Esri Production Mapping: Distributed Generalization Workflows

Amber Bethell
Automated Generalization

Best Scale Data

Multiple Scale Products
<table>
<thead>
<tr>
<th>Session</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Desktop Mapping:</strong></td>
<td>Generalization for Multi-Scale Mapping</td>
</tr>
<tr>
<td>• Generalization tools available without extensions</td>
<td></td>
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<tr>
<td><strong>Esri Production Mapping:</strong></td>
<td>Creating Map Generalization Models</td>
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<tr>
<td>• Generalization tools available in Esri Production Mapping Extension</td>
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<tr>
<td>• How to build GP models for generalization</td>
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<tr>
<td><strong>Esri Production Mapping:</strong></td>
<td>Distributed Generalization Workflows</td>
</tr>
<tr>
<td>• How to deploy generalization models in production</td>
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</tbody>
</table>
Generalization Workflow

Model Generalization and Preparation
Divide Data
Data Generalization
Symbolization
Cartographic Generalization
Cartographic Finishing

Best Scale Data → Generalized Data → Cartographic Data
Problem

- Generalizing large amounts of data.
- Managing the division of data, generalization of each partition, and merging of the data back into a single seamless database.
Distributed Generalization Demo
Distributed Generalization Workflows

- Generalize large datasets by partition as Workflow Manager jobs
- Manages processing across multiple machines and CPUs
Workflow Manager Capabilities

**Configurable**
- Easy to plug in your models and scripts into workflows
- Extensible with ArcObjects and Python

**COTs**
- Software already used by many organizations
- Ability to view workflows and status in ArcMap, Pro and Server

**Job Management**
- Centralized database with jobs
- Built in history and tracking
Parent Job

- One parent job for entire area being processed
- Run on a single machine

Performs any pre-processes
Child Jobs automatically created from Partitions
Waits until all child jobs are complete
Combine data and Perform Edge Matching
Parent Job

- Performs pre-process operations against the entire area (i.e. creating partitions)

Child Jobs automatically created from Partitions

Waits until all child jobs are complete

Combine data and Perform Edge Matching
Divide Data

Combination
Parent Job

- Creates one child jobs for each partition
- Waits until all children are complete before finishing parent job
• Child jobs are identified by processing machines and automatically begin to execute
Child Jobs

- Data in job Area of Interest extracted to local file geodatabase
Child Jobs

- Generalization operations performed on clipped data

Data Clipped to job AOI → Clipped data generalized → Generalized data made available for final processing
Child Jobs

- Child job makes results available by sharing data as attachment or loading into SDE

Data Clipped to job AOI → Clipped data generalized → Generalized data made available final processing
Parent Job

- Data Combined into single database

Performs any pre-processes
Child Jobs automatically created from Partitions
Waits until all child jobs are complete
Combine data and Perform Edge Matching
Parent Job

- Perform final processing and edge matching

Perform any pre-processes

Child Jobs automatically created from Partitions

Waits until all child jobs are complete

Combine data and Perform Edge Matching
Distributed Generalization Demo
Civilian Topographic Model (CTM)
Enabling Production Mapping for Topographic Mapping

- Template Maps
- Cartographic Rules
- Generalization Rules
- Editing Rules
- Validation Rules
- Workflows
- Sample Data

Derived from NFDD
https://github.com/esri/ctm
Server Based On-the-fly Generalization

- Choose product and desired scale
- Map extent generalized to scale when requested

http://pmsrvdemo.esri.com/productondemand/
### Method Comparison

<table>
<thead>
<tr>
<th>Distributed</th>
<th>On-the-fly</th>
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<tbody>
<tr>
<td>• Entire area processed at same time</td>
<td>• Data processed over small extent when needed</td>
</tr>
<tr>
<td>• Data reprocessed periodically throughout year</td>
<td>• Products take longer to generate but always using latest source data</td>
</tr>
<tr>
<td>• Quickly generate products using staged data</td>
<td>• Generalized data is temporary</td>
</tr>
<tr>
<td>• Generalized data persisted</td>
<td>• Leverages Server machines for processing</td>
</tr>
<tr>
<td>• Leverages Desktop machines for processing</td>
<td>• Leverages Server machines for processing</td>
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