Esri LAS Optimizer
An Introduction

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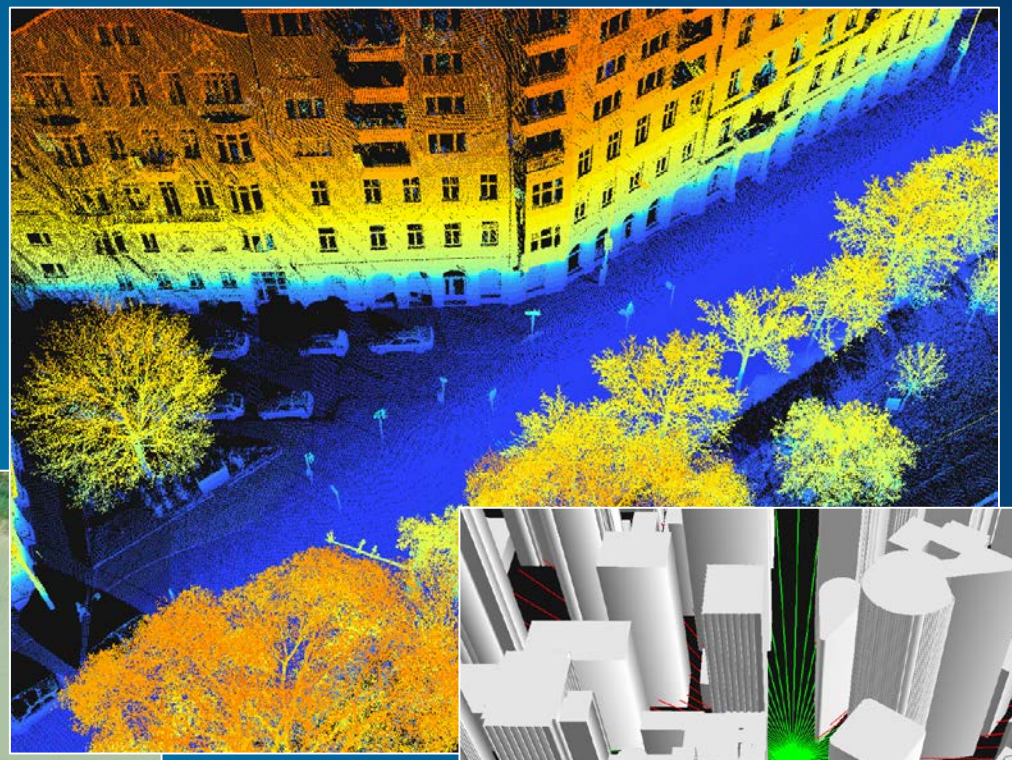
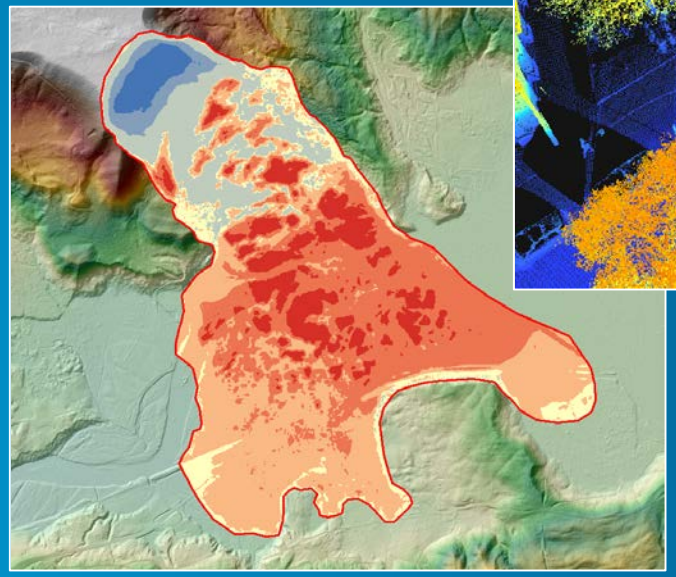
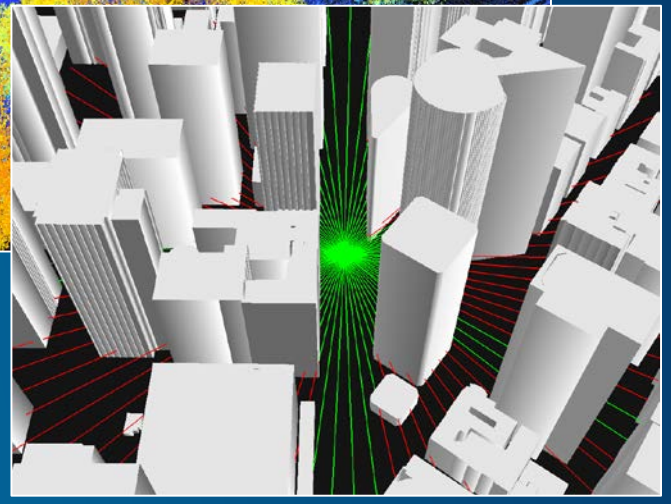
Outline

- LAS format basics
- Devil in the details
- New Optimized LAS format

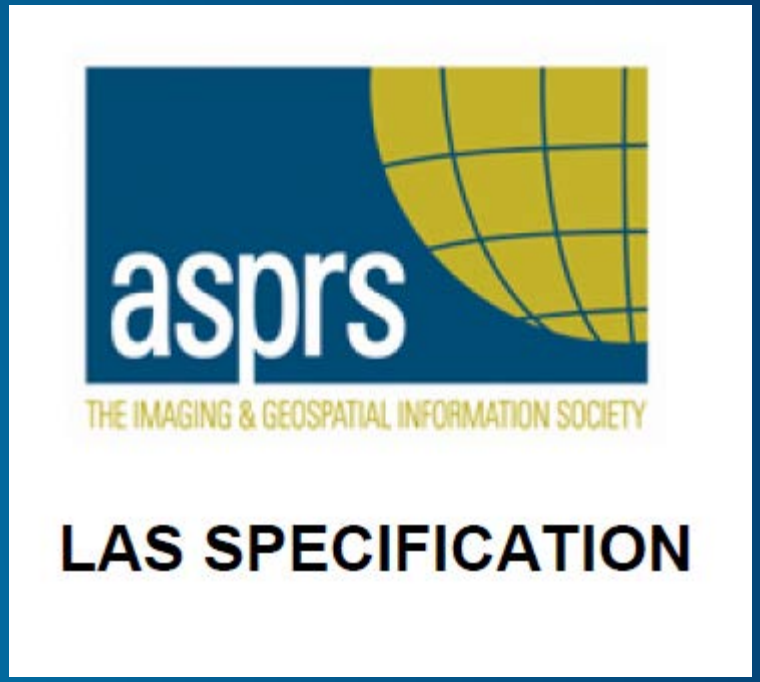






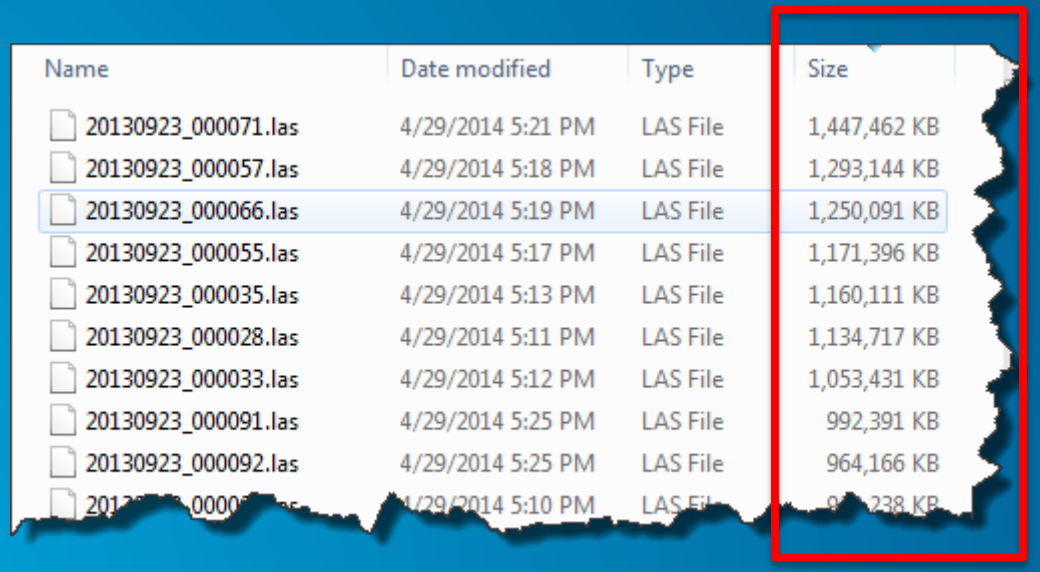
About LAS

- LAS(er) is an industry standard file format for lidar
  - Overseen by ASPRS
  - Esri has a member on the LAS committee
- Initially conceived as an exchange format
- Not designed for exploitation



What we know

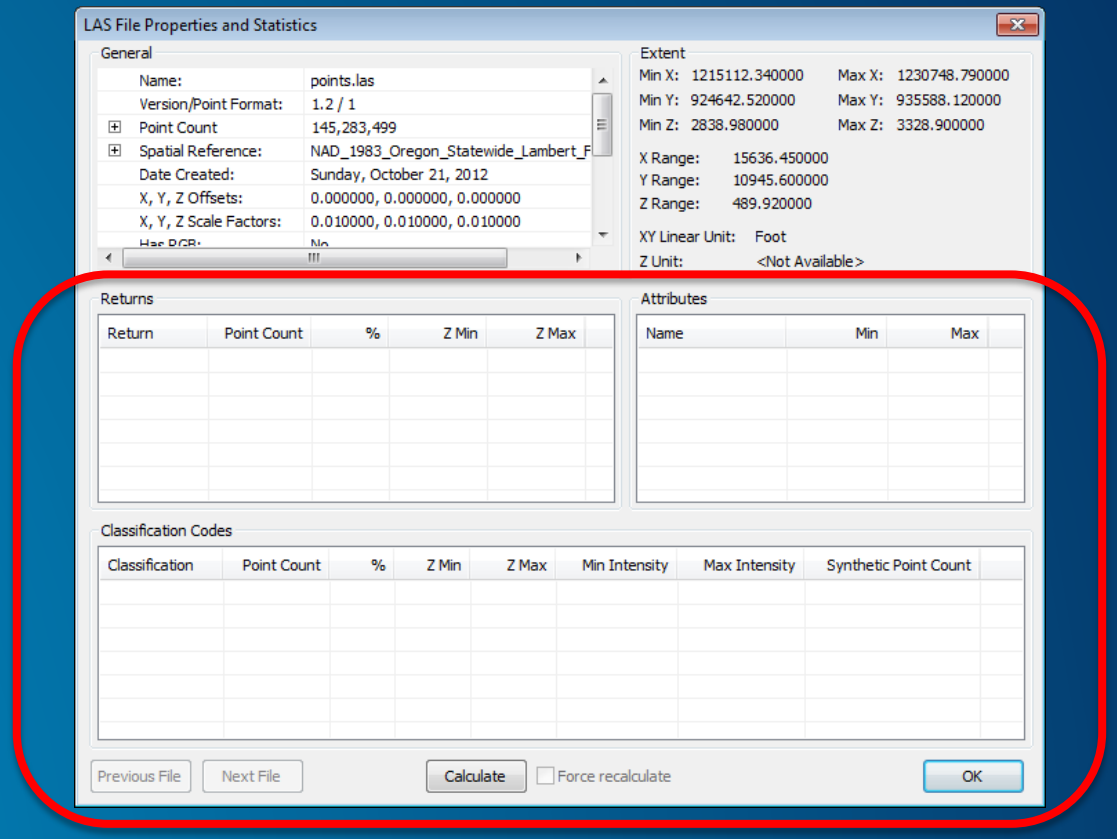
- The amount of data is so large that conversion, import, etc., is painful
- Especially without a preliminary quality review
- People want an exploitation format



Name	Date modified	Type	Size
20130923_000071.las	4/29/2014 5:21 PM	LAS File	1,447,462 KB
20130923_000057.las	4/29/2014 5:18 PM	LAS File	1,293,144 KB
20130923_000066.las	4/29/2014 5:19 PM	LAS File	1,250,091 KB
20130923_000055.las	4/29/2014 5:17 PM	LAS File	1,171,396 KB
20130923_000035.las	4/29/2014 5:13 PM	LAS File	1,160,111 KB
20130923_000028.las	4/29/2014 5:11 PM	LAS File	1,134,717 KB
20130923_000033.las	4/29/2014 5:12 PM	LAS File	1,053,431 KB
20130923_000091.las	4/29/2014 5:25 PM	LAS File	992,391 KB
20130923_000092.las	4/29/2014 5:25 PM	LAS File	964,166 KB
2013 0000	/29/2014 5:10 PM	LAS Fil	238 KB

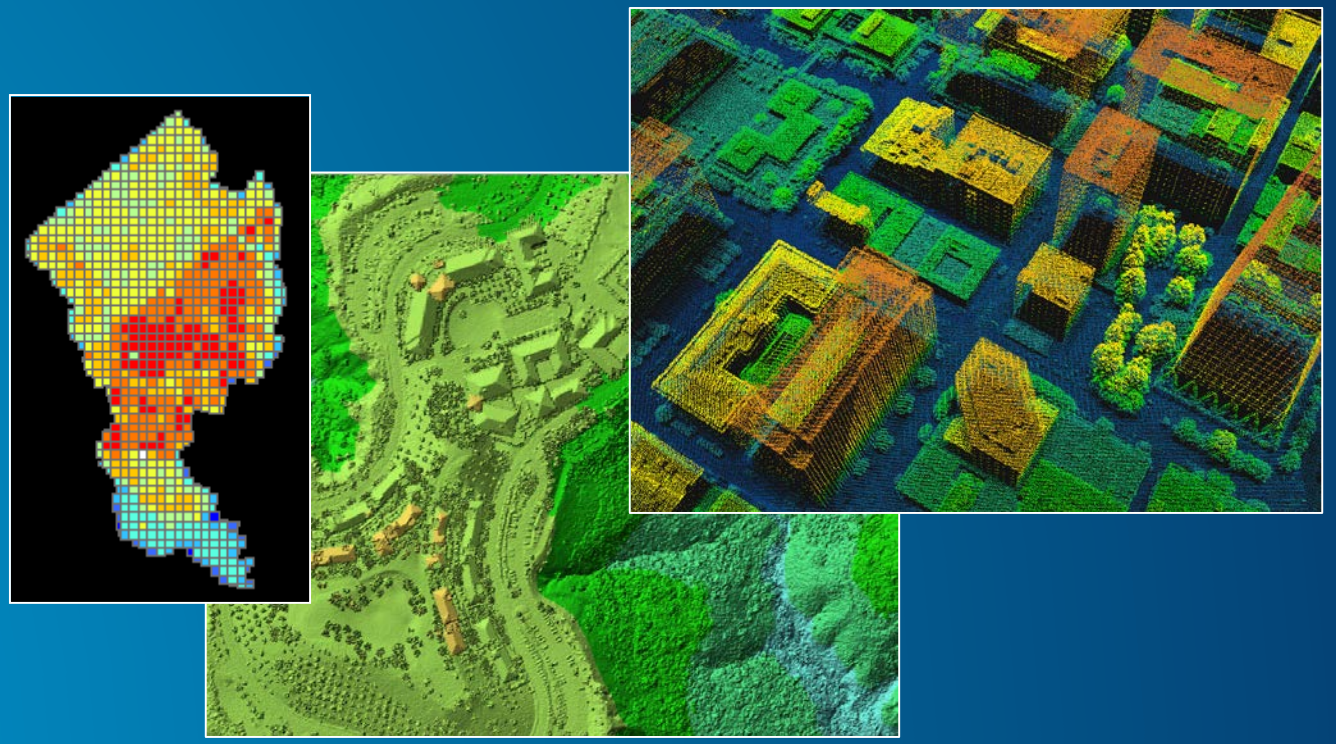
Issues With LAS

- Lack of basic information, such as:
  - Class codes
  - Height range per class
  - Intensity value range
  - …
- Lack of spatial index
  - Any spatial query requires a read through all points
- Size
  - Simple but big
  - I/O bottleneck



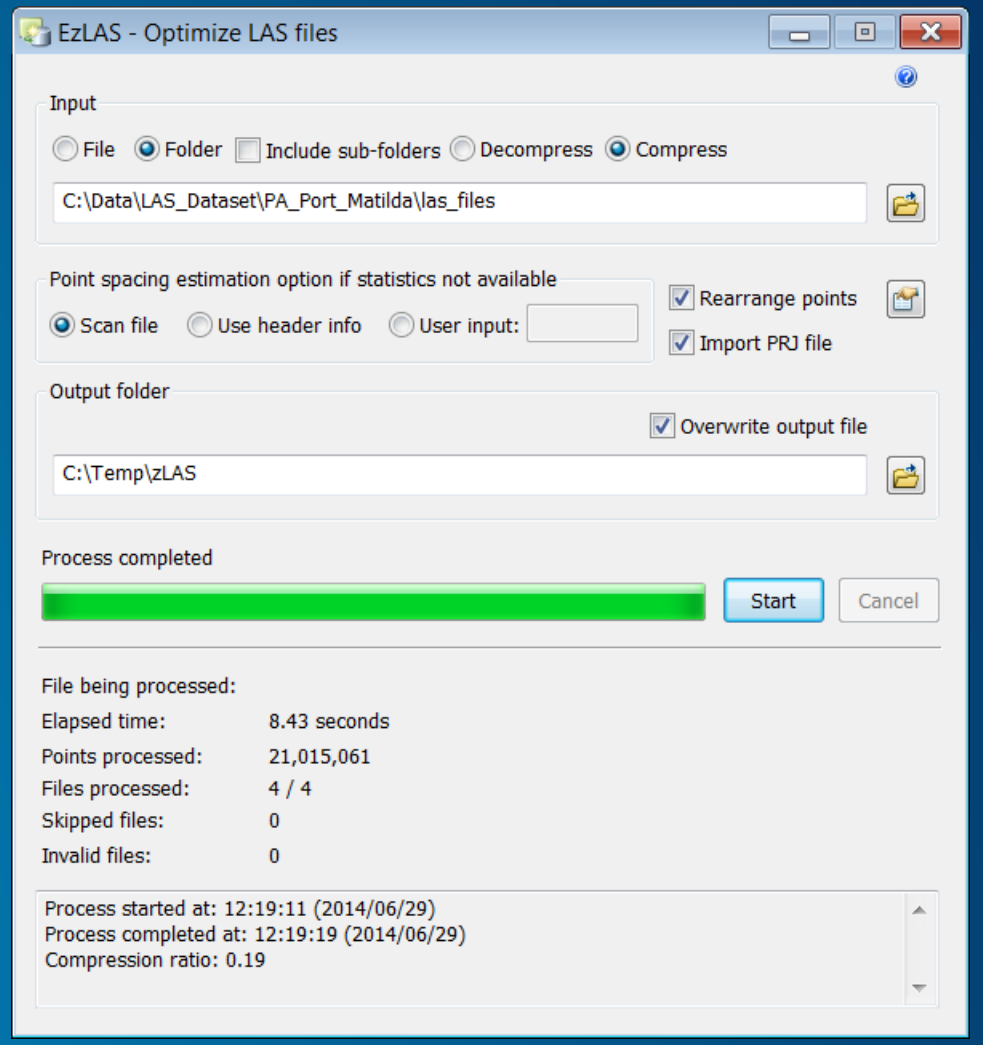
What Esri Has Done

- ArcGIS supports direct use through LAS Dataset and Mosaic Dataset
- Statistics, attribute index, and spatial index added as sidecar file (*.lasx)
- Ability to ‘Rearrange’ point records
- Introduced ‘Optimized LAS’



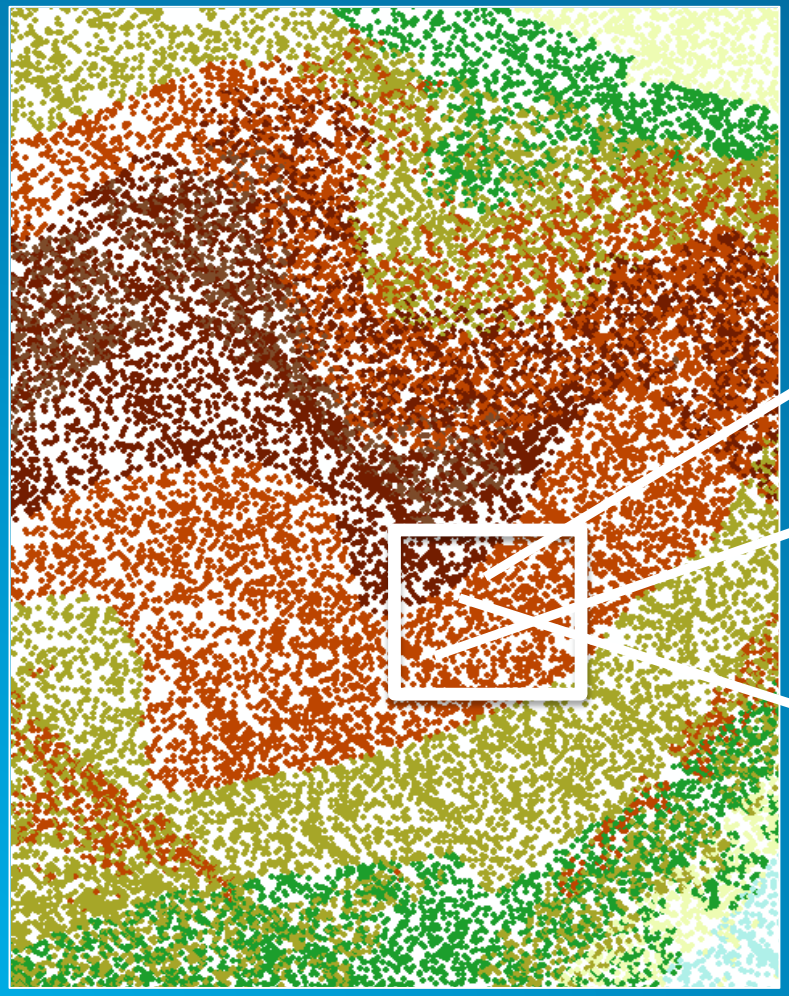
Optimized LAS

- **Lossless compression***
- **Statistics**
- **Indexing**
- **Optional point sorting (‘rearrange’)**
- **Optional projection definition/repair**
- **Directly usable in ArcGIS as LAS**



* Optional items will create difference b/w input and output but there is no loss of information

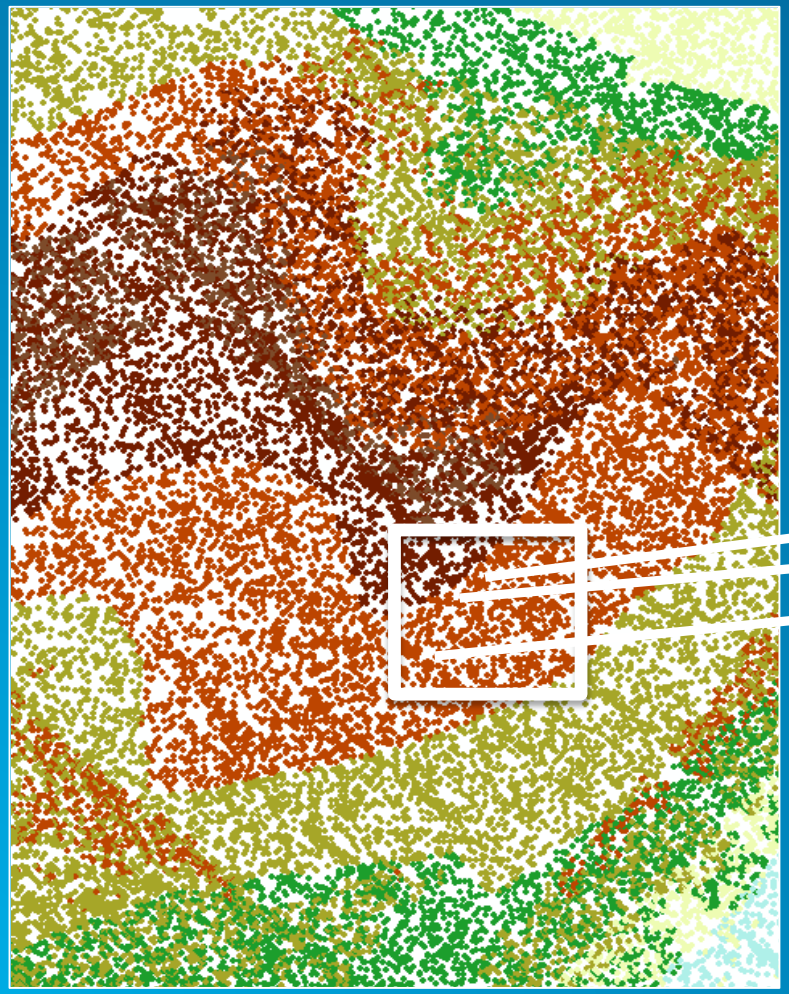
Rearranging Point Records



Spatial distribution of points

Physical location in file

Rearranging Point Records

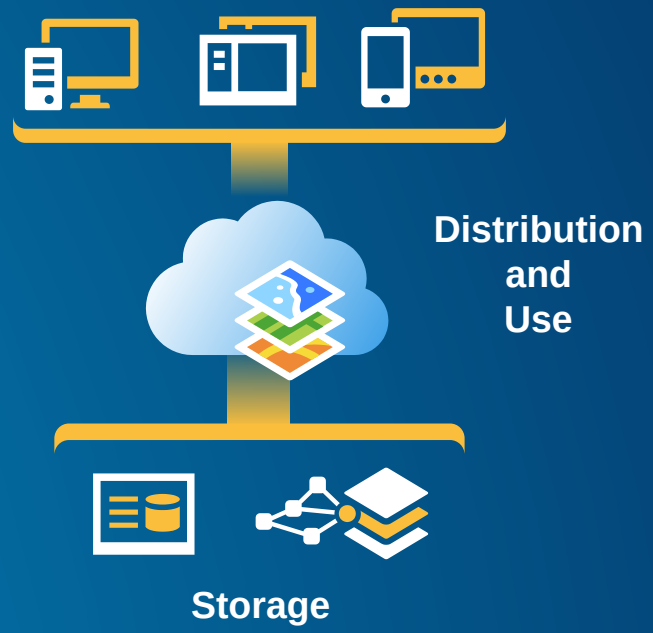


Spatial distribution of points

Physical location in file

Optimized LAS Is Free

- Anyone can download and use EzLAS app
- Don’t need ArcGIS to benefit from it
- Compression alone is useful
  - Archiving
  - Distribution
- Additional benefit with ArcGIS
  - Direct read

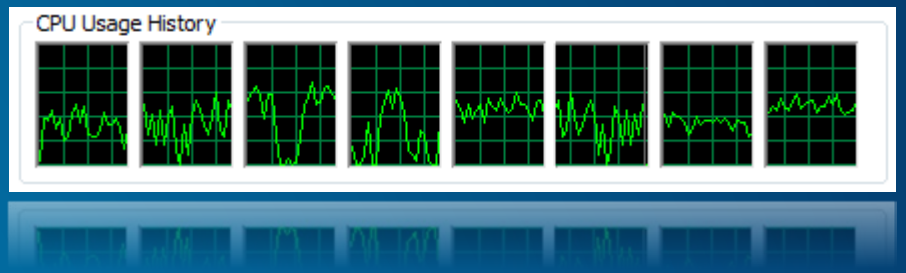


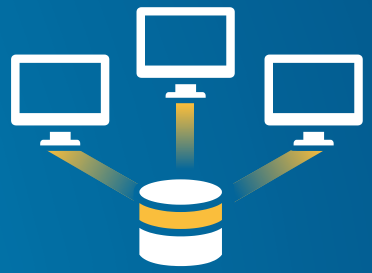
Best Practice

- If LAS will be processed on local machine:
  - Can stay in LAS format
  - Build statistics and spatial index (lasx file) before working with data
  - Consider having data provider do this up front
- If LAS is to be archived, distributed, used over a network, or local storage is in short supply:
  - Use Optimized LAS (zLAS)
  - Take advantage of ‘rearrange’ option
  - Consider having data provider deliver in this format

Near Future

- ArcGIS 10.3
  - Parallel decompression in ArcGIS apps
  - Support for LAS 1.4
- I/O libraries for 3rd party apps
  - Allow other apps to read and write zLAS
  - Free





One Format /
Multiple Apps

Thank you…

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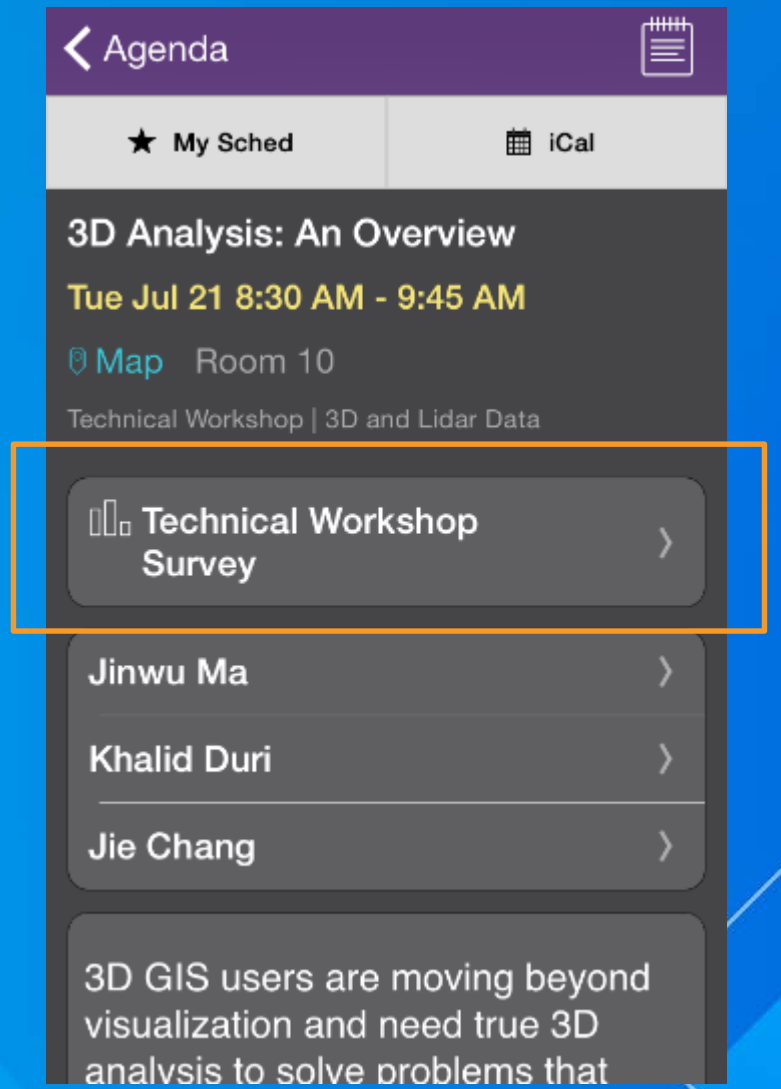
  - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments



Understanding our world.