HATCH DELIGHTS CUSTOMERS WITH IMMERSIVE DESIGN REVIEWS

Hatch provides engineering, project and construction, business consulting, and operational services to the mining, metallurgical, energy, and infrastructure industries.

Maurice Tayeh is the global CIO for Hatch and the inspiration and energy behind AssetXR. This virtual reality solution manages projects through planning, review, and execution by design and engineering teams at different offices. AssetXR was made possible with the help and expertise of Infosys, a digital services and consulting leader.

Maurice Tayeh, Global CIO of Hatch.
Source: Hatch

BRIDGING THE PHYSICAL AND DIGITAL WORLD

Hatch's projects involve multiple disciplines of engineering: civil for foundations and structures, mechanical for engines, compressors, and pumps, electrical for motors and transformers, and chemical for materials and liquids. Projects could be a process plant, refinery, or railway bridge.

Hatch needed the ability to do immersive design reviews with contractors, customers, and employees. Traditionally, a project review would involve twenty to thirty people flying into a central location and gathering for two weeks. The same group of people would repeat the review exercise a month later—a cumbersome and time-consuming way to perform project reviews which was not even possible during the pandemic.

Infosys developed a virtual reality (VR) solution in the cloud for Hatch that would enable it to perform design reviews while wholly immersed in the virtual design. The solution

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uses headset devices such as the Microsoft HoloLens and HTC Vive. I have reviewed Microsoft's second-generation HoloLens augmented reality headset here.

Another requirement was the ability to review the progress of the projects over time.

INFOSYS SELECTED FOR PRIOR KNOWLEDGE IN IMMERSIVE TECHNOLOGIES

Infosys was named the partner for this project mainly because of its prior experience in immersive technologies. Infosys utilized the Infosys Metaverse Foundry. The Infosys Metaverse Foundry is essentially the collective knowledge of Infosys' business domains combined with expertise in immersive design. Infosys metaverse foundry also includes strong relationships with the partner ecosystem, including Microsoft Azure.

A DIGITAL TWIN REDUCES REVIEW TIME FROM WEEKS TO HOURS

A digital twin is a three-dimensional virtual model that accurately reflects the physical asset. The digital twin enables visualization of the asset, tracking changes, and performing analysis over time.

Digital twins receive continuous updates with data from the physical asset with multiple inputs, including the Internet of Things (IoT), sensors, drones, cameras, light detection and ranging (LiDAR), and point clouds.

A point cloud is a plot of an object in 3D space. For example, in a building scan with a laser beam, each virtual X, Y, and Z coordinate position would represent an actual point on the wall.

The Bentley iTwin platform is the basis for the solution. The iTwin platform is an open purpose-built platform for infrastructure digital twins consisting of API's and libraries for infrastructure assets.

The backend database chosen to store project designs, CAD drawings, and 3D assets is Bentley's iModelHub, a Bentley service for storing Building Information Modeling (BIM) plans in a generic format called iModel. The application uses "iModel.Js," an open-source framework developed by Bentley to access projects on an iModelHub using a Javascript framework and acts as a server, serving BIM data to VR devices like HoloLens or HTC Vive.

The Microsoft Azure cloud hosts the solution. Bentley Systems has a [close alliance](#) with Microsoft combining Microsoft's Azure IoT Digital Twins and Azure Maps with Bentley Systems' iTwins platform.

FIGURE 1: ITWIN DIGITAL TWIN

Source: Bently Systems
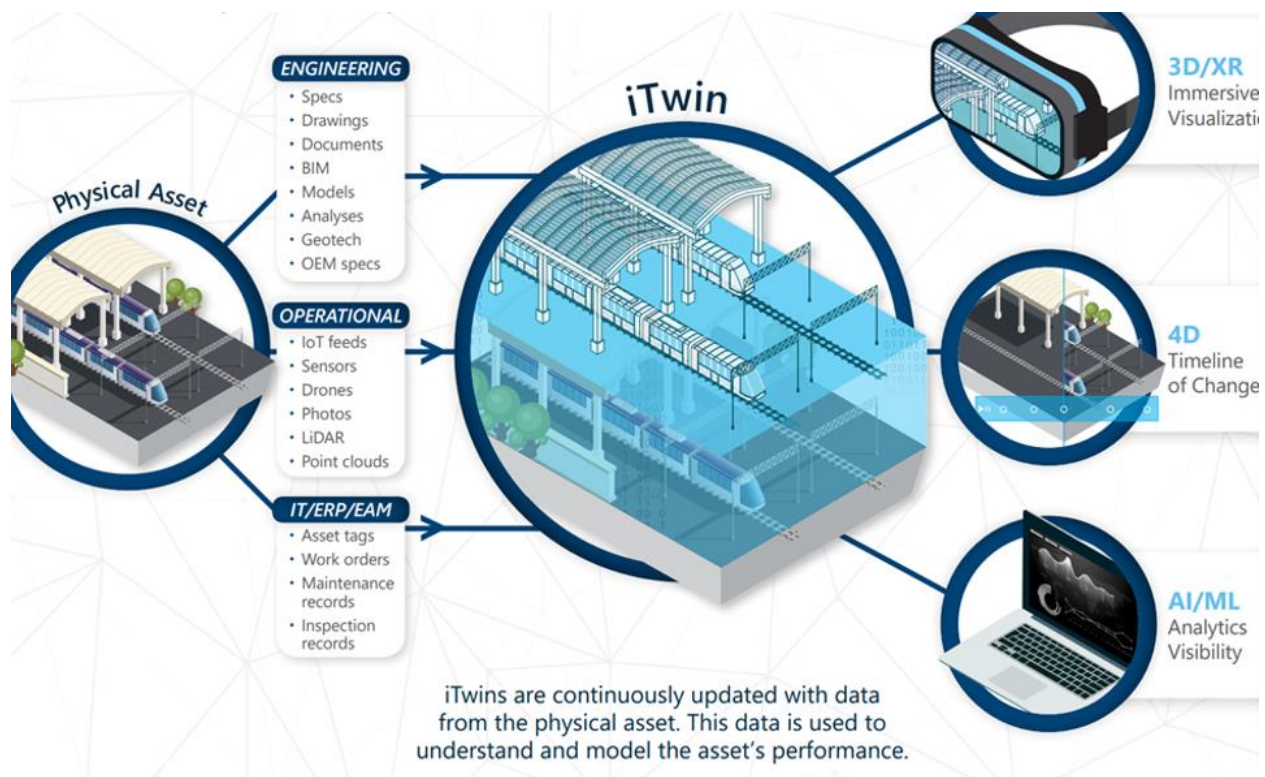
The front end is a custom application developed using [Unity3d](#), a game engine. The server serves content using [Google Protocol Buffer](#) over a [WebSocket](#), ensuring continuous communication between the server and the Unity application.

As mentioned earlier, Hatch also wanted to project simulation to see how the project evolved, essentially adding the fourth dimension of time. The 4D time dimension is part of the digital workflows. Inputs such as construction strategy, work breakdown structure, schedule, costs, resources, supply chain logistics, progress, and construction variables (human, materials, equipment, falseworks, and space) would generate predictable project delivery performance.

As changes happen to the schedule and field conditions, the solution provides visibility into the project data and the design, making it quick and easy to communicate and analyze the impact of changes on the entire project delivery process. Users can

compare construction strategies to evaluate the feasibility and efficiency of different scenarios, deriving insights toward the best possible construction outcomes.

Depending on access authorization, the user will see a list of projects. On selecting a project, the user can load the 3D model associated with that project, walkthrough, fly around and teleport to different locations on the 3D model to conduct a design review at a 1:1 scale.

I believe this quote by Maurice Tayeh sums up well how Hatch, alongside Infosys, are using incredible technologies and solutions to differentiate itself:

"Design review of infrastructure projects involves several moving parts – designers located at multiple locations and time zones, design iterations causing version control issues, all of which results in time and budget overruns. Having partnered with Hatch for more than ten years, Infosys understood the context and proposed a virtual reality solution to accelerate design review. Our solution allows designers to collaborate more closely and streamline the design process from concept to execution." – Maurice Tayeh, Global CIO at Hatch

WRAPPING UP

We are only scratching the surface of the immersive technology potential. We need only to think back to the clunky cell phones compared to our smartphones today to get a sense of what will be possible.

One of the challenges is getting comfortable with the glasses without feeling claustrophobic. I was one of the first people to use Microsoft's HoloLens publicly. It has taken us a while to get to this point, but glasses will become less bulky in the future. If Apple enters the fray probably next year, I think we will see the market put into high gear.

The immersive industry is still emerging, with companies developing processes on the fly with standardized nomenclature and workflow still in the making. With the Hatch example, you can see the combination of new working methods with traditional video, animation, and gaming workflows.

The economic benefits demonstrated by this example and many other use cases are compelling. Today's products developed in one location are rare, with globally distributed design being the norm. The recent work-from-home trend further adds to the challenge of effective collaboration between design teams. Bringing teams together

reduces the delay of getting all participants in one room, eliminates travel costs and the lost time due to travel, and enables issues to be quickly addressed and fixed.

Essentially Hatch is using technology to improve time to market for customers. Presumably, being able to show and tell is also improving the customer experience because one of the project's unintended consequences was presenting the Hatch sales team with a way to differentiate themselves in the marketplace against the competition!

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