Esri Production Mapping
Advanced Cartography
Bo King & G.C. Rice
Agenda

• Solution Overview

• Desktop Cartographic Production

• Multi-Scale Mapping using Generalization

• Product On Demand App (POD)
Solution Overview
Esri Production Mapping
Esri Production Mapping
Produce, Manage, and Share Authoritative Content

- Production Mapping as a Platform
  - Produce Authoritative Content
  - Manage Production Environment
  - Share and Collaborate
Providing Authoritative Content
Integrated across the ArcGIS Platform

Specifications
Data Models
ETL
Workflows

Produce

Authoritative Content

Disconnected Editing
Map Applications
Executive Access

Manage / Share

Server
Online Content and Services
Esri Production Mapping
An Extension to the ArcGIS Platform

- Custom Products
- Geoprocessing Toolsets
- Quality Assurance / Control
- Cartographic Symbology
Cartographic Production
Esri Production Mapping for ArcGIS Pro
Cartographic Production
Expediting the Map Creation Process
ArcGIS Pro
Esri Production Mapping for ArcGIS Pro

- Production Mapping Extension
  - Edit Tools
    - Modify Features
    - Create Features

- Topographic Production Toolbox
  - Cartography
  - Data Management
  - Workflow
Edit Tools
Esri Production Mapping for ArcGIS Pro

- Populate Angle
- Geoname to Feature
- Buildings
- Difference Polygon
Geoprocessing Tools
Esri Production Mapping for ArcGIS Pro

- Cartography
  - Banding
  - Cartographic Refinement
  - Features
  - Layout

Topographic Production Tools
- Cartography
  - Banding
    - Generate Elevation Bands
  - Cartographic Refinement
    - Apply Building Offsets
    - Apply Masks From Rules
    - Apply Visual Specification To Map
    - Calculate Bridge Offsets
    - Make Masks From Rules
    - Thin Spot Heights
- Features
  - Generate Adjoining Sheets Features
  - Generate Elevation Guide Features
  - Generate Spot Heights
  - Generate Topographic Contours
  - Identify Contours
- Layout
  - Make Grids And Graticules Layer
  - Populate Map Sheet Info
Geoprocessing Tools
Esri Production Mapping for ArcGIS Pro

- **Data Management**
  - Features
  - Generalization
  - Geodatabase
  - Topology
  - Validation
Geoprocessing Tools
Esri Production Mapping for ArcGIS Pro

- **Workflow**
  - Properties
  - Tasks
Support Files
Esri Production Mapping for ArcGIS Pro

- **Independent Install**
  - **Default Location**
    - `C:\Users\Public\Documents\Production Mapping\Product Files`
  - **Custom Location**
Map Templates
Esri Production Mapping for ArcGIS Pro

- Civilian Topographic Map
  - CTM50
Dynamic Elements
Esri Production Mapping for ArcGIS Pro

- Topo North Arrow
- US National Grid Box
Labels & Symbols

Esri Production Mapping for ArcGIS Pro

- Label Expressions (Python)
- Symbol Expressions (Arcade)
Map Production in ArcGIS Pro Demo
Data Generalization for Multi-Scale Mapping
Multi-Scale Mapping
One database, multiple products
Multi-Scale Mapping

Best Scale Data

Data Automation

Prepare Data

Data Generalization

Map Automation

Prepare Cartographic Data

Cartographic Finishing

Multi-Scale Products
Generalization Techniques

- Simplify
- Smooth
- Eliminate
- Amalgamate (Aggregate)
- Collapse
- Thin
- Exaggerate
Generalization Tools in ArcMap

• Analysis
  - Erase
  - Identity
  - Buffer
  - Graphic Buffer
  - Near
  - Generate Near Table

• Cartography
  - Aggregate Points
  - Aggregate Polygons
  - Collapse Road Detail
  - Create Cartographic Partitions
  - Delineate Built-Up Areas
  - Merge Divided Roads
  - Simplify Building
  - Simplify Line
  - Simplify Polygon
  - Smooth Line
  - Smooth Polygon
  - Thin Road Network
  - Detect Graphic Conflict
  - Propagate Displacement
  - Resolve Building Conflicts
  - Resolve Road Conflicts
  - Feature Outline Masks
  - Update Override

• Conversion
  - Feature class to feature class
  - Table to Table

• Data Management
  - Integrate
  - Add Geometry Attributes
  - Copy Features
  - Delete Features
  - Feature To Line
  - Feature To Point
  - Feature To Polygon
  - Feature Vertices to Points
  - Minimum Bounding Geometry
  - Multipart To Singlepart
  - Repair Geometry
  - Split Line At Vertices
  - Unsplit Line
  - Add Field
  - Calculate Field
  - Append
  - Copy
  - Delete
  - Dissolve
  - Eliminate Polygon Part
  - Make Feature Layer
  - Select Layer By Attribute
  - Select Layer By Location
  - Get Count

• Spatial Analyst
  - Topo To Raster
  - Raster Calculator
  - Polygon To Raster
  - Point To Raster
  - Raster to Point

• Model Only Tools
  - Select Data
  - Calculate Value
  - Iterators
  - Parse Path
  - Get Field Value

• Production Mapping
  - Aggregate Polygons
  - Calculate Visual Specification
  - Convert Polys
  - Delete Dangles
  - Delete Polygons and Extend Lines
  - Extend Polygon Sides
  - Fill Gaps
  - Generalized Shared Features
  - Increase Line Length
  - Increase Polygon Area
  - Production Centerline
  - Production Clip

• Defense Mapping
  - Hydro Centerline
  - Resolve Building Conflicts

• Production Tools
  - Production Dissolve
  - Prune Hydro
  - Remove Cutbacks
  - Remove Self Intersections
  - Repair Bad Geometry
  - Split Narrow Polygons
  - Thin Hydro Features
  - Thin Spot Heights
Generalization Tools in ArcGIS Pro

- **Analysis**
  - Erase
  - Identity
  - Buffer
  - Graphic Buffer
  - Near
  - Generate Near Table

- **Cartography**
  - Aggregate Points
  - Aggregate Polygons
  - Collapse Road Detail
  - Create Cartographic Partitions
  - Delineate Built-Up Areas
  - Merge Divided Roads
  - Simplify Building
  - Simplify Line
  - Simplify Polygon
  - Simplify Shared Edges
  - Smooth Line
  - Smooth Polygon

- **Conversion**
  - Feature class to feature class
  - Table to Table

- **Data Management**
  - Integrate
  - Add Geometry Attributes
  - Copy Features
  - Delete Features
  - Feature To Line
  - Feature To Point
  - Feature To Polygon
  - Feature Vertices to Points
  - Minimum Bounding Geometry
  - Multipart To Singlepart
  - Repair Geometry
  - Split Line At Vertices
  - Unsplit Line
  - Add Field
  - Calculate Field
  - Append
  - Copy
  - Delete
  - Delete Identical
  - Dissolve
  - Eliminate
  - Eliminate Polygon Part
  - Make Feature Layer
  - Select Layer By Attribute

- **Spatial Analyst**
  - Topo To Raster
  - Raster Calculator
  - Polygon To Raster
  - Point To Raster
  - Raster to Point

- **Model Only Tools**
  - Select Data
  - Calculate Value
  - Iterators
  - Parse Path
  - Get Field Value

- **Topographic Production**
  - Aggregate Polygons
  - Eliminate Polygon
  - Export Generalized Data
  - Import Generalized Data
  - Extract Data
  - Load Data
  - Remove Small Lines
  - Delete Polygons and Extend Lines
  - Extend Polygon Sides
  - Fill Gaps

- **Generalize Shared Features**
  - Increase Line Length
  - Increase Polygon Area
  - Polygon To Centerline
  - Production Clip
  - Production Dissolve
  - Thin Hydrology Lines
  - Remove Cutback Vertices
  - Remove Self Intersection
  - Repair Bad Geometry
  - Identify Narrow Polygons
  - Thin Hydrology Lines
  - Thin Spot Heights
  - Apply Building Offsets

- **Color Scheme:**
  - Available in Pro (2.4)
  - In Pro - Renamed/Moved
  - New in Pro
  - Not yet in Pro
Leverage Tools Within Models…
...and Submodels
...and sometimes Python
ArcGIS 10.x - TDS Generalization in Esri Defense Mapping

50K to 250K Generalization of TDS 6.1 Data Schema
- Output Intended for 250K Product Creation
- Stand-alone toolbox with models and scripts
Generalization in Pro

Development Approach for Defense and Production Mapping

- One set of geoprocessing models
- Not dependent on data schema
- Not dependent on input or output scale
Production Mapping and Defense Mapping - Pro 2.4

In the Box

Topographic Production GP Tools

- Cartography
- Data Management
- Features
  - Generalization
    - Eliminate polygon
    - Export Generalized Data
    - Fill Gaps
    - Identify Narrow Polygons
    - Import Generalized Data
    - Polygon To Centerline
    - Remove Small Lines
    - Thin Hydrology Lines
- Geodatabase
- Topology
- Validation

Included with Product Data Installers

Theme-Based Models

- 0_Prepare.tbx
- 1_Trans.tbx
- 2_Struct.tbx
- 3_SOE.tbx
- 4_Hydro.tbx
- 5_General.tbx
- 6_Finalization.tbx
- Generalization Tools.tbx

Generalization Rules

CTM 25K to 50K
(Production Mapping)

TDS 50K to 250K
(Defense Mapping)
Generalization in ArcGIS Pro

G.C. Rice
Topo Product On Demand (POD)

Esri Defense Mapping Web Application

- Installed with Esri Defense Mapping for Server
- Cartographic Production App
- Self-service
  - Defense Products
  - Civilian Products
  - Custom Products
  - Both Maps and Data
Product on Demand Application

G.C. Rice
Additional Sessions

- Showcase Locations
  - Mapping & Visualization
  - Mapping & Statistics
  - Defense & Intelligence
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