

UC



# Esri Production Mapping: Configuring the Solution for Civilian Topographic Agencies

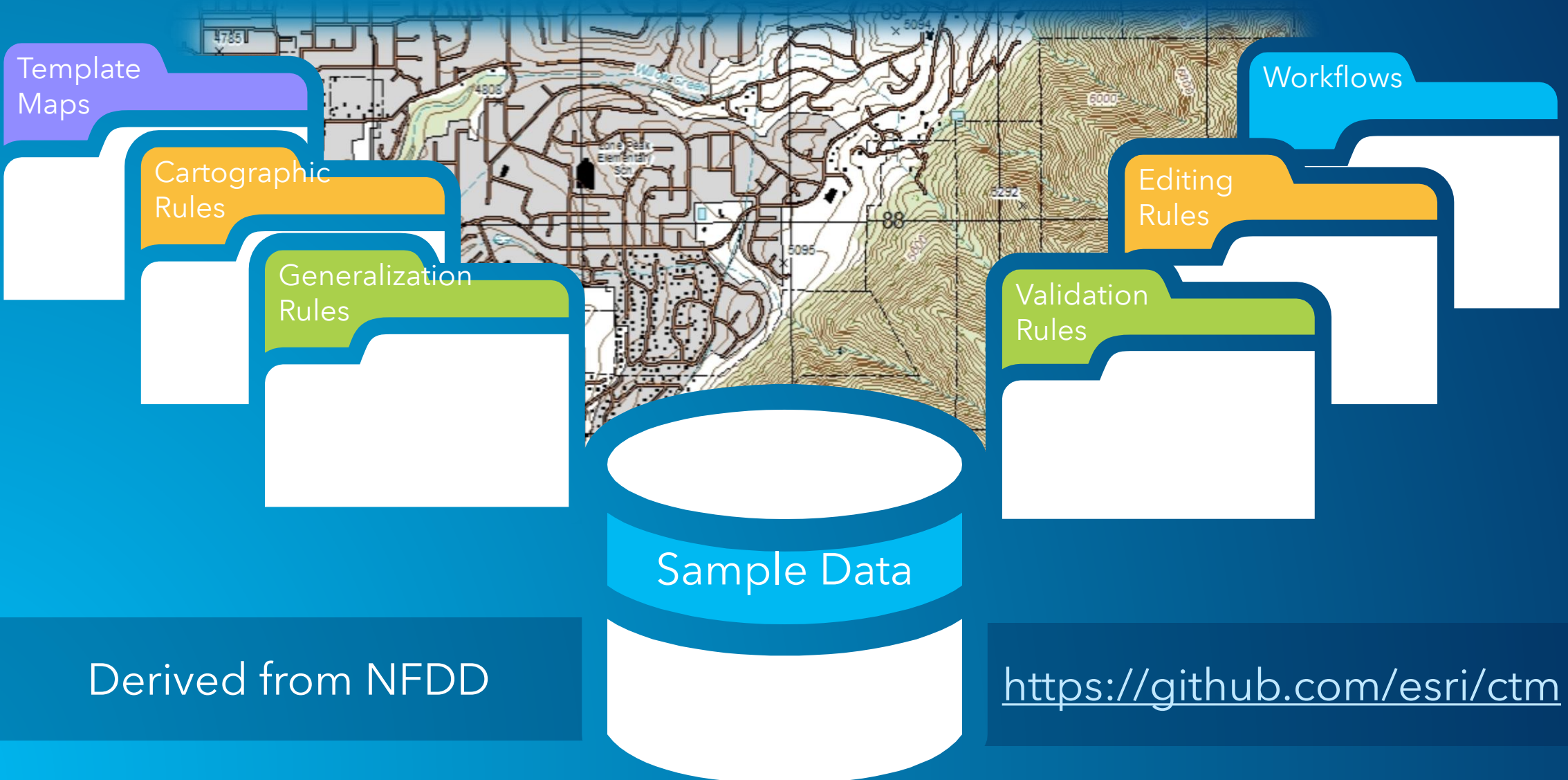
Sean Granata

# What's New

- **Version 4.0 (Released)**
  - Distributed Generalization
- **Version 5.0**
  - Support for 10K Map Products

# Civilian Topographic Map Product (CTM)

Enabling Production Mapping for Topographic Mapping





# Civilian Topographic Data Model

- **National System for Geospatial Intelligence Feature Data Dictionary (NFDD)**
- **Comprehensive dictionary**
  - Feature Types
  - Feature Attributes
  - Attribute Values
- **Standardized**

# Civilian Topographic Data Model

- National System for Geospatial Intelligence Feature Data Dictionary (NFDD)
- Comprehensive dictionary
  - Feature Types
  - Feature Attributes
  - Attribute Values
- Standardized

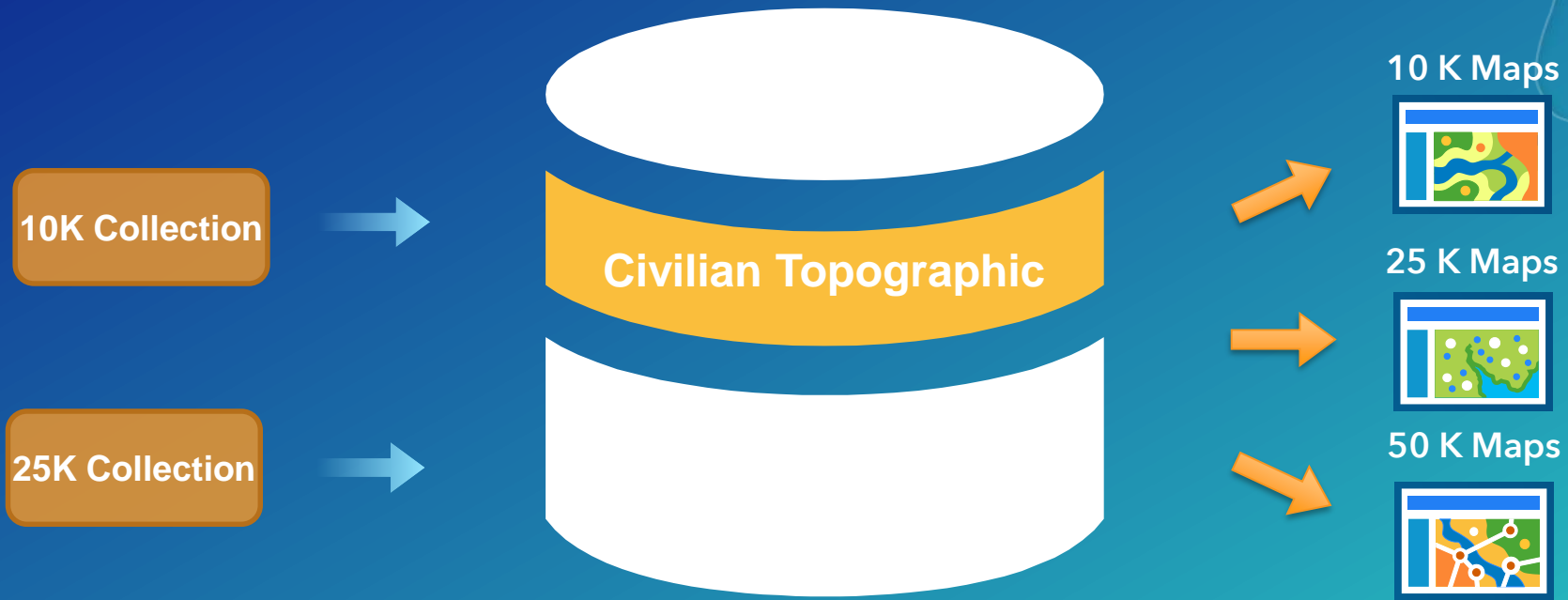


# Civilian Topographic Data Model

- National System for Geospatial Intelligence Feature Data Dictionary (NFDD)
- Comprehensive dictionary
  - Feature Types
  - Feature Attributes
  - Attribute Values
- Standardized



# Civilian Topographic Data Model



- 55 Feature Classes
- 325 Subtypes

# Editing configurations

- Sample Editing Feature Templates for 10K, 25K and 50K scales
- Field configurations

The screenshot shows the 'Manage Features' dialog box in a GIS application. The 'Template' is set to 'Building / Residence' and 'Metadata' is 'None'. A list of feature templates is shown, with 'Building / Residence' selected. Below the list are buttons for 'Create', 'Update', and 'Metadata'. The 'Create Attributes' section displays a table of fields for the selected template.

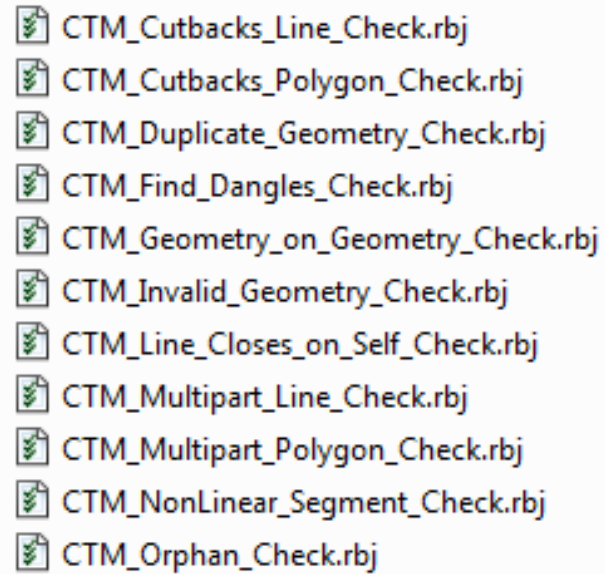
Field Name	Field Value
<b>Feature Information (3 Fields)</b>	
<input type="checkbox"/> ObjectID	
<input type="checkbox"/> FCSubtype	100083 - BUILDING_S
<input type="checkbox"/> F_CODE	AL013 - Building
<b>Mandatory (4 Fields)</b>	
<input type="checkbox"/> FNA	<Null>
<input type="checkbox"/> FFN	563 - Residence
<input type="checkbox"/> PPO	<Null>
<input type="checkbox"/> REL	<Null>
<b>Optional (11 Fields)</b>	
<input type="checkbox"/> PCF	-999999 - No Information
<input type="checkbox"/> CAA	-999999 - No Information
<input type="checkbox"/> AOO	-999999
<input type="checkbox"/> SSR	-999999 - No Information
<input type="checkbox"/> FNA2	<Null>
<input type="checkbox"/> ADA	000000

Buttons at the bottom: 'Create Attributes', 'Apply', and 'Save Template...'.

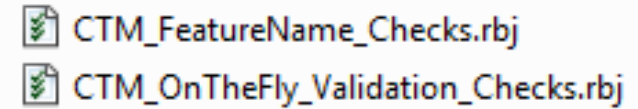


# Data Validation

- Spatial Checks
- Attribution Checks
- Topology



- CTM\_Cutbacks\_Line\_Check.rbj
- CTM\_Cutbacks\_Polygon\_Check.rbj
- CTM\_Duplicate\_Geometry\_Check.rbj
- CTM\_Find\_Dangles\_Check.rbj
- CTM\_Geometry\_on\_Geometry\_Check.rbj
- CTM\_Invalid\_Geometry\_Check.rbj
- CTM\_Line\_Closes\_on\_Self\_Check.rbj
- CTM\_Multipart\_Line\_Check.rbj
- CTM\_Multipart\_Polygon\_Check.rbj
- CTM\_NonLinear\_Segment\_Check.rbj
- CTM\_Orphan\_Check.rbj



- CTM\_FeatureName\_Checks.rbj
- CTM\_OnTheFly\_Validation\_Checks.rbj

# Layout

- Reviewed ~70 maps from different countries
  - North America, South America, Europe, Africa, and Asia
- Setup the layout based on the majority



# Symbols/Style

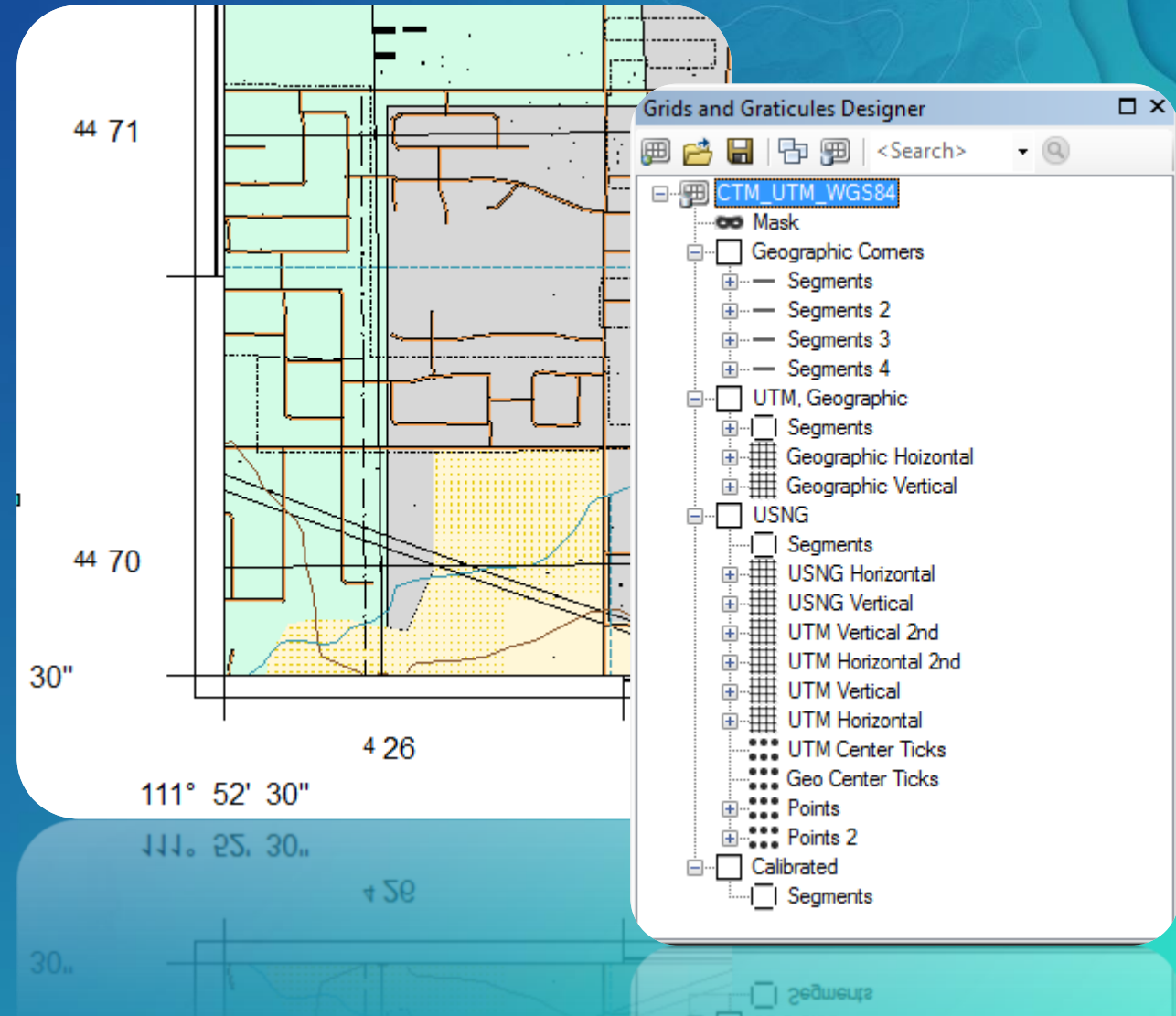
- Reviewed ~30 maps from different countries
- Compromised list of symbols, colors, type, etc.
  - Took the majority for each symbol and color

Aeronautic: Aircraft Hangar Pnt	Boundary: 3rd Order Administrative Srf	Culture: Ruins Srf
Aeronautic: Airport Pnt	Boundary: Administrative Area, Undefined (Anno Only) Srf	Culture: Tomb Srf
Aeronautic: Airport/Airfield Srf	Boundary: Administrative Division Surface Srf	Facility: Installation Srf
Aeronautic: Apron Srf	Boundary: Boundary Monument Pnt	Facility: Office Park Srf
Aeronautic: Control Tower Pnt	Boundary: International Administrative Crv	Facility: Shopping Complex Srf
Aeronautic: Control Tower Srf	Boundary: International Administrative Srf	HydroAidNavigation: Beacon/Light Pnt
Aeronautic: Helipad/Heliport Pnt	Boundary: Other Administrative Crv	HydroAidNavigation: Light Vessel/Lighthouse
Aeronautic: Helipad/Heliport Srf	Boundary: Other Administrative Srf	HydroAidNavigation: Lighthouse Srf
Aeronautic: Runway Srf	Culture: Archeological Site Pnt	Hydrography: Anchorage Pnt
Aeronautic: Seaplane Base Pnt	Culture: Archeological Site Srf	Hydrography: Anchorage Srf
Aeronautic: Seaplane Base Srf	Culture: Botanic Garden Srf	Hydrography: Aqueduct, Intermittent Crv
Aeronautic: Stopway Srf	Culture: Buddhist Tomb Pnt	Hydrography: Aqueduct, Perennial Crv
Aeronautic: Taxiway Crv	Culture: Cairn Pnt	Hydrography: Aqueduct/Ditch, Intermittent
Aeronautic: Taxiway Srf	Culture: Castle Complex Srf	Hydrography: Aqueduct/Ditch, Perennial Srf
Agriculture: Barn/Stable Pnt	Culture: Castle Pnt	Hydrography: Aquifer Srf
Agriculture: Barn/Stable Srf	Culture: Cemetery Pnt	Hydrography: Basin Gate Crv
Agriculture: Crop Land Srf	Culture: Cemetery Srf	Hydrography: Cistern Pnt
Agriculture: Fish Farm Facility Pnt	Culture: Cemetery, Christian Pnt	Hydrography: Dam Crv
Agriculture: Fish Farm Facility Srf	Culture: Cemetery, Christian Srf	Hydrography: Dam Pnt
Agriculture: Grain Storage Srf	Culture: Cemetery, Islam Pnt	Hydrography: Dam Srf
Agriculture: Grain Storage Structure Pnt	Culture: Cemetery, Islam Srf	Hydrography: Depth Curve Crv
Agriculture: Greenhouse Pnt	Culture: Cemetery, Judaism Pnt	Hydrography: Ditch, Intermittent Crv
Agriculture: Greenhouse Srf	Culture: Cemetery, Judaism Srf	Hydrography: Ditch, Perennial Crv
Agriculture: Holding Pen Pnt	Culture: Christian Tomb Pnt	Hydrography: Fish Ladder Crv
Agriculture: Holding Pen Srf	Culture: Conservation Area Srf	Hydrography: Flood Control Structure Crv
Agriculture: Industrial Farm Srf	Culture: Contaminated Region Pnt	Hydrography: Flood Control Structure Pnt
Agriculture: Mariculture Site Srf	Culture: Contaminated Region Srf	Hydrography: Flood Control Structure Srf
Agriculture: Orchard Srf	Culture: Courtyard Srf	Hydrography: Flume Crv
Agriculture: Plant Nursery Srf	Culture: Fountain Pnt	Hydrography: Flume Srf
Agriculture: Rice Field Srf	Culture: Hospital Pnt	Hydrography: Gauging Station Pnt
Agriculture: Vineyard Srf	Culture: Interest Site Pnt	Hydrography: Hazardous Rock Pnt
Agriculture: Windmill Pnt	Culture: Interest Site Srf	Hydrography: Lake, Intermittent Srf
Boundary: 1st Order Administrative Crv	Culture: Judaism Tomb Pnt	Hydrography: Lake, Perennial Srf
Boundary: 1st Order Administrative Srf	Culture: Monument Crv	Hydrography: Land Subject to Inundation Srf
Boundary: 2nd Order Administrative Crv	Culture: Monument Pnt	Hydrography: Offshore Construction Crv
Boundary: 2nd Order Administrative Srf	Culture: Monument Srf	Hydrography: Offshore Construction Pnt
Boundary: 3rd Order Administrative Crv	Culture: Mosque Tomb Pnt	Hydrography: Offshore Construction Srf
	Culture: Park Srf	



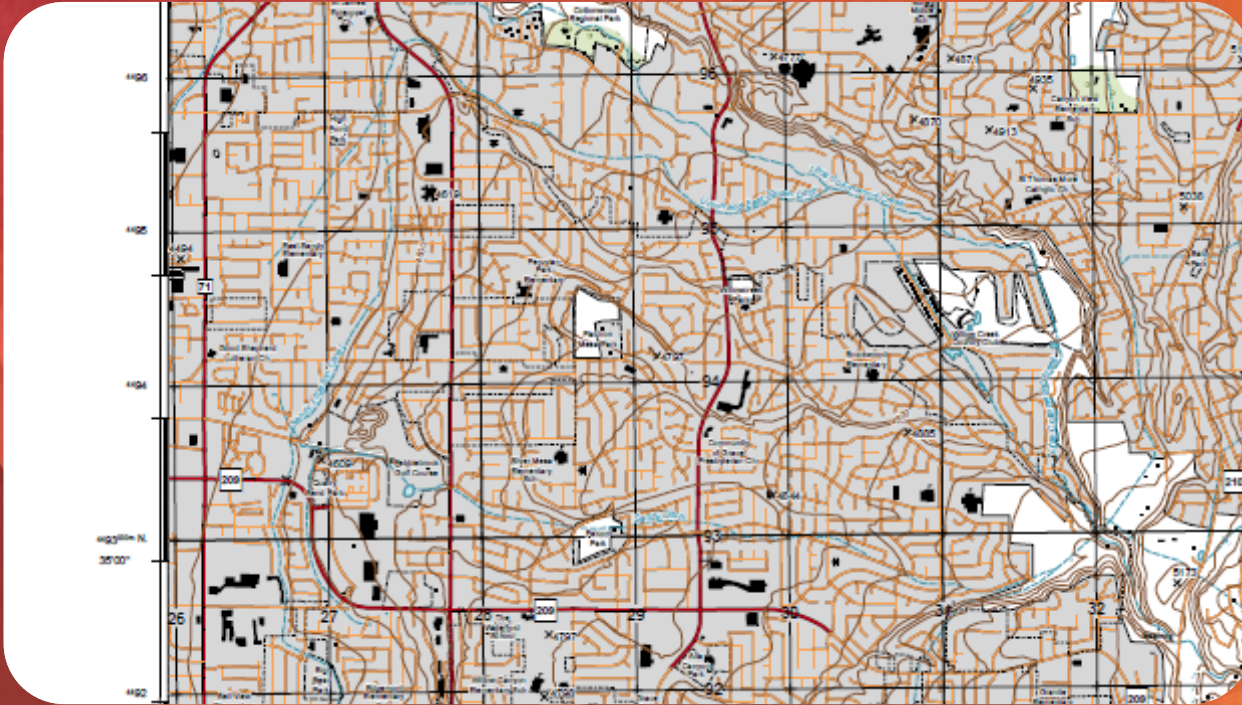
# Grids and Graticules

- 24K Grid - US Forestry Service
- Adjusted to CTM 25K
  - Map Layout
  - Scale
  - Coordinate Systems





# Generalization and Distributed Generalization

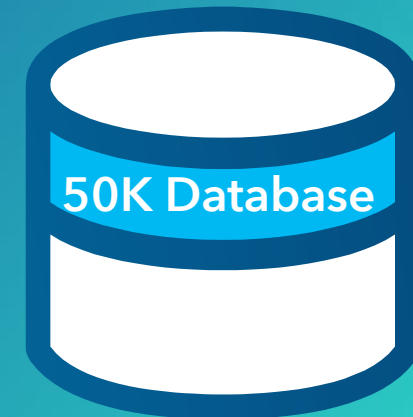


# Generalization

Initial Data

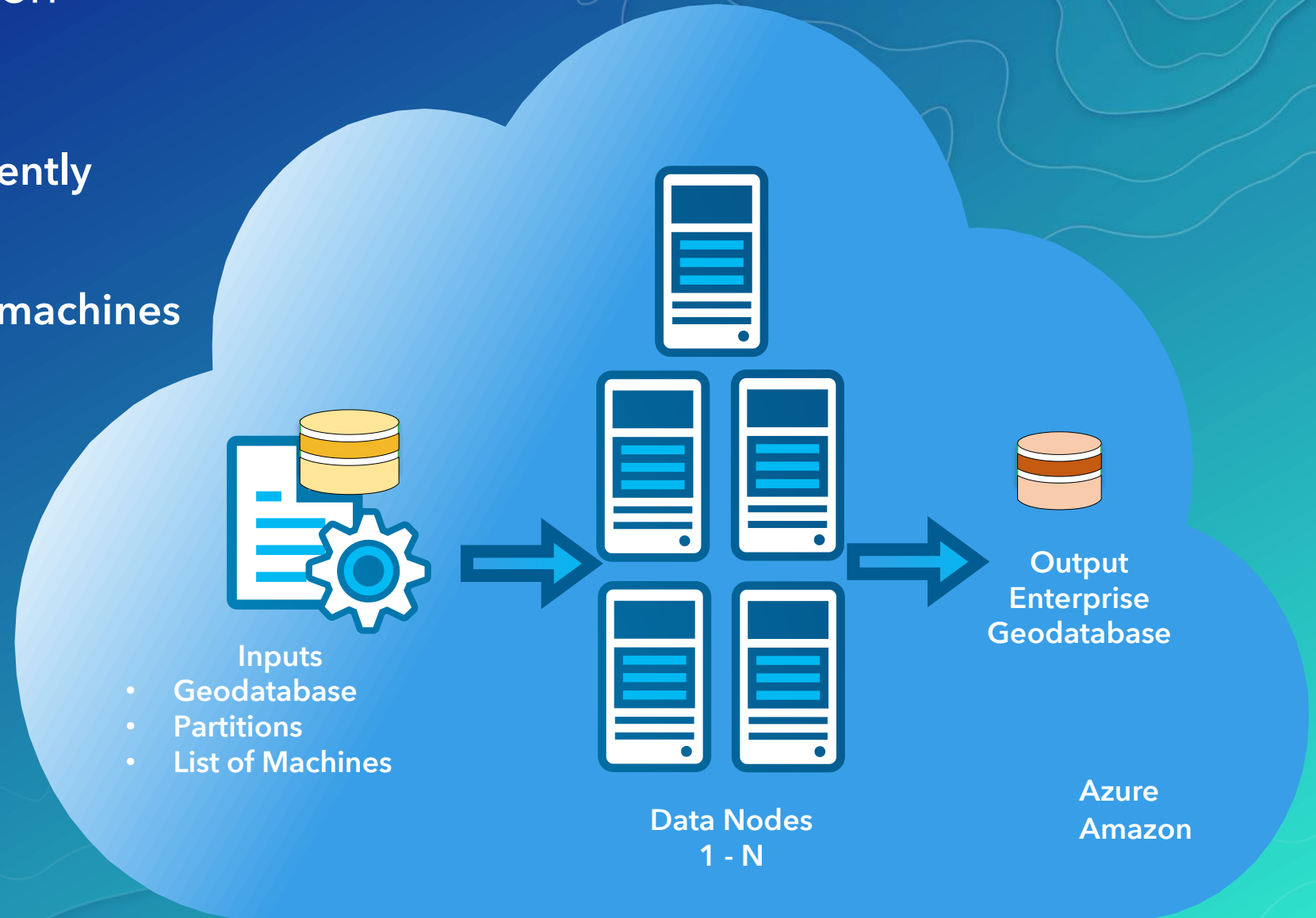


Generalized Data



# Distributed Generalization

- Process data more efficiently
- Uses "Partitions"
- Process across multiple machines and CPUs
- Can process
  - Geo Processing tools
  - Model Builder
  - Python



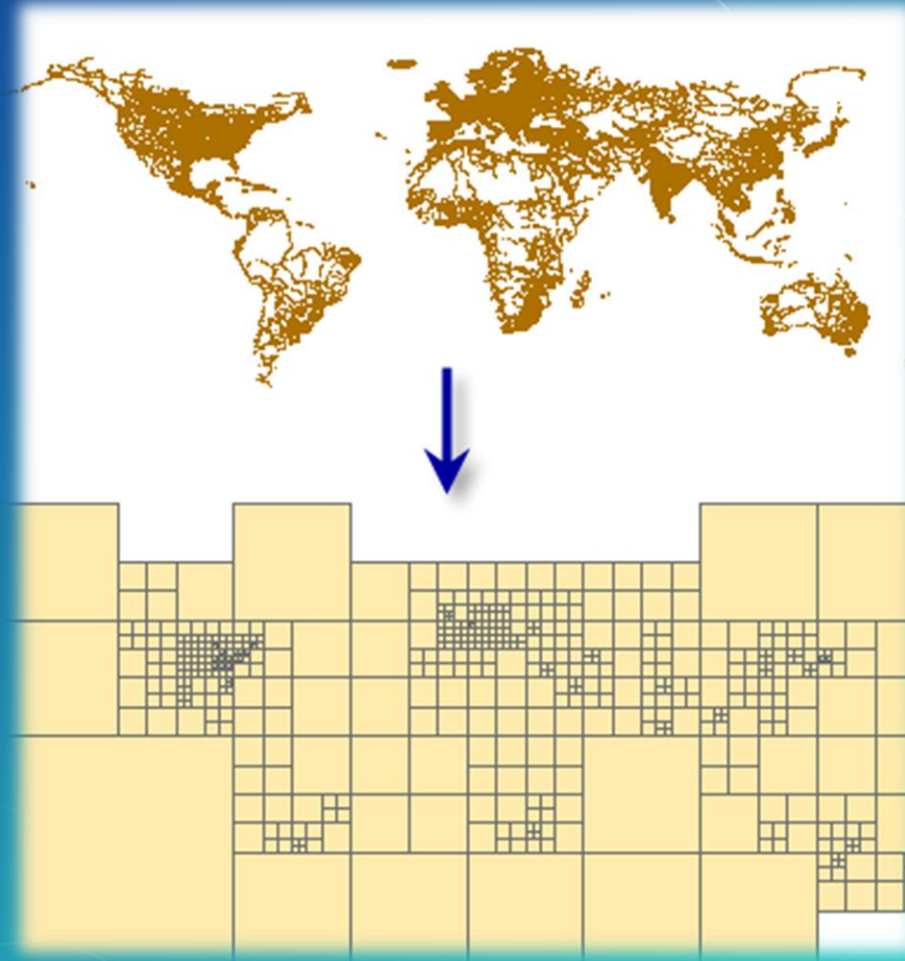


# Why use Distributed Generalization?



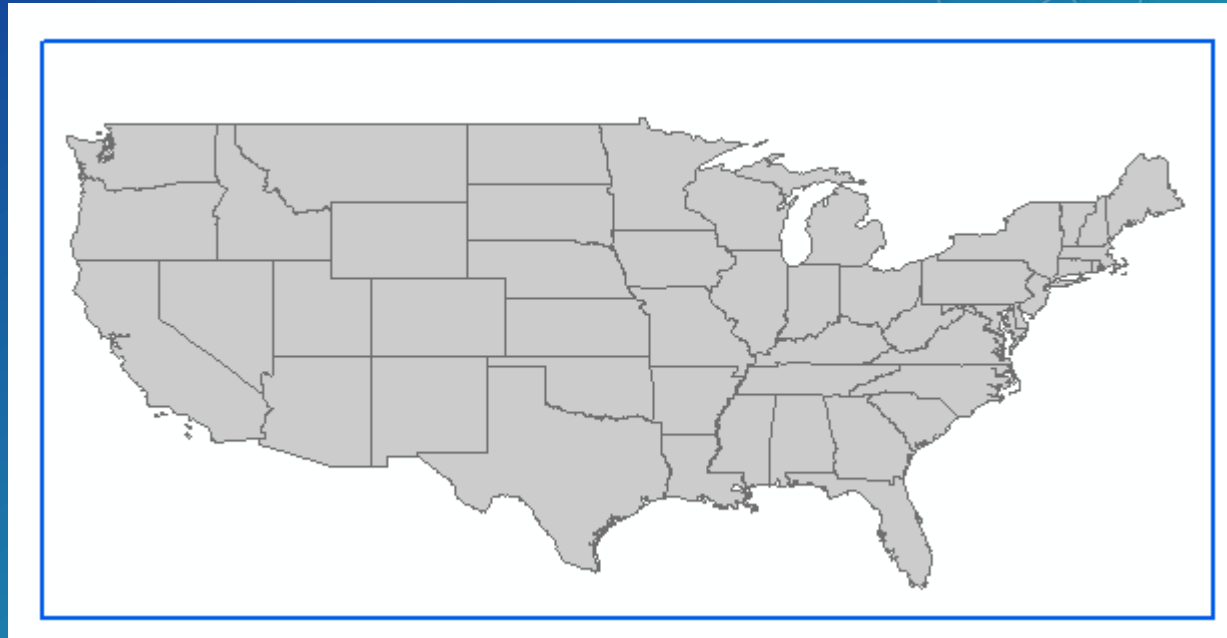
# Why use Distributed Generalization?

- Scalable
- Memory efficient
- Time efficient



## How it Works – Parent Job

- One parent job for the entirety of the work area
- Runs on a single machine



Performs any pre-processes



Child Jobs  
automatically  
created from  
Partitions



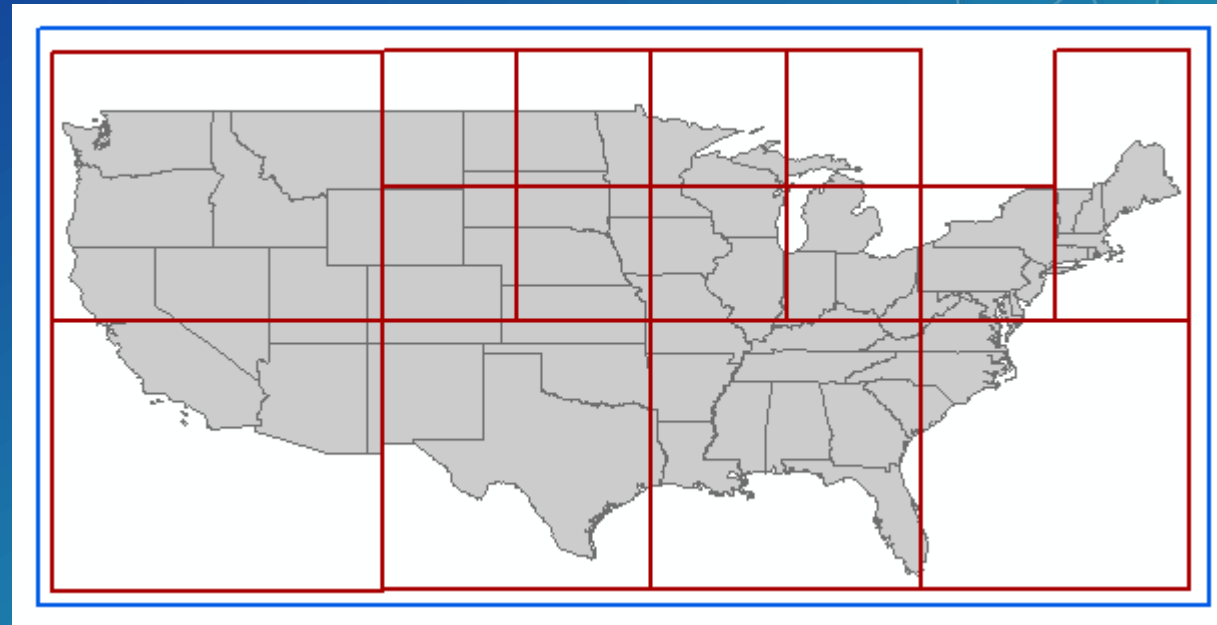
Waits until all child  
jobs are complete



Combine data and  
Perform Edge  
Matching

## How it Works – Parent Job

- Performs pre-process operations such as creating partitions



Performs any pre-processes

Child Jobs  
automatically  
created from  
Partitions

Waits until all child  
jobs are complete

Combine data and  
Perform Edge  
Matching

## How it Works – Parent Job

- Creates one child job for each partition
- Waits till all child jobs are complete



Performs any pre-processes

Child Jobs  
automatically  
created from  
Partitions

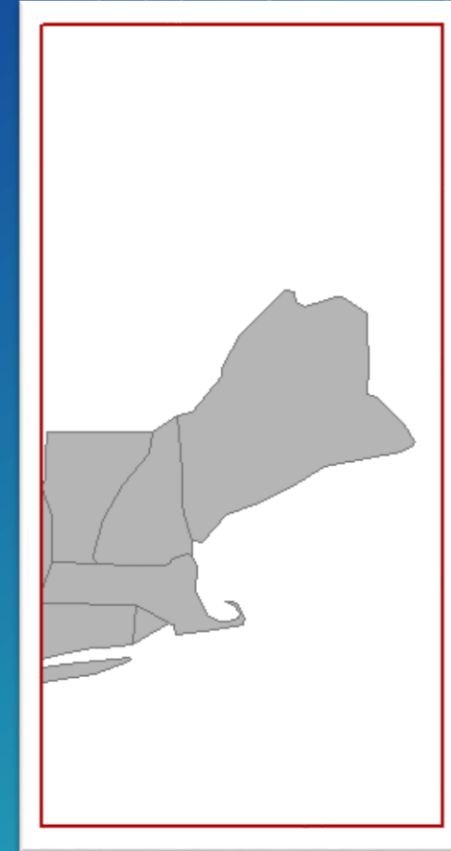
Waits until all child  
jobs are complete

Combine data and  
Perform Edge  
Matching



## How it Works – Child job(s)

- Generalization done by 1 child job
- One child process per partition



Data Clipped to  
job AOI



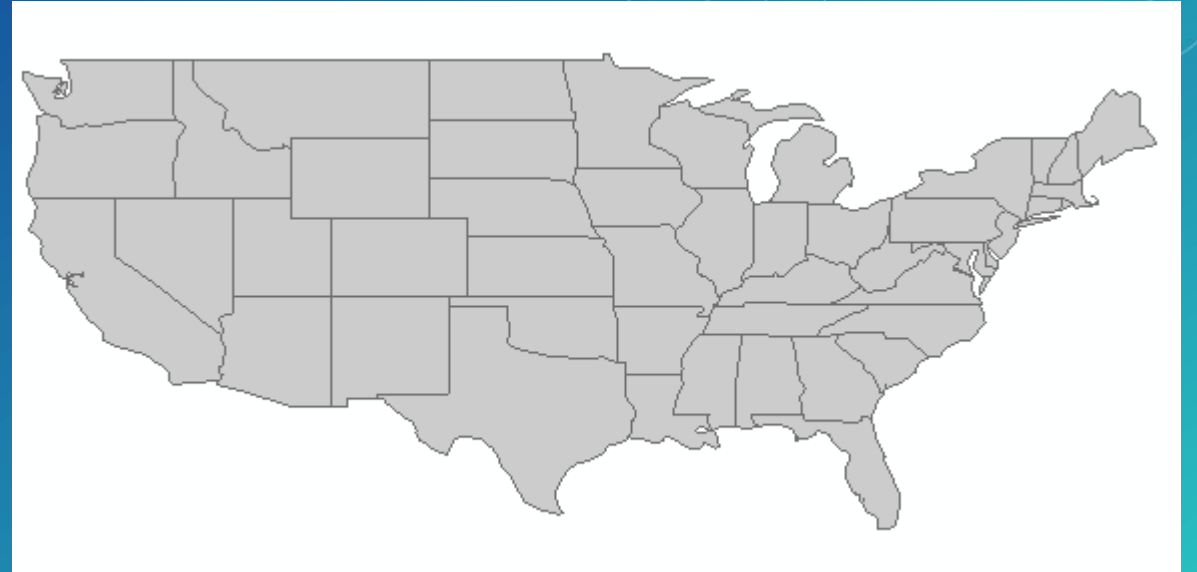
Clipped data  
generalized



Generalized data  
made available  
final processing

## How it Works – Edgematch

- Data is moved back to the parent
- Edgematching is done
- Seamless generalized database



Performs any pre-processes



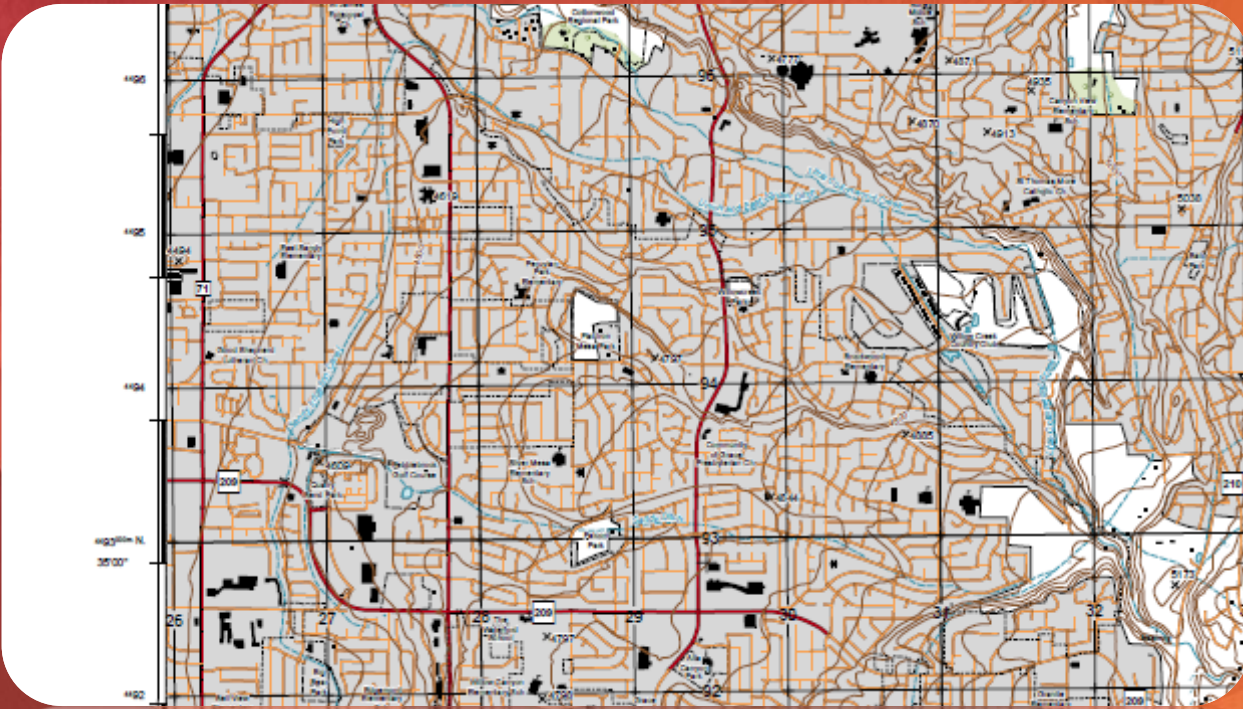
Child Jobs  
automatically  
created from  
Partitions



Waits until all child  
jobs are complete



Combine data and  
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# Production Mapping Server

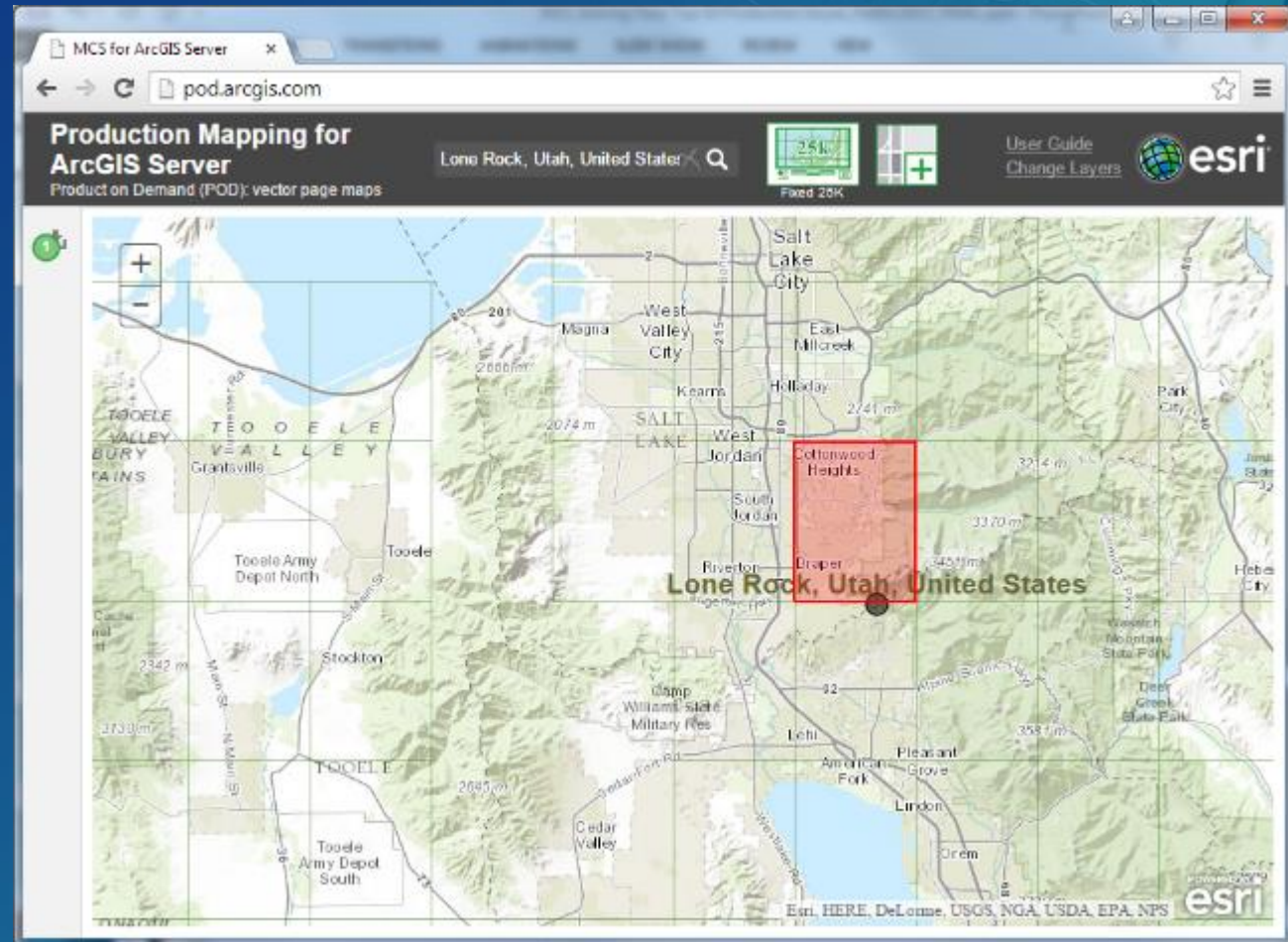


# Production Mapping Server

Product on Demand



Production  
Mapping Server





## Upcoming Releases

- **More Scales**
  - 1K/10K
- **New Generalization Models**
- **ArcGIS Pro Support**

## Resources

- The NFDD v2.0 specification is published at <https://nsgreg.nga.mil/fdd/view?i=80050/>
- CTM: <http://www.github.com/Esri/CTM>

# Want to learn more this week?

Day and Description	Type	Time	Location
Wednesday, July 12			
ArcGIS Workflow Manager: Advanced Topics	Technical Workshop	10:15 - 11:30am	SDCC Room 31
ArcGIS Workflow Manager: Integrate Tasks into your Workflow Process	Demo Theater	11:30am - 12:15pm	SDCC Demo Theater 06
Esri Production Mapping: Generating High Quality Product-on-Demand Maps Over the Web	Demo Theater	1:00 - 1:30pm	SDCC Demo Theater 18
ArcGIS Data Reviewer: An Introduction	Technical Workshop	3:15 - 4:30pm	Room 31B
ArcGIS Data Reviewer: Integrating Data Validation Capabilities into Web Applications	Demo Theater	3:30 - 4:15pm	Demo Theater 8 Enterprise
ArcGIS Workflow Manager: Integrating Geoprocessing and Python into your Business Processes	Demo Theater	3:30 - 4:15pm	SDCC Demo Theater 06
Esri Production Mapping: Automate Map Production with ArcGIS Workflow Manager	Demo Theater	3:30-4:15 pm	SDCC Demo Theater 03
ArcGIS Data Reviewer: Implementing Data Quality Reporting in Web Clients	Demo Theater	4:30 - 5:15pm	Demo Theater 8 Enterprise
Thursday, July 13			
Supporting Daily Workflows with Tools	Demo Theater	3:30-4:15pm	SDCC Demo Theater 03
ArcGIS Data Reviewer: Advanced Data Validation	Technical Workshop	8:30 - 9:45am	Room 31A
ArcGIS Data Reviewer: Leveraging Geoprocessing for Data Validation	Demo Theater	9:30 - 10:15am	Demo Theater 6 Spatial Data Mgmt
ArcGIS Data Reviewer: Validating Linear-Referenced Events	Demo Theater	10:30 - 11:15am	Demo Theater 6 Spatial Data Mgmt



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