BLD468696-R

Digital Twin for Building Owners

Roundtable Description:

Digital twins for building owners are emerging tools for facilities management, operations, and maintenance. The large benefits of digital twins to overall businesses beyond traditional practice are just being realized. As an iteration of digital twins from the digital manufacturing, product, and machine space, the current industry definition is this: Digital twins are software representations of assets, and processes that are used to understand, predict, and optimize performance in order to achieve improved business outcomes. Digital twins consist of three components: a data model, a set of analytics or algorithms, and knowledge. This roundtable will be jointly hosted by Walt Disney Parks and Resorts (WDPR), Brandon Wlosinski and Autodesk Consulting, Dorian Chau to explore, define, and understand what digital twins mean for the building industry today. Bob Bray, senior director for Autodesk Tandem, will provide his insights to the roundtable, as will other invited enterprise building owners.

Speakers

Brandon Wlosinski
Walt Disney World BIM Technical Specialist
Brandon Wlosinski works as the BIM Technical Specialist with the WDW Facility Asset Management teams. Brandon works with inter-disciplinary teams of many sizes, within and outside, providing support and leadership for process and deliverables, centered around models and data. He also works to help set, maintain and enforce company standards so that data and documentation can be made readily available for partners within The Walt Disney Company. He also works to build up tools and workflows to better safety and efficiencies of project team. This includes areas such as VR/AR, IoT, building analytics, agile construction and computational design.

Dorian Chau
Autodesk Principal Business Consultant
Dorian Chau orchestrates design technology solutions for major global organizations. He combines his background in architecture and expertise in design technology to help organizations transform their business by optimizing workflows through innovation and enables new capabilities in the design, build and manage lifecycle including tech giant campuses and top tier resorts. He also brings his deep foundational understanding of design technology, digital transformation, and BIM to the engineering and manufacturing spaces. Prior to joining Autodesk, Dorian was the Firmwide BIM Manager at Gensler, where he managed and refined the firm's BIM strategy for seven years.

Class Length	Session Type	Level of Expertise	Class Focus
90 minutes	Roundtable	Advanced	Thought leadership and innovation

Roundtable Approach:

Our Roundtable will explore three key considerations to better understand Digital Twin for Building Owners:
1. Why pursue Digital Twin (DT)?
    a. What does Digital Twin mean to you?
    b. Hype VS Reality
    c. DT is a data service and not a technology
2. What are your Digital Twin business drivers and value?
    a. What scale does the project need to be for DT RIO?
    b. What are the risks and rewards?
    c. Who pays for it? Is it part of a new standard deliverable?
3. What are the expectations for Digital Twin for Building Owners?
    a. How is DT for Building Owners going to implemented?
    b. What is a Single Source of Truth?
    c. What are the benefits in Building lifecycle management?

The purpose of this roundtable is to exchange ideas; Through a series of facilitated questions, audience polls, active discussions, insights and shared experience for our attendees to gain better understanding towards DT for Building Owners. Feel free to bring this framework back with you to your companies and firms to continue this discussion with your colleagues.

Learning Objectives

- Discuss some consensus and alignment of shared digital-twin strategy to take back to your company's leadership.
- Discover what digital twins mean to your particular industry and the data needs compared to other roundtable participants.
- Learning from sharing approaches and success toward digital twin implementation.
- Differentiate where Autodesk Consulting and Autodesk lead in digital twin approaches.
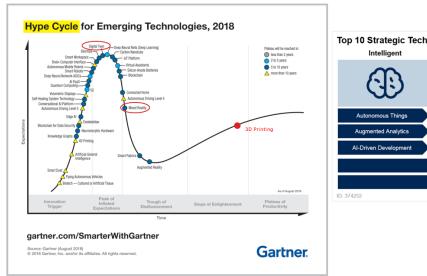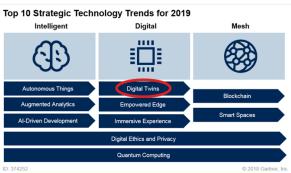

Background:

Roundtable Attendee Notes: This background is to aid current Digital Twin understanding before the Roundtable. Whether you agree or don't agree with this thesis, we wanted a starting point before our Roundtable.

Digital Twin has different understandings and approaches depending on the industry and use cases. Digital Twin strategies started in the digital manufacturing, product and machine

industries. This practice was spearheaded as far back as 2016, by companies such as GE and Siemens. GE conceptual understanding is "Digital twins are software representations of assets and processes that are used to understand, predict, and optimize performance in order to achieve improved business outcomes. Digital twins consist of three components: a data model, a set of analytics or algorithms, and knowledge. (Where is the end of this quote?)
Digital twin practices leveraging data tactics from other trending technologies like AI-driven development (artificial intelligence), Predictive/Augmented analytics, IoT (Internet of Things) and IIoT (industrial internet of things) to enhance next generation PLM (Product Lifecycle Management) and PDM (Product Data Management). For the building industry, it is an emerging technology and practices that is still being defined and understood.

Like most trending industry technology terms before it, like 3D Printing-Rapid Prototyping; Mixed Reality – AR/VR/XR, the term Digital Twin is overused and misinterpreted in the AEC&O industry today, most commonly confusing record drawings and models with a Digital Twin. The hype vs reality couldn't be more apparent in today's Building Industry vernacular. The industry buzz around Digital Twin hit its plateau in 2018/19 according to Gartner. The term is not even mentioned in any public Gartner Hype Cycles for 2020/21. If Digital Twin is really moving from the *Trough of Disillusionment* and into the *Slope of Enlightenment*, then **a more balanced, rational and practical understanding of Digital Twin will emerge**.
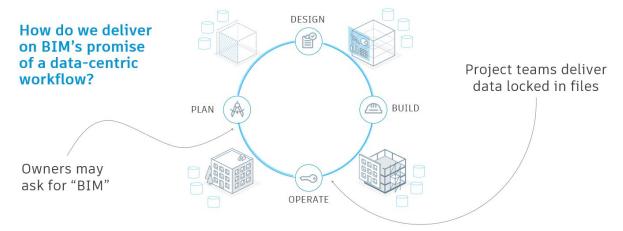
Owners Dilemma

Image courtesy of Bob Bray, Autodesk

Building owners and operators (Owners) have long understood the need for both geometric model representation and associated metadata of building systems for operational and maintenance needs. Owners struggle in obtaining both complete and accurate building data. The traditional practice of obtaining record, as-builts, as Constructed drawings (is this the right term?) is a flawed inefficient practice in providing the level of detail and accuracy required. Managing as-constructed and as design conditions from Contractors, trades and design consultants is also an inefficient workflow during the construction phases. From a professional fee perspective, it's poorly planned as a deliverable and resources requirement. BIM practices have helped with providing models and data deliverables, but owners still struggle with platform integration and metadata standards to make the requirement **efficient**, **repeatable** and **scalable**.

Facility Management practices of maintaining key data like manuals and asset warranties for building management systems can be inaccurate due to a lack of industry data standards and common platforms. Real time operational data needs with digital monitoring and sensors are currently explored but systems are costly and business value ROI does not make it affordable yet. Owners that have BIM data requirements typically don't have resources and time required to validate compliance of deliverables. Handover from Designers, Engineers and Contractors to Owner at substantial completion is still a traditional practice of 2D PDF deliverables in most cases. FM/PLMs are large databases but only digital records of known conditions of the building(s). This information requires continuous human intervention to validate, maintain and update. Currently most PLM/FM systems have only basic automated maintenance scheduling, asset tracking and management features. They require high levels of customization to meet Owners needs and relatively expensive to operate and maintain. This type of Digital Record keeping is not Digital Twin.

Owners also struggle with building renewal and renovation cycles. Property management, forecasting development, space planning and programming requirements of existing assets to new or repurposed uses need improvement in data understanding.

The value to owners is that the Digital Twin is a highly accurate and complete digital single point of truth of the build conditions and that information is always kept current and activities are regulated and visible. Operation and Maintenance is proactive and automated based on data

gathered during daily operations. Digital Twin also aids better understanding in Building renovation and renewal.

Digital Twin doesn't need to start at Building Commissioning. Design models are digital prototypes for the building(s). The evidence of collected data over time can be used to inform design decisions. The collection and understanding of design and business decisions over time allows for enhanced knowledge and understanding of buildings, knowing not only the what in a building, but also the why of it.

Key Concepts

From the Gartner report of Top 10 strategic Technology trends for 2019:
A digital twin is a digital representation that mirrors a real-life object, process or system. Digital twins can also be linked to create twins of larger systems, such as a power plant or city. The idea of a digital twin is not new. It goes back to computer-aided design representations of things or online profiles of customers, but today's digital twins are different in four ways:
1. The robustness of the models, with a focus on how they support specific business outcomes
2. The link to the real world, potentially in real time for monitoring and control
3. The application of advanced big data analytics and AI to drive new business opportunities
4. The ability to interact with them and evaluate "what if" scenarios

The focus today is on digital twins in the IoT, which could improve enterprise decision making by providing information on maintenance and reliability, insight into how a product could perform more effectively, data about new products and increased efficiency. Digital twins of an organization are emerging to create models of organizational process to enable real time monitoring and drive improved process efficiencies.

Industry Digital Twin Direction

In our research for this Roundtable, we are not aware of an establish public resource on Digital Twin for the Building industry today. Many vendors and industry groups have posted their definitions and approaches towards digital twin, related services and software platforms.

The Digital Twin Consortium is a new group established earlier this year. Autodesk is a member of the Digital Twin Consortium: https://www.digitaltwinconsortium.org/

Please note this Roundtable and speakers are not associated or have participated in the Digital Twin Consortium
Thank you for your time and see you at our Roundtable!

Dorian Chau (dorian.chau@autodesk.com)
Brandon Wlosinski