



# WORKING WITH 3D ANALYST AND CITYENGINE

Nathan Shephard, Eric Wittner

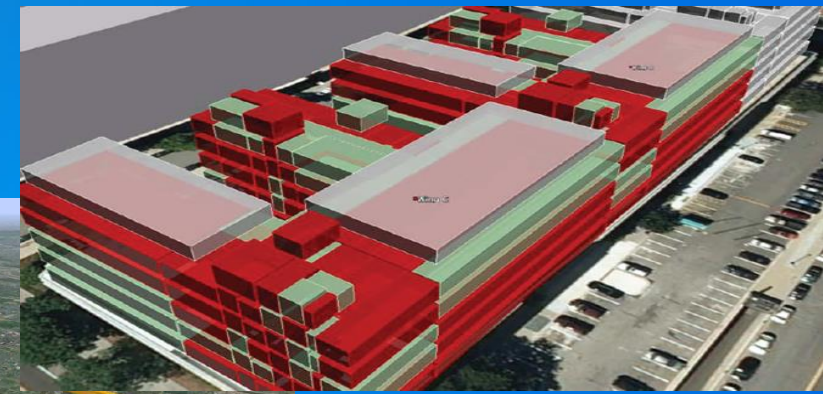
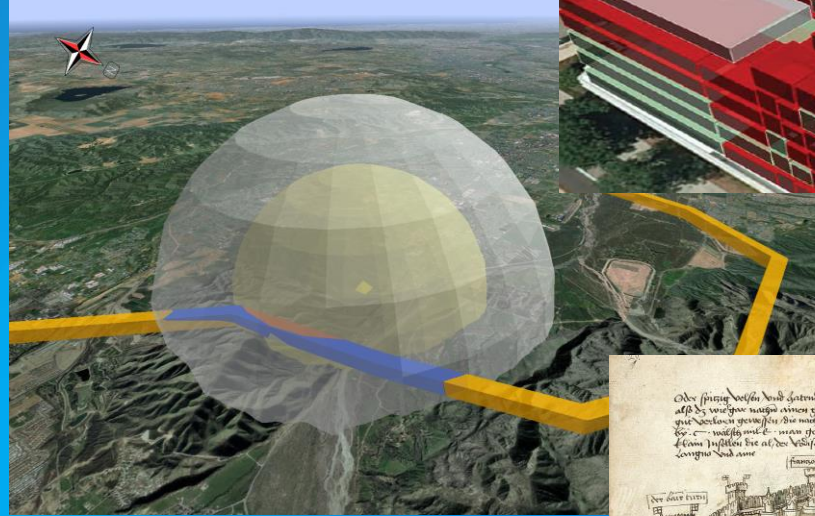
# Why work in 3D?

**“It looks cool, man!”**

*Which really means...*

- See vertically stacked content
- Solve 3D spatial problems
- Show data in an easy-to-understand form
- Invite imagination and understanding

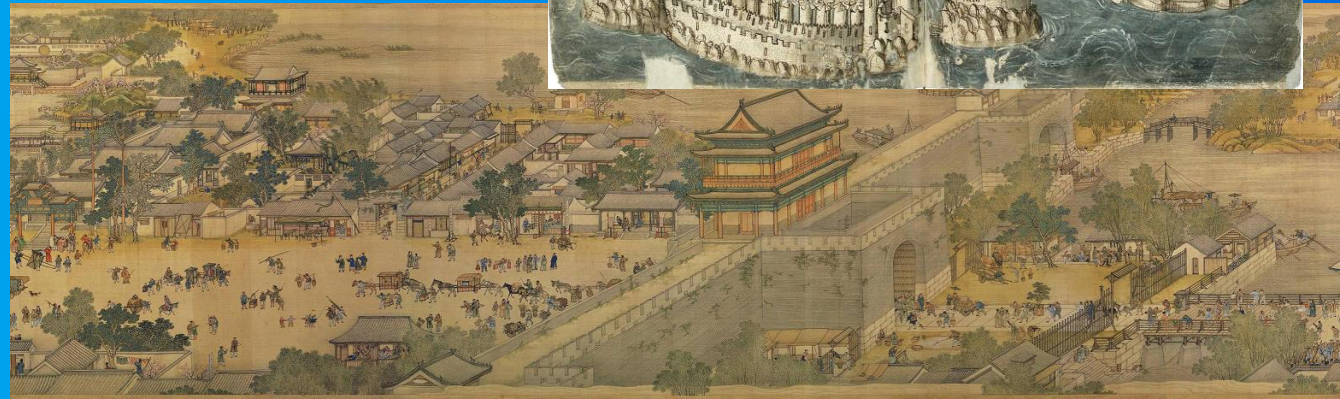
***3D is how we humans see the world***



Rhodes, Greece  
Konrad Grünenberg (1487)



“Along the River”, Keifeng, China  
Zhang Zeduan (1084-1145)





# 3D GIS



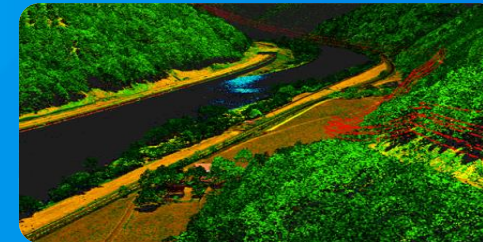
Multiscale 3D Models



ArcGIS for 3D Cities



3D Geodesign



Native lidar support



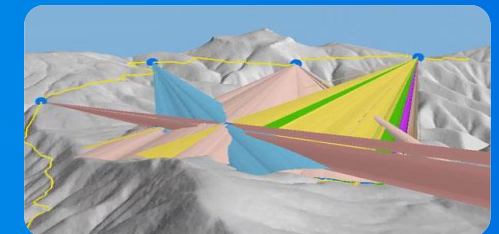
Surface modeling



Share 3D scenes



Integrated 3D



3D Analysis

*Supporting Defense, Local Government, Scientists, Urban Planners, Facilities Managers, Geologists, Architects, Landscape Planners...*

# Applications

- ArcGIS 3D: **ArcScene**, **ArcGlobe**, **ArcGIS Pro**
  - Authoring 3D Scenes
  - Managing Content
  - Running Analysis
  - Sharing Information



- **CityEngine**
  - Procedural content creation
  - 3D object (multipatch) editing



# Cross-application workflows

## 1) **Sharing 3D web scenes**

- a. Clip-and-ship small volumes of data
- b. Service-based sharing of larger datasets

## 2) **Creating 3D objects (via Geoprocessing)**

- a. Using pre-authored CityEngine rule packages

## 3) **Creating 3D objects (interactively in CityEngine)**

- a. Writing / adjusting new rules
- b. Interactively editing new 3D models

## 4) **Symbolizing simple geometry as 3D Objects (in Pro)**

- a. Esri symbols with an embedded rule package
- b. Custom symbols created from a rule package

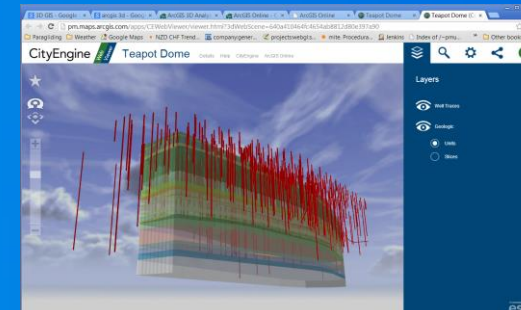
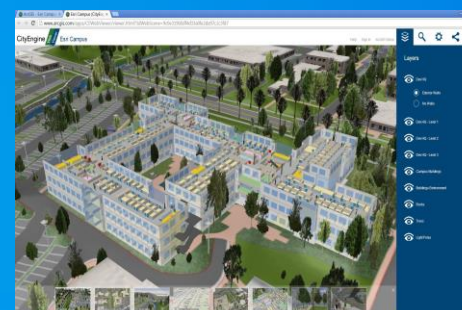
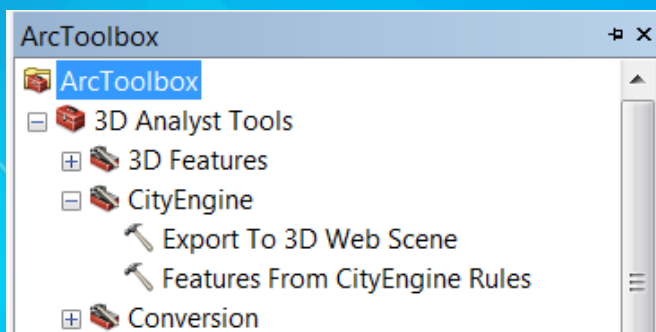
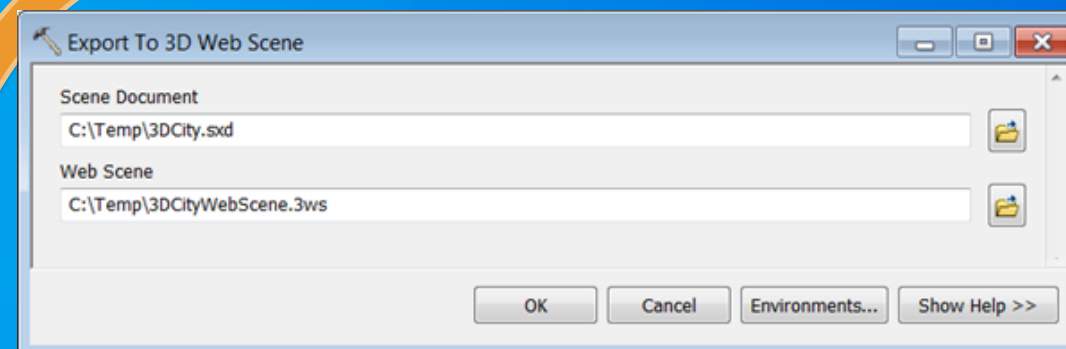
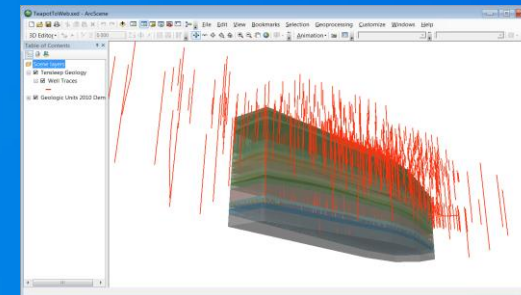
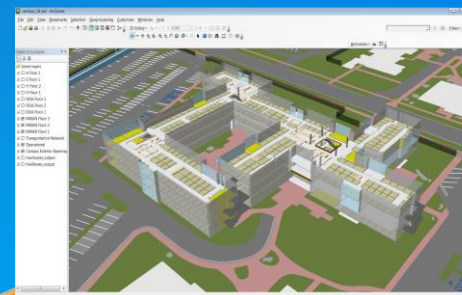


# Share 3D web scenes ... from ArcScene

## STEPS:

- Author a scene using ArcScene
- Run 'Export to 3D Web Scene' (GP)
- Upload 3ws file to ArcGIS Online

ArcScene



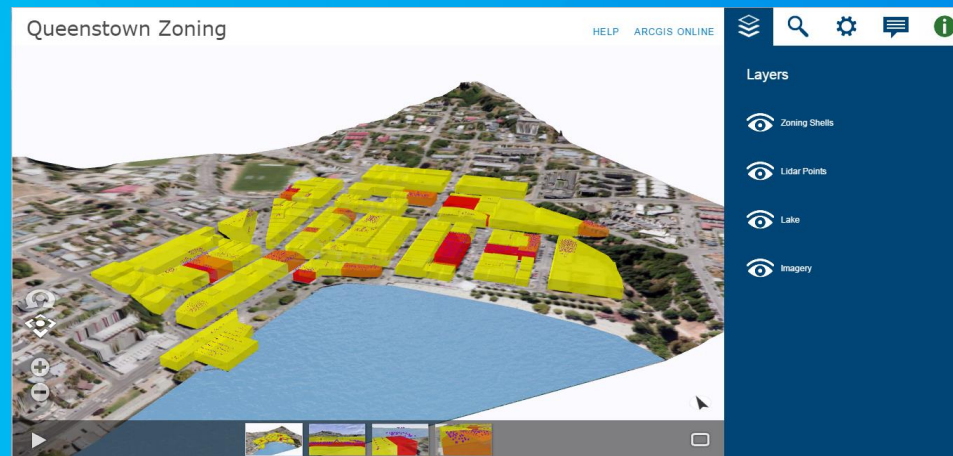
Web Scene

*Supporting Defense, Local Government, Scientists, Urban Planners, Facilities Managers, Geologists, Architects, Landscape Planners...*

# Demo

## ArcScene

Exporting an SXD to a web scene (3ws) file



# Supported properties

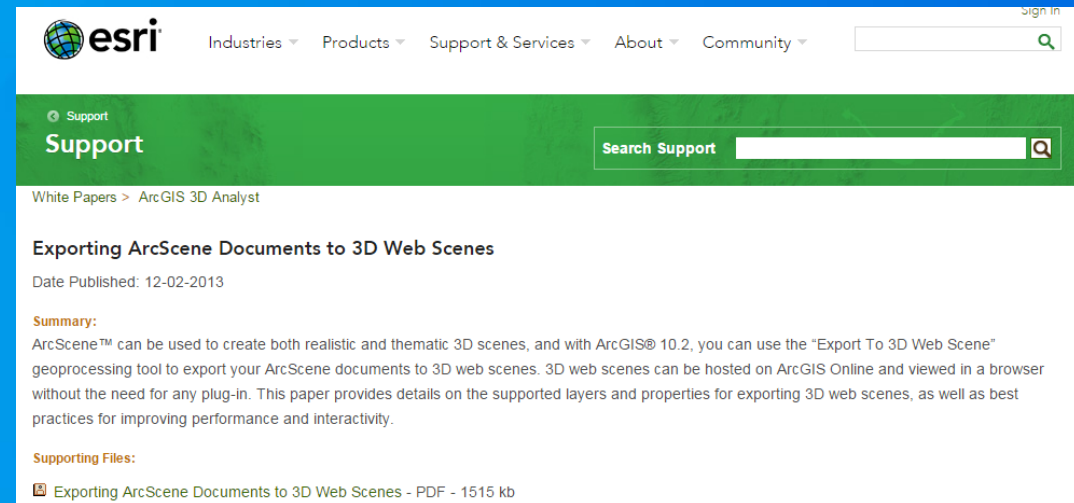
## Layer types

- Feature layers (point, line, polygon and multipatch)
  - Layer extrusion or 3D symbology
- Raster layer
- TIN layer

## ArcScene document properties

- Scene coordinate system
- Area of Interest (AOI)
- Bookmarks
- Group Layers (swipe)
- Vertical exaggeration

[Whitepaper on support.esri.com](http://support.esri.com/whitepapers/exporting-arcscene-documents-to-3d-web-scenes)



The screenshot shows the Esri Support website. At the top is the Esri logo and navigation links: Industries, Products, Support & Services, About, and Community. A search bar is in the top right. Below the navigation bar is a green header with the word 'Support' and a search bar labeled 'Search Support'. The main content area shows the breadcrumb 'White Papers > ArcGIS 3D Analyst'. The title of the whitepaper is 'Exporting ArcScene Documents to 3D Web Scenes', published on 12-02-2013. A summary states that ArcScene can be used to create 3D scenes and that the 'Export To 3D Web Scene' tool can export documents to 3D web scenes hosted on ArcGIS Online. A section for 'Supporting Files' lists a PDF file titled 'Exporting ArcScene Documents to 3D Web Scenes - PDF - 1515 kb'.

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**Exporting ArcScene Documents to 3D Web Scenes**

Date Published: 12-02-2013

**Summary:**

ArcScene™ can be used to create both realistic and thematic 3D scenes, and with ArcGIS® 10.2, you can use the "Export To 3D Web Scene" geoprocessing tool to export your ArcScene documents to 3D web scenes. 3D web scenes can be hosted on ArcGIS Online and viewed in a browser without the need for any plug-in. This paper provides details on the supported layers and properties for exporting 3D web scenes, as well as best practices for improving performance and interactivity.

**Supporting Files:**

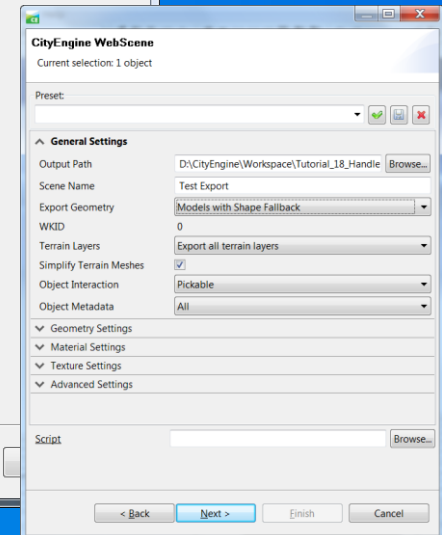
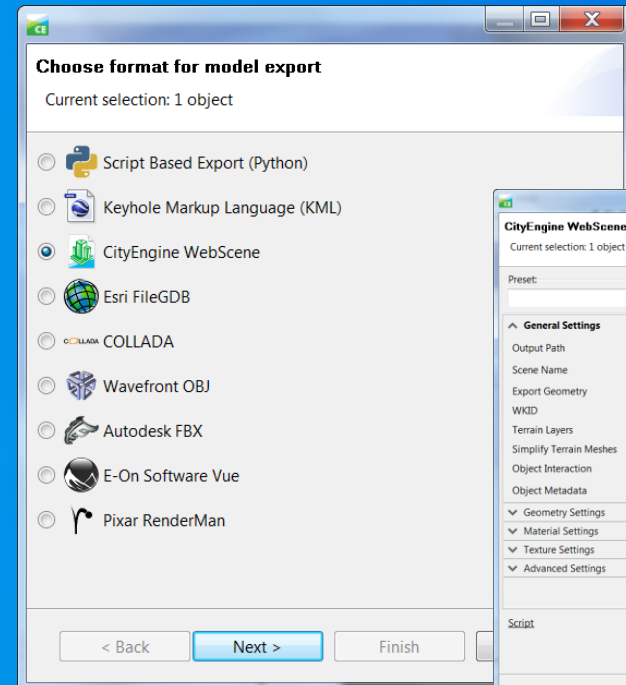
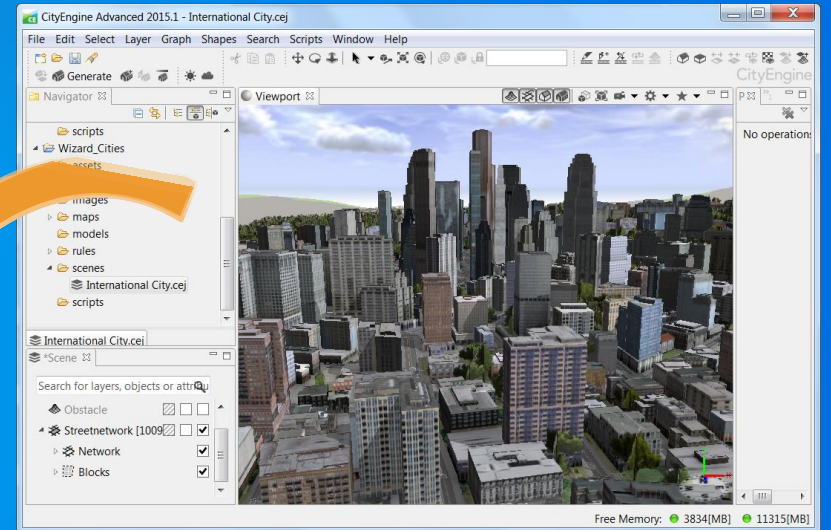
Exporting ArcScene Documents to 3D Web Scenes - PDF - 1515 kb



# Share 3D web scenes ... from CityEngine

## STEPS

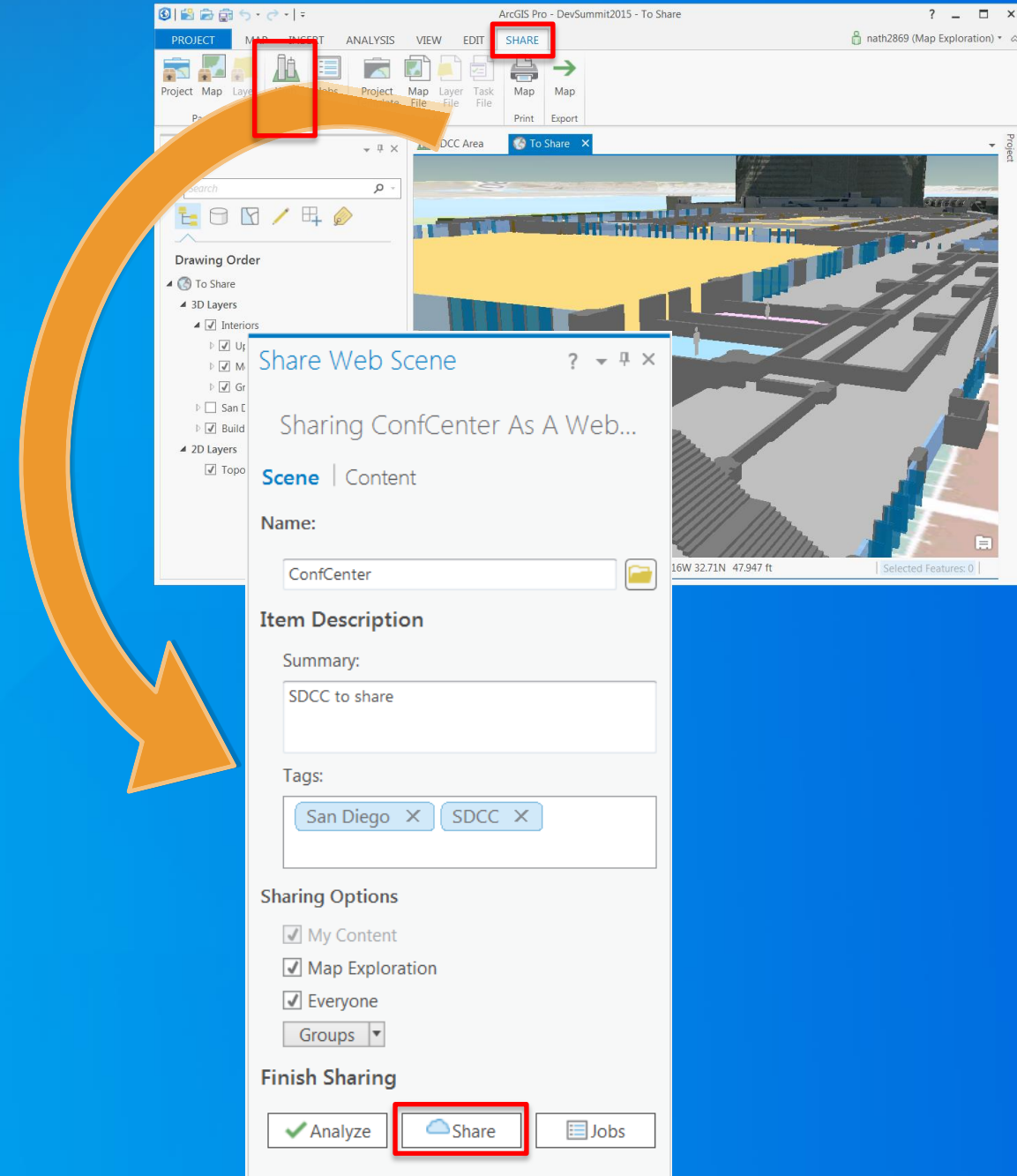
- Author a scene using CityEngine
- Select the content to export
- Click Export → Selected Models
  - As a CityEngine Web Scene
  - Complete the optional parameters
- Upload 3ws file to ArcGIS Online



# Share 3D web scenes ... from ArcGIS Pro

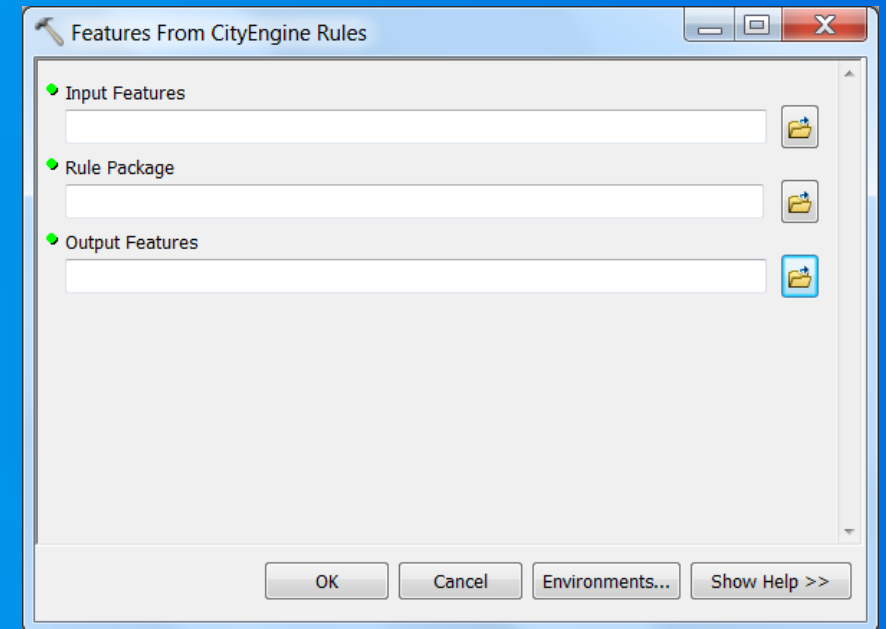
## STEPS

- Author a scene using ArcGIS Pro
- Login into Portal or Online
- Click 'Share' → 'Web Scene'
- Complete the metadata
- Click Share



# Creating 3D objects using CityEngine Rules

- Convert simple geometry into multipatch features
- Add procedural textures to existing untextured multipatches
- Leverage feature attributes
  - Auto-matching of fields to rule parameters





# Demo

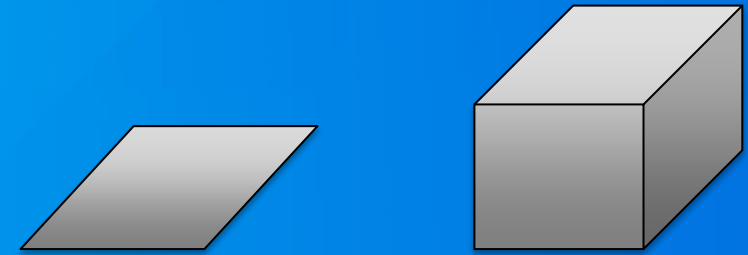
ArcScene & CityEngine

## Generating 3D content using a Rule Package

- ...for existing features
- ...as part of an editing / design effort
- ...with updated textures
- ...by adjusting / authoring the rule logic

# Supported Layer Types

- At 10.3.1, polygon and multipatches only
  - Buildings (real and imagined)
  - Zoning regulations
  - Cartographic symbols
  - ...
- Line support (eg: for streets) is coming later
- Until then, export features from CityEngine



# Demo

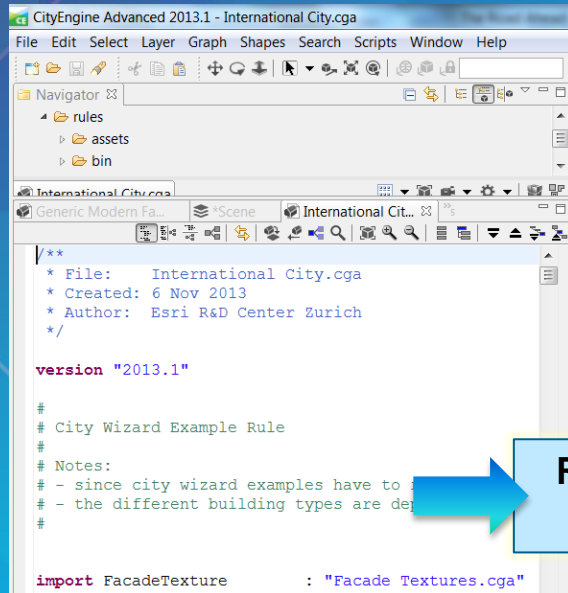
## CityEngine

### Creating new models by sketching and rules

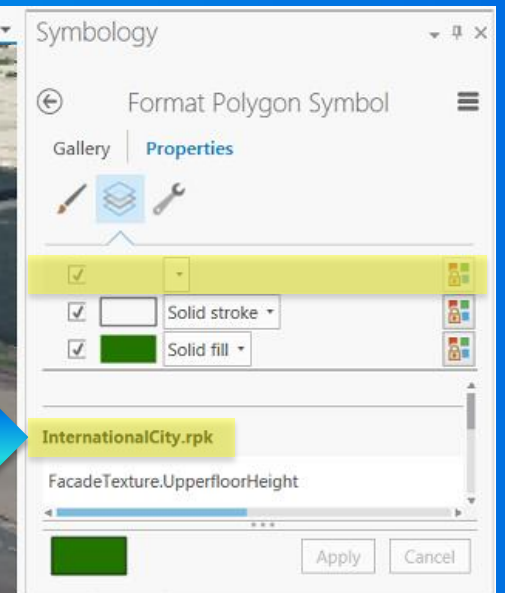
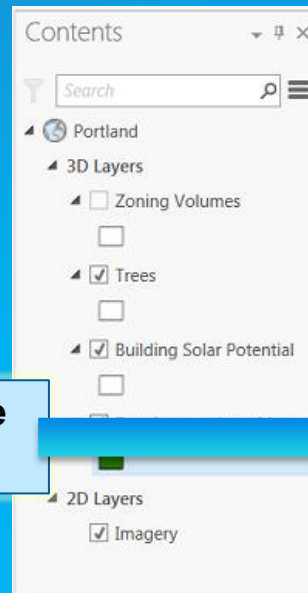
- ...add procedural textures using a CE rule
- ...interactive push/pull of the 3D shape
- ...export as 3D features



# ArcGIS Pro – Procedural symbols



**Rule Package  
(RPK)**



# Demo

## ArcGIS Pro

### Displaying 3D content using a Rule Package

- ...for existing features
- ...configuring to a custom data model
- ...as part of an in-progress GIS work

# SUMMARY: Working with CE Rules (RPK's) in ArcGIS

- **Author CityEngine rules inside CityEngine**
  - Where possible, author rules against the expected data model
  - Optionally, export new 3D content directly from CityEngine
- **Share CE rules with others**
  - Via ArcGIS Online, or as RPK files on disk
  - Limit access to the underlying logic, as needed
- **Create new 3D content via the 'Features from CE Rules' GP Tool**
  - Available with GP - in ArcScene, ArcGlobe, and ArcMap
- **Symbolize features directly inside ArcGIS Pro**
  - Configure rule parameters to link them to feature attributes



# Thank you...

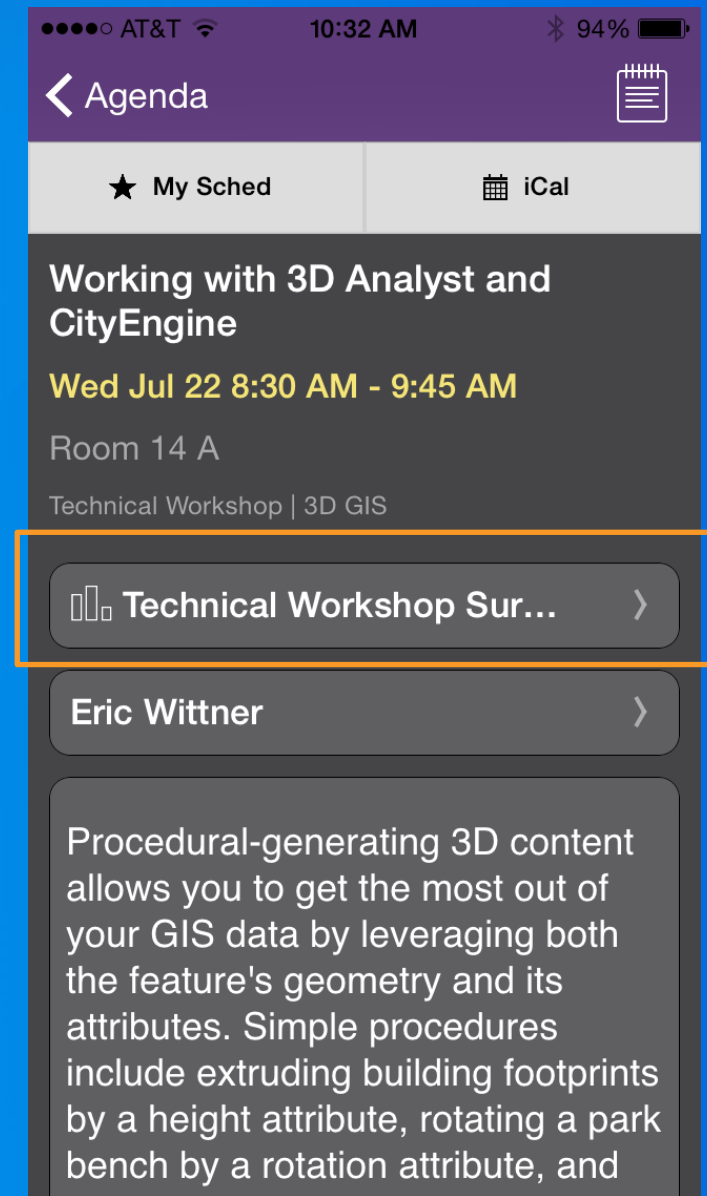
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@NathanCShephard



Understanding our world.