CityEngine: An Introduction

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3D Across The Platform

Complete workflow for editing, managing, publishing and sharing data in 3D

- ArcGIS Pro
- CityEngine
- 3D Analyst

- ArcGIS Runtime
- ArcGIS Online
- ArcGIS JavaScript API

Portal

Desktop | Web | Device

Server | Online Content and Services
Integrating GIS into the Design Process

Geodesign

Data ➔ Analysis ➔ Design (Sketch) ➔ Evaluate ➔ Decision

- Feedback

Map Current Conditions
- Design and Visualize Scenarios
- Engage with Key Stakeholders and The Public
Township Center Concept
West Bloomfield Township Center District

This section illustrates several considerations related specifically to the proposed Township Center area. It highlights important site planning, circulation, and building design principles aimed at achieving the goals articulated in the Township Master Plan for the Township Center area.
Work Flow with CityEngine

Site Reconnaissance

Preliminary Issues & Opportunities

Initial Sketches

Sketch Refinement

SketchUp Base

Simple Massing

Additional Detail

Rendering & Exports
CityEngine Work Flow vs Previous Time Commitment

Site Reconnaissance

Preliminary Issues & Opportunities

Initial Sketches

Sketch Refinement

SketchUp Base 50%

Simple Massing 80%

Additional Detail 75% - 80%

Rendering & Exports 50%
Swedish Parametric Architectural Styles ➤ Façade Style Variations and LODs
Interoperability

Virtual Reality, Augmented Reality, CAD, BIM, 3D Rendering, 3D Modeling
What is procedural modeling?
Procedural Modeling is Intelligent Rule Based Design

- Supports Rapid Iteration

- Multiple Views
  - Realistic Display
  - 3D Thematic Rendering

- Performance Reporting
  - Driven by Attributes
  - Visualized Dynamically
When to use ArcGIS Pro?
When to use CityEngine?
**Procedural Geometry**

<table>
<thead>
<tr>
<th>Feature</th>
<th>ArcGIS Pro</th>
<th>CityEngine</th>
</tr>
</thead>
<tbody>
<tr>
<td>“2D to 3D” procedural engine</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Interactive design tools</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dynamic reports, handles, local edits,...</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Rule authoring</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Dynamic 3D streets &amp; blocks</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

→ Continuous improvements & focus on visual rule authoring (with Portal/Online contents)
### 3D Data Types

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Lidar / reconstruction</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>BIM import</td>
<td>Yes</td>
<td>Partly</td>
</tr>
<tr>
<td>Multipatch editing</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3D export (Unity, etc)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

→ CE for advanced 3D models (materials, instances...); CE focus on CAD/BIM to WebGIS workflows
### 3D Visualization

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Scales</td>
<td>All (global &amp; local)</td>
<td>Up to city scale (local only)</td>
</tr>
<tr>
<td>Rendering</td>
<td>Streaming, adaptive</td>
<td>In-memory only</td>
</tr>
<tr>
<td>Animation</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>AR/VR</td>
<td>No</td>
<td>R&amp;D</td>
</tr>
</tbody>
</table>

- Focus in CE on preview; Pro, Earth & WSV are our real-time visualization environments