



Working with Elevation Services

Cody Benkelman

Outline

- **What is included?**
 - **Data and Tools**
- **How can I use it?**
 - **Modes of use**
 - **Client Applications**
- **What are the details?**
 - **Technical and Legal**

Contents

AGOL World Elevation



World Elevation Services - Data Sources

Public domain elevation data – 1.6 TB (LZW compressed TIF)

1 km Bathymetry (GEBCO)

250m GMTED

90 m SRTM & EarthEnv-DEM90

60 m NED (AK)

50 m OS (UK)

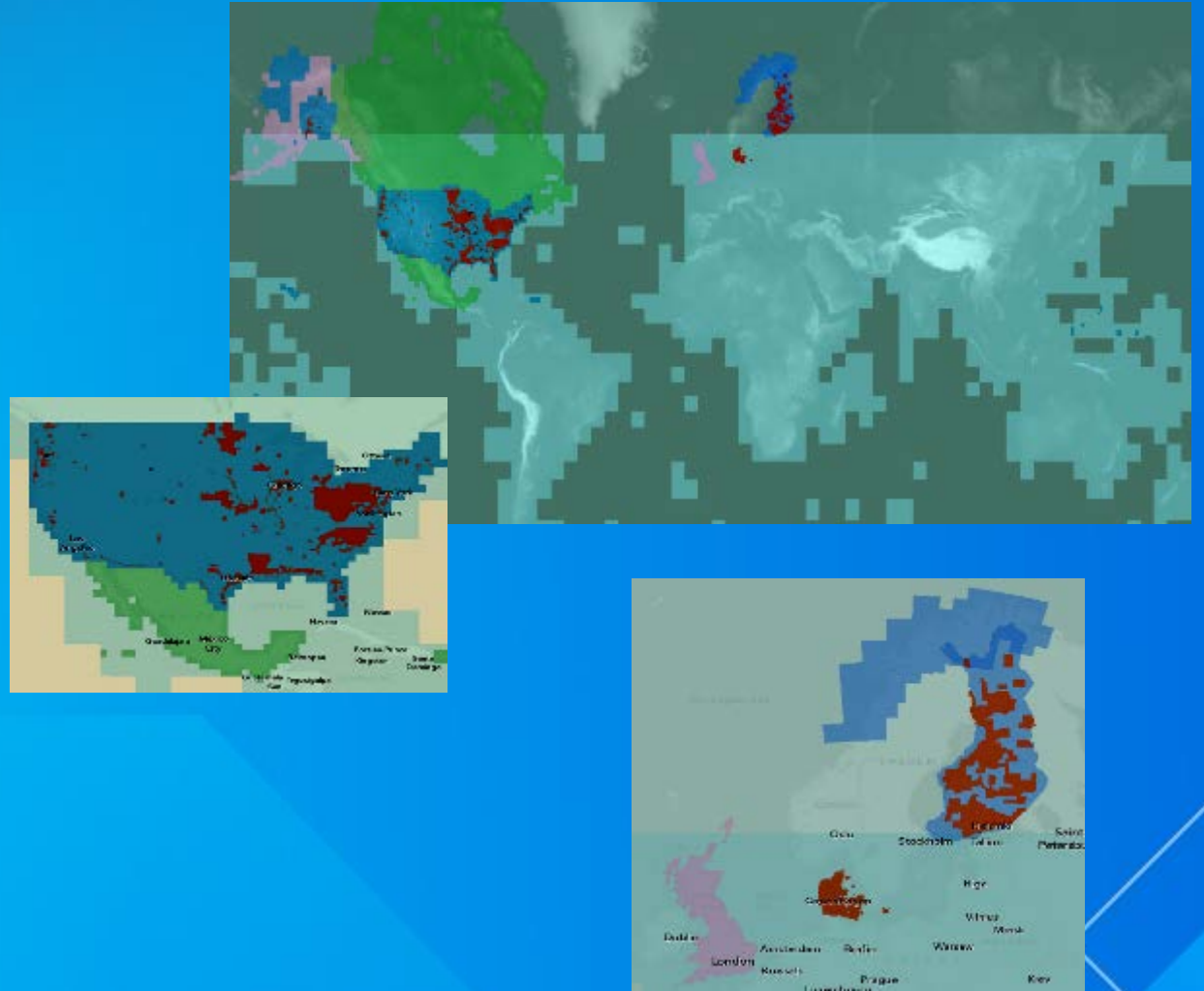
30 m SRTM (most of world)

30 m NED (North America)

10 m (USA & Norway)

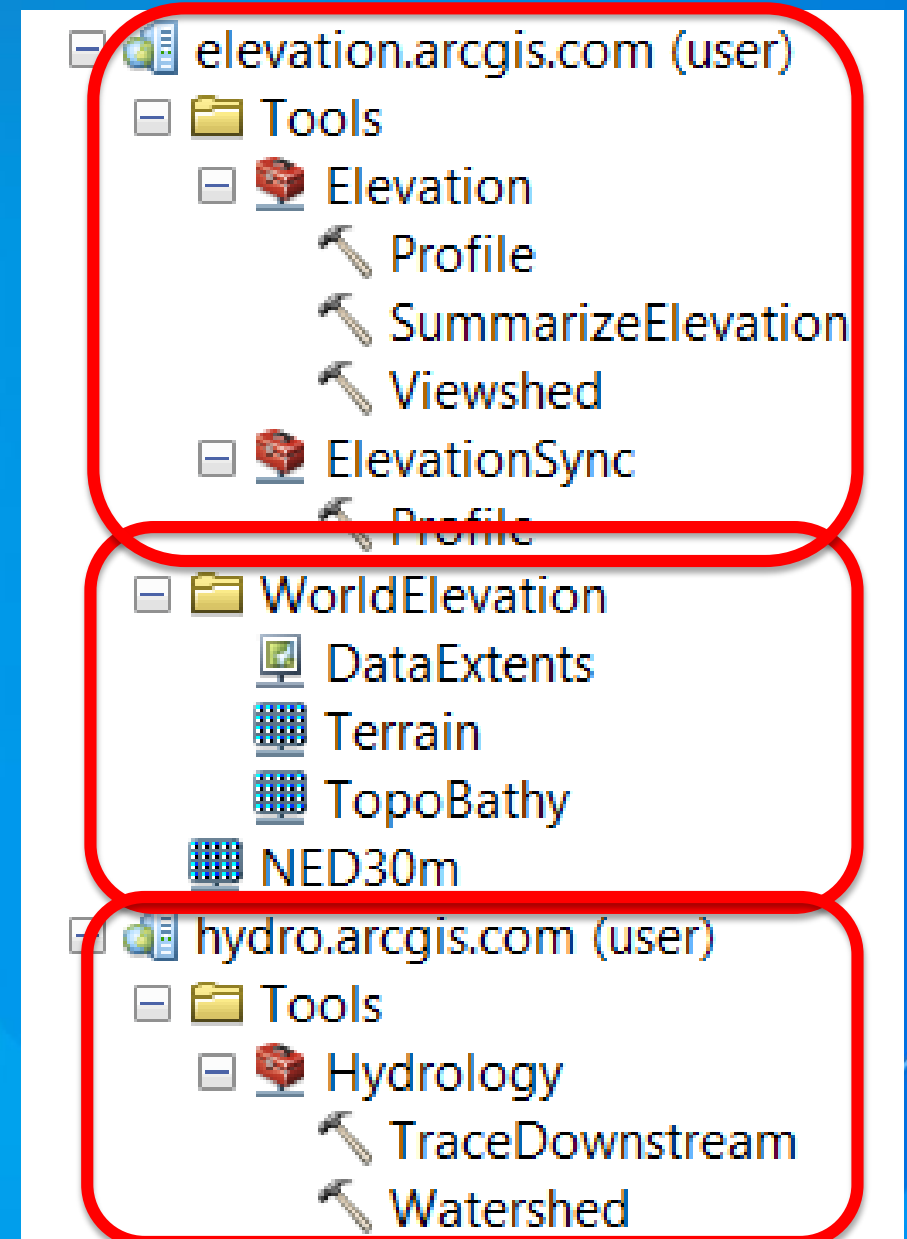
3 m (partial USA, Denmark, Finland)

...more coming each year



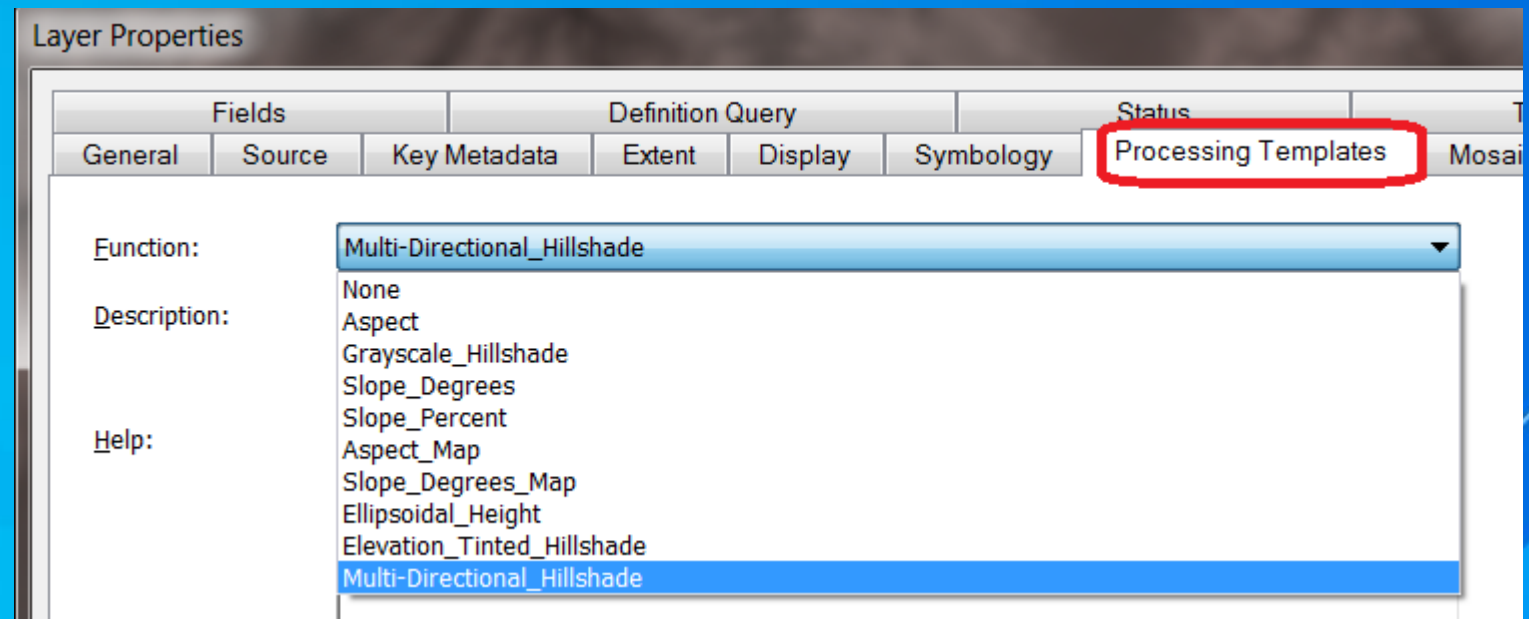
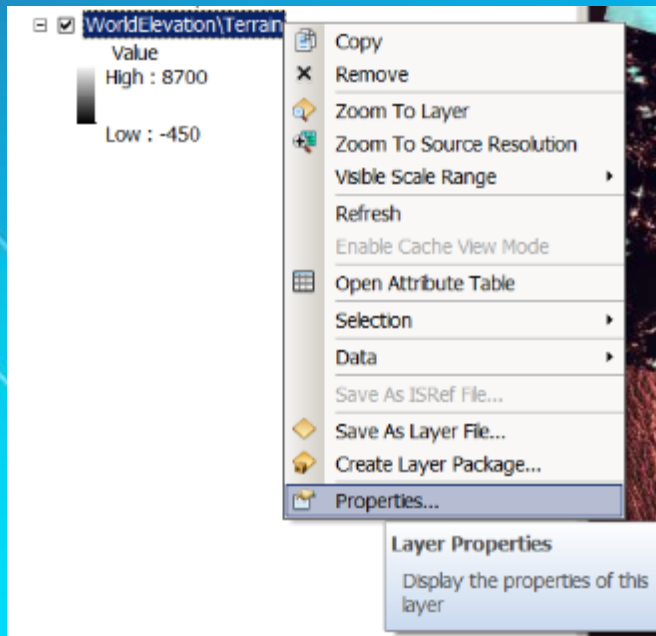
Services (as viewed in ArcGIS)

- **Image service: elevation values**
 - Terrain
 - TopoBathy
 - Dedicated NED 30m (USA)
- **Server-side Geoprocessing (GP) services**
 - Profile
 - Summary Statistics
 - Viewshed
 - Watershed (Hydro)
 - Trace Downstream (Hydro)



Contents – “Terrain” Image Service

- Default “Terrain” (orthometric height)
- 9 Functions to create on-the-fly products



Connecting and Using

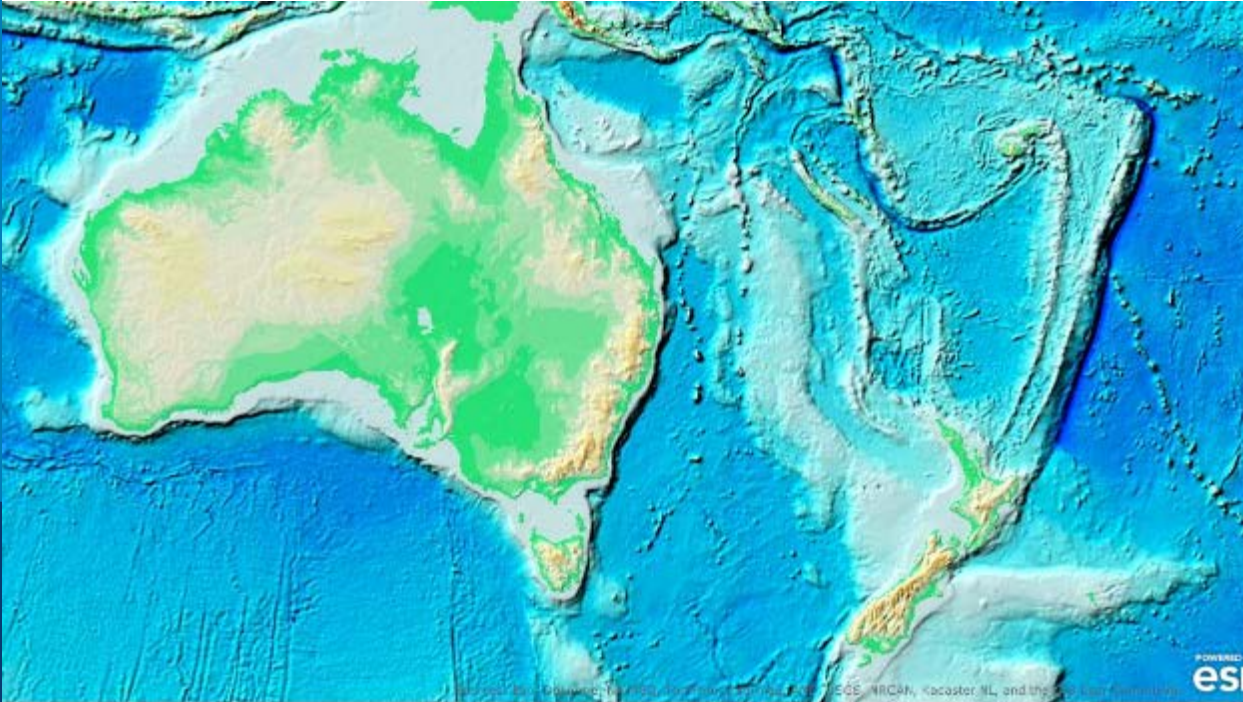
- AGOL Group: “Elevation Layers:
 - Shortcut: <http://esriurl.com/6548>
 - Multiresolution service is “Terrain”
 - Select Raster Function
- Authentication
 - ArcGIS, AGOL map
 - ArcGIS Online Subscription Account
 - Custom REST-based apps
 - Acquire token
 - Pass token in REST request

Elevation Layers

Terrain
A multi-resolution layer providing access to elevation values for use as a base layer, aspect, and hillshade.
Imagery by esri
Last Modified: June 26, 2014
★★★★★ (7 ratings, 3 comments, 41,370 views)

Terrain: Elevation Tinted Hillshade
This layer provides access to a tinted hillshade for use as a base layer.
Imagery by esri
Last Modified: June 26, 2014
★★★★★ (1 rating, 0 comments, 11,887 views)

Ground Surface Elevation - 30m



Using AGOL World Elevation

Modes of Use

AGOL World Elevation

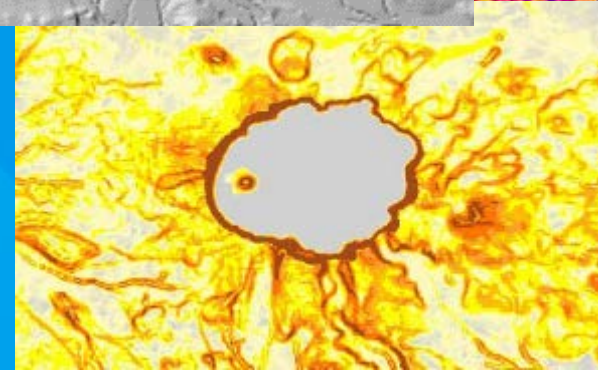
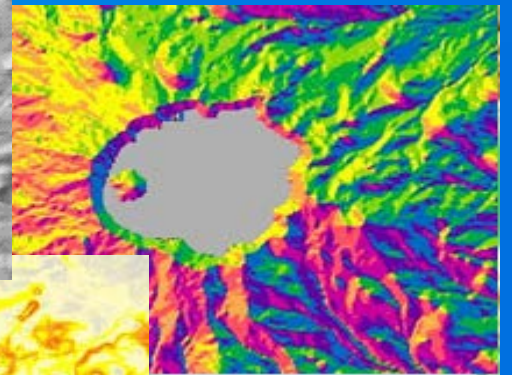
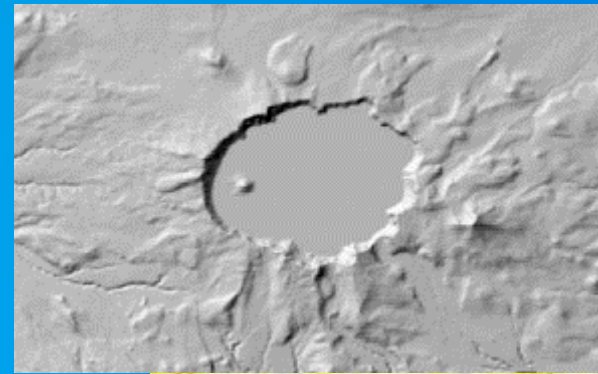


“How can I use these services?”

- **Usage Modes**
 - **Visualization**
 - **Data Values**
 - **Geoprocessing**
- **Client Applications**
- **End Users vs. Developers**

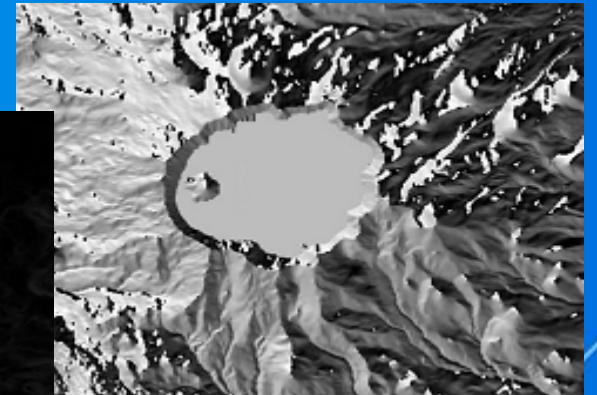
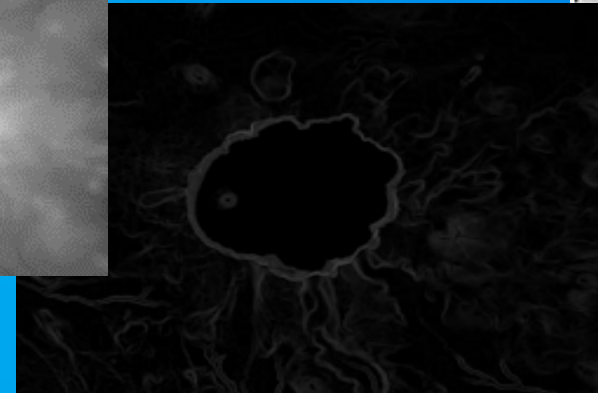
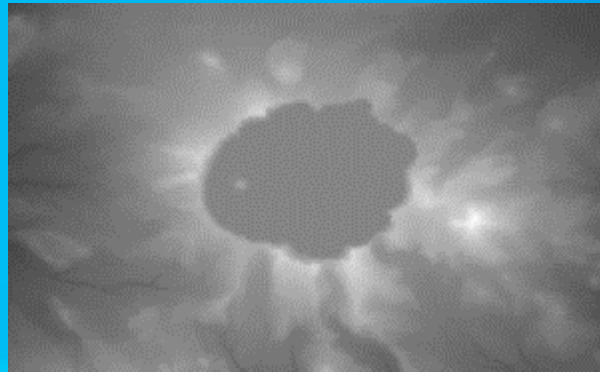
Usage Modes

- Visualization
 - Hillshade (Grayscale, Elevation Tinted)
 - Slope Map & Aspect Map



Usage Modes

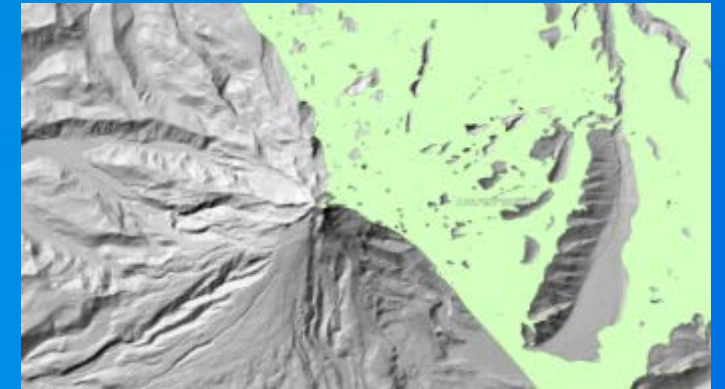
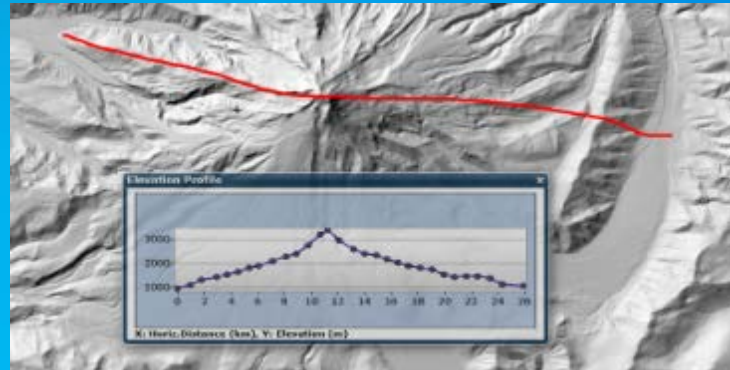
- **Visualization**
 - **Hillshade (Grayscale, Elevation Tinted)**
 - **Slope Map & Aspect Map**
- **Data Values**
 - **Orthometric & Ellipsoidal Height - for Orthorectification, Local Analysis...**
 - **Slope & Aspect**



Usage Modes

- Visualization
 - Hillshade (Grayscale, Elevation Tinted)
 - Slope Map & Aspect Map

- Data Values
 - Height
 - Slope & Aspect



- Server-side Geoprocessing Services
 - Viewshed, Profile, Statistics, Watershed, Trace Downstream

Client Applications

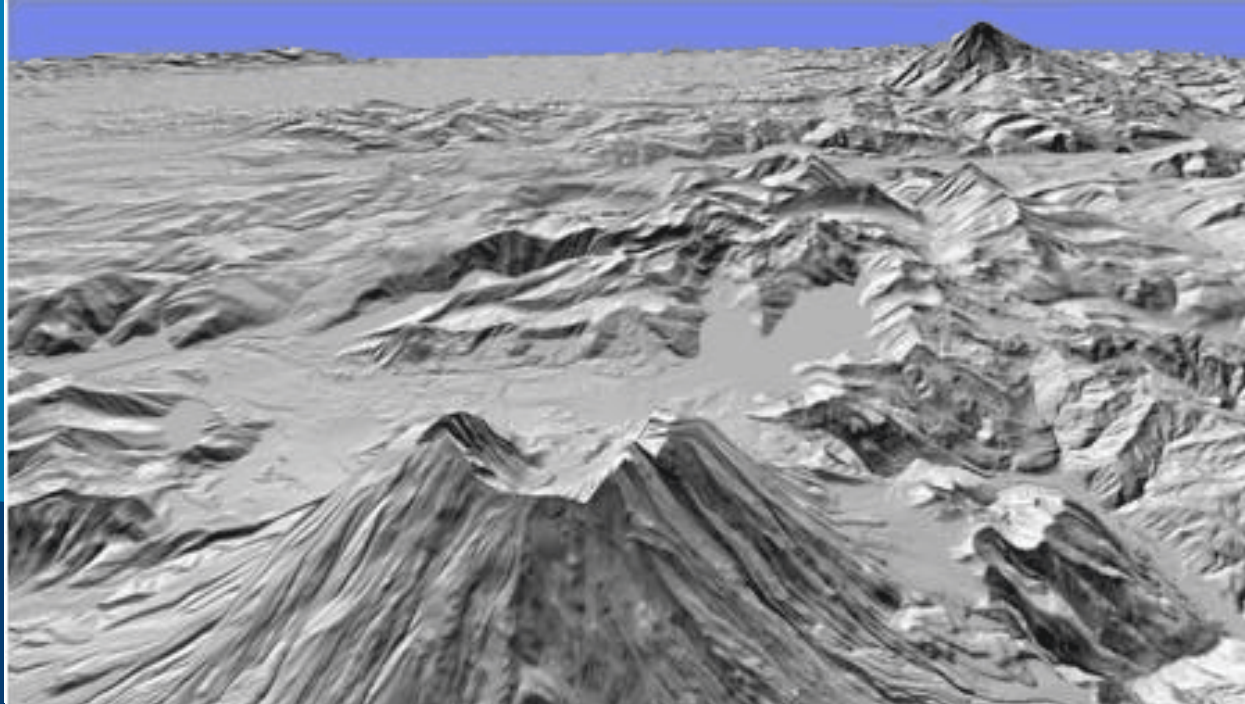
- ArcGIS Online web map

Client Applications

- ArcGIS Online web map
- ArcGIS Desktop 10.1.1 or later

Client Applications

- ArcGIS Online web map
- ArcGIS Desktop 10.1.1 or later
- Custom web applications
 - Cartography
 - Data for elevation analysis
 - Custom geoprocessing
 - ArcGIS API's vs. OGC (WMS, WCS – limited functionality)



Geoprocessing Services

Details...

AGOL World Elevation



Terms of Use

- ArcGIS Online Subscription account
- Services with no cost in terms of AGOL Credits:
 - Image services & functions (elevation, hillshade etc.)
 - ElevationSync analysis: Profile
- Geoprocessing services that will consume Credits:
 - Hydrology analysis: Trace Downstream and Watershed
 - Elevation analysis: Profile, Summarize Elevation, and Viewshed
 - ***1 credit per 1000 features!***

That's not exactly what I wanted...

For organization with their own elevation data

- **In-house data collections**
 - Proprietary data
 - Lidar with DSM
- **Offline use/Behind your firewall**

“Best Practices for Managing Lidar Data”

Wednesday 3:15 – 4:30, Room 04

“...show how additional data can be incorporated along with the challenges and solutions for combining different data sources, resolutions, projections and accuracies...”

Resources

World Elevation group on ArcGIS Online:

<http://esriurl.com/6548>

FAQs for World Elevation services:

<http://esriurl.com/ElevationFAQ>

Recorded Live Training Seminar:

<http://esriurl.com/ElevationLTS>

Community Elevation Contributions:

<http://esriurl.com/CommunityElevation>

For developers:

<https://developers.arcgis.com/rest/elevation/>

**Open for
questions...**

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