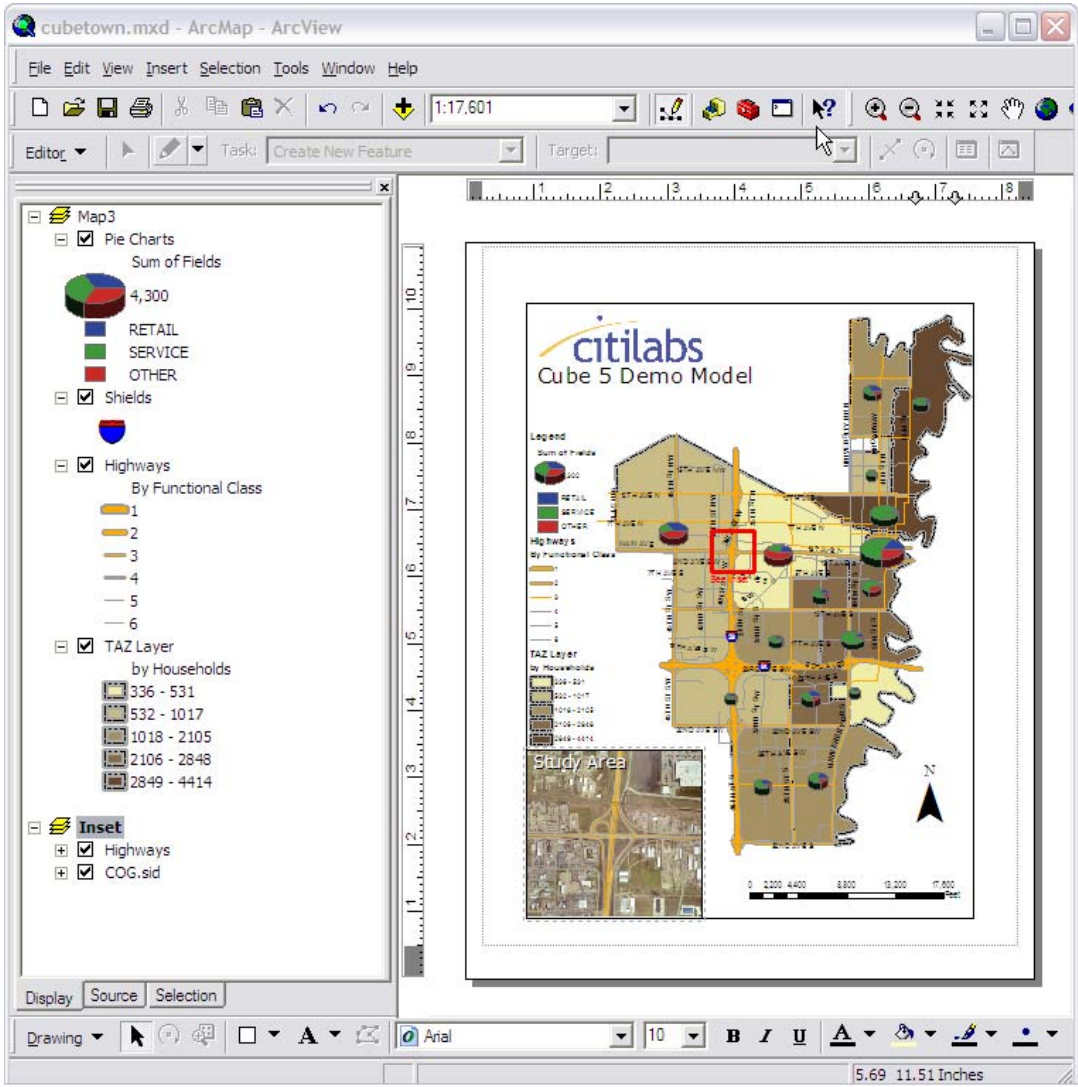


Calculate and save zone-level access to transit stops

ZONE	LENGPERC0	LENGPERC1	LENGPERC2	LENGPERC3	AREAPERC0	AREAPERC1	AREAPERC2	AREAPERC3
1	0	100	0	0	0	100	0	0
2	0	100	0	0	0	100	0	0
3	0	100	0	0	0	100	0	0
4	0	100	0	0	0	100	0	0
5	0	100	0	0	0	100	0	0
6	0	100	0	0	0	100	0	0
7	0	100	0	0	0	100	0	0
8	0	100	0	0	0	100	0	0
9	0	100	0	0	0	100	0	0
10	0	100	0	0	0	100	0	0
11	0	100	0	0	0	100	0	0
12	0	100	0	0	0	100	0	0
13	0	65.81	34.19	0	0	86.82	13.18	0
14	0	100	0	0	0	100	0	0
15	0	100	0	0	0	100	0	0
16	0	100	0	0	0	100	0	0

Share With GIS Staff

- You (or other GIS users) can also create maps for Cube 5 using ArcView 9.2. Add advanced elements such as multiple inset frames with extent rectangles or semi-transparent layers, and specify detailed symbol style and legend settings. Once your map is saved as an *.mxd file it can be opened in Cube 5 as well.



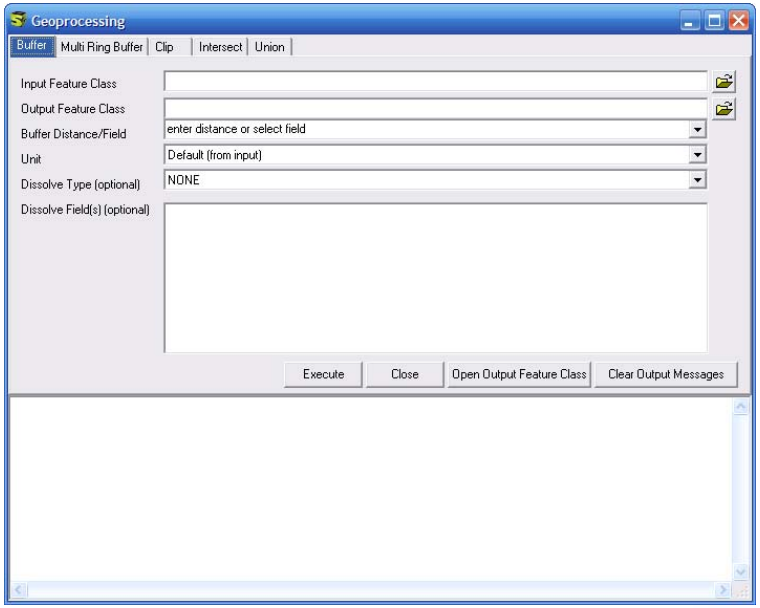
Updates in Cube Voyager

- Several Cube Voyager programs can read and write data—primarily attribute tables—to and from geodatabases:
  - Matrix, Generation, Fratar, Distribution (DBI, PAO, RECI, RECO, ZDATI)
  - Network (LINKI, LINKO, NETI, NETO, NODEI, NODEO)
  - Highway (NETI, NETO, SUBAREANETI, ZDATI)
  - Public Transport (LINEI, LINEO, LINKO, NETI, NTLEGI, NTLEGO, STOP2STOPO)
  -

Note: it is recommended that you use binary network files for intermediate model steps as appropriate

Upcoming Developments

- More Spatial Tools
- Continued Migration of Data Formats to Geodatabase
- Continual Refinement of UI
- Added Support for Avenue, Land, etc.
- Service-based GIS Data Management
- User-customizable Menus and Toolbars
- 64 Bit Voyager



Considerations

Changes to Be Aware Of

- Voyager is the Only System Supported in Cube GIS
- Moving from a File-based System to a Geodatabase
- File Naming and Scenario Management
- Performance
  - Native Binary vs. Geodatabase
  - Intermediate vs. Final Results
- Working with MXD Files
- Working with Transit Files

File-based Model vs. Geodatabase Model

- Geodatabase Can Store All “Tabular” Data
- Geodatabase Can Store All “Spatial” Data
- Geodatabase Makes Sense for Vector Data
  - ZDATA
  - EITRIPS
  - Friction Factors
  - Trip Rates
  - Etc.
- Geodatabase Makes Little Sense for Large Matrix Data
  - Easily Usable for EETRIPS Though
  - Not Suited to PTRIPS for Example

File Naming and Scenario Management

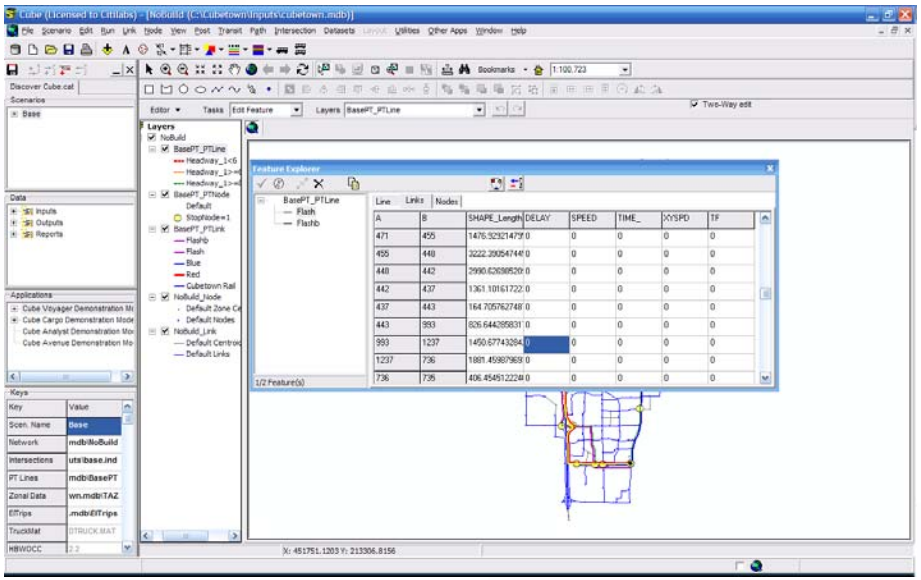
- New MDB File(s)
- A Few Input Options
  - Master Databases
  - Alternative-specific Databases
- A Few Output Options
  - Year/Alt on MDB with Standard Table Names Inside
  - Standard MDB Name with Year/Alt Table Names Inside

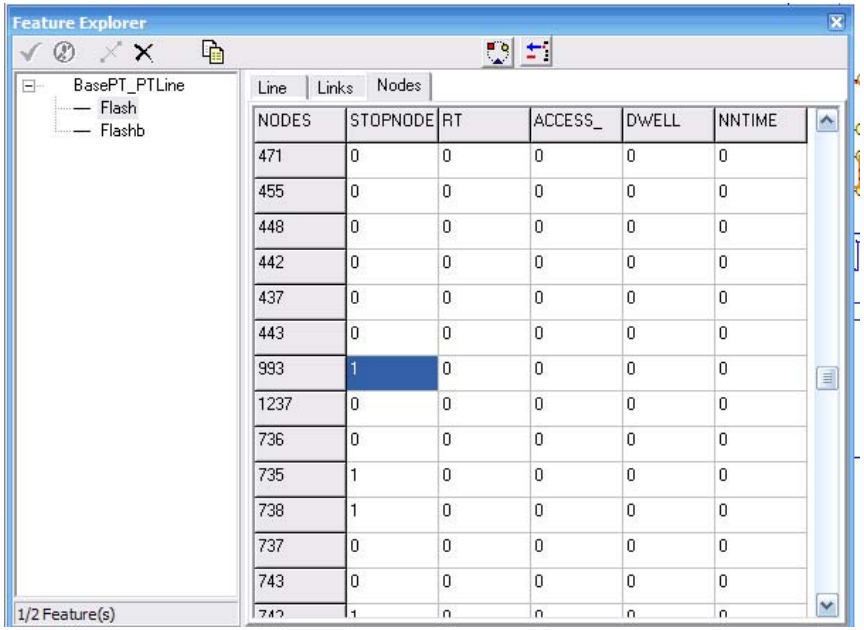
Working with MXD Files

- Cube Can Create Basic MXD Files
- Cube Can Read ANY MXD Files
- ARC offers Advanced Tools to Create MXD Files
- Considerations of Absolute and Relative Paths

Working With Transit Files

- Access/Egress Leg Considerations (sometimes from user programs)
- Line Data Considerations
- System, Fare and Other Non-Spatial Data





Discussion

How Florida Can Take Advantages of the Changes in Cube

Opportunities

- Unified Spatial Framework for Model Data
- Master Network or Master Network Databases
- Master Socio-economic Databases
- Whole New Realm of Spatial Analysis Capabilities
- Mapping, Templates and Presentation

Discussion “Starter” Topics

- Scenario Management- File Naming and Other Conventions
- Updating the FSUTMS Data Model
- Working with Other Folks in Your Agency/Company
  - Import/Export
  - MXD Sharing
- Master Networks and Databases
- Size Matters (aka MDB 2 gb limit)
- Opportunities to Move to Alternate Sources For Networks
  - True Shape
  - NAVTEQ, etc
- Opportunities for Feedback and Enhancements

FSUTMS Framework Discussion

- FSUTMS Data Framework and Data Sharing
- Opening Discussion with Key GIS Stakeholders
  - Socio-economic
  - Framework for Creating a **Model-worthy** data set
- E-mail Wade White at wwhite@citilabs.com to forward comments that merit consideration for enhancements to the software