

Image courtesy of Microsoft

Add Real-world Insights to Your Digital Twins with Reality Modeling

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Introduction

Drone pilots, surveyors, data acquisition specialists, and mappers need to add reality data and real-world insights to digital twins to support the decision-making process during the design, engineering, construction, and operations phases of the infrastructure lifecycle.

Operating under demanding workloads and tight deadlines, they aim to deliver clients precision-focused data right from the start, minimizing the need for return visits.

However, traditional topographic surveys require labor-intensive fieldwork, particularly in challenging terrains, increasing safety risks and expenses.

The reliance on paper-based data collection and manual processing poses additional challenges, introducing the risk of errors and hindering collaboration, resulting in costly delays and ineffective decision-making.

In this dynamic landscape, embracing innovative solutions becomes imperative to streamline processes, enhance efficiency, and deliver accurate results on time and within budget.

Discover how iTwin Capture Modeler, a desktop photogrammetry application, can accelerate your infrastructure workflows by easily capturing the real world.



Make Your Real World Easier with iTwin Capture Modeler

iTwin Capture Modeler is a comprehensive, cost-effective reality data and modeling solution that allows you to generate a 3D single source of truth.



Planning

Assess and understand existing conditions.



Design

Accelerate design and manage constructability risk.



Construction

Monitor sites for change and to verify design.



Operations

Document existing conditions and manage assets in real time.



Inspection

Continuously survey to create high-quality documentation and reduce safety risks.

Its advanced visualization capabilities automatically turn raw reality data into an actionable reality mesh before it is shared in a connected reality data environment. The application makes data actionable so that stakeholders can receive the right information at the right time, as well as make more informed and timely decisions throughout the project lifecycle.



Create and enhance reality data

Import any reality data into iTwin Capture Modeler to enable various data ingestion workflows. This application allows you to create engineering-ready reality data, such as reality meshes, point clouds, and orthophotos, from data captured by any digital camera, scanner, or mobile mapping device.

An advanced set of features, including masks, water constraints, and advanced retouching capabilities, is also available to enhance your reality data.

Improve the precision of reality meshes with ground control points, flight metadata, and camera calibration management, all assessed throughout the processing stage. Expect industry-leading quality of your reality mesh, limited only by the image or point cloud quality.



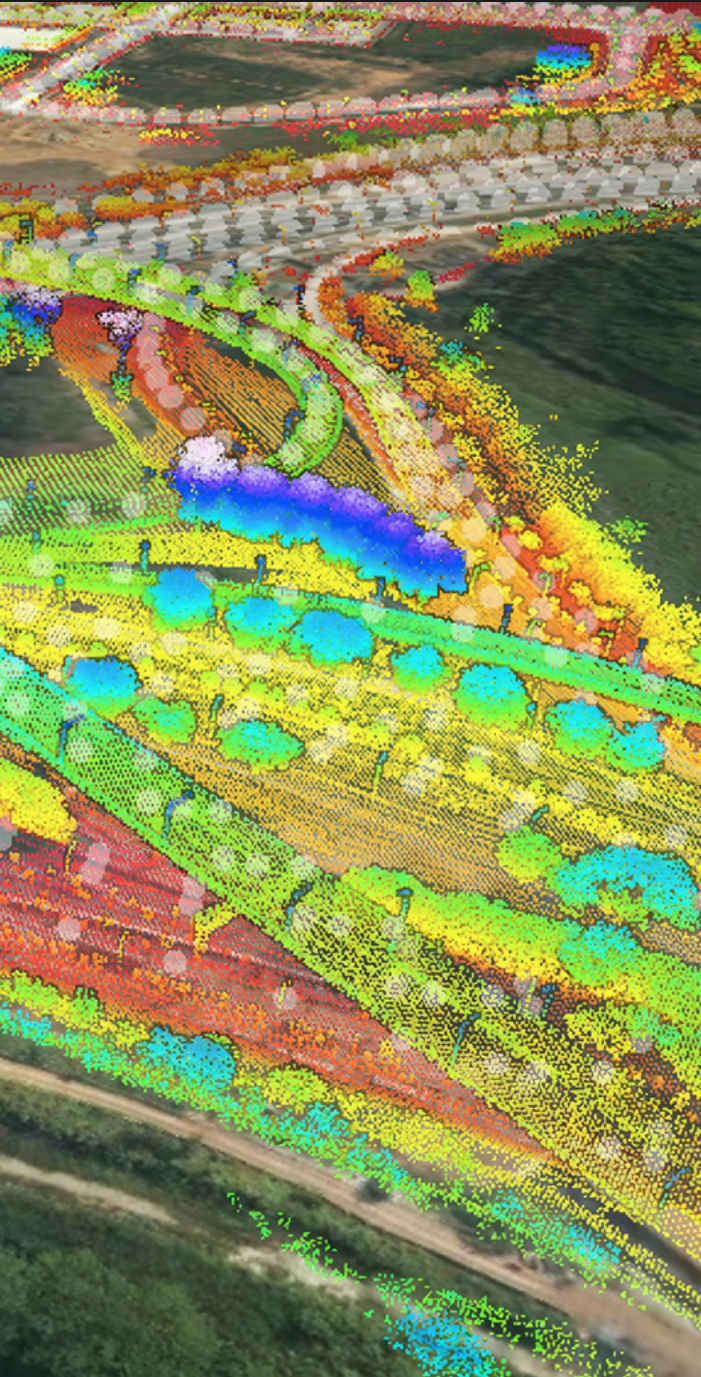


Image courtesy of Singapore Land Authority

Meet your most challenging projects with scalability and parallel computing capabilities

From objects measuring a few centimeters to projects replicating entire cities, iTwin Capture Modeler performs equally at any scale.

With a powerful graphical processing unit and parallel computing capabilities, you can drastically accelerate the processing of complex city-scale scenes and execute it in a few days.

You can also access cloud processing capabilities using a dedicated desktop wizard to scale your production and fit your business needs.

Advance your workflows by leveraging interoperability

Reality meshes, point clouds, and orthophotos created by iTwin Capture Modeler can be easily managed by desktop and web applications in downstream workflows.

With iTwin Capture Modeler, you can export files in the format of your choice to any design, engineering, construction, and/or operations application.

The unique level-of-detail technology available in most export formats ensures smooth navigation around reality meshes of any size, in both desktop and web environments.

iTwin Capture Modeler At-a-glance

Every digital twin should provide users with immediate access to real-world insights across their workflows. With iTwin Capture Modeler, we are committed to making reality capture an everyday part of your work.

iTwin Capture Modeler helps you:

- ◆ Deliver the best reality meshes at the highest speed possible based on laser scanning and photogrammetry.
- ◆ Use all reality modeling techniques and data types in a desktop environment.
- ◆ Ensure accurate geo-registration of your work for smooth collaboration among project stakeholders.
- ◆ Assess the precision of your work with multiple reports and insights.
- ◆ Generate web-ready reality meshes that you can smoothly navigate in other iTwin applications.
- ◆ Share deliverables to a connected digital environment to enable data ingestion workflows.



Go Above and Beyond the Creation of the Digital Replica of Real-world Conditions with iTwin Capture Cloud Services

As reality capture experts, we know that your job may not be limited to just capturing reality data.

That's why we have created several options to fit your needs.

- ♦ **iTwin Capture Modeler:**
 - ♦ Capture existing conditions of any size from any capturing device.
- ♦ **Reality Modeling WorkSuite:**
 - ♦ Capture existing conditions of any size from any capturing device with iTwin Capture Modeler.
 - ♦ Store, manage, and share reality data using Reality Data Management.
- ♦ **iTwin Capture Cloud Services:**

Capture, manage, analyze, and share reality data to accelerate your workflows with our most comprehensive reality data and modeling solution.

 - ♦ Capture existing conditions of any size from any capturing device.
 - ♦ Manage terabytes of reality data captured over time.
 - ♦ Deal with the multiplicity of captured reality data.
 - ♦ Update assets at the speed of data collection.
 - ♦ Extract insights from reality data.
 - ♦ Validate work through quality assurance (QA) before delivery.
 - ♦ Share and bring this reality data to stakeholders.



Learn more about iTwin Capture Cloud Services

Use Cases

Thousands of Users Trust iTwin Capture.





Image courtesy of SMEC South Africa

Use Case

iTwin Capture for Transportation

N4 Montrose Interchange

SMEC South Africa | Mbombela, Mpumalanga, South Africa

The Montrose Interchange project was initiated to replace an existing at-grade T-junction on the N4 highway, improving traffic mobility, safety, and the Mbombela province's economy and tourism. Positioned between two rivers amid steep valleys between mountains, the project presented difficult terrain for implementing the new high-standard, free-flow interchange on a short timeline with no available survey data. Bidding for the contract, SMEC realized that their traditional, manual 2D strategies would not suffice to meet the project challenges and requirements to use much of the existing infrastructure.

SMEC selected iTwin Capture to develop a reality mesh of the existing terrain and infrastructure and LumenRT™ to present their conceptual design, winning the design contract and delivering a workable design in record time. OpenRoads™ Designer facilitated integration with the bridge team's modeling software while corridor modeling tools enabled accurate earthworks and material quantities calculations, reducing the carbon footprint of the project. Working in a collaborative digital environment saved approximately 2,500 hours in design time and an estimated ZAR 2.5 million in design costs. **Project Playbook:** iTwin Capture, LumenRT, MicroStation®, OpenFlows™, OpenRoads, Pointools™

[Watch Video](#)



Image courtesy of Italferr S.p.A.

Use Case

iTwin Capture for Cultural Heritage

The Digital Twin for Structural Monitoring of St. Peter's Basilica

Italferr S.p.A. | Vatican City

To help preserve some of the world's most important architectural and religious heritage, Italferr was hired to develop a digital twin of St. Peter's Basilica. The project required an extensive survey campaign, resulting in a large amount of data needing to be managed and processed into a reality mesh, and shared among multiple disciplines and stakeholders for continued monitoring. To address these challenges on a six-month timeline, Italferr needed integrated and open 3D modeling and digital twin technology.

Italferr relied on ProjectWise®, iTwin Capture, and MicroStation to manage three terabytes of multisourced data and generate a digital twin model shared among 30 people. Working in a collaborative digital environment saved 50 hours in modeling time, delivering the model 20 days ahead of schedule. Using iTwin, a structural monitoring system will be developed, facilitating data collection, and connected to the digital twin to monitor the basilica's health. **Project Playbook:** iTwin, iTwin Capture, LumenRT, MicroStation, OpenBuildings®, OpenCities®, ProjectWise

[Read Case Study](#)[Watch Video](#)



Image courtesy of Yuba Water Agency

Use Case

iTwin Capture for Dams

New Bullards Bar Dam

Yuba Water Agency | *Camptonville, California, United States*

Constructed in 1970, New Bullards Bar Dam was part of the Yuba River Development project to reduce flood risk, generate clean hydropower, and ensure reliable water supply for Yuba County. Yuba Water Agency initiated a modernization of the dam monitoring system, replacing a hazardous legacy system and manual inspections. The new system optimizes dam operations, preventing potential loss of life and billions of dollars of damage in Northern Sacramento Valley. Faced with steep terrain and site challenges, Yuba Water needed to remotely survey and monitor the dam.

They selected iTwin Capture Modeler to generate a 3D reality mesh from thousands of drone-captured images and uploaded the mesh to the iTwin Platform, creating a digital twin. The digital twin remotely captures sensor data from monitoring devices and performs real-time digital crack detection, enabling visualization into the structural integrity of the dam. Compared to the conventional monitoring system, the automated digital station provides 1,000 times more data monitoring points and has improved data accuracy by 50% and risk assessment by 100%.

Project Playbook: iTwin, iTwin Capture, iTwin IoT

[Watch Video](#)



Image courtesy of Collins Engineers, Inc.

Use Case

iTwin Capture for Bridges

Digital Twins and Artificial Intelligence For Historic Robert Street Bridge Rehabilitation

Collins Engineers, Inc. | St. Paul, Minnesota, United States

Nationally registered as a historic structure, Robert Street Bridge is a reinforced concrete arch bridge that crosses the Mississippi River. To address significant structural deterioration, MNDOT initiated a bridge rehabilitation project and retained Collins Engineers to perform a detailed bridge inspection. The project required accurate collection of detailed inspection information that traditional methods and previous software could not accommodate. Collins wanted to supplement conventional workflows with artificial intelligence and digital twins.

They selected iTwin Capture and iTwin Experience to generate a 3D digital twin of the bridge, which helped them to automatically find, quantify, and communicate concrete cracks and deterioration. The ability to pre-inspect the bridge with the digital twin allowed engineers to validate defects prior to starting fieldwork. The solution saved 30% in inspection hours and offers an environmentally friendly, advanced method for future bridge monitoring and management. By making the digital twin available to potential contractors for more detailed insight into the structural condition of the bridge, Collins expects to save approximately 20% in rehabilitative construction costs. **Project Playbook:** AssetWise®, iTwin, iTwin Capture, iTwin Experience, MicroStation, ProjectWise

[Watch Video](#)

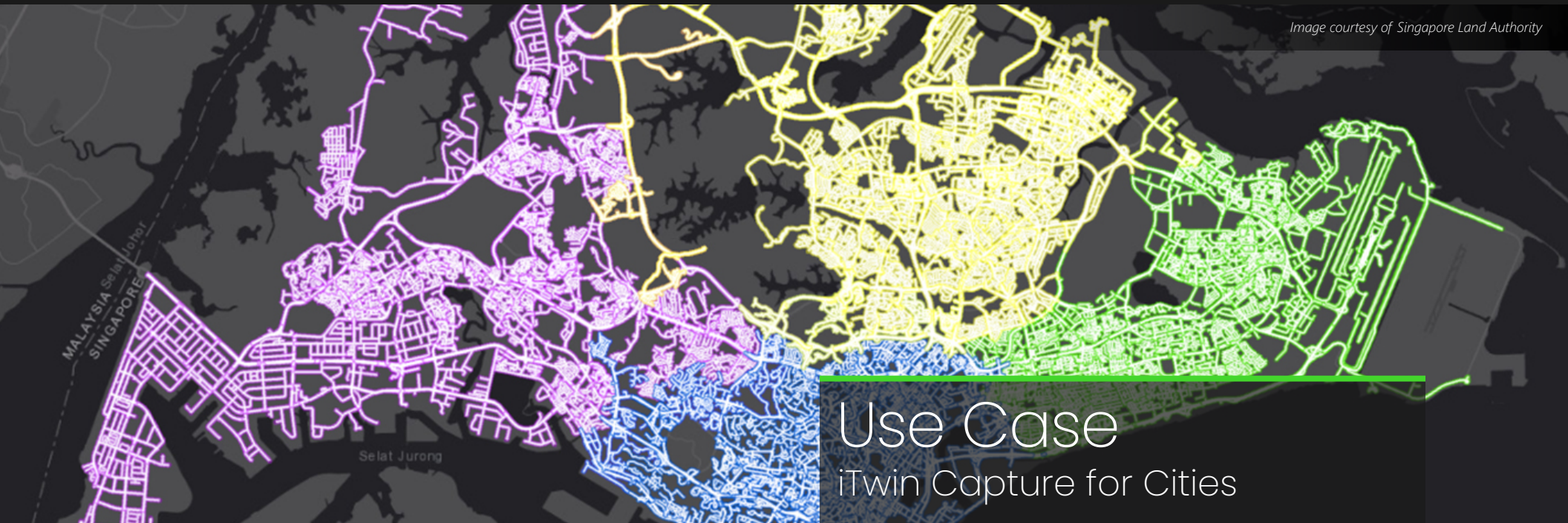


Image courtesy of Singapore Land Authority

Use Case

iTwin Capture for Cities

SG Digital Twin Empowered by Mobile Mapping

Singapore Land Authority | *Singapore*

Singapore Land Authority (SLA) initiated a national 3D mapping of Singapore via aerial and street mobile imaging. The objective was “capture once, use by many” to create a smart, resilient, and sustainable nation. The project presented challenges when integrating aerial and mobile-captured data, compounded by difficulties refining 600 billion point clouds and sharing 25 terabytes of mobile mapping data with government agencies and stakeholders. SLA needed a comprehensive, web-based application to manage the massive amount of data and develop a digital twin.

SLA selected iTwin Capture to manage and integrate the large volume of point clouds and images, then generated a digital twin, enabling data sharing with multiple users via cloud-based resources. Compared to traditional mapping methods, rapid mobile mapping using Bentley’s application saved SGD 26 million and one year in capture and processing time. The digital solution increases data availability by 50%, enables accurate data extraction, and delivers a sustainable, collaborative digital twin that can be used for multiple planning purposes. **Project Playbook:** iTwin Capture

[Read Case Study](#)



Partnership for Success

Your success goes beyond the software. It also depends on doing business the way that best serves your organization. That is why we have a variety of subscription and license options, as well as 24/7/365 support to ensure your software is up and running quickly and continuously.

[Learn More About iTwin Capture Modeler](#)[Learn More About Reality Modeling Worksuite](#)

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