

AN ESRI
VISION PAPER

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Esri and Autodesk— What's Next?

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Esri and Autodesk—What's Next?

Executive Summary

Architects, contractors, builders, engineers, designers and planners face an immediate opportunity to influence significant process change to improve efficiency and project outcomes. Esri and Autodesk have partnered to make sure that our technology and our resources support this digital transformation.

As software leaders, we believe that working together to create direct, faster, and more transparent data flow between our systems will enable our customers to positively impact the way we build things. By streamlining information exchange early in the design phase, we can responsibly consider the natural environment and set achievable goals for sustainability and resiliency.

Creating an interface between geographic information systems (GIS) and building information modeling (BIM) will help to lower costs, reduce waste and coordinate logistics scheduling. Authoritative information shared between builders and cities can ensure that projects finish on time, within budget and with less negative impact on the community.

The collective set of information generated from these efforts can then be available to future projects, for regulation reporting, impact and risk analysis.

In a world where sensors and devices providing real-time status create increasingly big data, the combined GIS and BIM systems will ingest this information for improved project context. Users can then process and visualize this data to monitor the health of the build, make adjustments, and inform ongoing maintenance requirements.

Combining our innovative technology and the creativity of the Esri and Autodesk customer and partner communities, we look forward to the next generation of building with 'Data at the Center'. This vision paper frames the focus areas of the Esri and Autodesk partnership. We look forward to incorporating input from our customers and partners

Focus on the Future

In the next 30 years, the number of people living in cities will double while the global population will increase by 3 billion people. This growth will require construction of a thousand new buildings every day. Urbanization will result in 75 percent of the world's population living in cities, with 95 percent of the population within a day's drive from an urban center.

The infrastructure that exists today is already failing to meet the needs of our current population, let alone scale to meet vastly accelerating and expanding demands. The way we plan, design, build and operate will go through a major transformation to meet these requirements. The same will need to happen with the software that is used to help achieve project success.

Esri founder and president, Jack Dangermond, and Andrew Anagnost, the president and CEO of Autodesk, met on stage at Autodesk University in November to discuss how we must do, 'More, Better . . . with Less'. Communities must become smarter, more sustainable, and grow at a pace that has never been seen before. Massive growth will happen while communities strive to become continuously more efficient; using the data and context around them to make better decisions. To achieve a sustainable world, all of this growth and change must have less net impact on the world around us.

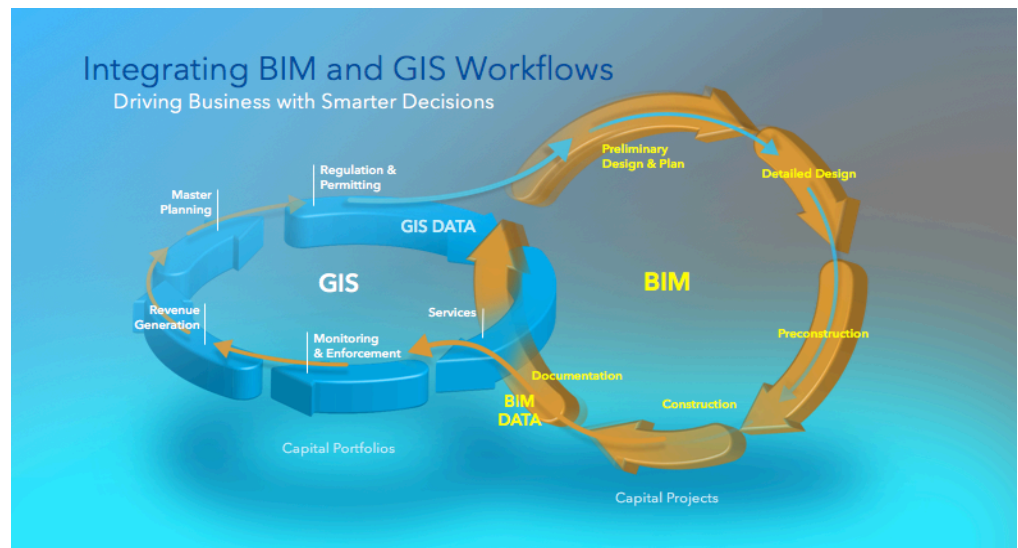


Resilience provides an underlying driver to meet future infrastructure demands.

When Jack Dangermond spoke, he said that while this partnership could not have stopped Hurricane Harvey [for example], the next-generation Houston [or other urban area] will be more resilient thanks to improved understanding. Achieving more resilient infrastructure that can better respond to major catastrophes is an overriding necessity to accommodate the massive increase in urbanization in the next 30 years. Freeing the flow of data between GIS and BIM will help our best planners, designers, engineers and operators consider the interface between our built environment and natural environment—and the impact that design decisions have on this balance.

Data and Flow

For our customers, obvious wins from our partnership can come from removing slow and inefficient data conversion between systems, but that is just the start. Before the partnership, both companies focused on the next major changes to our respective software and work process to meet the heightened demand for improved infrastructure. We realized that neither of us was likely to achieve this transformation alone, and that we could accelerate community success by working together. Our partnership is committed to helping discover and create the next evolution of how we do 'smart'—smart cities, smart utilities, smart transportation, smart logistics, smart infrastructure.



Improved data flows will drive smarter decisions.

Throughout our initial meetings, our focus has always started with understanding the complete workflow of how data moves between planning, designing, building, and operating buildings and infrastructure. The key has been to figure out how we can more easily integrate BIM and GIS data to improve this process. Autodesk and Esri are focused on the following key areas to help make you more successful in the work that you do:

- *Transforming the Project Lifecycle* – Improving data integration workflows will bring immediate value to both GIS and BIM users. We know we can achieve more than just data integration and are already researching opportunities to bring context to the design and building workflows that lead to improved construction and renovation of facilities and infrastructure.
- *Building Site Context with the Environment* – Buildings and assets will be planned, designed, and built in a way that considers project context in depth by making relevant information available when it is needed most. By integrating GIS and BIM, planners and designers will better understand projects in relative context: how the natural and existing built environment will be impacted by and interact with new projects. Geodesign, designing with the natural environment in mind, provides a new approach that capitalizes on the power of spatial knowledge to address complex environmental design problems. Geodesign

practitioners will benefit from a free flow of information to better inform the design. By pulling these insights up the project lifecycle, project owners will be able to predict potential issues, streamline the project lifecycle, and reduce costly delays.

- *Sensing Site Change* – Thanks to the many technological innovations of drones, sensor input, and data processing, we have achieved the ability to rapidly scan, photograph, and sense the three-dimensional world around us. Every project can start with a realistic and accurate ‘picture’ of the original site that can be updated with regular scans to record how the site changes with every phase of development. We are focused on delivering and improving site context and visualization for all project stakeholders.
- *Designing and Visualizing the Real World in 3D* – Traditionally, designing and representing the world has been done in 2D. With advancements in technology and hardware, 3D is quickly becoming the standard people want to use for design, visualization, and analysis of assets throughout their lifecycle. Our focus will be on tools and apps that utilize 3D to facilitate better use of spatial information to inform and guide the design process so that projects can achieve economic, sustainability, and performance goals.
- *Optimizing Infrastructure Operation Intelligence* – The Internet of Things (IoT) makes it possible to monitor every tremor and temperature change of an infrastructure asset such as a building or bridge using embedded sensors. The world is going to be tracked with billions of sensors all around us, many of which will be designed into the assets we use and then tracked and analyzed in 3D experiences. This data will fuel machine learning that will generate new insights when they are most relevant. By sharing Esri’s expertise in The Science of Where™ and Autodesk’s leadership in design analysis, we look to discover new opportunities for enabling customers to plan, deploy and consume sensor information to improve operational performance of large systems of assets.
- *Open and Extensible* – Recognizing that ‘Data is at the Center’ of our customers’ businesses and organizations, we are committed to creating extensible platforms that enable our users to innovate. We understand that the future of our platforms depends on users extending our capabilities, creating new tools from our software building blocks, and inventing new workflows to become more productive.

Future releases of technology will be driven by these key themes. As we focus on helping you solve the problems of tomorrow, your feedback and direction are essential to achieving our shared mission.

We are excited about what the future holds and look forward to shaping that future with you. More information pertaining to software functionality will be announced in 2018.



Esri, the global market leader in geographic information system (GIS) software, offers the most powerful mapping and spatial analytics technology available.

Since 1969, Esri has helped customers unlock the full potential of data to improve operational and business results. Today, Esri software is deployed in more than 350,000 organizations including the world's largest cities, most national governments, 75 percent of Fortune 500 companies, and more than 7,000 colleges and universities. Esri engineers the most advanced solutions for digital transformation, the Internet of Things (IoT), and location analytics to inform the most authoritative maps in the world.

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