

# Strategies for Integrating CAD and BIM in ArcGIS

Don Kuehne  
Esri 3D Product Manager: CAD/BIM/AEC

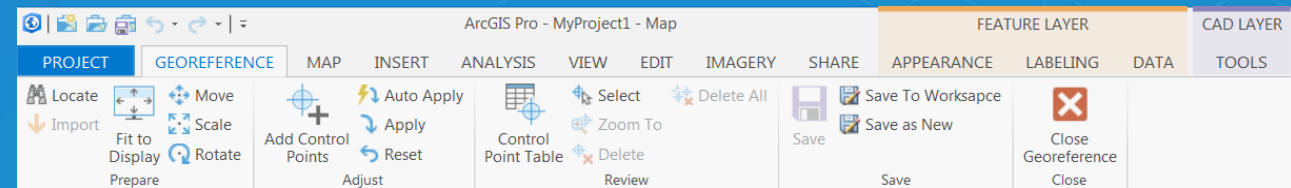
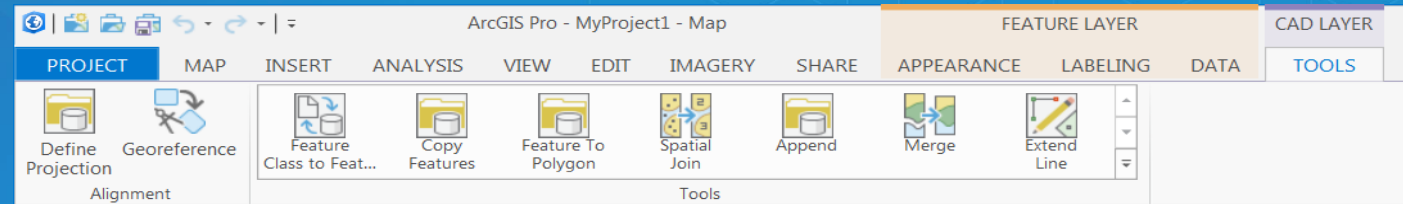




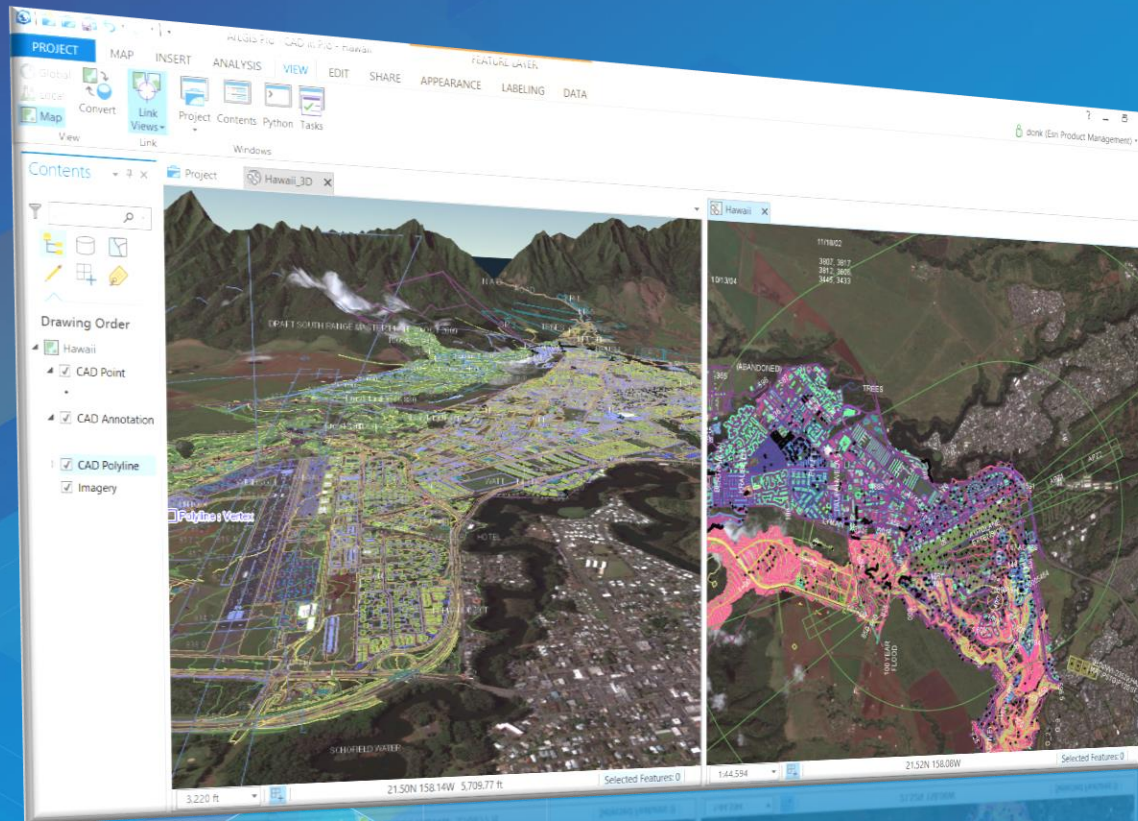
# CAD

## Digital Drawing

# CAD in ArcGIS Desktop



# CAD in Desktop



CAD as Data

CAD as a Map

# EXPORT TO CAD

Create and Append to CAD Files

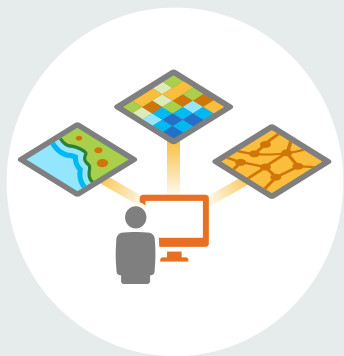
## ArcGIS data in AutoCAD files (MSC)

- Feature Classes
- Attributes
- Coordinate System
- Better than Shapefiles...

ArcGIS Desktop

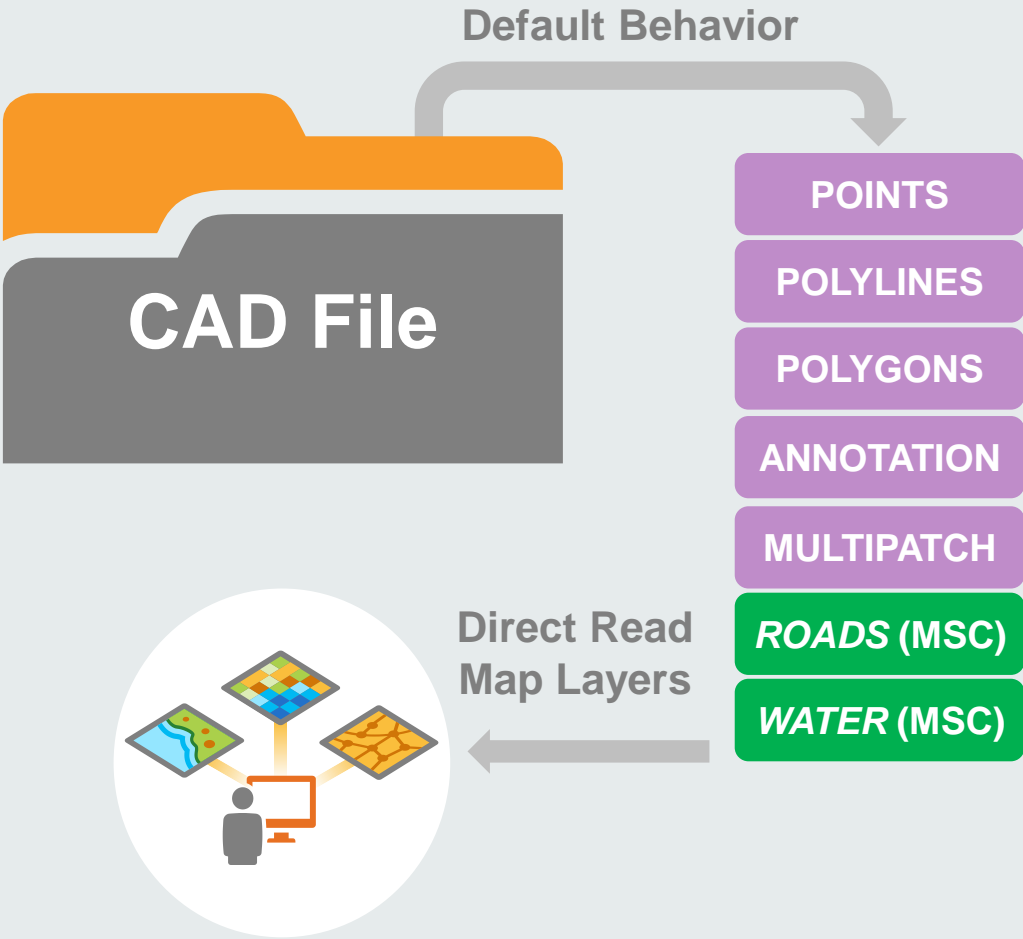


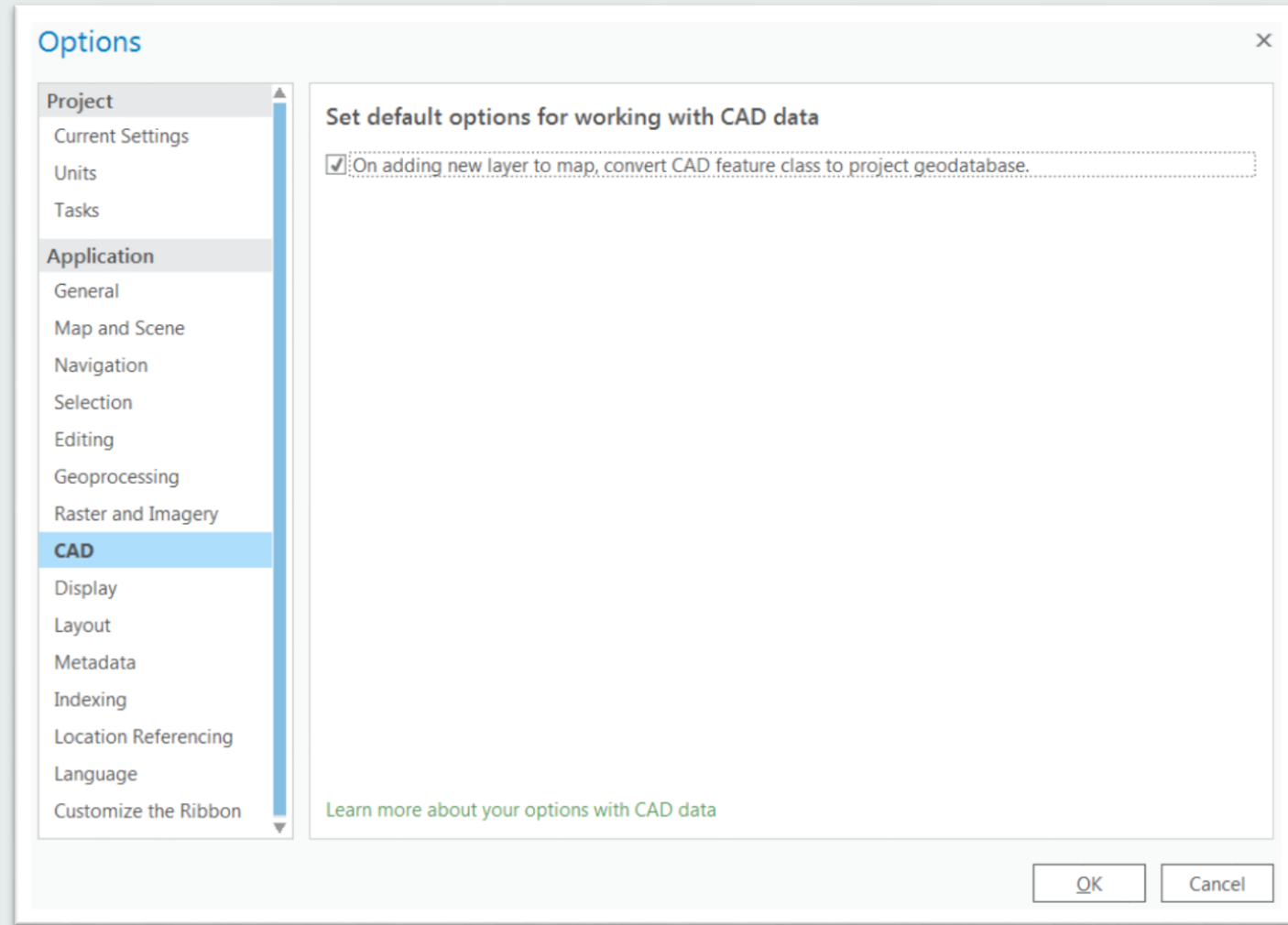
DWG



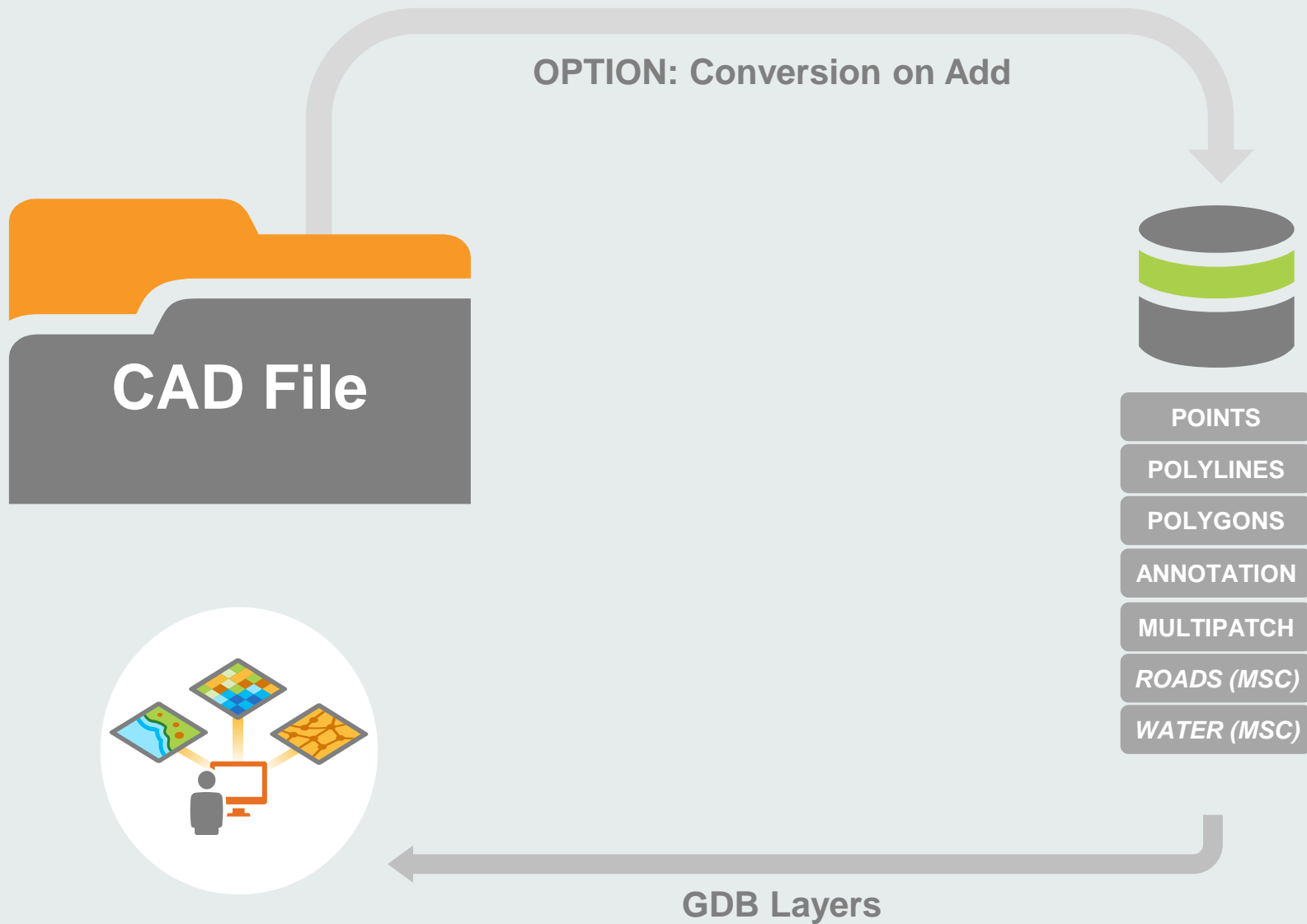
## Adding CAD Data in ArcGIS Pro

CAD Reader









## Adding CAD Data in ArcGIS Pro

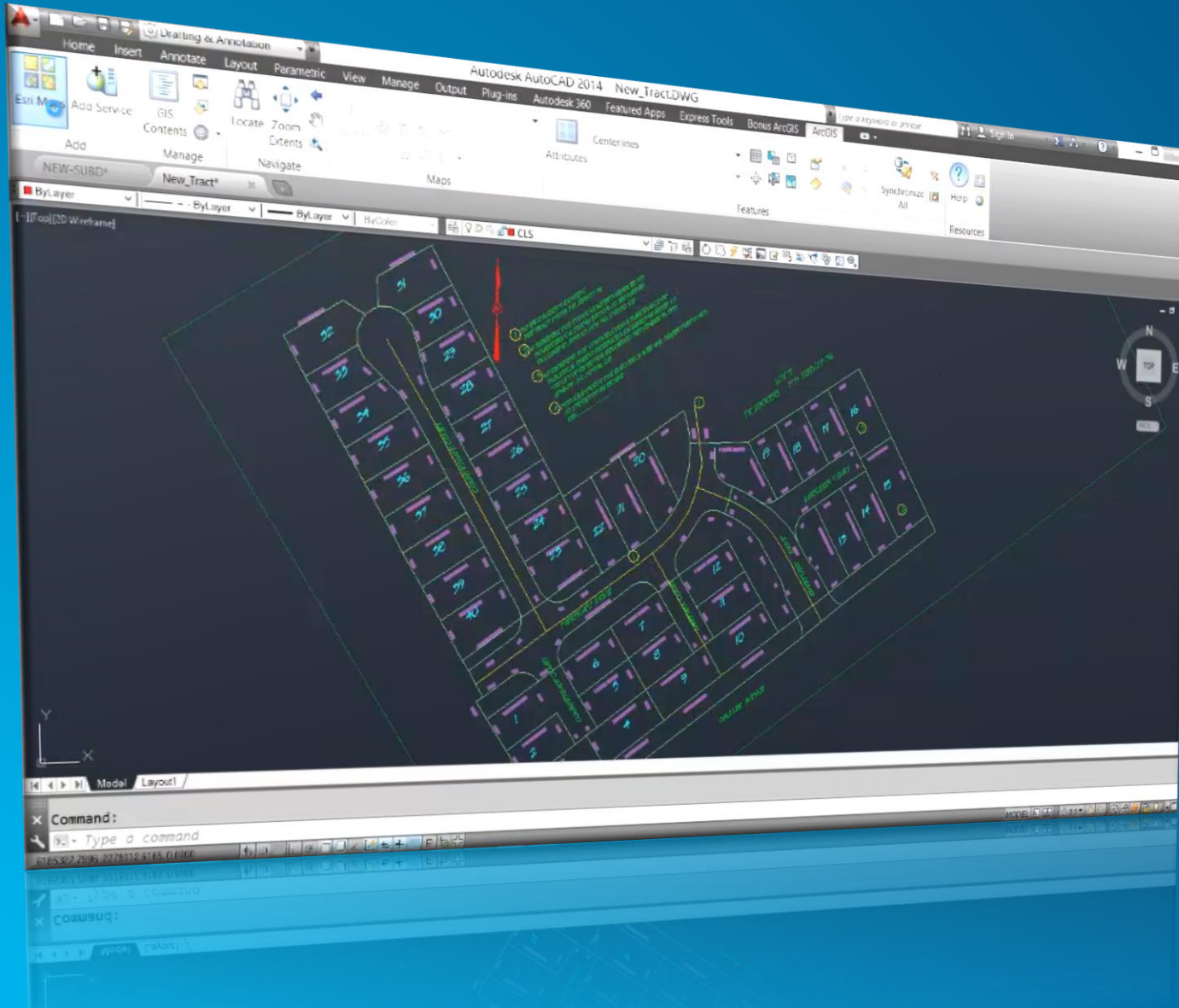
CAD Reader

# GIS and CAD

## Interoperability Patterns



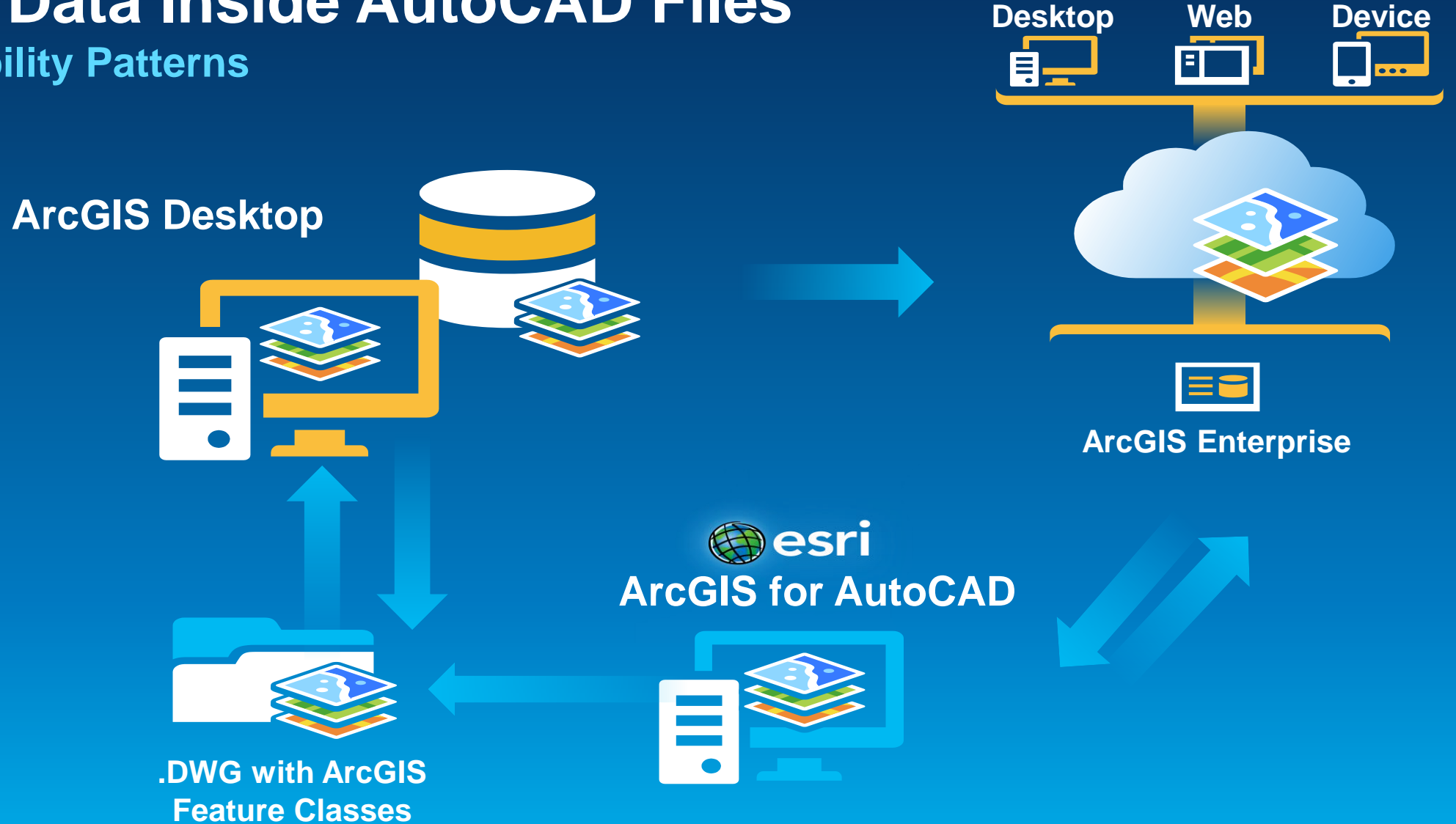
# ArcGIS for AutoCAD



- Free Download
- Create GIS Data
- ArcGIS Web Services

# ArcGIS Data Inside AutoCAD Files

## Interoperability Patterns



# ArcGIS Services Pattern...

The screenshot shows a web browser window displaying the Graebert website. The browser's address bar shows the URL <https://www.graebert.com/en/ares-map>. The website header features the Graebert logo and the tagline "Leading developer of CAD Software for Desktop, Mobile and Cloud". A navigation menu includes links for "ARES® CAD Software", "SiteMaster™", "OEM Platforms", "Plugin Development", "Development Services", "Company", "Blog", and "Stores". A language selector is set to "English".

## ARES Map: CAD for GIS and GIS for CAD...

ARES® Map™ is a hybrid solution bringing together the intelligence of GIS contents and a full-featured dwg-based CAD system. Maps and floorplans created with ARES Map are saved natively in dwg but contain also smart GIS-enabled information associated to the entities.

The main content area features a video player with the title "ARES Map: CAD for GIS & GIS for CAD" and a play button. Below the video, there is a small text block: "For GIS users using Esri® solutions, it is the perfect companion to collect and convert but also modify information".

On the right side, there is a promotional section titled "Get a free 30 days trial". It includes the text "Learn more about ARES Map or download a free trial:" and the ArcGIS Marketplace logo. Below this are two buttons: "Visit ArcGIS Marketplace" (blue) and "Download" (yellow). A "More information" section follows, with "Download the brochure" (blue) and "Contact us" (yellow) buttons.

BIM

3D Virtual Construction



# BIM is a process for increasing efficiency throughout the construction process

Home | Mobile Site | Newsroom | Regions | Staff Directory | Careers | Forms | e-Tools | QuickLinks

GSA U.S. General Services Administration

WHAT GSA OFFERS DOING BUSINESS WITH GSA LEARN MORE BLOG

Home > Buildings & Real Estate > Design & Construction > 3D-4D Building Information Modeling >

## Design & Construction

- Overview
- Architecture & Engineering
- Art in Architecture & Fine Arts
- Building Awards
- CAD Standards
- 3D-4D Building Information Modeling
- 3D-4D BIM Overview
- Spatial Program Validation
- 3D Laser Scanning
- 4D Phasing
- Energy Performance and Operations
- Circulation and Security Validation
- Facility Management
- BIM Champions
- BIM Program In The News
- BIM Video
- BIM Mailing List

### 3D-4D Building Information Modeling

In 2003 the General Services Administration (GSA), through its Public Buildings Service (PBS) Office of Chief Architect (OCA), established the National 3D-4D-BIM Program. OCA has led over 30 projects in its capital program, and is assessing and supporting three dimensional (3D), four-dimensional (4D), and Building Information Modeling (BIM) applications in over 100 projects to date across the nation. The power of visualization, coordination, simulation, and optimization from 3D, 4D, and BIM computer technologies allow GSA to more effectively meet customer, design, construction, and program requirements. GSA is committed to a strategic and incremental adoption of 3D, 4D, and BIM technologies.

There is a progression from 2D to 3D, 4D, and BIM. While 3D models make valuable contributions to communications, not all 3D models qualify as BIM models since a 3D geometric representation is only part of the BIM concept.

Critical to successful integration of computer models into project coordination, simulation, and optimization is the inclusion of informal

CONTACTS  
Charles Matta  
(202) 219-2355  
• charles.matta@gsa.gov  
• View Contact Details  
National 3D-4D-BIM Program  
• bim@gsa.gov  
• View Contact Details

## Russia following UK's lead with plans for BIM mandate

By [Kim Slowey](#) | September 16, 2016



### TIPS ON MEP AND STRUCTURAL BIM E-SUBMISSION

Towards a smoother and simpler approval process.

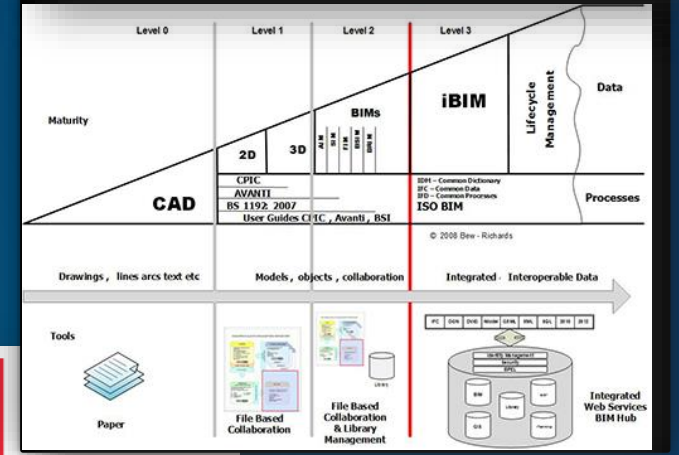
### Updates on Mandatory BIM e-Submission

1. From July 2013, BIM e-Submission for regulatory approval would be made mandatory in three phases. New building projects with a Gross Floor Area (GFA) of more than 20,000 m<sup>2</sup>, which are submitted to the Urban Redevelopment Authority (URA) for planning approval on or after 1 July 2013, are required to submit their architectural plans in BIM format.
2. From 1 July 2014, there will be mandatory structural and Mechanical, Electrical and Plumbing (MEP) BIM e-Submission for all new building projects with GFA of 20,000 m<sup>2</sup> and above (in 2013 and 2014).
3. From 1 July 2015, companies are also required to make architectural, structural and MEP BIM e-Submissions for all new building projects with a GFA of 5,000 m<sup>2</sup> and above (in 2015).

## Cameron Gov't Requires BIM Construction Procurement for UK Public Projects by 2016

by [Jeff Yoders](#) on [MAY 28, 2014](#)  
Style: Commentary Category: Manufacturing, Public Policy, Sourcing Strategies

Across the pond, a revolution in construction procurement and supply chain logistics is happening with a goal of reducing greenhouse gas emissions and unlocking process efficiencies that can create better buildings and better-followed budgets.



Article [Talk](#)

## SOSI

From Wikipedia, the free encyclopedia

**SOSI** is a much used [geospatial vector](#) data format for predominantly used for exchange of geographical information.

SOSI is short for **S**amordnet **O**pplegg for **S**tedfestet **I**nformasjon (literally "Coordinated Approach for Spatial Information" expanded in English to **S**ystematic **O**rganization of **S**patial **I**nformation).

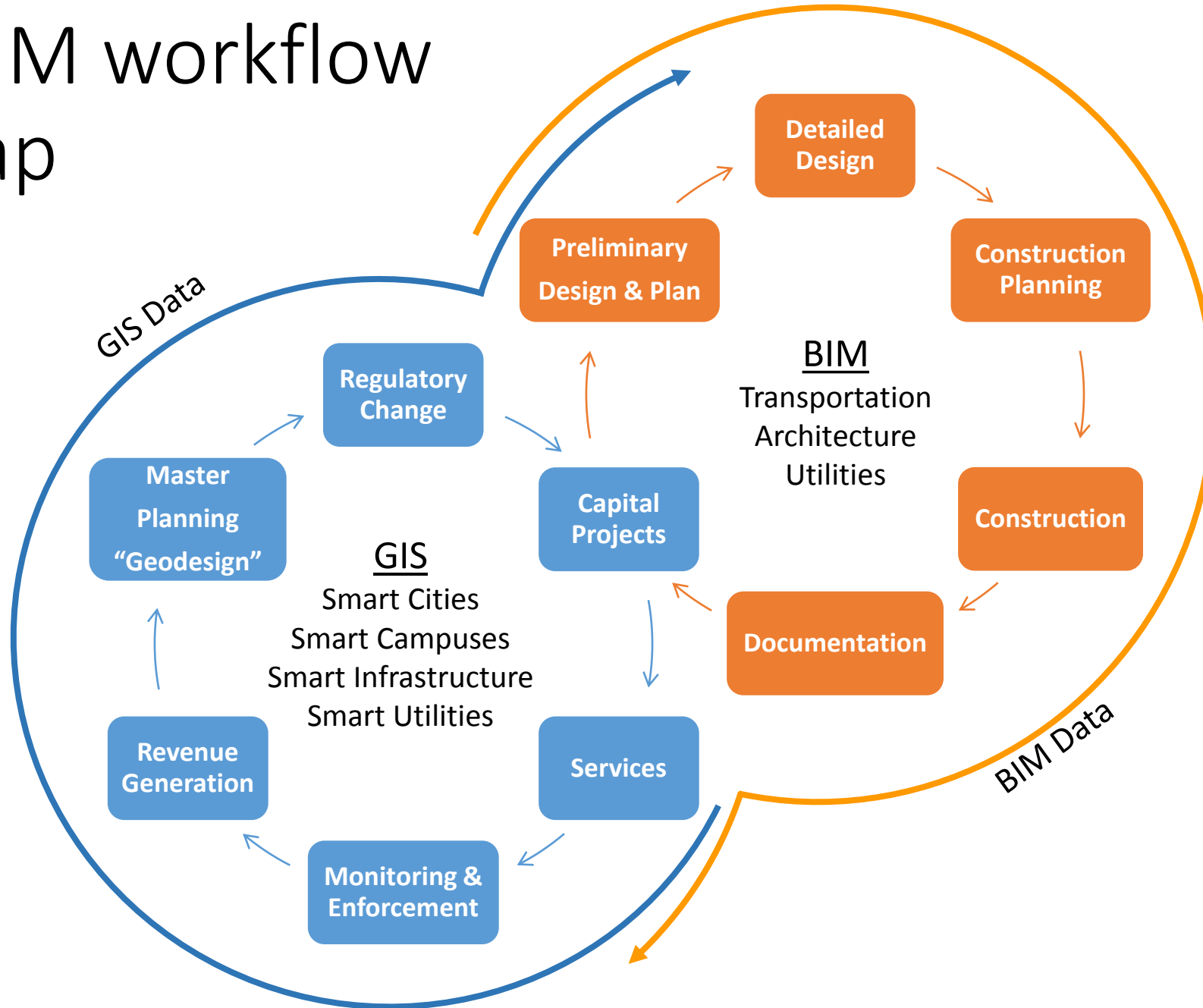
The standard includes standardized definitions for geometry and topology, data quality, coordinate systems, and metadata.

The open standard was developed by the Norwegian Mapping and Cadastre Authority. It was first published in 2004.

**NEWS**

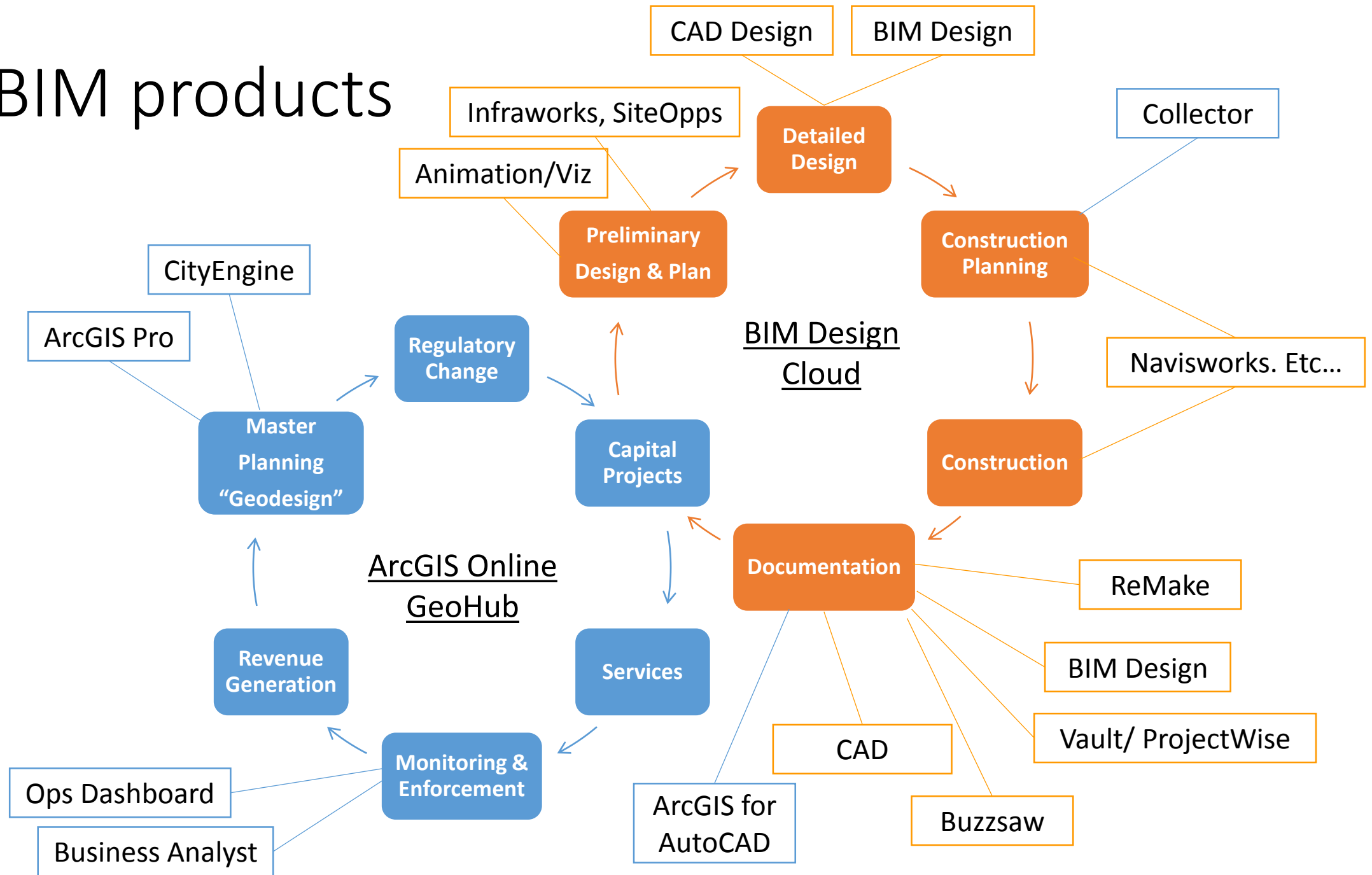
## FRANCE AND GERMANY MOVE FORWARD ON BIM ADOPTION

# GIS-BIM workflow overlap



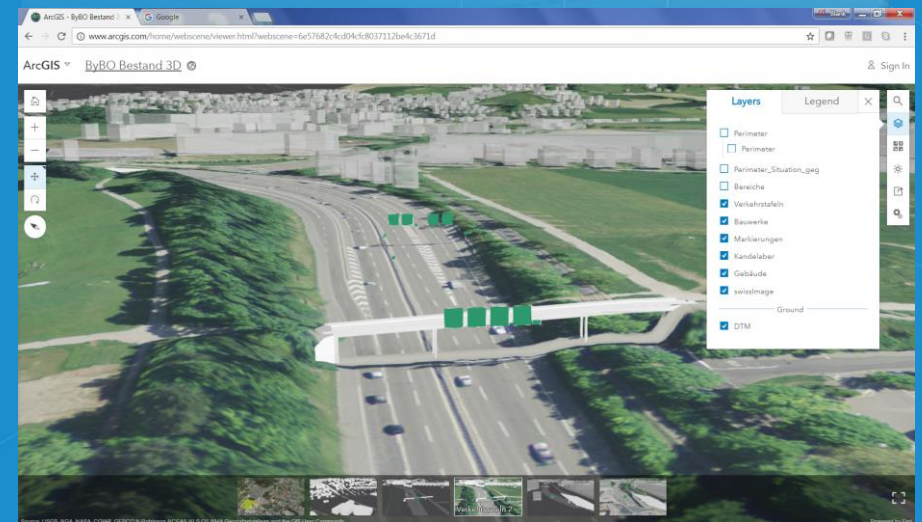
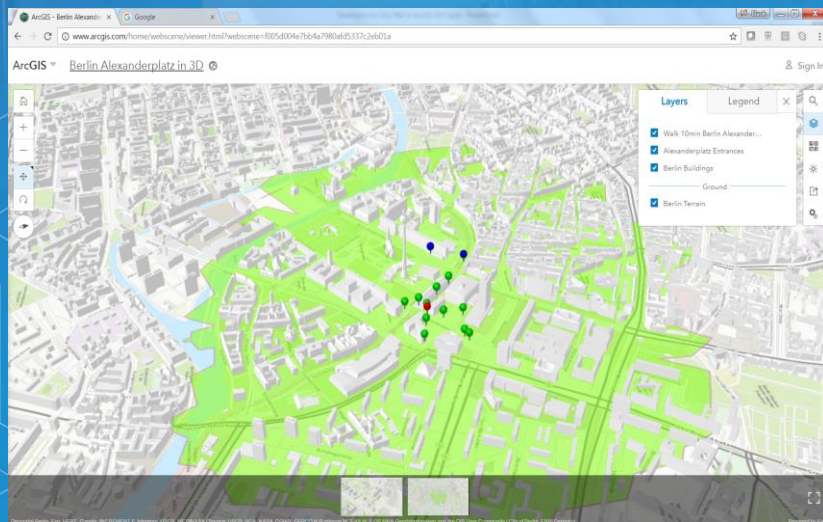
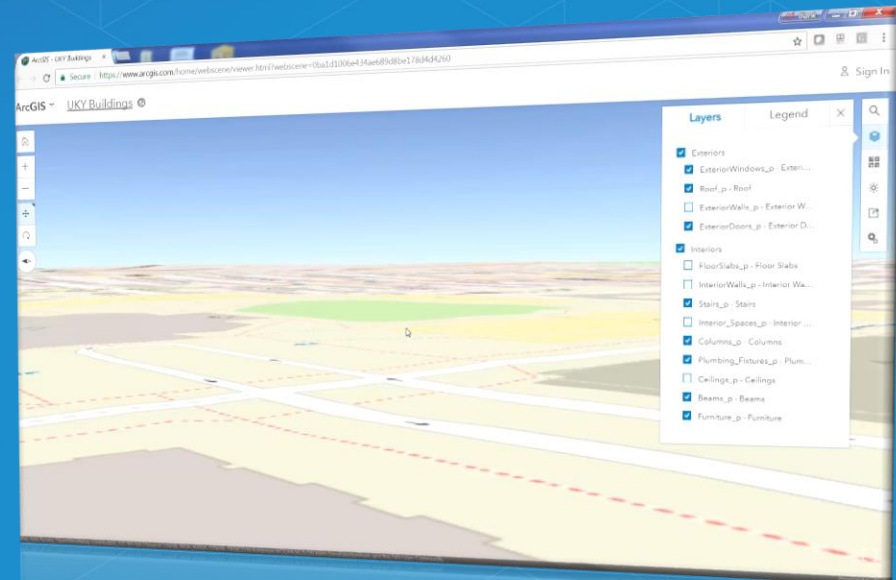
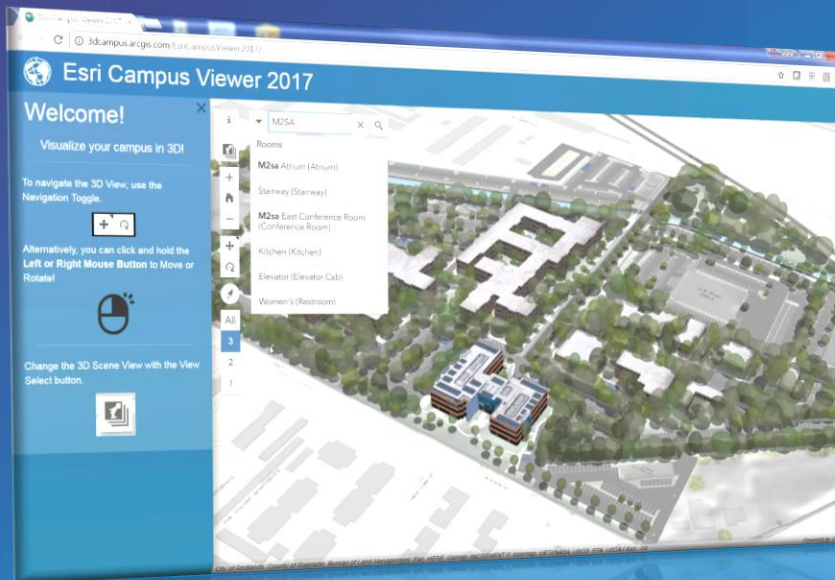


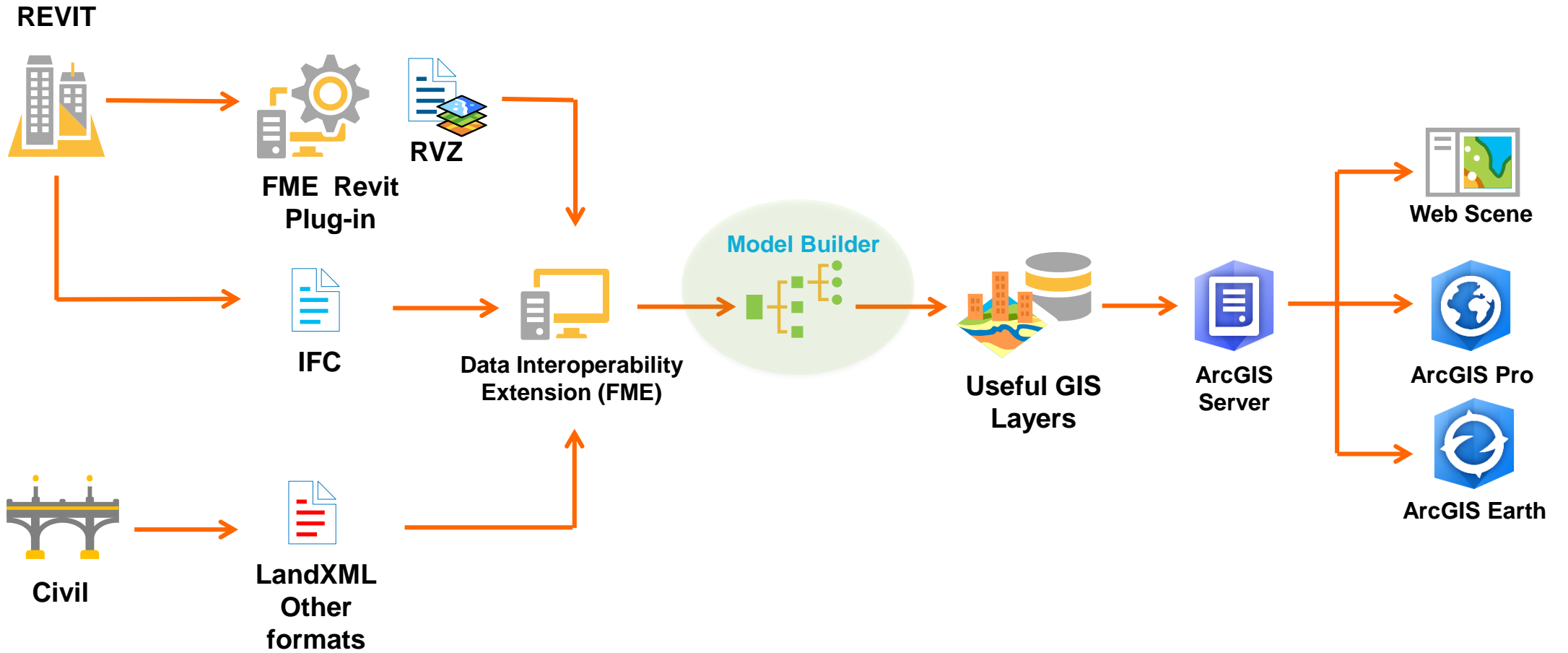
# GIS-BIM products



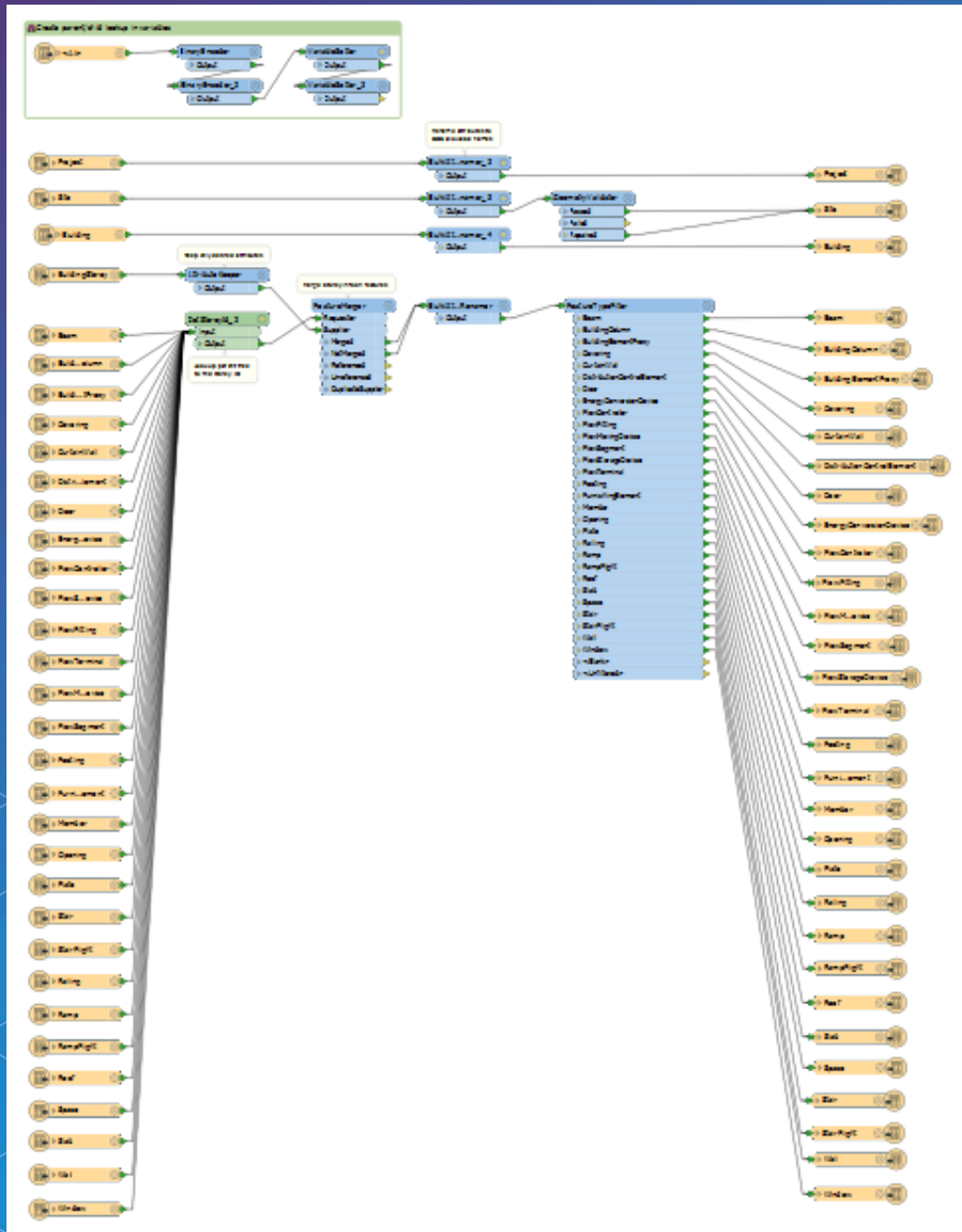
# BIM as Features

# BIM Visualization

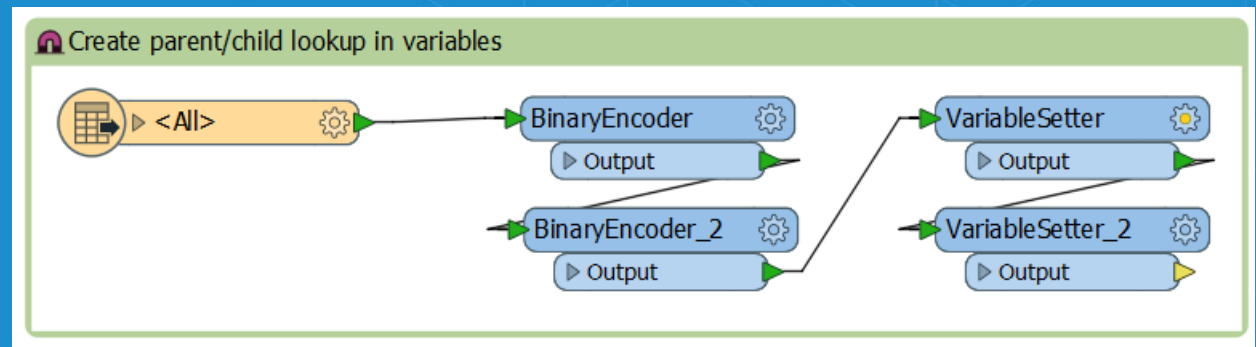




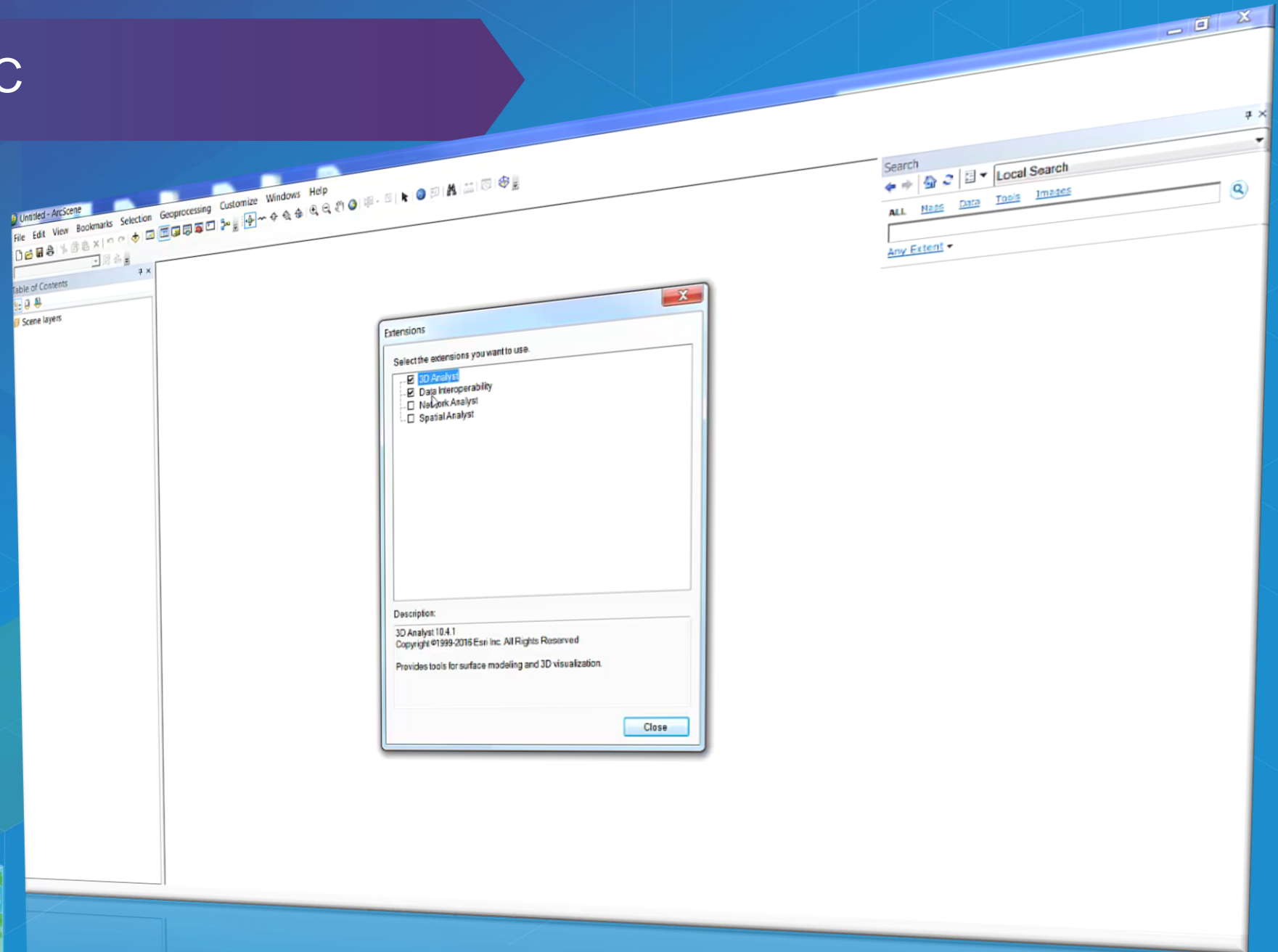
## BIM to GIS Workflow Today



## Advanced Workbench IFC with Attributes



# Quick Import IFC



# 3D in the Platform

- Powered by services, accessible **across clients**
- Combine 2D and 3D in Esri Web GIS architecture
- 3D Layers Types
- Web Scenes as building blocks for 3D apps
- Create higher value visualizations, analyses, and information products using data and geoprocessing with 2D and 3D



# ArcGIS Pro Multipatch Editing



Multipatch Editing

# Indexed 3D Scene Layers

## ArcGIS Scene Layers



- **3D Objects Scene Layer**
  - MULTIPATCH
  - Preset Point Symbols (Trees...etc)
- **3D Point Scene Layer**
  - User Defined 3D Symbols
  - Automated Thinning
- **3D Integrated Mesh Layer**
- **3D Point Cloud Scene Layer**





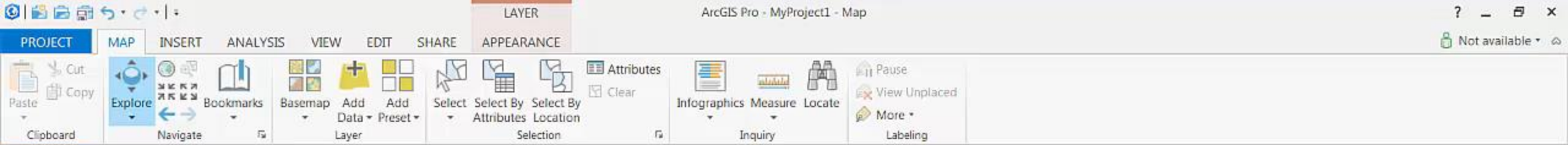


Find address or place

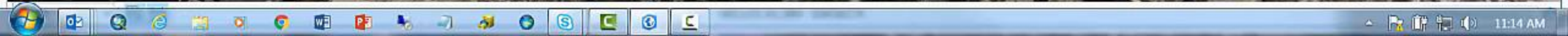
My Data

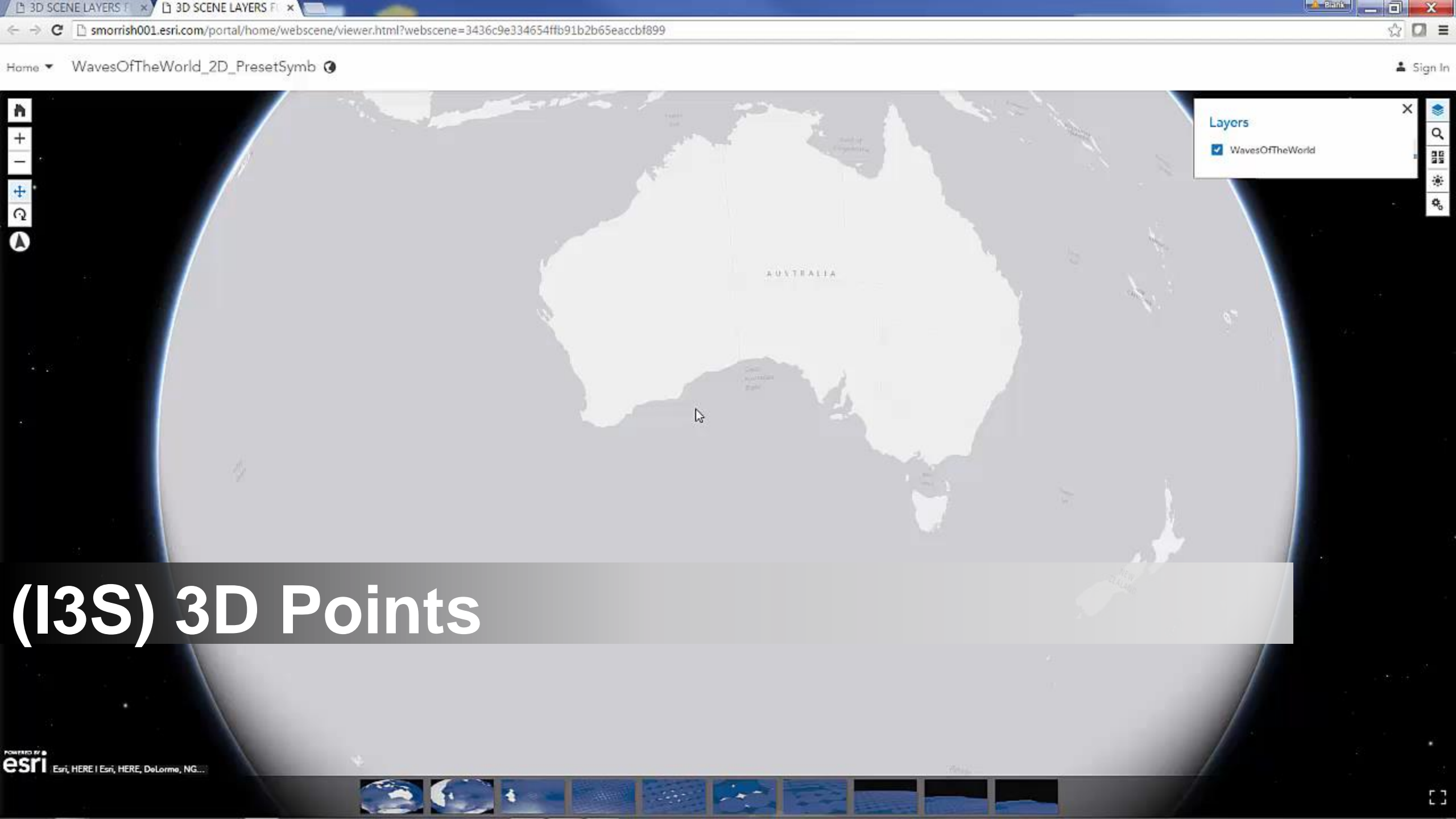
- Buildings\_San\_Francisco

# (I3S) 3D Objects



**(I3S) Integrated Mesh**





# (I3S) 3D Points

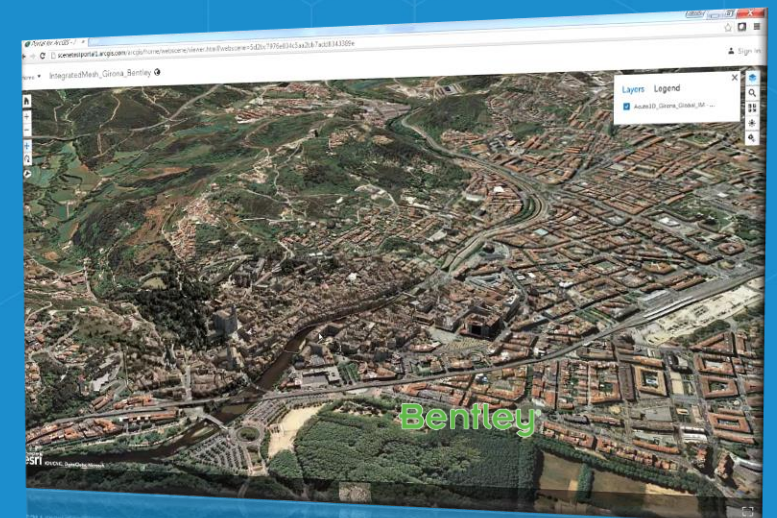


**(I3S) Point Cloud**

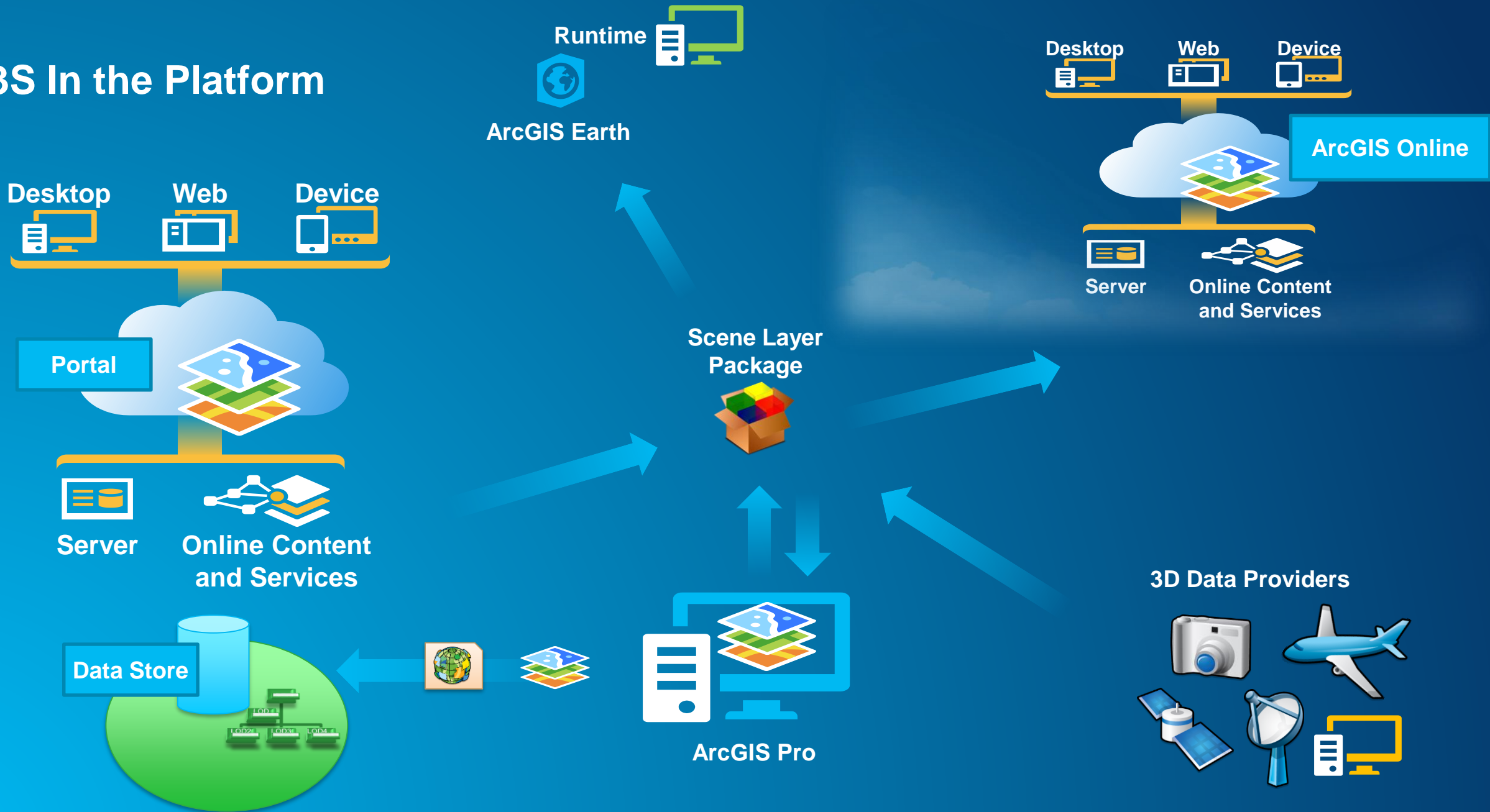
# Industry Adoption I3S

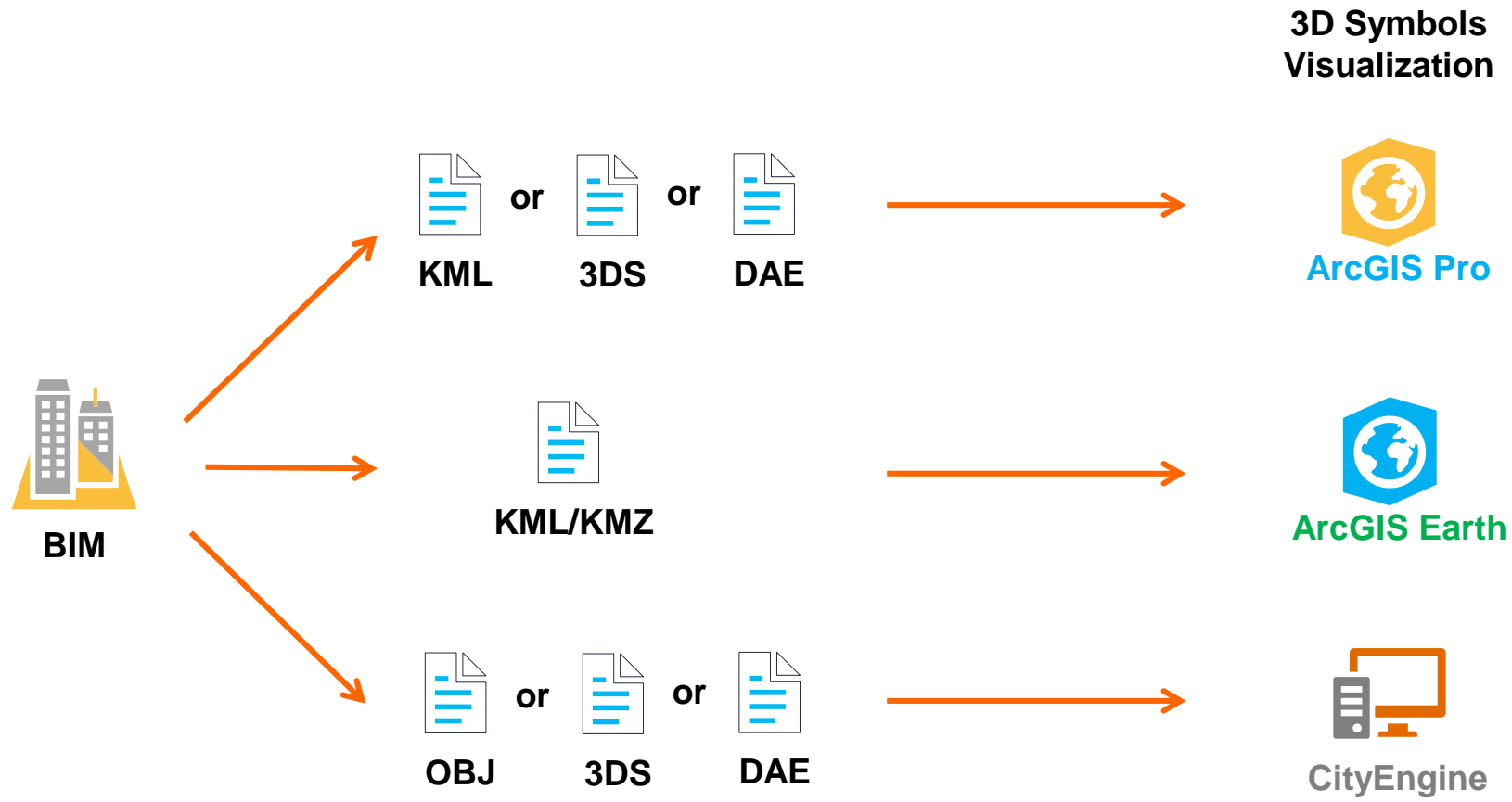


- Integrated mesh
  - VRICON, Bentley, and Pix4D sharing packages of data in I3S format
  - Improves Military/Intel/AEC story
  - Supports Drone2Map
- Additional partners and layer types
  - Safe Software and Cyclomedia

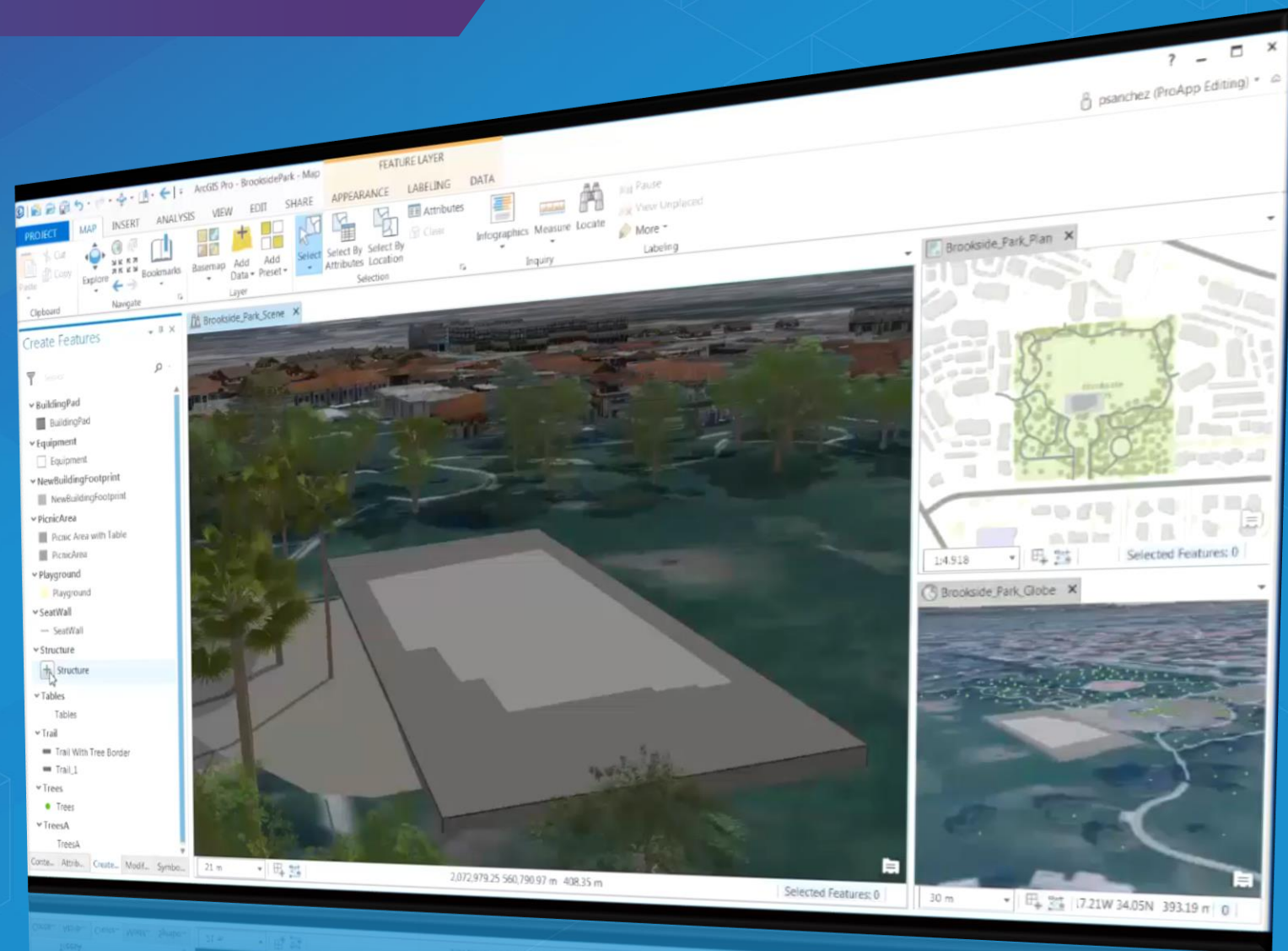


# I3S In the Platform



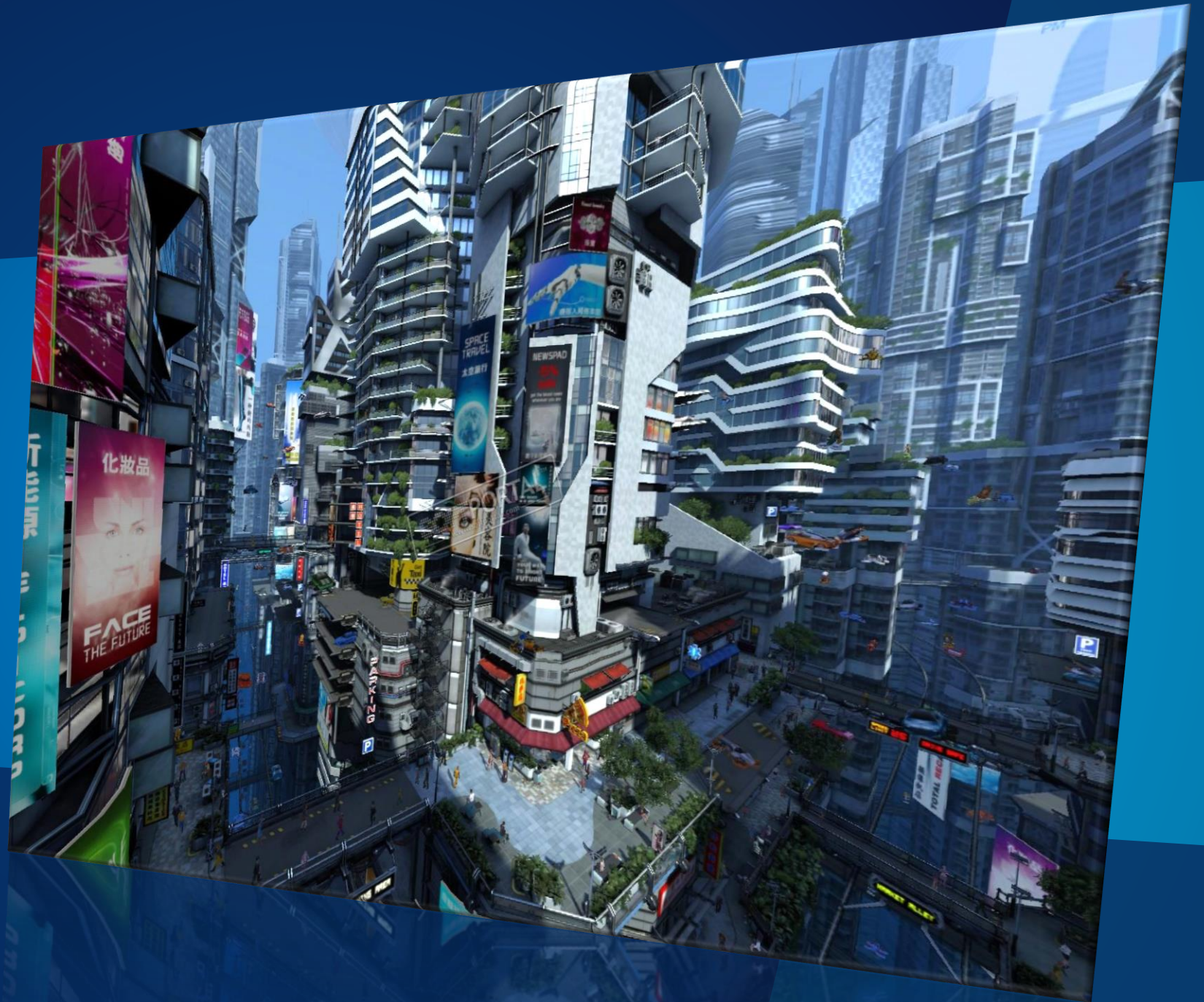


# BIM as Symbols





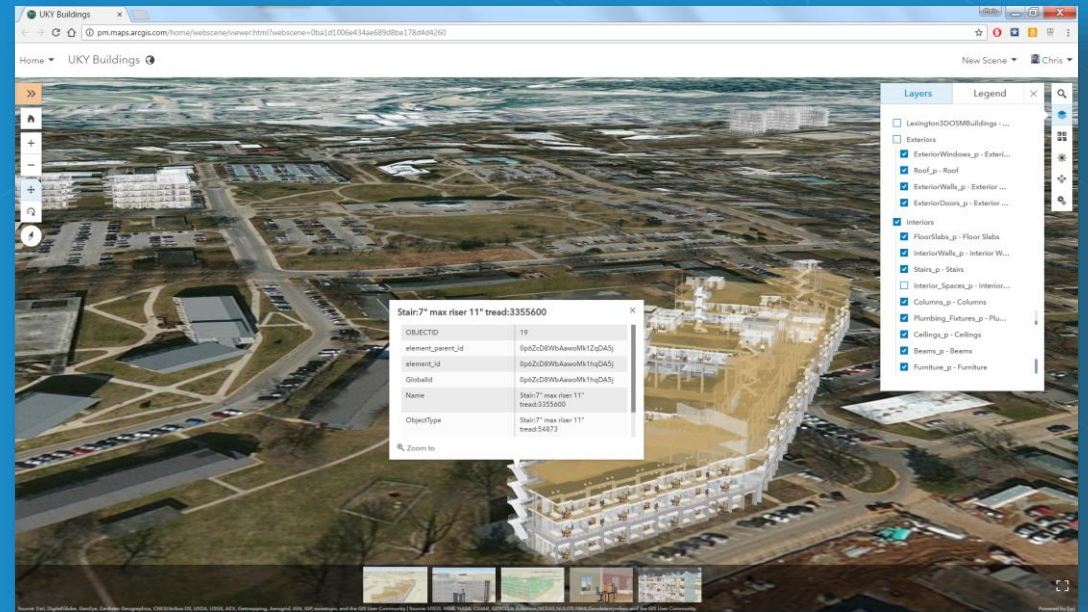
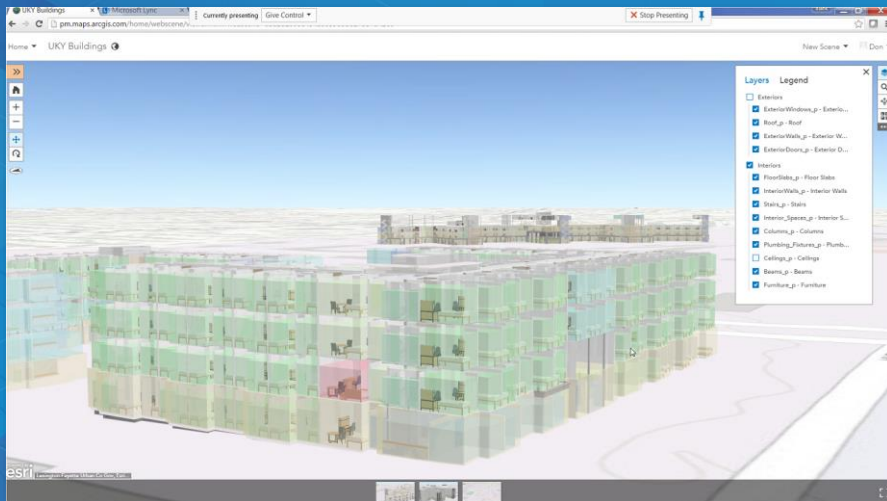
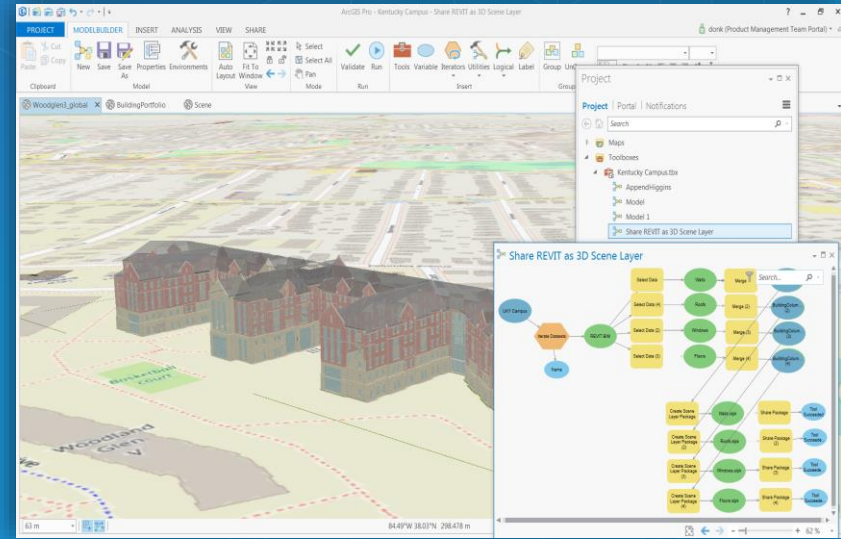
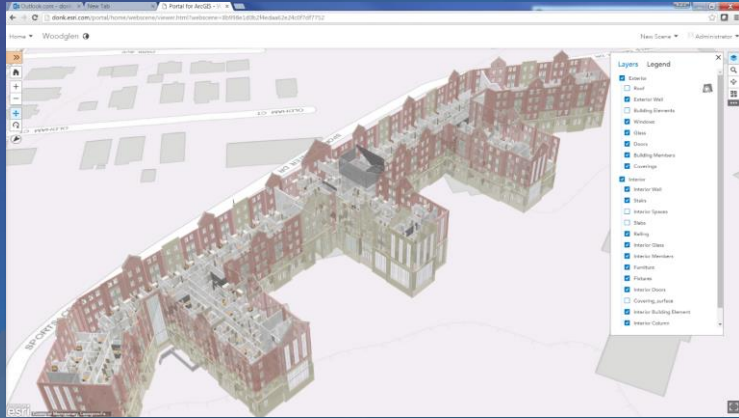
BIM/GIS  
Future?  
...you.



...Future more of what we know.

- Improved Direct Data Access
- More GIS 3D Scene Layers
- System of Systems Approach
- Cross Vendor Apps

# Directly Read BIM Files



# Continue the Conversation...

Don Kuehne, [DKuehne@esri.com](mailto:DKuehne@esri.com)

Chris Andrews: [CAndrews@esri.com](mailto:CAndrews@esri.com)



esri

THE  
SCIENCE  
OF  
WHERE

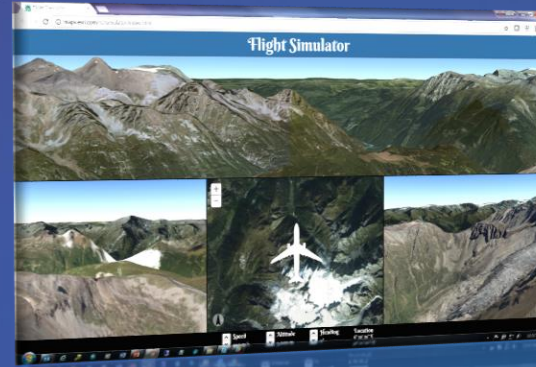
# Thanks to our Sponsors



CRITIGEN



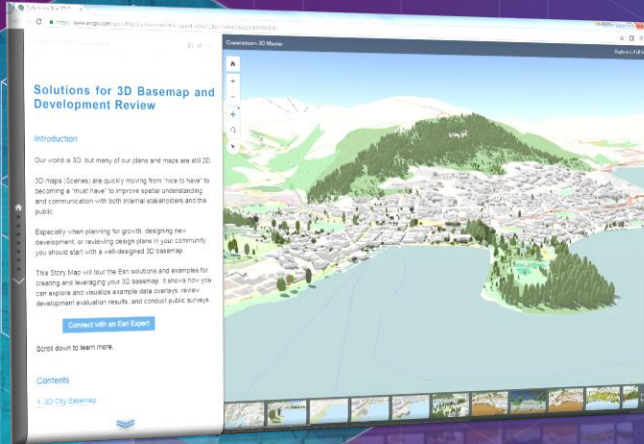
# GIS for BIM



Runtime



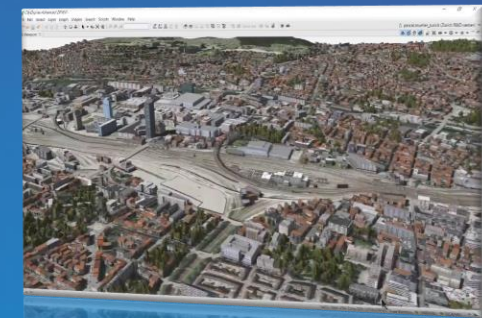
JavaScript



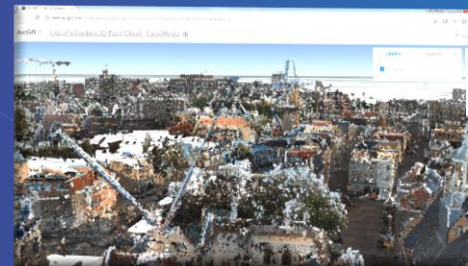
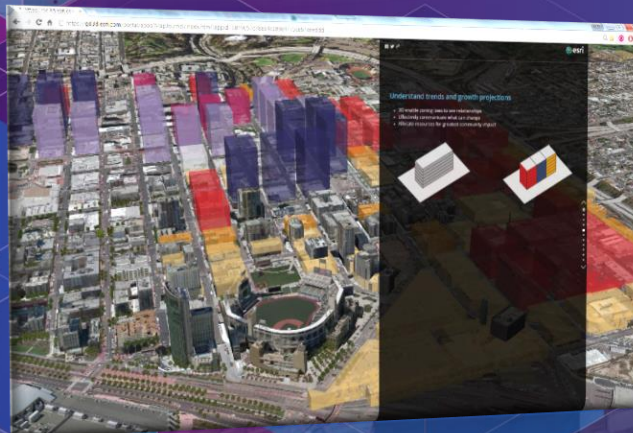
Story Maps



BIM Visualization



Parametric Design



Point Clouds



Analysis