مجموعة مايكروسنتر
MICROCENTER GROUP

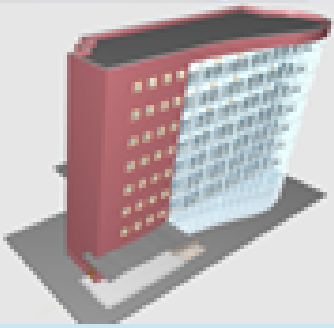
AUGUST 2024

# BIM NEWSLETTER

## ( AEC NEWS & STORIES)

## HIGHLIGHTS

- BIM in Practice
- How to use Digital Twins in Construction and benefits of digital twins in construction
- Building and designing with BIM
- openBIM and ClosedBIM
- What are the advantages of openBIM standards?
- IFC versions (schema) and IFC structure
- What is the Common Data Environment (CDE)?
- IFC file formats directly in Esri ArcGIS Pro



BIM (Building Information Modeling) is rapidly becoming a standard due to its ability to facilitate seamless information sharing and informed decision-making throughout the AEC (Architecture, Engineering, and Construction) industry.

This newsletter discuss the BIM Practice, advantages of openBIM standards, such as standardization of processes and integration with GIS (Geographic Information Systems), which are crucial for project planning and execution.

# BIM in Practice

(BIM) has revolutionized project management in the construction industry, providing a comprehensive framework for efficient collaboration and information sharing. At the enterprise level, it's inspiring to see how AEC organizations are adapting their structures to accommodate BIM. By establishing clear roles and responsibilities, AEC companies are empowering their teams to fully leverage the potential of this technology.


BIM organizational structure, roles, and responsibilities should be defined both at the enterprise (agency) level and at a project level. BIM in practice is the formal management of projects through BIM Execution Plans (BEPs). These plans serve as important roadmaps, guiding teams through the complex process of BIM implementation.

Employer's Information Requirements (EIRs) and digital models should be provided to contractors during procurement (in addition to drawings) to establish expectations on project delivery. As part of these digital information modeling and delivery requirements, model development specifications should be clearly outlined (e.g., model delivery schedule).

Use of open standards and openBIM development of object-based data models should be encouraged during the project. Tools that facilitate interoperability and integration of the developed CAD, BIM, GIS, Point Cloud (LAS/LAZ) data models should be used.

A CDE (as defined by ISO19650) should be set up as the information exchange platform.
sign data models should support clash detection, visualization, quantity take-off calculations, fabrication, automated machine guidance, and asset information requirements. For asset information, GIS-systems are more relevant and, therefore, design data must be in a format that makes it easy to move them or export them to a format read by GIS systems.

# How to use Digital Twins in Construction?

Architecture, engineering, and construction teams need a clear understanding of the built environment as they tackle major projects. The main benefit of digital twins within construction is that they help improve the analytical capabilities of (BIM). Digital twin technology adds a new level of sophistication to BIM models, so that stakeholders can visualize the real-time status, working conditions, and position of physical assets.

**Other benefits of digital twins in construction include:**

**Resource Management:** Digital twins make it possible to create an information pipeline between the office and the field. With the aid of automatic data delivery, project stakeholders can predict allocation issues and help balance labor costs with budgets. This helps the jobsite run more efficiently and affordably.

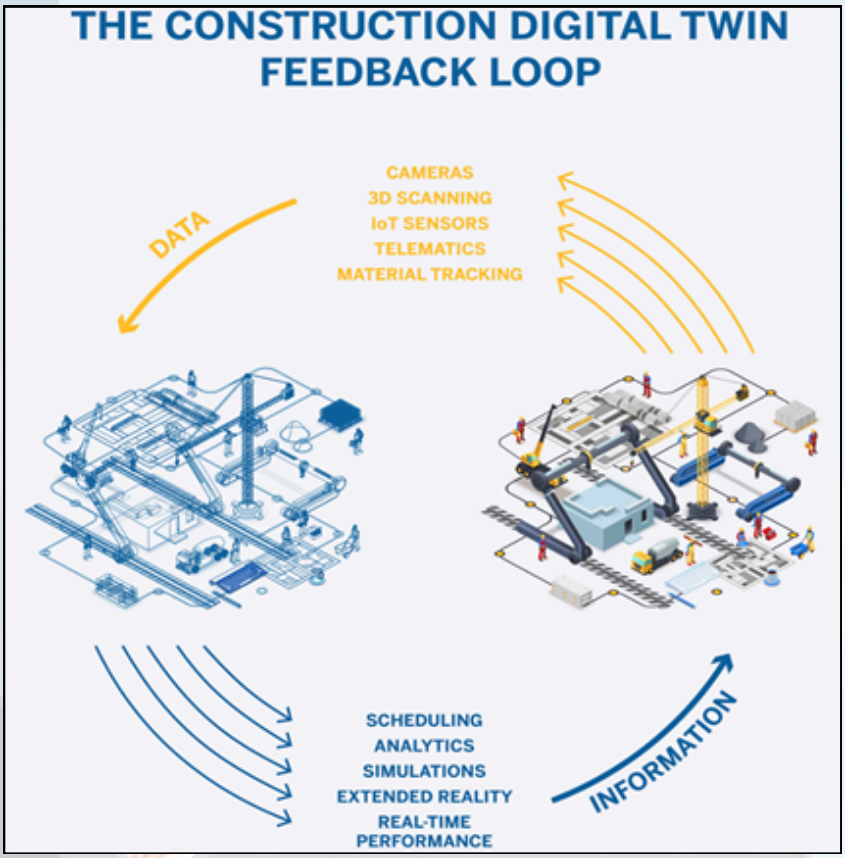
**Connectivity:** Digital twins deliver information in a centralized platform. This technology takes BIM a bit further by automatically updating 3D models with constructible data. Component dimensions, model details, working conditions, and more can be added to content-enabled models. This way, no details get lost as a model evolves with the building over the years.

# Building and designing with BIM

**Planning:** In the planning phase of a project, conceptual design software gives teams a virtual space to brainstorm, sketch out provisional ideas, and share these ideas with teammates.

**Design:** If a building's structure or dimensions need to be changed, BIM 3D models make it easy to edit building designs and solve important engineering problems.

**Execution:** Once it comes time to break ground on a new building, BIM 3D models give teams an overview of its constructibility. The model is a handy resource as they work to turn their virtual model into a built reality.



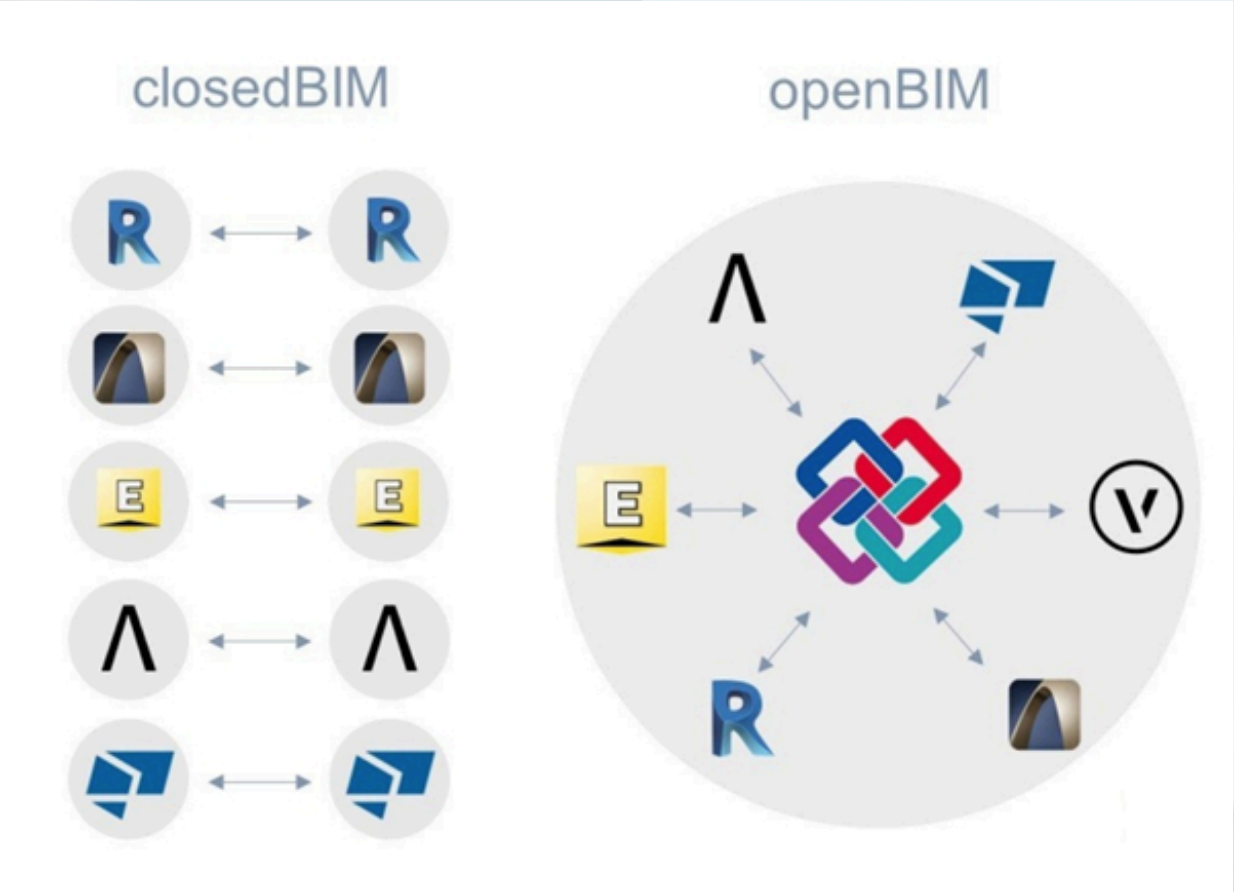

# openBIM and ClosedBIM

openBIM is adhering to international buildingSMART standards and commonly defined work processes. openBIM extends the benefits of BIM to share and exchange construction and facilities management information.

openBIM facilitates a common data environment to exchange the data in IFC (Industry foundation class) BCF, COBie, CityGML, etc formats.

**BCF** – BIM collaboration format, allows different BIM applications to communicate model-based issues with each other by leveraging IFC data . For data processing objects, vendors can use any kind of BIM software platforms like Bentley, Autodesk, Telka (a Trimble product), Archicad, BIMx etc, and objects can export in to IFC. For example, Autodesk Revit (. rvt) can export the data objects in to IFC format.

**Closed BIM** is an environment where the same software platform must be used throughout the building process to create a unified digital representation of the project. It involves several exchanges using the BIM tools of the same provider to ensure interoperability and prevent incompatibility issues.




# What are the advantages of openBIM standards?

Interoperable, open and international standards for BIM that transcend traditional design and construction phases to enable a complete digital environment for the entire project and resource lifecycle offer substantial benefits.

We can summarize the main advantages guaranteed by the standard openBIM in:
more transparent, collaborative and open workflows

- greater certainty of information thanks to a shared vocabulary of sector terms
- more open procurement processes
- inclusive processes for large and small enterprises
- greater reuse of data
- easier integration with linked data created and shared in related industries.

In order for the resulting benefits to be shared, standards must be developed collectively by the main stakeholders.

To work with open file formats and only with openBIM standards, to communicate freely with others and manage data regardless of the software you use, you need to choose an openBIM platform.

# IFC versions (schema)

The IFC definitions are regularly updated and developed by buildingSMART. It is recommended that you use the latest versions wherever possible. Among other things, the IFC4 format allows better representation of complex geometries.

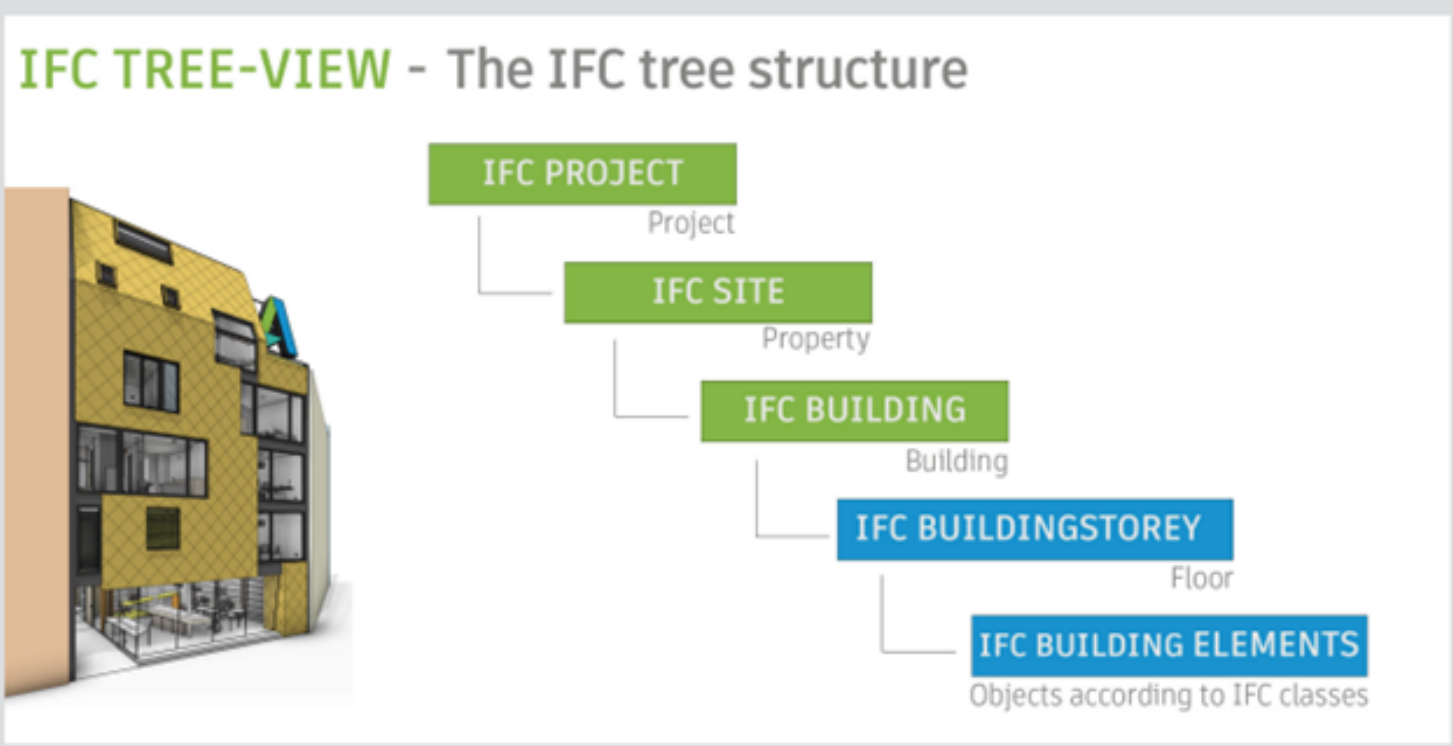
**Current versions:**

• IFC4 (offers certain advanced possibilities but is not widely used yet);
• IFC2x3 (currently the most supported and stable format, certified in Revit and recommended for production);
• IFC2x2 (recommended if the recipient of the file does not have software with IFC2x3 or IFC4 support).

Revit no longer supports the following older versions: IFC2.0 (import still supported), IFC1.5.1, IFC1.5, and IFC1.0

# IFC structure

IFC files create a building model based on a pre-defined structure that builds the model in a logical way. When it is saved, the IFC file format orders the IFC units hierarchically according to their type, as follows.



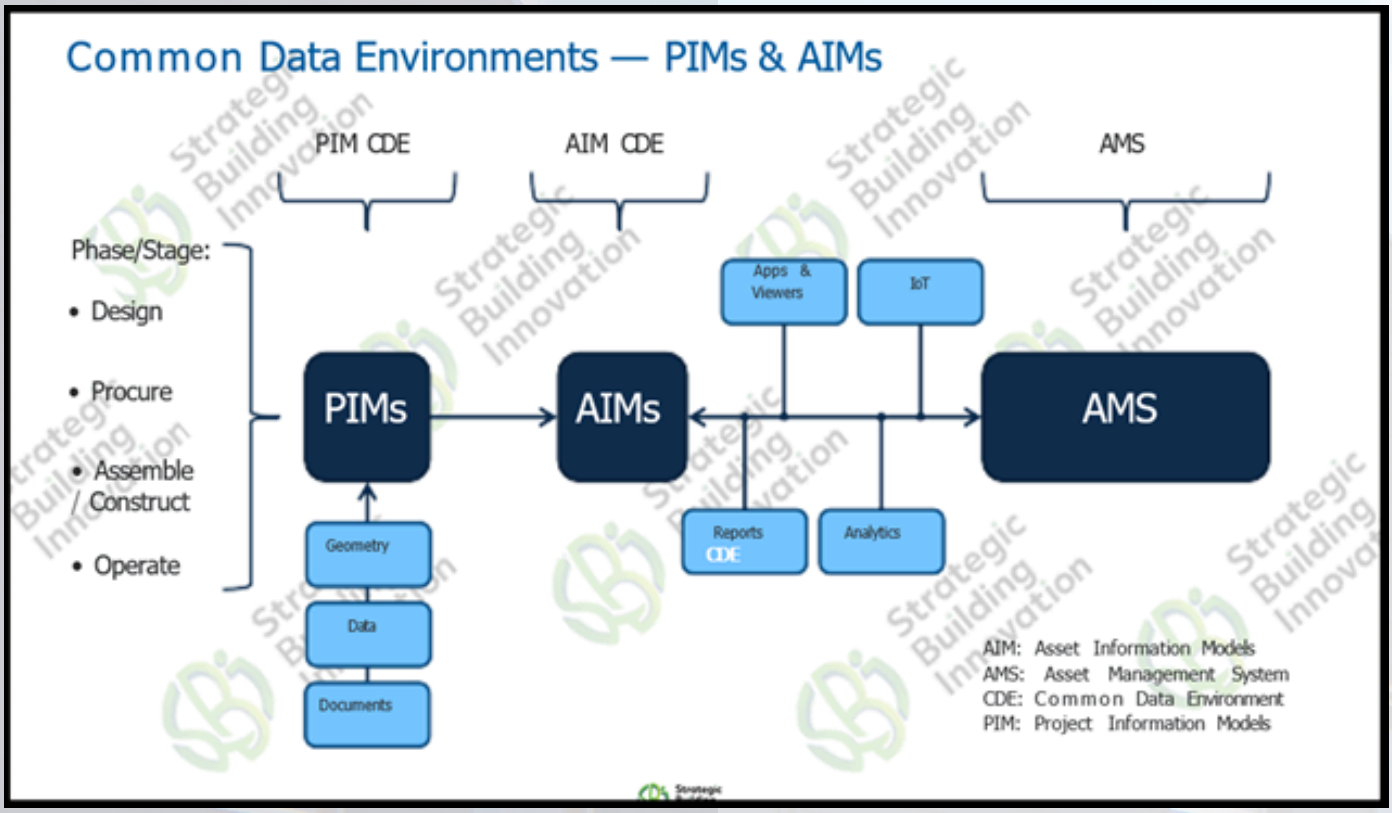
# What is the Common Data Environment (CDE)?

What is the common data environment or CDE on a construction project used for?

- Who contributes?
- Who is responsible?
- Who owns the information within?
- Why use a CDE at all?

We explore the idea of a central information repository that is at the heart of BIM implementation.

The Common data environment **(CDE)** is a central repository where construction project information is housed. The contents of the CDE are not limited to assets created in a 'BIM environment' and it will therefore include documentation, graphical model and non-graphical assets. In using a single source of information collaboration between project members should be enhanced, mistakes reduced and duplication avoided. ***Here we explore the CDE in more detail.***

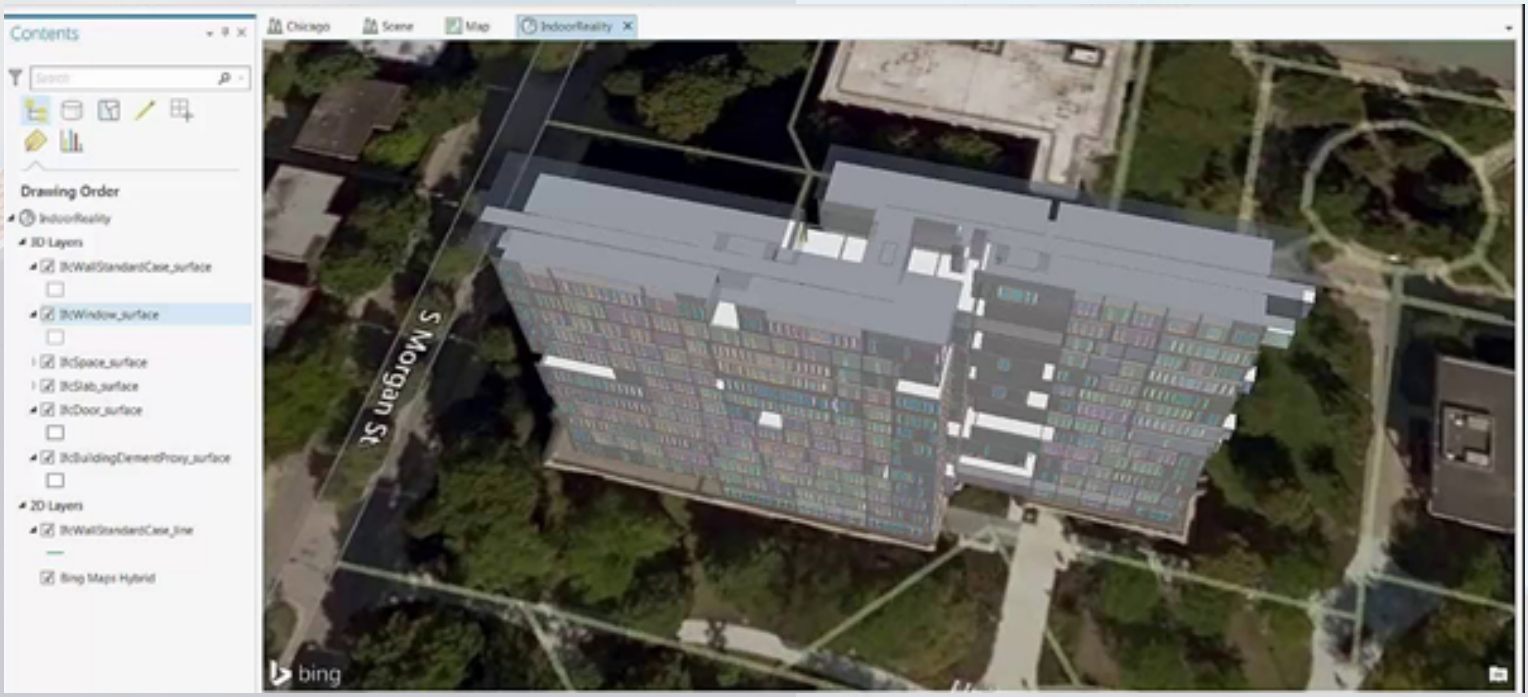



The Common Data Environment (CDE) is truly a game-changer in the construction industry, revolutionizing how project information is stored, shared, and managed. This central repository serves as a digital hub, bringing together a wealth of project-related data in one accessible location. It's impressive how the CDE goes beyond just storing BIM-generated assets, encompassing a wide range of information including documentation, graphical models, and non-graphical assets.

What's particularly noteworthy about the CDE is its ability to foster collaboration among project members. By providing a single source of information, it creates a unified platform where team members can seamlessly work together, share ideas, and stay updated on project developments. This level of collaboration is invaluable in an industry where coordination is key to success.

# IFC file formats directly in Esri ArcGIS Pro

The integration of planning and geospatial data is increasingly expected in the Construction industry. More and more common 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.

**for more details:**

https://pro.arcgis.com/en/pro-app/latest/help/data/indoors/import-floor-plans-from-ifc-files.htm

https://pro.arcgis.com/en/pro-app/latest/help/data/revit/what-is-bim-data-.htm#:~:text=An%20IFC%20or%20RVT%20format%20file%20is%20interpreted,does%20not%20attempt%20to%20access%20linked%20BIM%20models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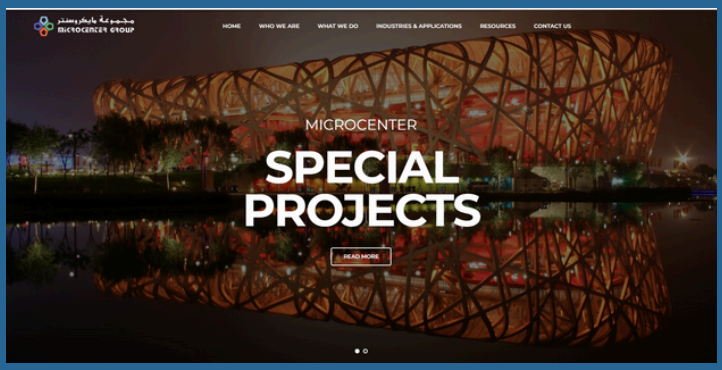


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# About MicroCenter Group

Incorporated in 1984, MicroCenter is an award winning group of technology companies in the Kingdom of Bahrain, which provides IT Business Solutions, Geographic Information Systems (GIS), Utility Network GIS Surveys, LIDAR Technology, GeoBIM, Smart card& Digital Solutions and highly specialized GIS &Autodesk Training. With over 100 qualified staff & branch in Saudi Arabia, it aims to refine its capabilities in developing& integrating innovative IT, GIS & Engineering solutions and expand the expertise in different corners of the GCC.

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