Esri Web 3D Technology

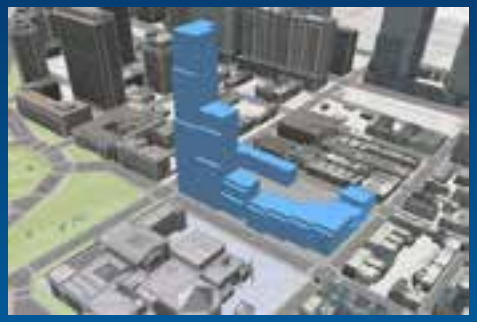
Markus Lipp, Ph.D.

Why 3D?

ArcGIS 3D

Because our world is 3D

- **Improve understanding**
  3D is easy for everyone to understand



- **Better communication**
  3D makes it easier to articulate ideas

- **Solve 3D problems**
  Some spatial problems can only be solved in 3D

For what use cases are we developing Web3D?

Story Telling in 3D

Industries: All (e.g. GeoDesign, urban planning)

Contents: 3D models, design scenarios, authored analyses etc mashed up with surroundings (e.g. terrain, buildings, 2D base maps)

Situational Awareness in 3D

Industries: Public safety, defense & intelligence, …

Contents: Visibility/spatial analysis tools for positional/lidar data mashed up with 3D environment (e.g. terrain, buildings)

Monitoring & Tracking in 3D

Industries: Local Government, TODOGERT

Contents: Live location/tracking/event/sensor data mashed up with 3D environment (e.g. terrain, buildings)

Search & Routing in 3D

Industries: All (e.g. logistics, TODOGERT)

Contents: Google Maps/Earth typical search and routing queries put in 3D context (e.g. terrain, buildings)

Demo

City Engine Web Viewer

Current state

http://www.arcgis.com/home/group.html?owner=CityEngine&title=CityEngine%20Web%20Scenes

Web Viewer for Developers

ArcScene
10.2

Export

GP Tool

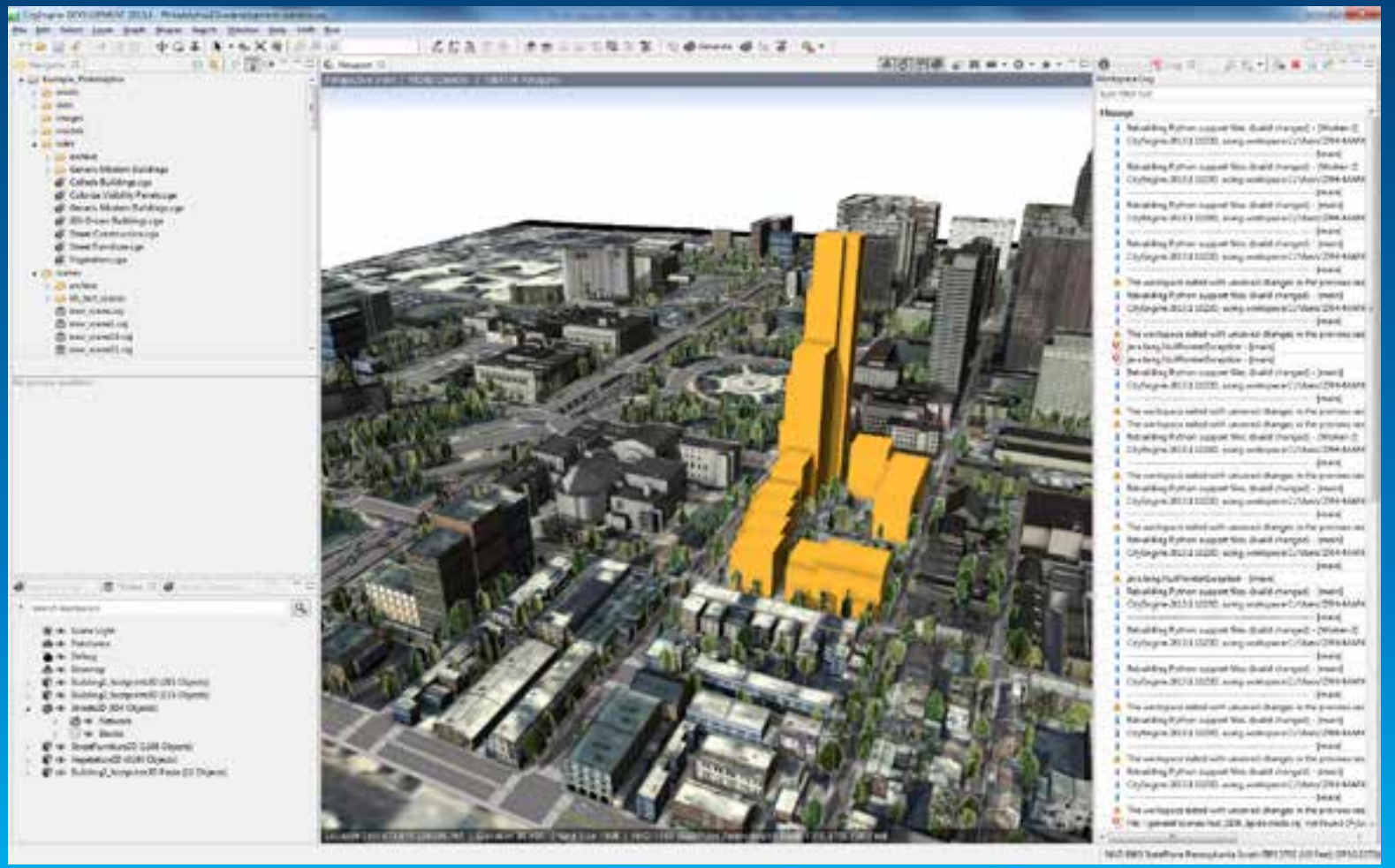
ArcGIS

WebViewer

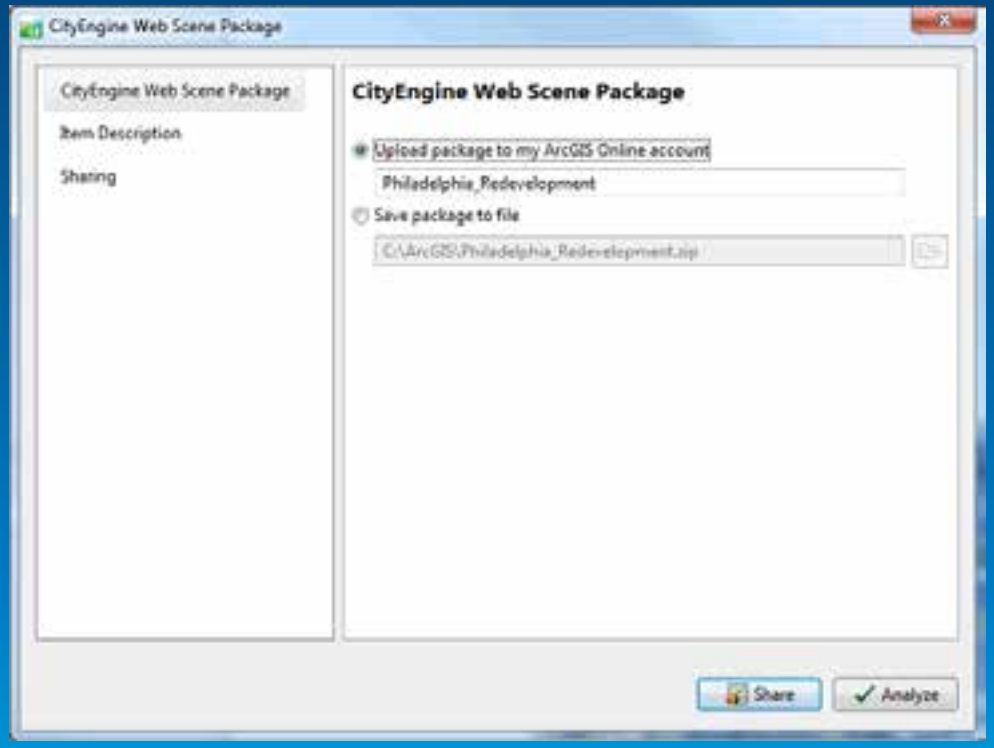
Scripting, GP Tools
API's

Currently NO 3D
Javascript API

Developing in CityEngine:
Next Talk



Export Workflow

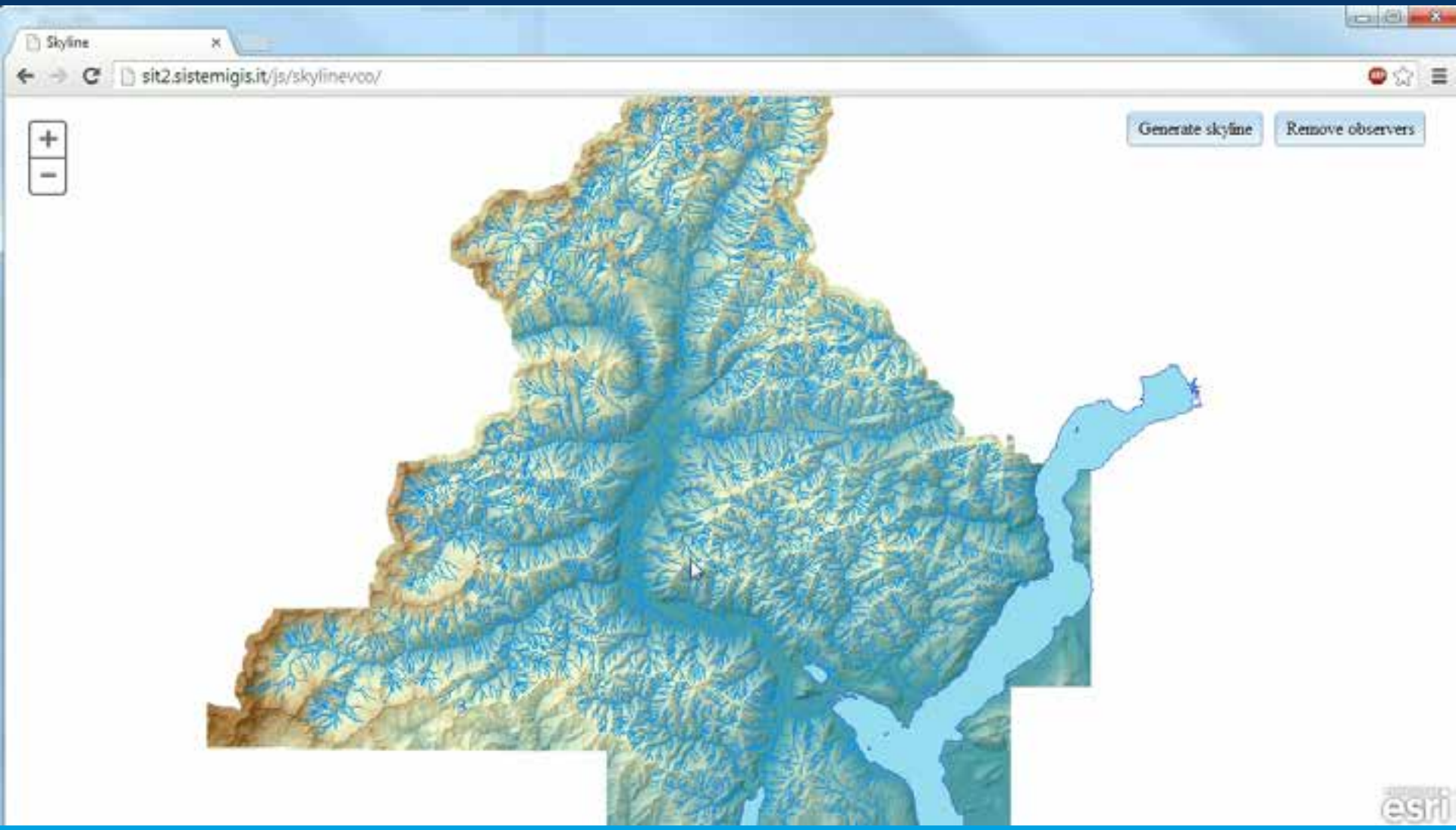


CityEngine

ArcScene 10.2

Scripting Web Viewer in the cloud - Status

Example Application



Esri Web 3D Future

Web Scene Viewer

CE

Scene Server REST API

JavaScript 3D maps API

ArcGIS (Server &Portal)

Demo

Web 3D Future

Philadelphia

Demo

Labeling Details

Scene Server – Usage Scenarios

Global viewing of 2D/3D Content

Editing & Authoring

Feature overlays

Feature fusion from multiple service instances

Content Profiles (in development)

ID	Name *(example)*	Display Type
1	Regular-spacing point array *(Grid)*	Triangles
2	Pre-Triangulated irregular-spacing point array *(TIN)*	Triangles
3	Integrated Mesh *(Acute3D)*	Triangles
4	Individual Feature Mesh *(Multipatch)*	Triangles
5	Point Cloud *(LAS)*	Points
6	Point Features *(GIS data)*	Points/Triangles
7	Line Features *(GIS data)*	Lines/Triangles
8	Polygon Features *(GIS data)*	Triangles

Scene Server

populate
(cook)

cache

REST API

requests

ArcGIS
(Server
&Portal)

Rest Operations (in development)

Base Service Profile

- **GetServiceInfo**
- **FindNode, GetNode, GetFeature**
- **SearchFeature**

Transactional Service Profile

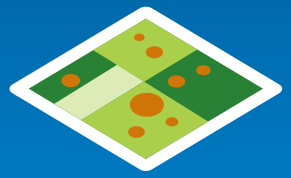
- **PostFeature**
- **PutFeature**
- **DeleteFeature**

All operations are available through a REST API:

```
GET http://server/servic/cachename/findNode?pos=x,y,z
POST http://server/servic/cachename/ {FEATURE_DATA}
```

Rest Resources (in development)

- SceneServer
  http://.../rest/services/zurich/SceneServer
- Layer
  /SceneServer/layers/Buildings
- Node
  /SceneServer/layers/Buildings/nodes/51
- Features
  /SceneServer/layers/Buildings/nodes/51/features/3



JavaScript 3D API (in development)

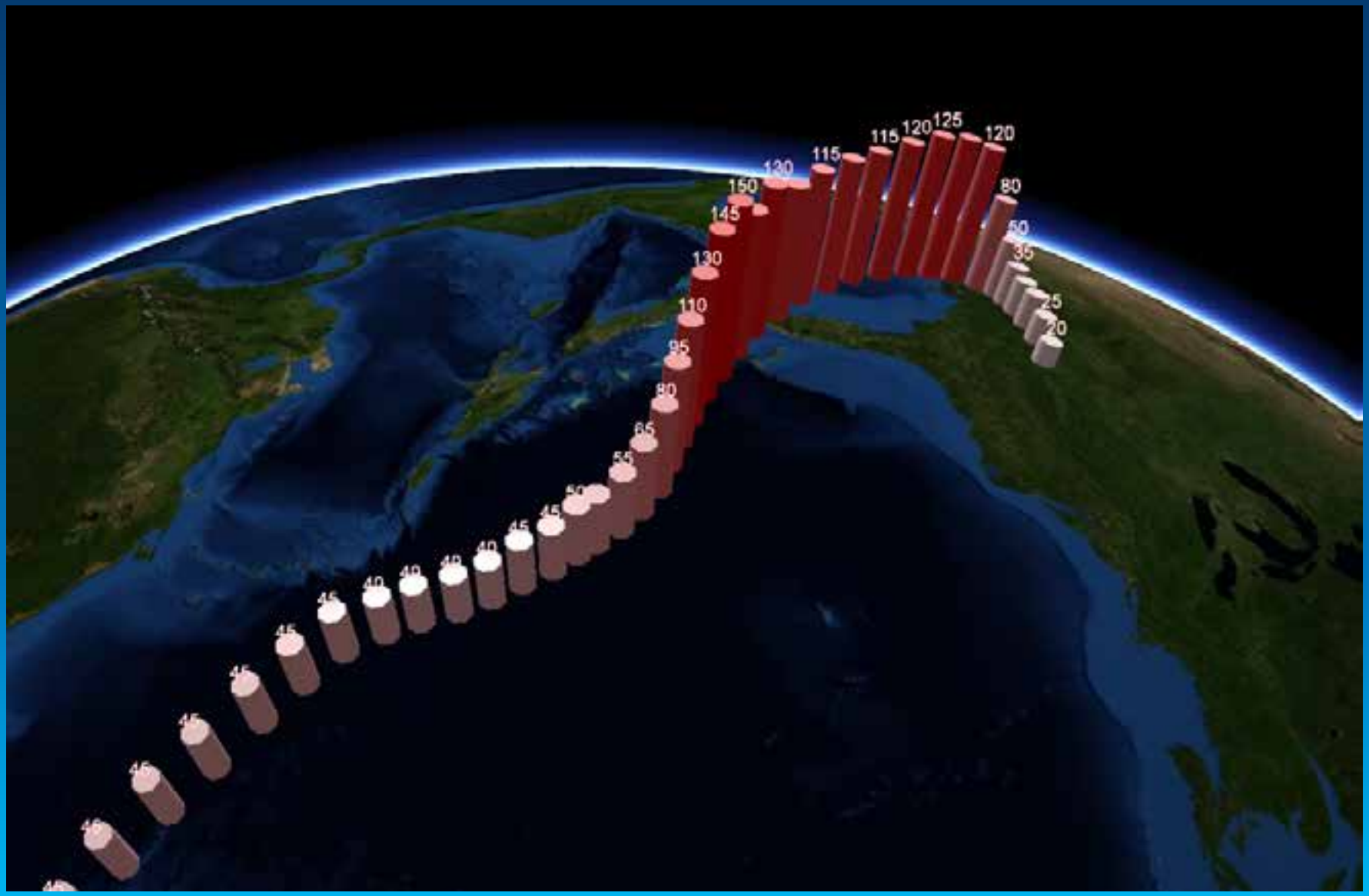
- Existing ArcGIS JavaScript API extended with 3D capabilities

```
//API Example (parameters abbreviated)

map = new Map({3d:true});
layer = new FeatureLayer(url);
symbol = new SimpleMeshSymbol();
symbol.style = SimpleMeshSymbol.Cylinder;
layer.setRenderer(SimpleRenderer(symbol));
map.addLayer(layer);

map.addLayer(new SceneServiceLayer(url));
```

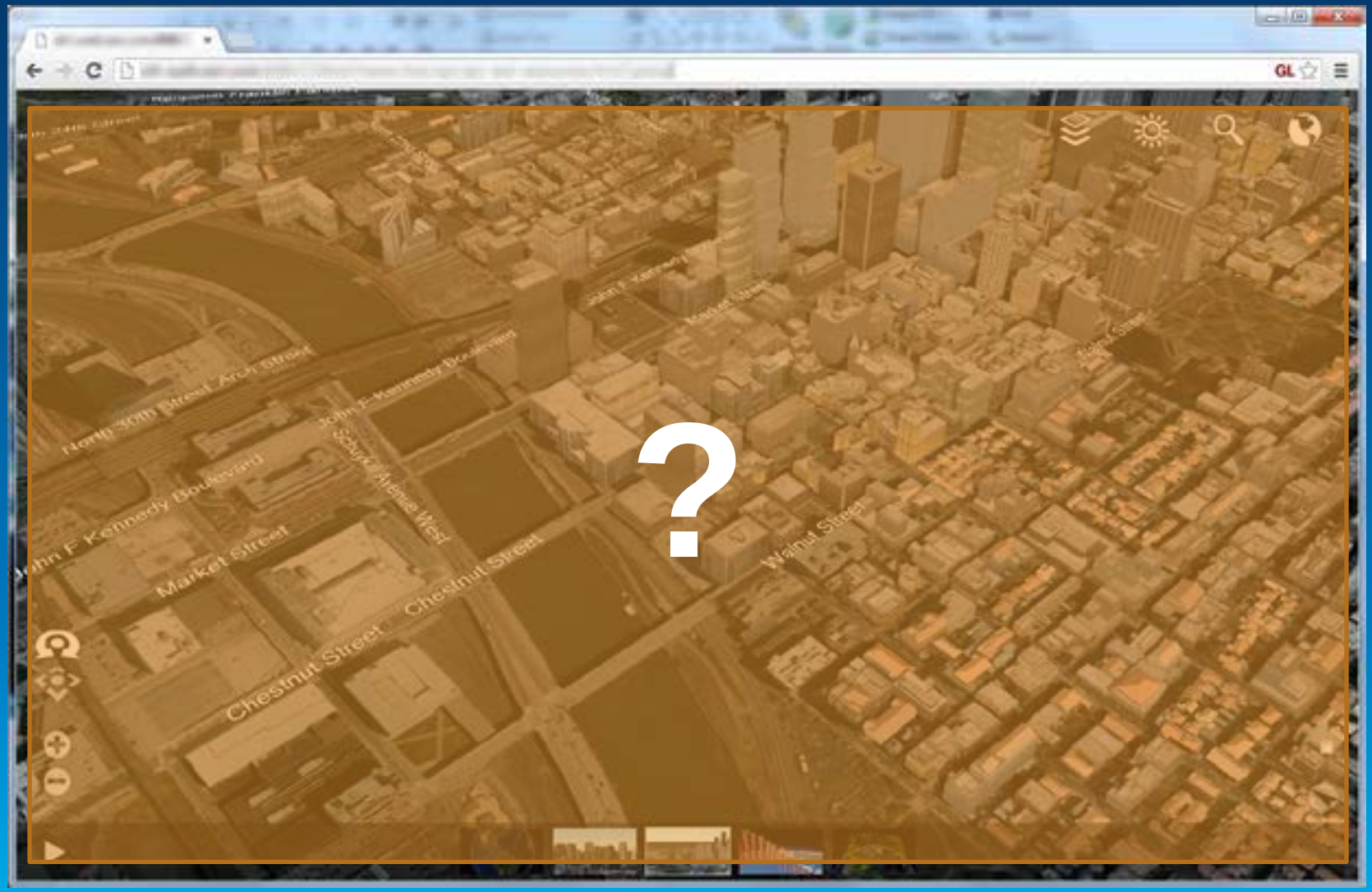
Layer types: 3D Scene Service

Layer types: Elevation

Layer types: 3D Features with symbology



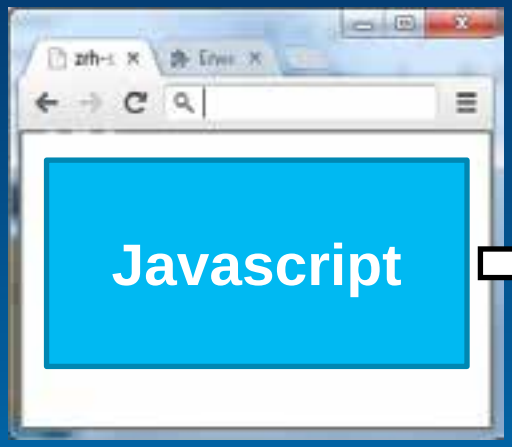
Web scene viewer



WebGL
John F Kennedy Boulevard
Market Street
Chestnut Street

Markus Lipp

Architecture

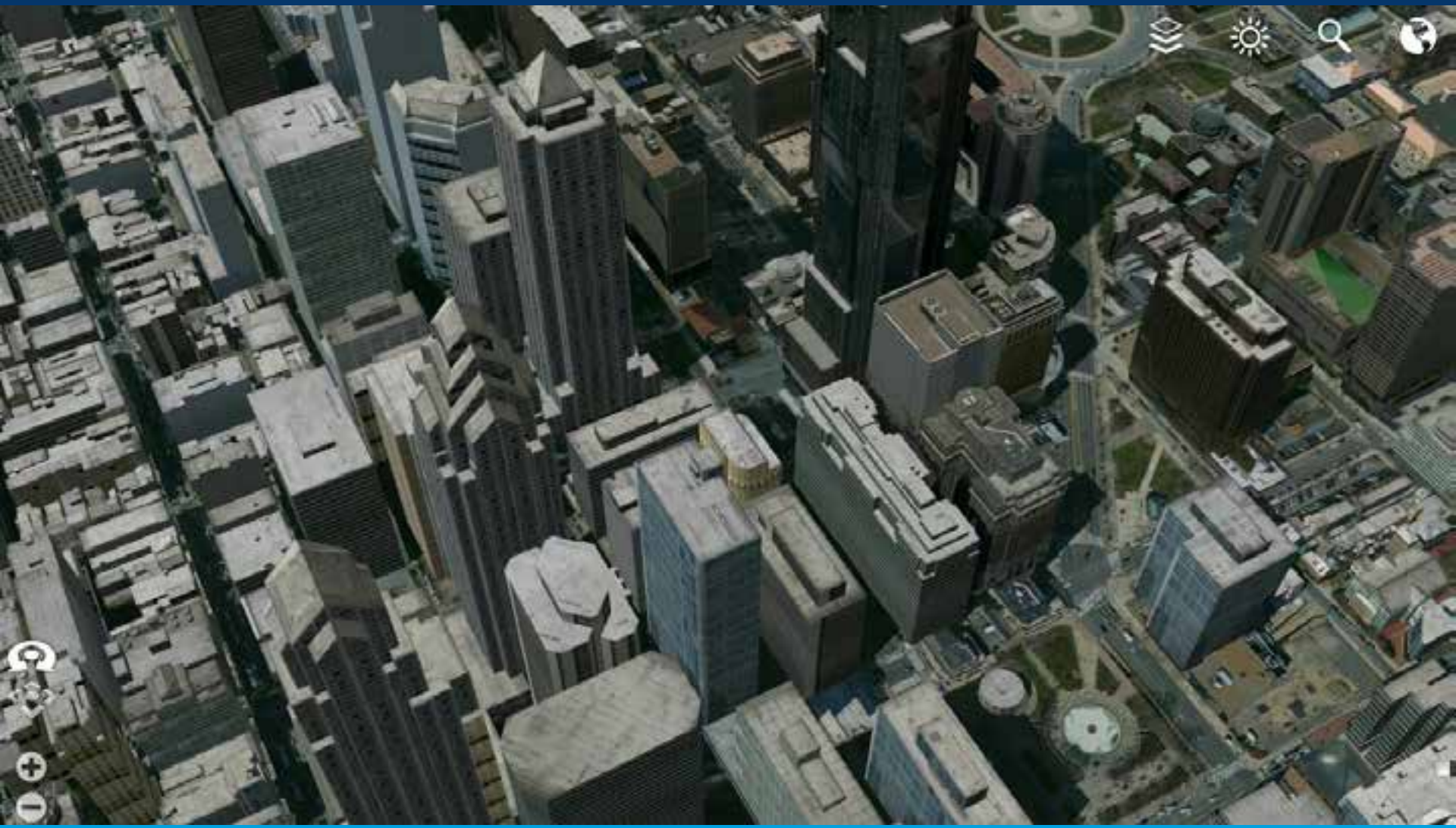


ArcGIS 3D Javascript API

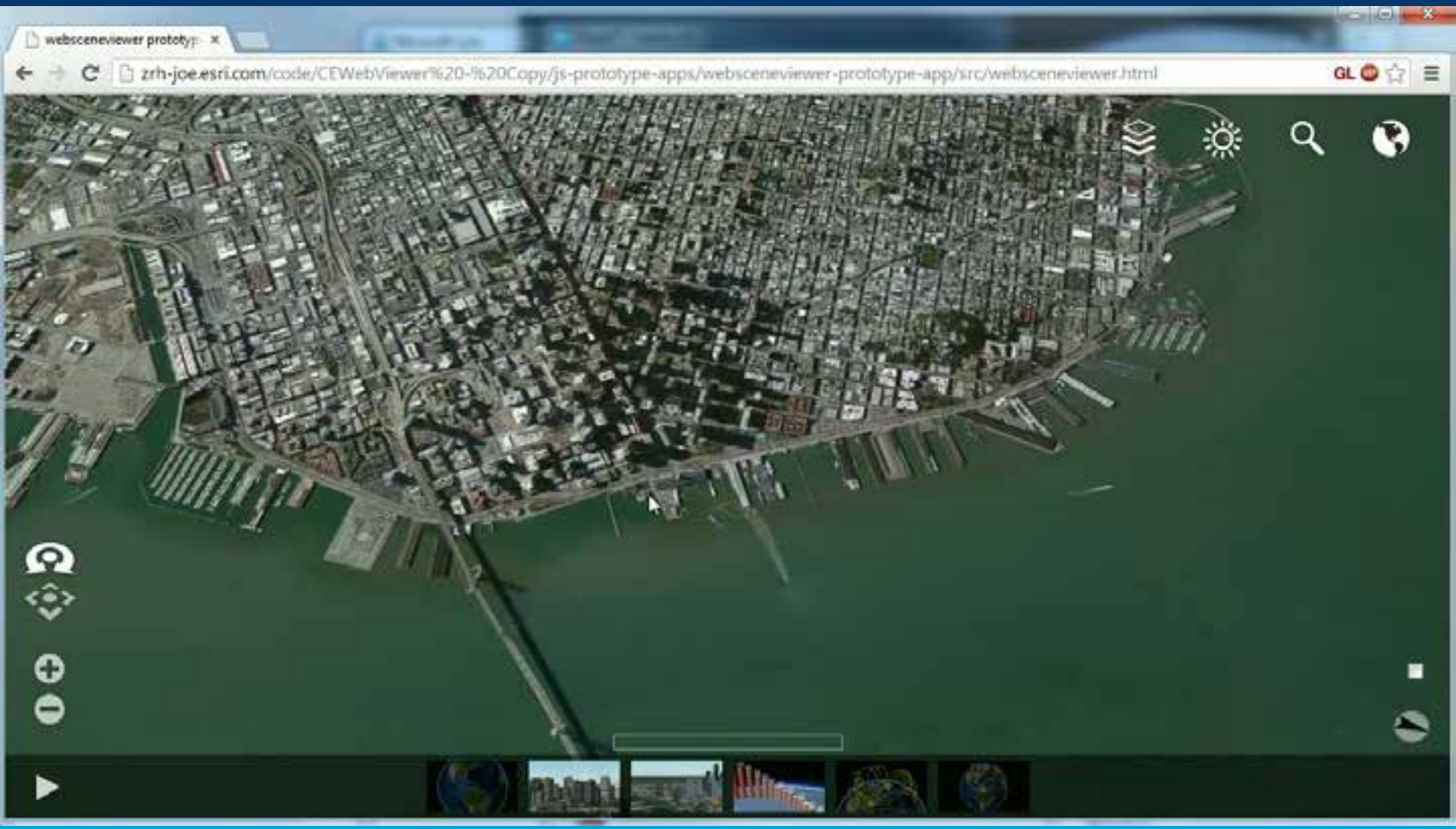
WebGL

Graphics card

Streaming input data



Streaming input data



Summary: Esri Web 3D great for Developers

Now

CityEngine
Web Viewer

Future: online & on-premise solution for 3D

Streaming Web Viewer

3D Javascript API

Scene Server
REST API

Understanding our world.