Bentley Systems iTwin Services

Bentley®

Advancing Infrastructure

Architecture, Engineering & Construction.
Asset-intensive Industries. Smart Cities & Campuses.

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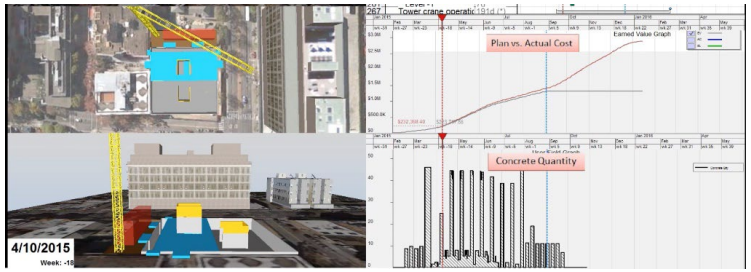
Challenges

Engineering & construction projects have vast amounts of data in many different applications and file formats making it difficult to share, visualize, and analyze.

It takes too long to access, validate, and verify information across the many sources of data.

Outdated or inaccurate data makes it difficult and high risk to make critical decisions.

Operating in silos can cause duplication of information and re-do of work which wastes time.



Ideal Solution

Data created in native formats can be imported and transformed into a single federated, cloud-based repository that can be viewed as if created by a single application and from any perspective.

Users can “4D-visualize” and track engineering change including changes in real-world conditions from IoT connected devices, sensors, and drones.

Users know who changed what when and can provide change notifications to the right person at the right time.

Desired Outcomes

Firms can build digitally before they build physically, and asset owner-operators can plan out and de-risk maintenance activities before they carry them out in the real-world.

No claims for scope omissions, rework rates less than 2%, fewer forced outages.

Digital twin services take “dark data” and make it accessible and query-able information.

Users are able to view and access data from different applications in different formats.

Users can visualize engineering data in the context of a 3D or city-scale model.

iTwin Services

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Create, visualize, and analyze digital twins of infrastructure assets

Alignment

- Align engineering data, reality data, and other associated data with no disruption to current tools or processes
- Transform data from any design application regardless of format or source into aligned structure
- Integrate data from IoT connected devices.

Accountability

- Know who changed what and when.
- Provide change notifications to the right person at the right time.
- View and understand the cost and time impact of change

Accessibility

- Help engineers understand current and future performance.
- Manage access for project participants, JVs, and stakeholders across the supply chain.
- Drive savings through actionable insights.

Open

- An open-source JavaScript library (iModel.js) is available on GitHub and can be used to create applications to run web-browser, cloud, desktop and disconnected on mobile devices.

"Data centric design processes allow for the virtual build of the plant before anyone hits the field. We can simulate construction and optimize the productivity at each workface. The digital processes result in complete engineering – no claims for scope omissions, and we are proud that our construction rework rates are typically less than 2%."

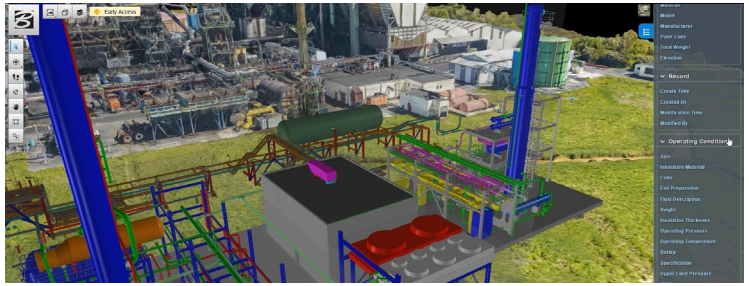
Bentley Systems' iTwin Services + Microsoft Azure

iTwin Services are a set of cloud services that run on Azure for creating, visualizing, and analyzing digital twins. iTwin Services integrate engineering information created by multiple design tools into a living digital twin, aligning engineering data, reality data, and other associated data with no disruption to current tools or processes.

Solution Alignment

Bentley + Microsoft Azure

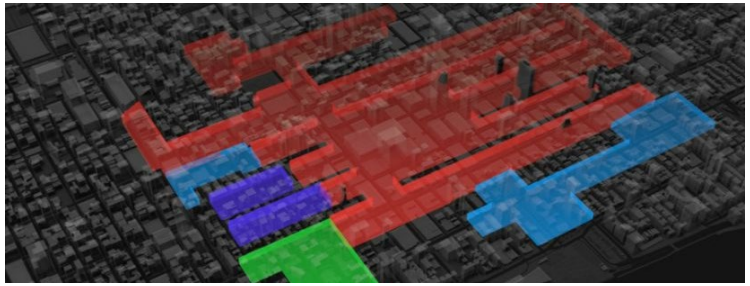
Provide infinite scalability and connectivity for a multitude of digital twin use cases and unlimited users.



Bentley + Azure Digital Twins

Integrate IoT data feeds with BIM models to create an intuitive visualization of smart cities, office buildings and interior spaces.

(Also Azure Maps – Private Atlas.)



Bentley + Microsoft HoloLens

Enable an immersive and holistic view of infrastructure assets above and below ground using augmented reality (AR) and mixed reality (XR).

Customer Success Story

HATCH

Sulfuric Acid Plant, Katanga, Democratic Republic of the Congo

Hatch, a global multidisciplinary management, engineering and development consultancy, was retained for a new, USD 245 million sulfuric acid manufacturing plant in the Democratic Republic of the Congo, including a 1,400 ton-per-day manufacturing facility and a 20-megawatt electrical waste heat system. The project needed to safely handle the high environmental risks of hauling acid to this remote area.

With Bentley applications, the project team created a digital twin that:

- saved 10% to 15% in purchasing costs;
- streamlined digital workflows to cut six weeks from the delivery schedule;
- reduced production ramp-up time from six months to one week.

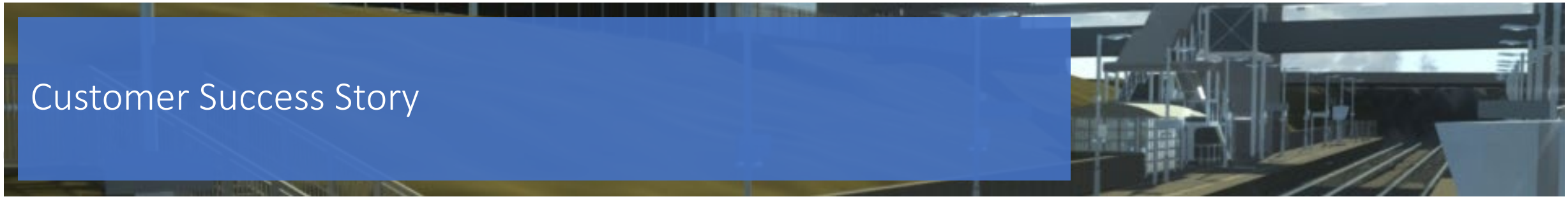
Win Results

Bentley applications allowed the project to design a complete intelligent virtual twin to the greatest level of detail. They improved project delivery workflows, eliminated traditional paper deliverables, improved quality of design, minimized construction rework, and improved performance on commissioning of systems.

Bentley's connected data environment was also used to manage and share information between Hatch engineering offices in Canada, South Africa, India, Australia and in the Democratic Republic of Congo.

This was Hatch's first paperless project. They were able to reduce production ramp-up time to design name plate after hot commissioning from 6 months to one week.

Customer Success Story



EWR Alliance
Connecting People

East West Rail Alliance, United Kingdom

The East West Rail Alliance (EWRA) is responsible for the delivery of phase 2 of the East West Rail project – a major £1bn rail program and one of the most prestigious projects in the UK infrastructure pipeline. East West Rail Phase 2 will re-establish a rail link between Cambridge and Oxford to improve connections between East Anglia and central, southern and western England. The EWRA is a 'pure' Alliance consisting of Atkins SNC Lavalin, Laing O'Rourke, Network Rail and Volker Rail.

The EWRA is using Bentley's digital twin technologies for infrastructure—iTwin Services—on East West Rail Phase 2. The project is currently in "detailed design" stage.

The works consist of a major route upgrade and the re-opening of unused lines, featuring 100 kilometres of new track, new stations, a new signalling system and over 20 new bridges.

Win Results

The EWRA is using iTwin Services to:

- Unify digital content created in various authoring environments across multiple disciplines
- Design review: coordination and visualization of models
- Design insights: project analytics

Future benefits/uses:

- System automation
- Performance insights

The EWRA is also benefitting from iModel.js, the open source platform for infrastructure digital twins, enabling the integration of an augmented reality (AR) and mixed reality (MR) solution developed by vGIS, Inc. to simplify fieldwork by visualizing utilities infrastructure in the field, in real time.

Customer Success Story

RFI
RETE FERROVIARIA ITALIANA
GRUPPO FERROVIE DELLO STATO ITALIANE

The New Polcevera Viaduct, Genova, Liguria, Italy

After a bridge collapse in northern Italy, Italferr S.p.A. was tasked with designing a new EUR 202 million viaduct that would be a pivotal transportation point. The project needed to measure over 1,000 meters in length and consist of 19 steel-concrete spans.

With Bentley applications, the project team implemented a BIM model and connected data environment that:

Created digital models of the terrain, road, civil works, and systems;

Reduced design costs and improved collaboration for faster decision-making, more accurate calculations, and better management of revisions;

Kept the project on schedule for a June 2020 completion.

Win Results

A digital twins approach allowed Italferr to significantly change the way in which they deal with the design and management of infrastructure work.

The innovation consists in not having only a static design that represents a clearly defined phase, but a model that evolves over time as the work is constructed, up to the management of maintenance and any subsequent decommissioning.

The digital twin has broad application in advanced design environments, in which a fully functioning virtual model is developed, allowing it to be improved by analyzing different design choices, right up to the project/prototype phase with an almost definitive or much more evolved approach compared to more conventional approaches.