# GIS NEWSLETTER
## July 2023

July 10–14, 2023 | San Diego, California

# 2023 Esri User Conference Highlights

"What kind of world do you want to see?" That was the question Esri Founder and President Jack Dangermond posed at the 43rd annual Esri User Conference at the San Diego Convention Center on Monday. The event attracted nearly 18,000 in-person attendees and more than 20,000 people watching online.

In helping to solve some of our most complex challenges, Dangermond told the crowd of mostly geographic information system (GIS) professionals that their work is essential to creating a more sustainable, equitable, and prosperous world.

Dangermond paraphrased US President John F. Kennedy who had talked about a changing world in his 1961 inaugural address, noting that humans were at a crossroads and held, "the power to abolish all forms of human poverty and all forms of human life."

"Now, it's about sustainability," Dangermond said. "Sustainability starts with geography."
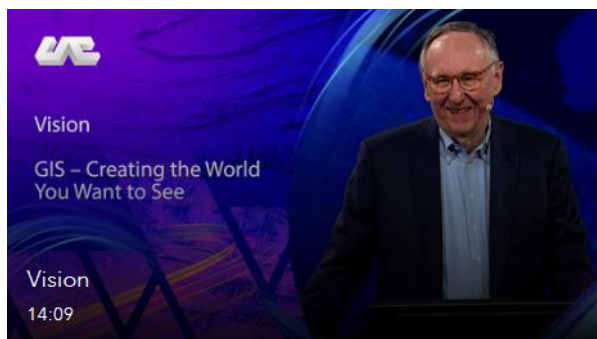
**GIS — Creating the World You Want to See**

Monday's presentations made it clear that geography is central to strategies for shaping the world.

*Click here for more details*

# Discover the 2023 Esri Plenary Session videos

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# openBIM from Building Design to Infrastructure

## (Combining openBIM with GIS to deliver Digital Twins)





**openBIM supports** collaboration and data sharing between diverse applications employing standards that can be use by all, not proprietary "locked" or "closed" protocols. openBIM is adhering to international **buildingSMART standards** and commonly defined work processes.

With OpenBIM in place, the large network of stakeholders working on a Construction project can easily send information between systems and tools, leading to a number of benefits that improve cost control and productivity.

**Why is openBIM important?**

- openBIM supports a transparent, open workflow and allows project members to participate regardless of the software tools they use.

- openBIM creates a common language for widely referenced processes, allowing industry and government to procure projects with transparent commercial engagement, comparable service evaluation and assured data quality.
- openBIM provides enduring project data for use throughout the asset life–cycle, avoiding multiple input of the same data and consequential errors.

**openBIM standards**

We can classify openBIM standards in

- Data Standards
- Workflow Standard

**Data Standards**

IFC is a standard for openBIM data exchange. Open data formats like IFC allow data to be transferred accurately across different software platforms, streamlining design and engineering workflows.

The complexity of modern construction projects requires the use of open standards. Open standards make it easier and more efficient to communicate using data exchange formats such as IFC.

A single project can involve hundreds of stakeholders, from the architect to the company, each of whom must contribute and access data. Needless to say, if that data cannot be easily exchanged or reused during the life cycle of the project, there could be considerable confusion with consequential waste of time and money.

**The following belong to the Data Standard:**

- IFC (Industry Foundation Classes), which allows you to catalogue the data that make up an information

- MVD (Model View Definition), which defines which of these datasets need to be exchanged during a communication process and represents a property filter for an IFC file.

   In general, a MVD, or "Model View Definition", is a specific implementation level of IFC to describe facilitate a specific use or workflow.

   The model view definition determines how you use an IFC file, because it enables a specific data exchange scenario.

## Workflow Standard

Integrated design is based on the coexistence of different disciplines and therefore specific models made by different professionals. There may be errors in transmitting the model, and those responsible must be told to resolve them.

It is therefore necessary to define process standards, a set of specifications that indicate the minimum information necessary to achieve all the processes of the entire life cycle of the building. The aim is to increase the effectiveness of communication between the different stakeholders.

**The standard workflows include:**

- **BCF** (BIM Collaboration Format), which was created to streamline communications and allow the exchange of feedback between professionals
- **IDM** (*Information Delivery Manual*), which allows you to standardize the exchange processes between professionals
- **IDS** (Information Delivery Specification), which defines Exchange Requirements within an exchange of information based on the use of a BIM model (IDS BIM)
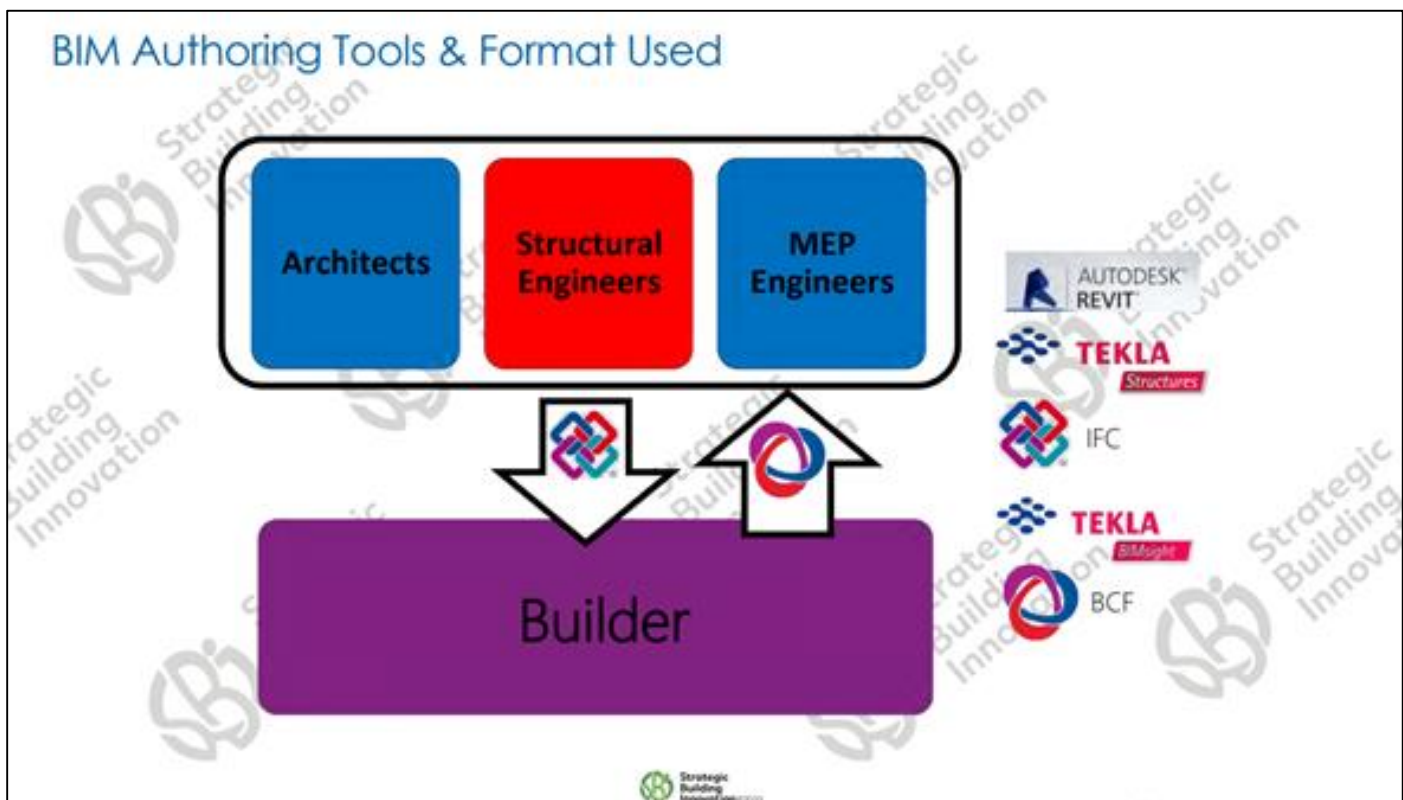


*BIM Authoring Tools & Format used*

The latest version of the IFC schema, IFC4 facilitates interoperability and collaboration among different stakeholders in a Building construction and Infrastructure projects.  Autodesk's' multidisciplinary BIM

software Revit obtained certification for Industry Foundation Class 4 (IFC4) Reference Exchange for architecture and structure exports.

**How does the IFC work?**

According to the "buildingSMART" consortium, **IFC is the main tool used for openBIM** implementation, "…a universal approach to the collaborative design, realization, and operation of buildings based on open standards and workflows".

**The IFC format is a standardized data model that describes:**

The IFC architecture bases its structure on:  Semantics, relations, properties

- identity and semantics: object, name, function
- characteristics: material, colour, properties
- relationship between:
- objects (e.g. walls, slabs, windows)
- abstract concepts (e.g. performance, costing)
- processes (e.g. installation, assembly)
- people (e.g. owners, designers, contractors, managers).

The IFC schema itself can be expressed in various file formats, most commonly in **STEP Physical Format** (SPF or IFC-SPF) but also as XML or a ZIP file.

- IFC-SPF is a text format in the modelling language of express data. It has compact dimensions and is the most used IFC format
- IFC-XML is a format in the extensible markup language, XML. Although XML is a more common programming language, IFC-XML has a larger file size than IFC-SPF and is less used
- IFC-ZIP is a ZIP compressed format of the IFC-SPF file.  A. ifcZIP file usually compresses a 60-80% .ifc and a 90-95%. ifcXML



Missing Information When Exporting to IFC
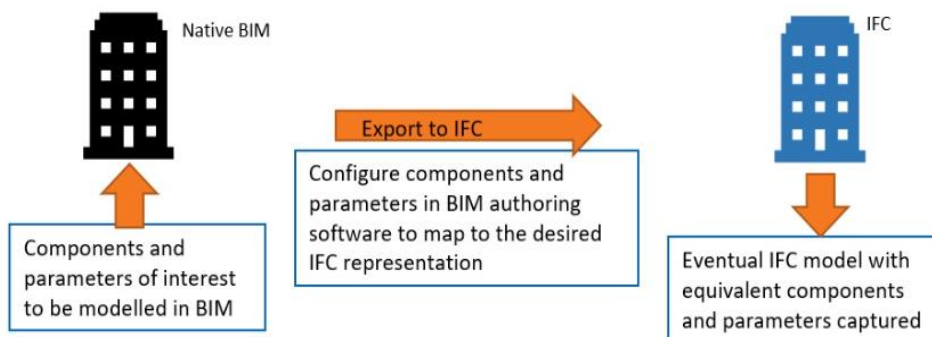
## Advantages of the IFC

The main advantage offered by the IFC format is to allow collaboration between the various figures involved in the construction process, allowing to exchange information through a standard format. This entails greater control and quality, reduction of errors, reduction of costs, time saving, with consistent data and information in the design, execution, management and maintenance phase.

IFC files can be used to transfer data between BIM softwares. For data processing objects, vendors can use any kind of BIM software platforms like (Bentley, Autodesk, Telka (a Trimble product), Archicad, BIMx etc, and these objects can export in to IFC.  This ensures that all stakeholders involved in a project have access to the same information.
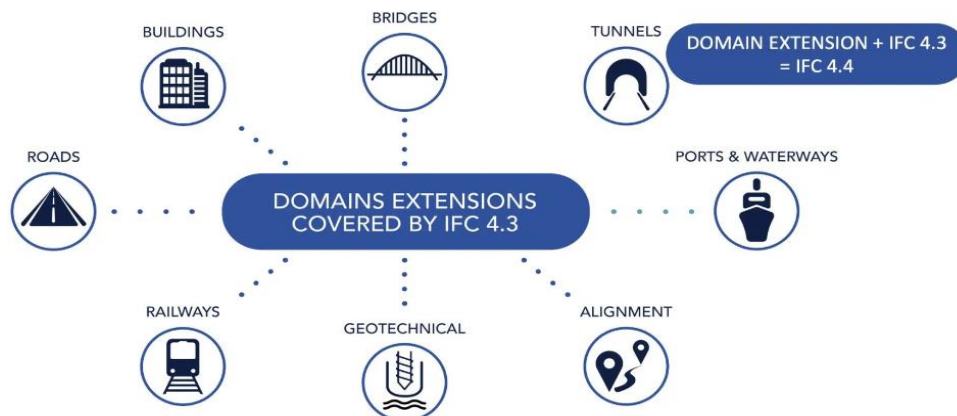


*IFC4: Expanding from Building Design to Infrastructure*

An infrastructure schema covering bridges, roads, railways as well as ports & waterways, and an international effort the new IFC 4.3 schema for infrastructure has released.

## IFC file formats directly in ArcGIS Pro

The integration of planning and geospatial data is increasingly expected in the Construction industry. BIM and CAD formats are being used in ArcGIS to support workflows such as maintenance, inspection, operations etc.

ArcGIS Pro can now directly read BIM files in Industry Foundation Classes (IFC) format in addition to Autodesk Revit (. rvt) and Autodesk Civil 3D (.dwg) files.

This widely used schema helps designers share BIM content from any source that supports the standard. Many BIM software vendors export to IFC. Adding this capability brings a powerful method to share data between those applications, directly with ArcGIS. Currently, ArcGIS Pro supports Building IFC 2×3 and 4x and will expand as future standards are adopted.

**Geospatial Digital Twins of Web-based 3D Interactive Viewer with openBIM.**

By **integrating Esri ArcGIS Enterprise APIs** with the openBIM technologies a Web -enabled platform allows for the customization and expansion, making it a valuable tool for professionals in the field. This platform will follow the principles of Service-Oriented Architecture (SOA), allowing data exchange and communication between subsystems while maintaining information integrity.

This integration enhances coordination and streamlines communication between architects, engineers, contractors, and other professionals involved in obtaining building permits and managing construction projects effectively.

Additionally, with the inclusion of openBIM standards, stakeholders can collaborate seamlessly by sharing models and information across the software platforms.

# ARTICLES



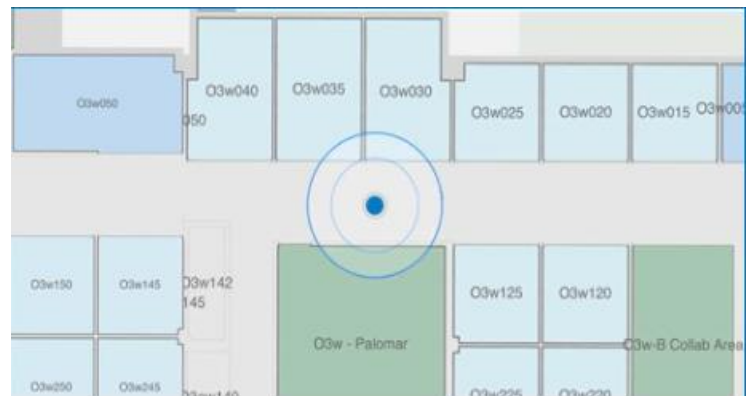## The Differences Between ArcGIS Online and ArcGIS Enterprise

Find out when to choose one over the other—or when it adds value to employ the two products together.

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## Apple Indoor Positioning for ArcGIS Indoors

Enable Apple indoor positioning in ArcGIS Indoors mobile app for iOS by converting the Indoors model to IMDF.

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## In ArcGIS Pro 3.1, the Points To Line tool has more options for you!

In ArcGIS Pro 3.1, the Points to Line tool includes three new parameters to specify how to construct lines and transfer attributes.
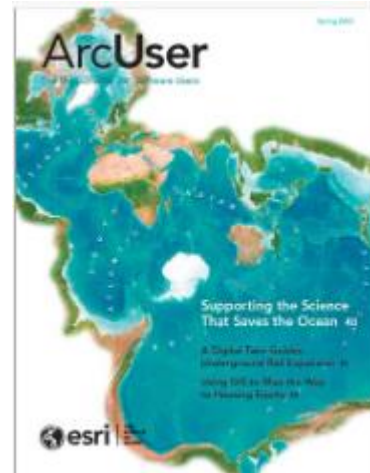
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Founded in 1983, MicroCenter Group is a pioneer in providing information technology solutions in Bahrain. Initially it was starred with the aim of providing customized IT solutions to small and medium organizations but today with over 100 customers, both in the Government and private sector it has attained a leadership position in the industry within the country. With four group companies and an office in Saudi Arabia, today it has diversified into various other businesses that include IT Business Solutions, Geographical Information Systems (GIS), Utility network GIS surveys, LiDar Technology / BIM modeling, and Digital media solutions & Specialized training.

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