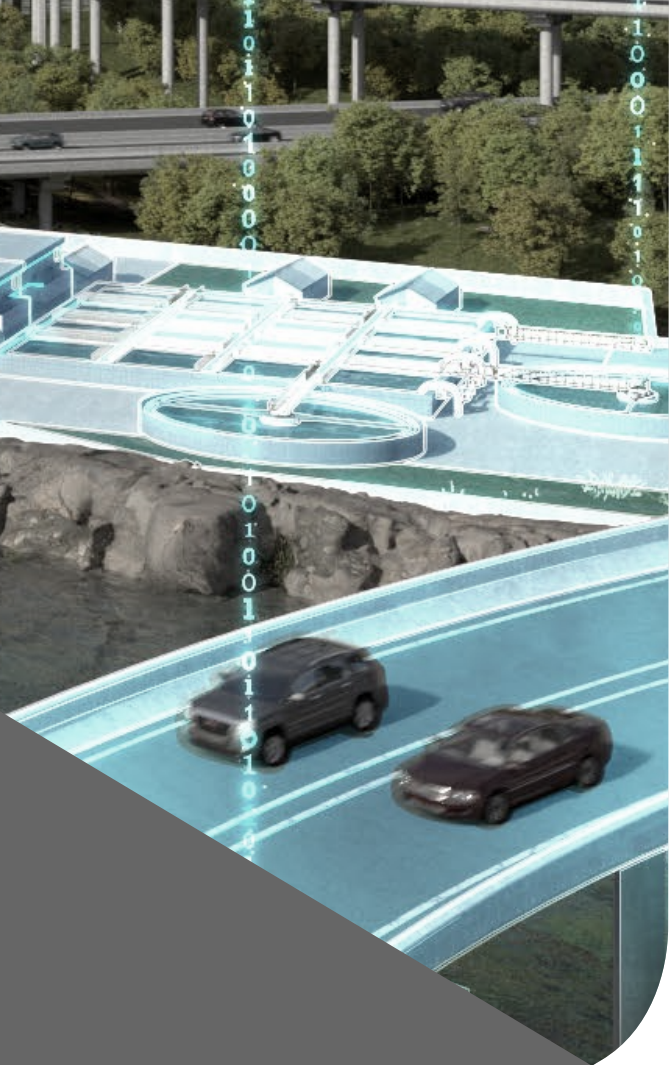


The background of the slide is a composite image. It features a modern cityscape with a prominent cable-stayed bridge in the foreground. In the background, there are more buildings and a large, arched structure. Overlaid on this image are various digital elements: a blue and white diagonal swoosh, vertical lines of binary code (0s and 1s), and a glowing blue sphere. The text is positioned on the right side of the slide, partially overlapping the dark blue swoosh.

Where Data Fuels **Opportunity** The Benefits of BIM and GIS in the Cloud



CONTENTS

- / Introduction
- / The Stakes are High
- / Potential Pitfalls Across the Project Lifecycle
- / Unleash the Full Potential of Connected BIM and GIS
- / The Products that Maximize Visibility
- / Autodesk and Esri: Add Synergy to BIM with GeoBIM
- / BIM and GIS Cloud Collaboration in Action
- / Looking Ahead: Context Is Everything



INTRODUCTION

Transporting people and goods safely, ensuring access to water and sanitation resources, and building schools and hospitals are among the most important projects in any community.

To develop and manage architecture, engineering, and construction (AEC) projects – from airports and government buildings to roads and rail lines – you have to work with a multitude of stakeholders, while keeping an eye on project delivery times and budget. The project to-do list keeps growing, and Oxford Economics^[1] researchers estimate that worldwide infrastructure investment will total **\$94 trillion** between now and 2040.

For complex projects, you need to carefully choreograph every step along the way. That's why improving collaboration and communication is paramount – as is having the right data and tools.

Connected data is here to help. Building information modeling (BIM) is becoming the standard for AEC projects. Architects and engineers also rely on geographic information system (GIS) data to add geospatial context to project designs.

Integrating both in a common data environment in the cloud is the next step for improved collaboration and communication between project stakeholders across disciplines.

Find out how combining BIM and GIS with cloud collaboration can help you plan, build, and operate complex building and civil infrastructure projects more efficiently.



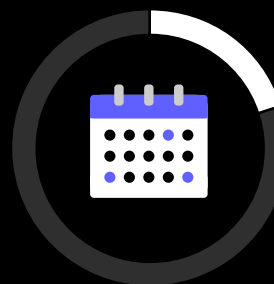
THE STAKES ARE HIGH

When you are responsible for billions of dollars in assets, you need the right data to make informed decisions. You also need to streamline the process as much as possible.

Consider these facts:^[2]



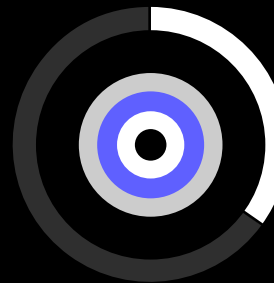
Up to **80%** of AEC projects go over-budget.



About **20%** of projects miss their completion milestones.



More than half (**52%**) of all projects require rework because of poor data or communications.



Another **35%** of projects experience delays and waste resources because of conflicts and the need for rework.

POTENTIAL PITFALLS ACROSS THE PROJECT LIFECYCLE

Think about possible problems in terms of planning, design, construction, project delivery, and operation and maintenance. This is where BIM and GIS cloud collaboration provides a holistic framework for better efficiency and management.

■ Design and Planning

The root cause of many planning issues is lack of information. Siloed systems often result in missing project data. A designer working on a site plan may, for instance, not have access to survey data that identifies a utility right-of-way, or to a map that shows a protected area of wetlands.

According to the Geospatial World survey^[3], 55% of project stakeholders believe that integrating GIS and BIM solutions leads to more collaborative workflows. By integrating BIM and GIS data, designers can create more accurate models for visualizing and monitoring a project before, during, and after construction. This will make it easier for you to model and visualize how potential changes and design options will affect the project and its surroundings. For example, you need to assess the implications of moving a rail station platform or tunnel entrance.

■ Project Delivery

Some of the underlying causes for missed deadlines include faulty planning assumptions, slow decision-making, and poor communication between key stakeholders.

When you can access up-to-date information in a common data environment, project deadlines become more manageable.

Better information also mitigates risk.
The Geospatial World survey found that

59% of participating organizations believe that using GIS and BIM for complex project design reduces the risks associated with project execution, including project delays and design to execution conflicts.

III Operation and Maintenance

Easily accessible and up-to-date data results in better operation and maintenance.

When you know how an asset changes over time, you can plan for upgrades and repairs, while minimizing costly downtime. Maintenance is also easier when you have control over your data and can manage a project using a web dashboard.

The Geospatial World survey^[3] found that GIS and BIM integration provides enhanced support for facilities management, maintenance and safety. It also facilitates smart energy consumption monitoring and data access to support ongoing operations.

Replacing legacy systems with cloud-based solutions helps to improve communications and ensure that your entire project team is on the same page.

Potential Pitfalls Across the Project Lifecycle

BIM and GIS cloud collaboration provides solutions for a number of project challenges, such as:

LACK OF DATA ACCESSIBILITY

Project stakeholders often lack access to real-time data on construction progress.

The solution: a shared platform that reflects the most current data and details about every project.

SILOED DATA

One of the biggest challenges on AEC projects, historically, has been locating and accessing data from a multitude of different systems and platforms.

The solution: the ability to make different types and sources of project data accessible to all of the key stakeholders on a project.

FILE SHARING CONSTRAINTS

Legacy file sharing processes are often cumbersome and difficult to use.

The solution: make all of your project files accessible for shared use in the cloud.

LEGACY COMMUNICATION AND COLLABORATION PROCESSES

When your project depends on up-to-date project data, you don't want to waste time with obsolete information.

The solution: the ability to make all of your project data readily available for all of your stakeholders to access in the cloud.

Now you can bring all your data together, and visualize it across BIM, GIS, and CAD systems – in a 3D web-based experience that results in more efficiency, reduced risk, and better outcomes.

UNLEASH THE FULL POTENTIAL OF CONNECTED BIM AND GIS

Cloud collaboration and the use of shared BIM and GIS data can help you identify potential conflicts early on, before you break ground. That means you can reduce unexpected and costly rework, and stay on budget and on schedule.

MORE CONTEXT

Connecting BIM and GIS systems means you can harness surface, subsurface, and land use datasets to visualize a project.

IMPROVED EFFICIENCY

Online access to BIM and GIS data helps to reduce mistakes and rework by facilitating collaboration.

OPEN DATA

Data interoperability is the key to streamlining project workflows. Three key elements of this digital workflow solution include open data standards, a common data environment, and the ability to use application programming interfaces (APIs).

APIS FOR AUTOMATION

Cloud-based APIs enable the use of applications that augment and integrate design and engineering data, and connect existing AEC software systems and digital workflows. By replacing project silos with an integrated platform, you can streamline planning, design, building, and operations.

Using a common data platform means:

- / Better collaboration
- / Improved cost and performance analysis
- / More efficient maintenance scheduling



CREATE RICHER 3D MODELS

You can better represent the physical world using data-rich 3D models. More detailed models help to make the construction process easier.

The data that informs your planning can be updated as the project progresses and, ultimately, you can use it for on-site management and better operation and maintenance.

ENHANCE PRODUCTIVITY WITH DIGITAL INFRASTRUCTURE

Infrastructure is the foundation of the built environment.

Overcoming the challenges of complex building projects requires the ability to aggregate information, connect workflows, and facilitate cooperation across disciplines.

Integrating BIM and GIS data is essential for you to efficiently manage AEC projects. You can now rely on the cloud to keep every project on track.

GAIN INSIGHT WITH MACRO AND MICRO VIEWS

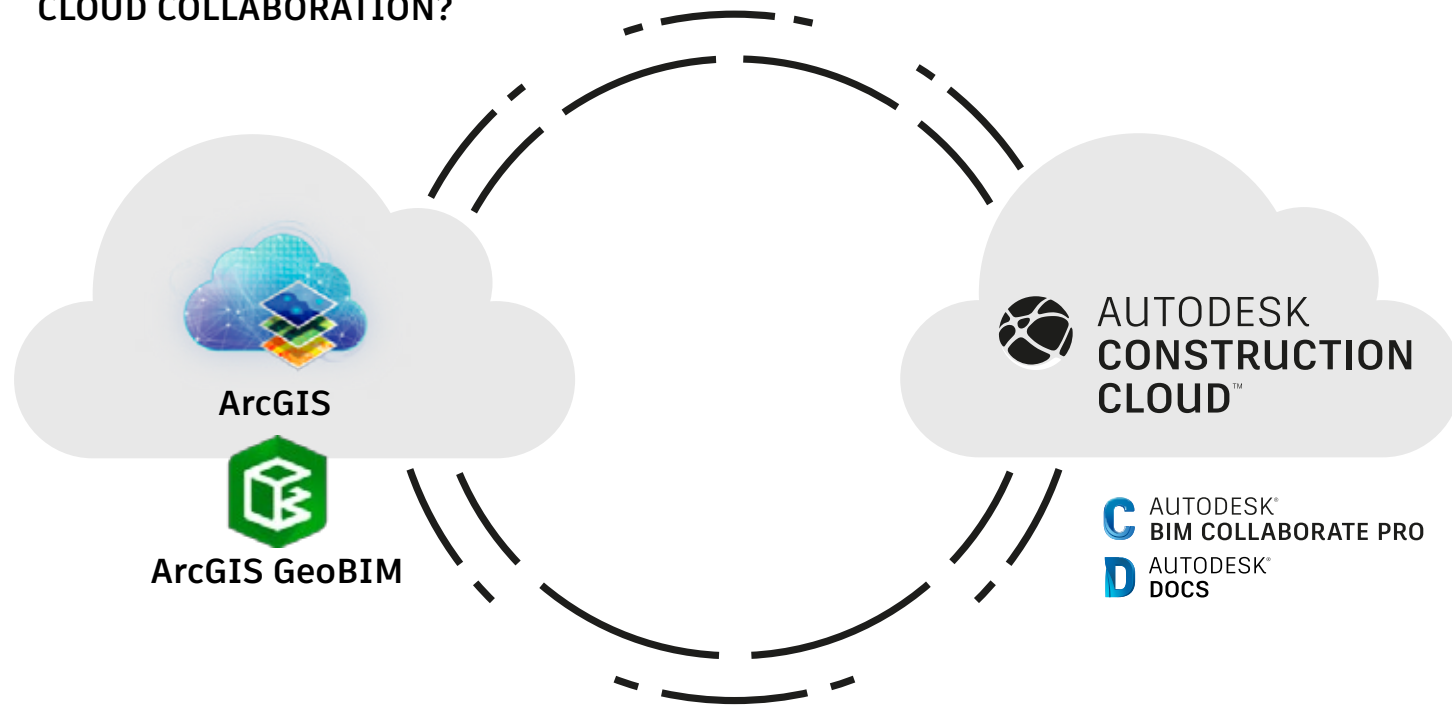
From better planning and design to enhanced analytics about construction and operations, using integrated BIM and GIS data will give you both macro and micro views of your projects, connecting you to accurate and relevant data, and removing hurdles from the decision-making process.

When you understand where and how a fire or flood can impact your assets, for example, you can make adjustments when you're designing, building, or upgrading them.

THE PRODUCTS THAT MAXIMIZE VISIBILITY

The integration of GIS and BIM started with the Autodesk Connector for ArcGIS that enables Civil 3D, InfraWorks, and Map 3D users to easily access shared content from Esri's ArcGIS. In a next major milestone this has now evolved into a connected cloud-to-cloud environment.

WHAT IS BIM & GIS CLOUD COLLABORATION?



These products make it possible:



Autodesk Docs simplifies collaboration and data management in a cloud-based CDE on the Autodesk Construction Cloud platform.



BIM Collaborate Pro empowers project teams to align and execute on design intent, offering design collaboration and workflow coordination solutions.



ArcGIS Online is a cloud-based mapping and analysis solution. Use it to make maps, analyze data, and to share and collaborate.



ArcGIS GeoBIM is a solution that enables web-apps for exploring BIM models, engineering documents, and project management issues in a geographic context.

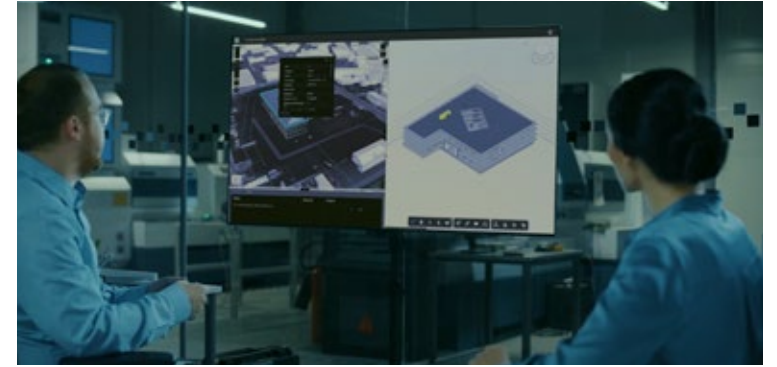
AUTODESK AND ESRI: ADD SYNERGY TO BIM WITH GEOBIM

Esri, the market leader in GIS technology, and Autodesk have been working together since 2017 to integrate GIS and BIM.

First it was the ArcGIS Connector for desktop design products; now you can use a web portal for connecting ArcGIS to Autodesk Construction Cloud—called ArcGIS GeoBIM. It lets you easily collaborate with other stakeholders, and share data via maps, apps, web dashboards, and reports.

Bridging the gap between GIS and BIM removes the obstacles caused by data silos and leads to more streamlined workflows – for better planning and designing, more efficient project delivery, and streamlined operations and maintenance.

[CLICK HERE TO FIND OUT MORE >](#)



REAL-WORLD EXAMPLES

BIM AND GIS CLOUD COLLABORATION IN ACTION

You can produce impressive results when you plan your AEC projects with the integration of GIS and BIM data, using a safe and secure web dashboard. BIM and GIS cloud collaboration results in proven benefits:

HNTB BENEFITS FROM INTEGRATION WITHOUT TRANSLATION

HNTB, a U.S.-based infrastructure solutions firm, was among the first companies to embrace integrated BIM and GIS Cloud Collaboration on a \$1.4 billion airport infrastructure project. The firm's project team used BIM and GIS to guide the design and construction of a new tunnel system for utilities, baggage, and passengers at O'Hare International Airport in Chicago.

The HNTB project relied on ArcGIS GeoBIM to optimize the layout and construction of the tunnels, while minimizing the impact on utilities.

The tunnel project at O'Hare marked HNTB's first use of ArcGIS GeoBIM on a major construction project.

HNTB used GIS and BIM data to develop a digital twin to facilitate a model-first design. The team relied on GIS data to better visualize the exact locations and arrangements of the tunnels.

Moving data between disparate systems eats valuable time. Real-time access to GIS and BIM data helped create faster and more accurate workflows because it bridged the gap in accessing files from more than one system – eliminating the need for conversions.



Collaboration in the cloud also ensured that all of the key stakeholders on the project were working with the entire dataset.

Integrating BIM and GIS also allowed HNTB's design team to connect directly to the Autodesk Construction Cloud from ArcGIS Pro, and from Autodesk Civil 3D directly to ArcGIS.

The result was a “web-first” GIS approach that provided access to project details such as live working files and the latest maps and models.

LEARN MORE ABOUT THE HNTB USE CASE >



LOOKING AHEAD: CONTEXT IS EVERYTHING

The tools your AEC teams use have come a long way – from drafting tables to BIM. The next iteration in AEC technology is the ability to add geospatial context to model and mirror the built environment.

BIM and GIS integration enable you to use location intelligence and design to make smarter decisions that help solve real-world problems. Project teams can explore and collaborate using up-to-date data from multiple systems in a geospatial context.

With BIM and GIS cloud collaboration, you can eliminate data silos, monitor progress, and resolve issues proactively.

Digital integration for AEC projects creates holistic workflows that will reduce costs and scale as big as anything you want to build.

Your projects can now benefit from integrated BIM and GIS without translation – that means everyone on an AEC team can use software tools that work together without the need for data conversion.



WHAT'S NEXT?

The era of data and software silos is coming to an end. Local file sharing and waiting for files to sync are also on their way to obsolescence.

Use the cloud to connect everything and everyone on an AEC project. This will improve efficiency and decision-making.

You can minimize data incongruities and disconnected workflows while improving interoperability on infrastructure projects that depend on efficiency and connectedness to succeed. Harnessing the full potential of BIM and GIS in the cloud can help you

to overcome these obstacles by integrating a powerful toolset that you can use throughout a project lifecycle.

The integration of BIM and GIS data is a game-changer for AEC teams. Whether you're designing a new highway or health center, building a dam, or managing existing assets, you can achieve better outcomes with less risk, increased quality, and lower costs.

CONTACT US FOR MORE INFORMATION ON BIM AND GIS CLOUD COLLABORATION >

[1] Oxford Economics, Global Infrastructure Outlook

[2] McKinsey, Imagining construction's digital future

[3] Geospatial World, GIS and BIM Integration for Sustainable AEC Industry Practices