Outline

- Introduction – LAS dataset
- Demos
- ArcObjects API
  - Access LAS files and their properties
  - Read point records and attributes
  - Edit point class codes
  - Create derivatives
- Resources
LAS Dataset

- Introduced with ArcGIS 10.1
- Reads lidar directly from LAS files
- Point and surface based representations
- Class/interface definitions inside GeoDatabaseExtensions
- Use of API requires 3D Analyst extension
Examples - demos

- Classify model key points
- Classify points relative to height above ground
- Extract breaklines
- Classify rooftop points
- Clip, filter, and project LAS files to new files
Model Key Points – Intelligently Thinned

- Read ground points – retain record IDs
- Build TIN – use IDs as node tags
- DecimateTinNodes to thin based on z-tolerance
- Change class codes of retained points to 8
Height Above Ground

- Construct ground surface
- Retrieve non-ground points
- Interpolate z from ground for their respective xy positions
- Subtract ground-z from point-z to get height
- Assign class codes
Extract Breaklines – Hydro Flattening

- Retrieve TIN for display extent
- Find triangle from digitized seed point
- Use TIN topology to flood outward based on edge length
- Extract flooded area as polygon
Classify Rooftop Points

- Retrieve ground TIN for display extent
- Retrieve TIN made from last returns
- Use custom TIN triangle filter to flood rooftop from digitized seed point. Constraints are slope and height above ground.
- Edit class codes for points in flooded area
Clip, Filter, Define Projection, Project

• Find LAS files with extents that intersect area of interest (AOI)
• Clone filter from layer
• Adjust AOI if clipping
• Set/get new spatial reference if projecting
• Call ILasDataset.Export
Key Objects

- LasDataset
- LasDatasetLayer
- LasFile
- LasFilter
- LasSurface
- LasPointEnumerator
Las Dataset – Key Interfaces

- ILasDataset
- ILasDatasetEdit
- ILasPointCloud
- ILasPointEdit
LasFile

- Las file header info and, if calculated, summary statistics for point records
LasFilter

- Used on calls retrieving points or surfaces
- Area of interest
- Class codes/flags and returns
- Constraint feature classes
LasSurface

- Extract TIN subsets
- Raster interpolation
- Feature interpolation
LasPointEnumerator

- Read point records
- Reads are done in chunks (arrays) of user defined size
- Use of WKSPointZ
Resources

• 3D resource center:

• Sample code:
  - Email: ccrawford@esri.com

• GeoDatabaseExtensions Object Model Diagram
  - Comes with the SDK

• ArcObjects API reference
  - Member help
Thank You!

Please fill out the Survey: www.esri.com/devsummit

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