



The owner operator's definitive guide to better digital twins

EBOOK

Contents

Breaking down the digital twin value proposition

- 5 What can digital twins do anyway?
 - 6 Frequent use cases and scenarios
 - 8 Prioritizing use cases with scalability in mind
 - 9 Three common misconceptions about digital twins
-

Three digital twin imperatives

- 11 Imperative one:
 Defining the scope
 - 14 Imperative two:
 Setting clear responsibilities and handover practices
 - 15 Imperative three:
 Ensuring only validated information gets entered
-

Bridging the gap: From project twin to operational twin

- 18 Digitizing the pre-digital facility
 - 19 Digital twins for operations and maintenance:
 The entry point to unleashing intelligence at scale
 - 20 Integration:
 From data silos to single source of truth
 - 21 Intelligence:
 Transforming data with role-based context
 - 23 Insight:
 Optimizing decision-making and outcomes with AI expertise
 - 24 Three obstacles to operational twin success
-

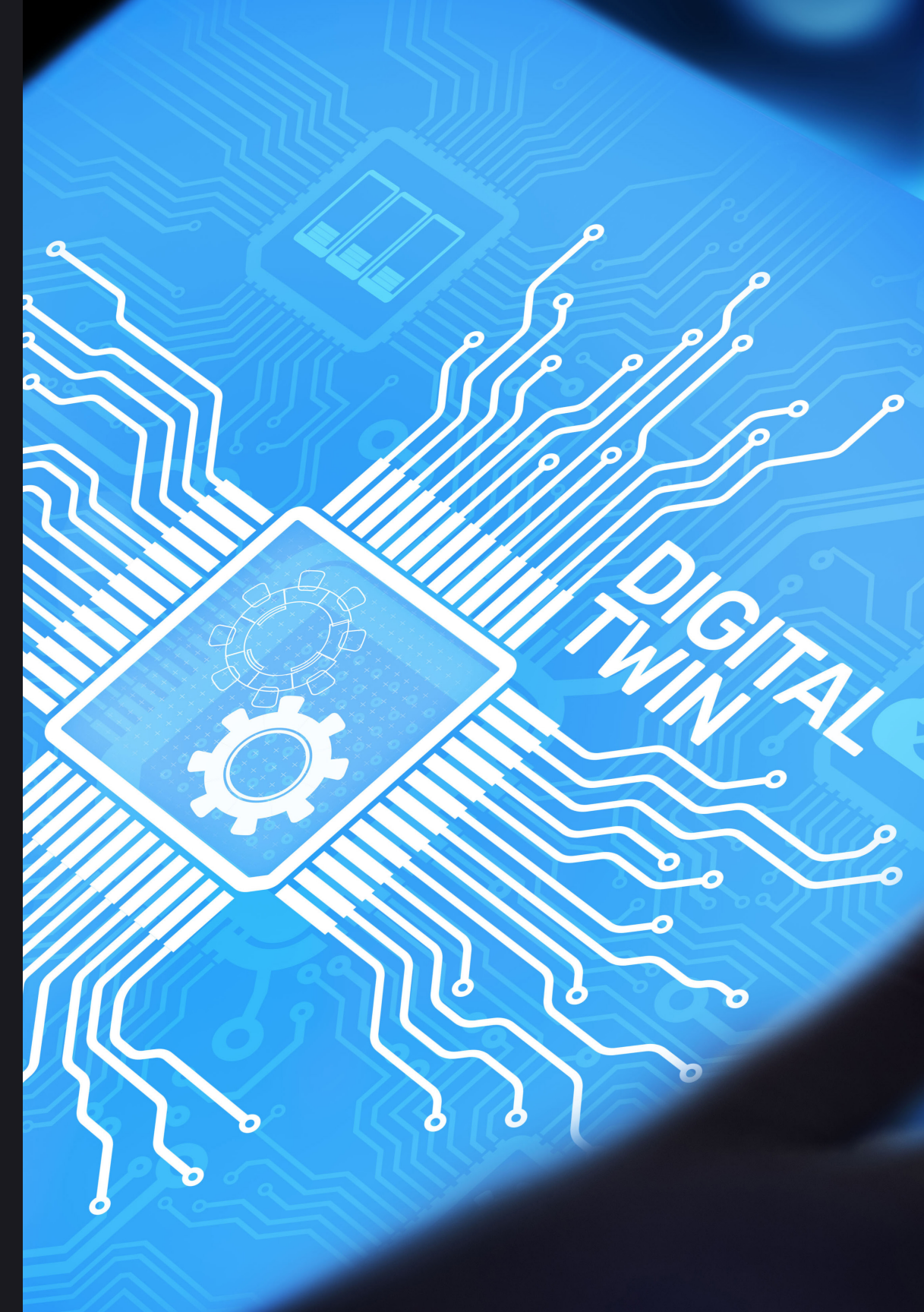
Digital twins can unleash significant benefits for owner operators. In fact, 80% of senior managers in operations, engineering, maintenance, process safety and data science and IT roles see the digital twins' value proposition as "important" or "very important" to their organization.¹

Delivering on these value propositions requires a clear vision, meaningful investment of money, resources and skills and the right decisions at the right time—imperatives that are all too often lost in the digital twin discourse.

In this guide, we break down the practical value digital twins can deliver across your organization, including a high-level roadmap for implementing both project and operation twins, along with key questions, best practices and real-world case studies to guide and inspire your approach.

Whether you're just beginning to explore digital twins or looking to scale up existing performance, this guide is designed to help owner operators move forward with greater clarity, confidence and impact.

¹ Darmasseelane, K. (2023, March 13). Navigating the Digital Twin World: Finding Your Perfect Match. Verdantix.com. <https://www.verdantix.com/insights/blogs/navigating-the-digital-twin-world-finding-your-perfect-match>



Breaking down the digital twin value proposition

A digital twin is a living digital model of a physical asset, system or process. By leveraging real-time operational data, digital twins empower owner operators to simulate, analyze and amplify performance and efficiency.

While an effective digital twin seamlessly unleashes intelligence in real-time, successful implementation doesn't just happen. It requires a clear vision from the start.

Before setting out, owner operators need to develop a clear point of view of the applications and expected outcomes. To build this vision, it's helpful to understand the value propositions, potential areas of use and possibilities digital twins unlock.

30% of time is spent looking for information



According to the ARC Advisory Group, engineers typically spend 30 percent of their time looking for information.



Octave InConcert (formerly HxGN SDx2) customers locate data and documents 30% to 50% faster.



What can digital twins do anyway?

The value of a well-implemented digital twin is vast and multifaceted, unleashing a range of valuable benefits. Among the top cited services is **rapid access to (and communication around) data and information**.

Most owner operators struggle to manage large volumes of technical documentation. Information may exist in multiple formats or become duplicated throughout the organization, leading to fragmentation and degradation of data integrity.

This isn't just inconvenient—it's risky. Compromised information creates gaps that expose owner operators to serious financial and safety threats.

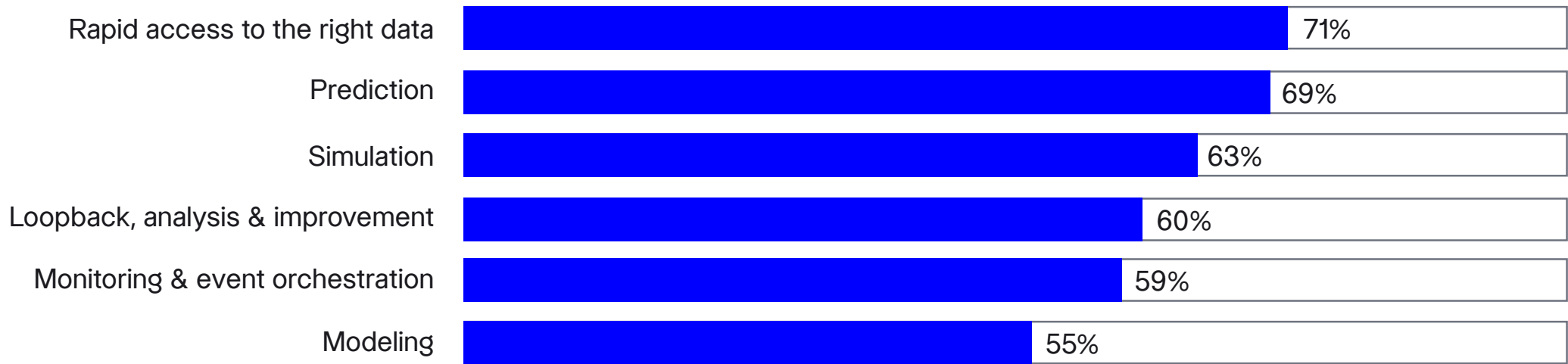
A digital twin solves the problem, ensuring that information is easy to find whenever it is needed, whether for shutdown planning, incident investigation, modifications, compliance audits, facility startups or otherwise. They also serve

as a single source of truth that supports communication and collaboration by presenting information in context.

Another top cited benefit is **prediction**. These tools help power a shift from reactive and preventative measures to proactive, predictive maintenance. Other uses include predicting costs and cash flow impacts, energy usage, the need for resources, raw materials and personnel and risks and hazardous conditions, among others.

Simulation capabilities play a key early role in planning and design phases by illuminating the impact of different design choices. During the construction and operation phases, simulation also enhances safety, enabling owner operators to manage simultaneous operations or simulate interventions before they ever set foot in the facility or site.

Most impactful data services offered by a Digital Twin

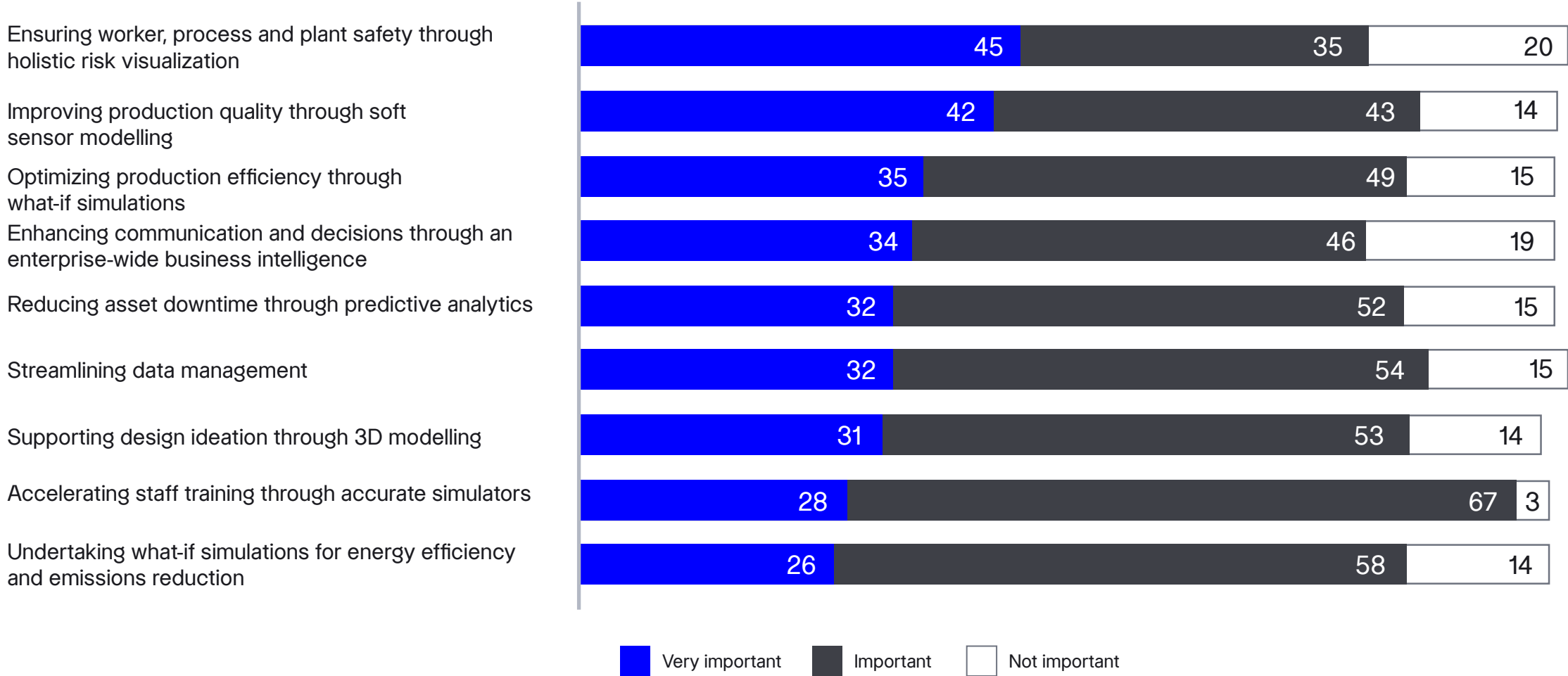


Source: Capgemini Research Institute, Digital Twins survey, September–October 2021, N=800 organizations with ongoing digital twin programs.

Frequent use cases and scenarios

Executives most commonly identify risk mitigation as a key digital twin value proposition, be it reduced safety risks thanks to visualization and information access, or minimized risk of asset downtime based on predictive analytics and maintenance.

How important are the following value propositions offered by digital twins for industrial facilities?



Graphic source: Verdantix Global Corporate Survey N=301

For example, Octave’s digital twin solution helps companies meet strict health, safety, security and environmental (HSSE) requirements.

One way it does so is by integrating with Octave Tempo Operations Management (formerly j5 Operations Management Solutions) solutions such as Tempo Control of Work (COW) (formerly j5 Control of Work) capabilities (including permit-to-work, isolation management, risk assessment and lessons learned, as well as incident management and management of change) to present critical safety information at a glance.

Integration with historians and other third-party software brings in live process data from shift handovers and inspections, supporting a holistic and real-time view of risk management.

			
Scaling up quality with soft sensors that enable better real-time monitoring, data validation and anticipation of quality issues before they occur.	Optimizing production efficiencies by testing process changes or strategies, such as different workflows, equipment usage or resource allocation in a virtual environment before implementing them in the physical world.	Amplifying collaboration across the value chain by enabling organizations to securely share and exchange information that improves project and operations efficiencies.	Improving change management including support for concurrent engineering and ensuring auditable traceability to provide demonstrable compliance.

Sustainability and emissions reduction are fast-growing uses, with 57% of executives naming it as a key driver behind digital twin investments in a recent survey.³ Digital twins reduce the necessity of on-site visits by providing access to information anywhere.

Additionally, they enhance the repair and reuse of equipment, minimizing the need for replacements.

³ Gya, R. et al. (2022). Digital Twins: Adding Intelligence to the Real World. Capgemini.com. <https://www.capgemini.com/be-en/insights/research-library/digital-twins/>

Prioritizing use cases with scalability in mind

When working at the scale of an organization, an agile approach that starts small and gradually expands can yield the best results. This approach enables owner operators to efficiently learn and adapt as they grow, while avoiding the pitfalls of “pilot purgatory.”

Case study

Perstorp, a leader in specialty chemicals, started with a pilot digital twin implementation at one of its smaller sites in 2020. After the success of this first phase, Octave InConcert Core (formerly HxGN SDx) was deployed at one of the company’s largest existing sites, located in Southern Sweden. In addition, the solution was used from the start for a greenfield project in India. This strategy helped the company get ahead of challenges that greenfield and brownfield sites could present, before issues ever occurred.⁴

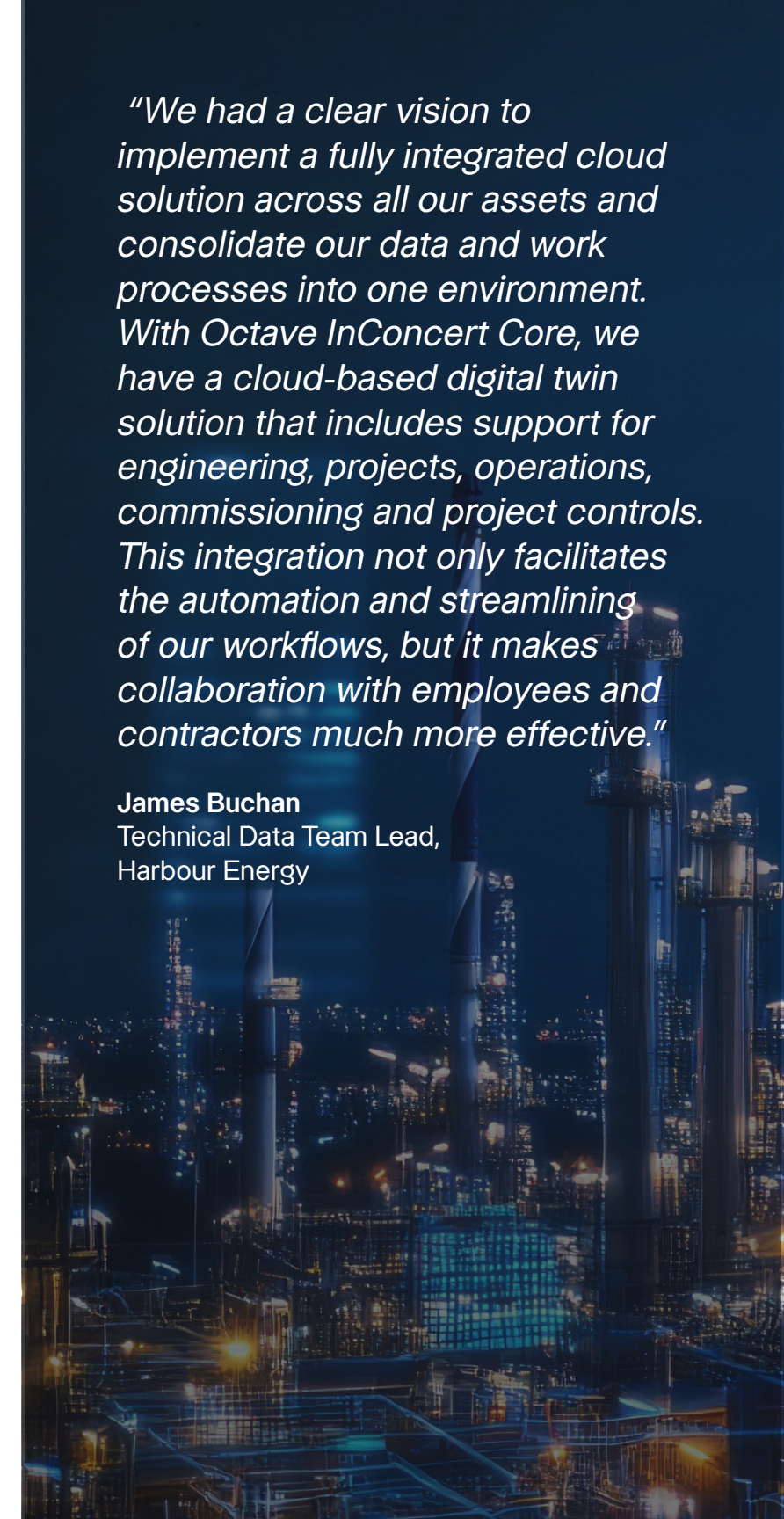
Perstorp, a leader in specialty chemicals, started with a pilot digital twin implementation at one of its smaller sites in 2020. After the success of this first phase, InConcert Core was deployed at one of the company’s largest existing sites, located in Southern Sweden. In addition, the solution was used from the start for a greenfield project in India. This strategy helped Perstorp get ahead of challenges that greenfield and brownfield sites could present before issues ever occurred.

Cloud native solutions make it easy to scale rapidly. As a multi-tenant platform, Octave’s cloud-native platform InConcert offers high-scalability, allowing organizations to easily adjust the number of concurrent users as needed. Its architecture supports zero downtime updates, ensuring continuous access and uninterrupted operations—an essential feature for customers with 24/7 requirements.

⁴ Octave’s Asset Lifecycle Intelligence’s division. (2023a, June). Octave.com. <https://www.octave.com/learn/resources/case-studies/transforming-lifecycle-information-management>

“We had a clear vision to implement a fully integrated cloud solution across all our assets and consolidate our data and work processes into one environment. With Octave InConcert Core, we have a cloud-based digital twin solution that includes support for engineering, projects, operations, commissioning and project controls. This integration not only facilitates the automation and streamlining of our workflows, but it makes collaboration with employees and contractors much more effective.”

James Buchan
Technical Data Team Lead,
Harbour Energy



Three common digital twin misconceptions

01

"A digital twin is an industry term for simulation, document management and/or CAD software"

It's tempting to reduce the digital twin to something more familiar, like a point solution. But doing so massively undermines its potential.

First, when companies assume a digital twin is just another off-the-shelf application that will instantly fix their problems, they are likely to underestimate the need for investment, configuration, and interoperability.

Additionally, digital twin implementation isn't "plug-and-play"—it's a true digital transformation project that requires careful management of change and stakeholders.

When digital twins falter, it's typically for organization-level reasons: think lack of management support, absence of cross-functional integration or poor governance. Treating it as "just another piece of software" sets them up to fail.

02

"The main use of a digital twin is 3D visualization"

Although 3D visualization models often serve as the foundation for digital twins, that's only the start of the story.

For example: operations, maintenance, engineering and safety executives often use visual dashboards or intelligent 2D schematics reporting rather than 3D interfaces to easily view key information in one place, such as permits, work orders, asset details, operator logbook entries or live video feeds.

Perhaps we can blame the thousands of stock images of people spinning 3D holograms for this misconception. But it's more accurate to think of digital twins as a real-time, single pane of glass. One that provides role-based views into critical operations, maintenance, safety and engineering data to foster collaboration. It acts as an information management tool as well as a visualization/analytics platform.

03

"The more data the better"

Like many misconceptions, this notion contains a kernel of truth: realizing the full potential of digital twins generally entails integrating various data sources, ranging from structured and unstructured, historical or real-time, proprietary or from third parties. This involves bridging data gaps and digitizing manual processes.

However, data alone is just data. The ability to validate, analyze, contextualize and effectively utilize the data is what gives it power.

Deliberate selection of data sources becomes crucial, and data quality triumphs over quantity.

Not all data sources need to be consolidated into the digital twin. Repository information can be "pulled on demand" from external sources such as data historians or asset integrity systems. If organizations indiscriminately dump information into a data lake without careful validation, it can easily transform into an error-filled swamp.

Three digital twin imperatives

In this chapter, we'll explore key digital twin roles—and establish the three imperatives that must be considered to ensure success.

Digital twins play two key roles for industrial facilities: First, serving as a dynamic blueprint for the project, design and execution phases. And next, creating the conditions for operational excellence during the operations phase.

A dynamic blueprint

Digital twins enable information browsing and collaboration between stakeholders across project, design and execution phases, while supporting design simulation and optimization and streamlining quality control.

Digital twins can:

- Provide a single source of truth for project information and documentation, with a collaborative platform for reviewing submissions and managing comments, actions and technical queries.
- Offer a platform for securely sharing information across the project value chain.
- Incrementally consolidate and validate submitted information to ensure completeness, consistency and compliance with required standards and specifications
- Capture inconsistencies and non-compliance early to enable rectification before errors can delay the project.
- Enable 4D/5D/6D/7D visualization through integration with project controls and environmental safety standards.
- Power near real-time construction management with visualization into material availability and constraints to optimize construction sequencing.

Transforming operational excellence

Digital twins create the conditions for operational excellence during the operation phase by enabling secure management and control of documents and deliverables, with version tracking and governance controls that ensure information is accurate, compliant and seamlessly handed over.

Succeeding on both fronts requires three key imperatives:

- 01** *Defining the scope*
- 02** *Setting clear responsibilities and handover practices*
- 03** *Ensuring only validated information gets entered*

Imperative one: Defining the scope

Successful digital twin implementation requires precise scoping, and precise scoping requires navigating key decisions:

What is the scope of the data to be included?

Defining the scope of data incorporated into the digital twin, both for operations and project execution, is vital. It should align with strategic objectives and be flexible to adapt to changing needs.

It can include a mix of:



Design data

Including architectural, structural, engineering designs and drawings, BIM data, specifications and 3D models.



Material and equipment data

Including information about materials used in construction, equipment specifications, installation instructions and maintenance requirements.



Project management data

Including schedule and timeline, budget, resources allocation and progress reports.



Contract and supplier data

Including the detail of suppliers and subcontractors as well as contracts, invoices and purchase orders.



Risk and safety data

Including risk assessments, safety plans, incident reports and mitigation strategies.



Regulatory and compliance data

Including permits, regulatory requirements, inspection reports and evidence of compliance with applicable standards and regulations.



Environmental impact data

Including environmental assessments and reports on emissions or waste disposal.



Personnel data

Including teams involved, roles, responsibilities, qualifications and contact information.



Preliminary operational data

Including expected performance, energy use, maintenance schedules and staffing requirements.

To what degree should the twin focus on a facility's physical aspects?

The importance of visual fidelity varies based on industries and use cases. The factors include:

- If complex machinery or spatial layouts impact operational efficiency, safety or maintenance.
- If the physical interplay between different components is essential to optimizing processes—for example: a wastewater treatment plant.
- Facilities where physical parameters influence safety—such as chemical plants, oil refineries or nuclear power plants.

It is also not uncommon for several twins to work side-by-side. For example, a facility twin may work alongside a process twin.

Is there a need for a geospatial twin?

A geospatial twin incorporates geographical and spatial data within a digital twin framework.

It goes beyond a facility's physical and process details, integrating the geographical context, spatial relationships and environmental factors that may influence operation.

This is particularly useful if factors such as weather conditions, terrain or spatial constraints play a decisive role. This was the case in the implementation of a digital twin for a BASF chemical production site in Antwerp, Belgium—one of the largest sites in the world.⁵

⁵ Octave's Safety, Infrastructure & Geospatial division. (2023, May). Smart site situational awareness in Belgium. Octave.com. <https://www.octave.com/learn/resources/case-studies/smart-site-situational-awareness-in-belgium>

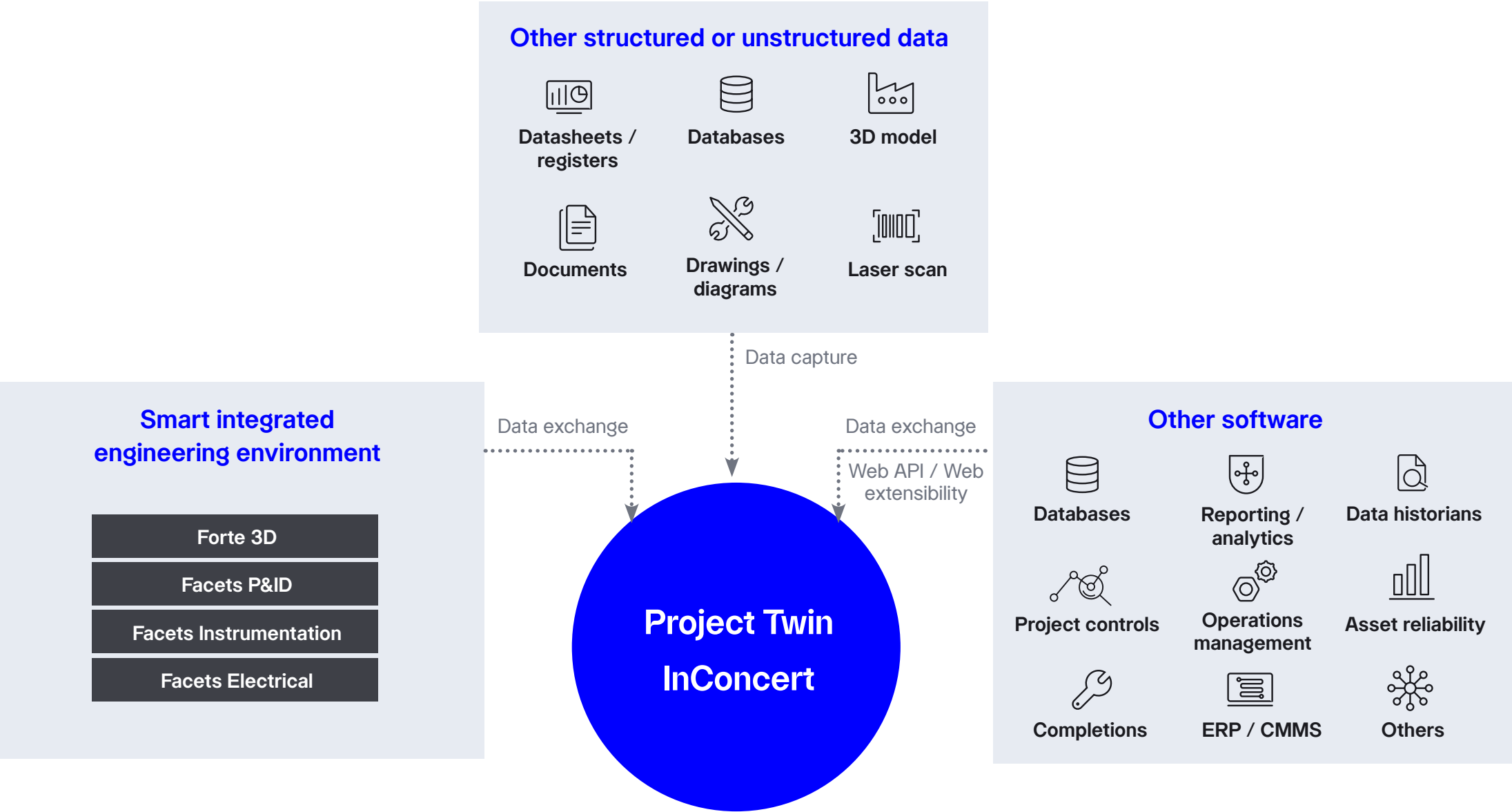
How will the digital twin interface with existing IT systems?

Interoperability between software and data formats is crucial for the success of a physical twin. The best way to avoid interoperability issues is to opt for software suites designed to work together, such as Octave's Design portfolio including Forte 3D (formerly Interraph Smart 3D), Facets P&ID (formerly Intergraph SmartPlant P&ID), and Aspect Pipe Stress (formerly CAESAR II). Partnering with EPCs and suppliers experienced in these systems can further enhance integration efforts.

Octave InConcert (HxGN SDx2), an engineering information management platform, introduces an object-based paradigm that goes beyond one-way integrations, offering several advantages to make digital twins more effective and evergreen:

- Continuous data sharing: Smart design tools can share data continuously, eliminating the need to wait until design deliverables, such as P&IDs and 3D models, are complete before data is shared.
- Simplified third-party integration: The platform simplifies the integration of third-party authoring tools, enhancing overall flexibility and reducing barriers to interoperability.
- Early discrepancy detection: By detecting discrepancies between disciplines earlier in the design process, Octave InConcert reduces the risk of late-stage changes, improves design quality, and facilitates earlier completion of designs.

These advancements enable a seamless integration with existing IT systems, with Octave InConcert serving as a central point for various data streams, including datasheets, databases, 3D models, documents, drawings, specifications and laser scans. The result: a more cohesive digital twin environment that drives better project outcomes and operational efficiency.



Imperative two: Setting clear responsibilities and handover practices

Large projects often involve multiple parties, from EPCs to suppliers. The more stakeholders in the mix, the more important continuity of information becomes.

When the responsibility for creating and feeding a digital twin is split between several parties— most notably owner operators and contractors—it is crucial to carefully define roles and responsibilities.

Poor handovers create data integrity problems that compound throughout the operation phase — leaving teams to manage large volumes of outdated, inaccurate and uncontextualized data and documents. To avoid this, teams must clearly define the scope of information to be handed over at each project milestone.

For operations handovers, many owners are increasingly adopting the CFIHOS standard—but owner-specific additions are often required, as well as additional data to support project execution.

Point of attention:

Handover requirements in contracts

Incorporating precise requirements and specifications into contracts is essential, including stipulations that suitably experienced and knowledgeable personnel should be assigned to digital twin realization.

Owners must also obtain the rights to audit and review deliverables in progress at the contractors' sites, along with the right to validate and verify the deliverables including content, delivery timeline and/or API-based data transfers.

In the case of incremental deliverables, it is also crucial to create detailed and well-defined requirements, such as expectations, timelines, quality control, feedback and integration.

Imperative three: Ensuring only validated information gets entered

If data is inaccurate, it does more harm than good. Developing a process to validate data before it enters the digital twin is essential, whether it comes from contractors or suppliers.

Doing so ensures the digital representation accurately mirrors its physical counterpart, enabling it's value as a single source of truth.

At Octave, we recommend a two-step process:

Step 1

All incoming data is loaded into a staging area

This area acts as a buffer, enabling a thorough audit before data proceeds to the digital twin. This initial filtering forms the basis of the validation process, which is automated for efficiency and accuracy.

Step 2

A validation process takes place, guided by predefined rules

Dimensions covered include naming conventions, mandatory data fields, relationship cardinality, picklists, units of measure and more. The platform should also allow non-IT specialists to define business rules. For example: that the maximum operating pressure must not exceed the maximum design pressure.

Applied rules can result in either errors or warnings. Error-flagged data is blocked from being loaded into the digital twin, ensuring that erroneous data does not compromise integrity. Warning-flagged data is loaded but marked for later correction and resubmission. The strictness of these rule sets typically increases as the project progresses, with requirements tightening at each stage.

Unleashing AI to optimize data capture

Legacy facilities and projects often contend with large volumes of unstructured information—ranging from PDFs and unintelligent CAD files, to office documents and laser scans.

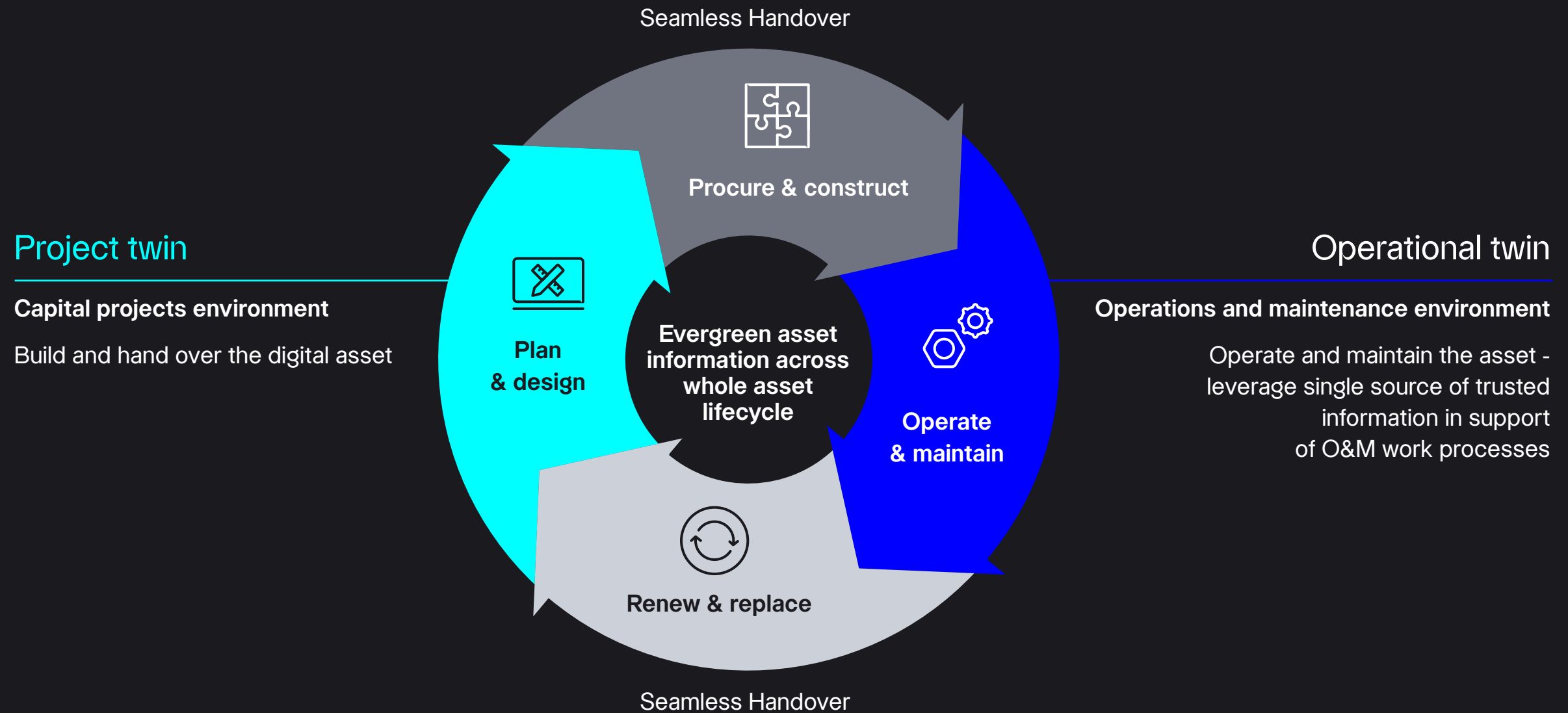
Traditionally, extracting useful data from these sources was tedious, requiring extensive rule setup and inefficient manual processes, particularly for laser scans.

Octave's digital twin platform Octave InConcert changes the game by putting AI and machine learning (ML) technologies to work. With InConcert, capturing and validating data from unstructured information sources is streamlined and simplified—some even refer to it as "smartification."

- **For P&IDs:** InConcert supports tag extraction, hot spotting and off-page connector detection, greatly simplifying the integration of these documents into the digital twin.
- **For other documents:** The platform provides initial capabilities for tag extraction, with plans to expand to include document class identification and title block information extraction in future releases.
- **For laser scans:** InConcert can recognize tags on visible nameplates and stenciled areas, enabling geotags for hotspot navigation and more streamlined integration. The result is faster data capture with less manual effort, even for complex legacy environments. Powered by AI, unstructured data can be integrated into the digital twin with minimal setup, making it easier to unlock the value of legacy information while improving the overall quality and completeness of the twin.



Bridging the gap: From project twin to operational twin



Digitizing the pre-digital facility:

How new technologies are transforming brownfield operations

Hans Kouwer, Executive Director of Industry Consulting at Octave, explains how even decades-old facilities can leverage the power of operational twins and technologies that mine, capture and validate data.

Is it possible to digitize a pre-digital-era facility?

"Absolutely. In most of our digital twin implementations, customers often operate facilities that have been functional for decades, with a significant amount of their information archived in unintelligent and unstructured formats.

While digitizing brownfield sites is justifiably seen as more complex, the process of retrospectively constructing a digital twin from these available information sources is a common practice - and it can bring vast benefits.

How does that work?

It all starts with the data: we leverage cutting-edge technology to mine information from unintelligent 2D CAD formats, such as AutoCAD® and Microstation, as well as PDF files, Office Files, and other documents. We configure rules to automate the extraction of information from title blocks, reference tags and the building of hotspots for navigational ease.

This unstructured data is then amalgamated with structured information, sourced from legacy data systems such as maintenance systems, thereby constructing a comprehensive digital twin retrospectively.

When a 3D model is not readily available, we can use laser scanning for 3D digital reality capture. By implementing geotags, we establish successful navigation among 1D, 2D and 3D sources, even for legacy facilities.

To ensure data consistency from multiple sources, we run reports that cross-verify information. Further, these reports can check the presence of expected documents for specific tags and identify potential missing documents.

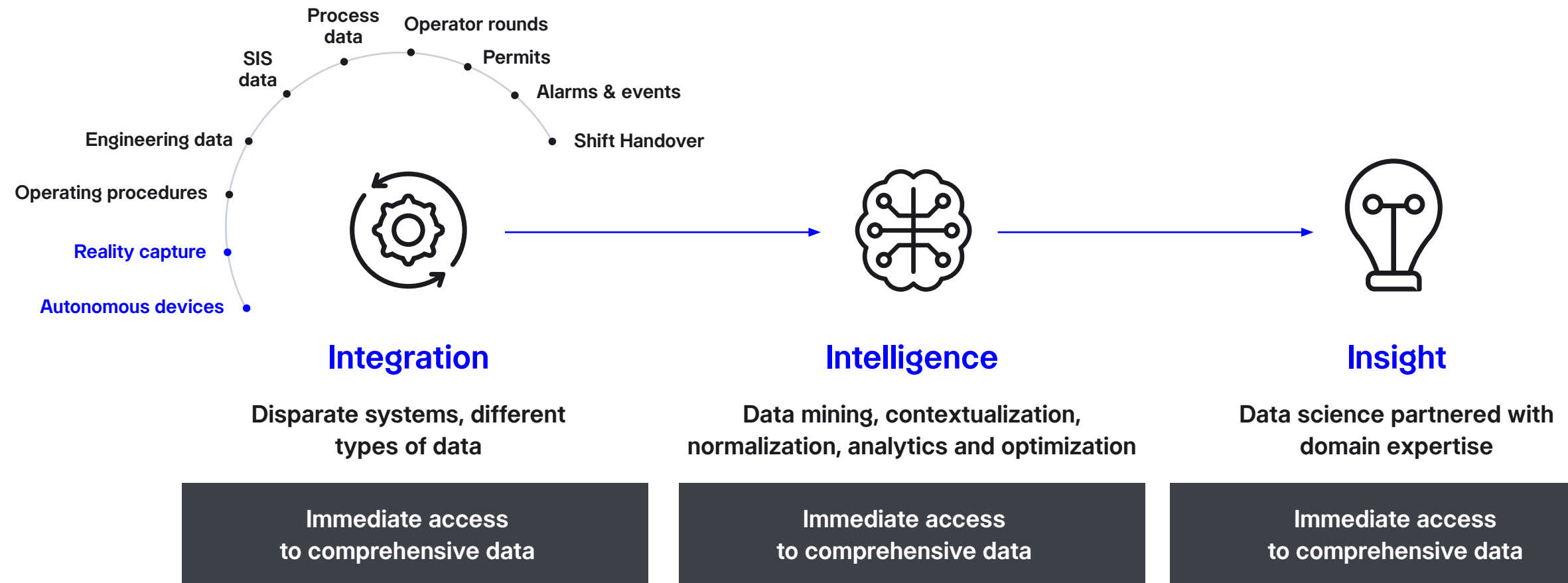
What happens next?

Once the digital twin is set up, we recommend processes like electronic Management of Change (eMoC) to ensure that the digital twin is consistently updated and remains 'evergreen.'

Our eMoC solution includes advanced features such as concurrent engineering, designed to manage complex change scenarios often encountered in engineering facilities where multiple parallel changes may affect the same equipment and documents."

Digital twins for operations and maintenance: The entry point to unleashing intelligence at scale.

As we've explored, the key capabilities of an operational digital twin boil down to integration, intelligence, and insight.



Integration: From data silos to single source of truth

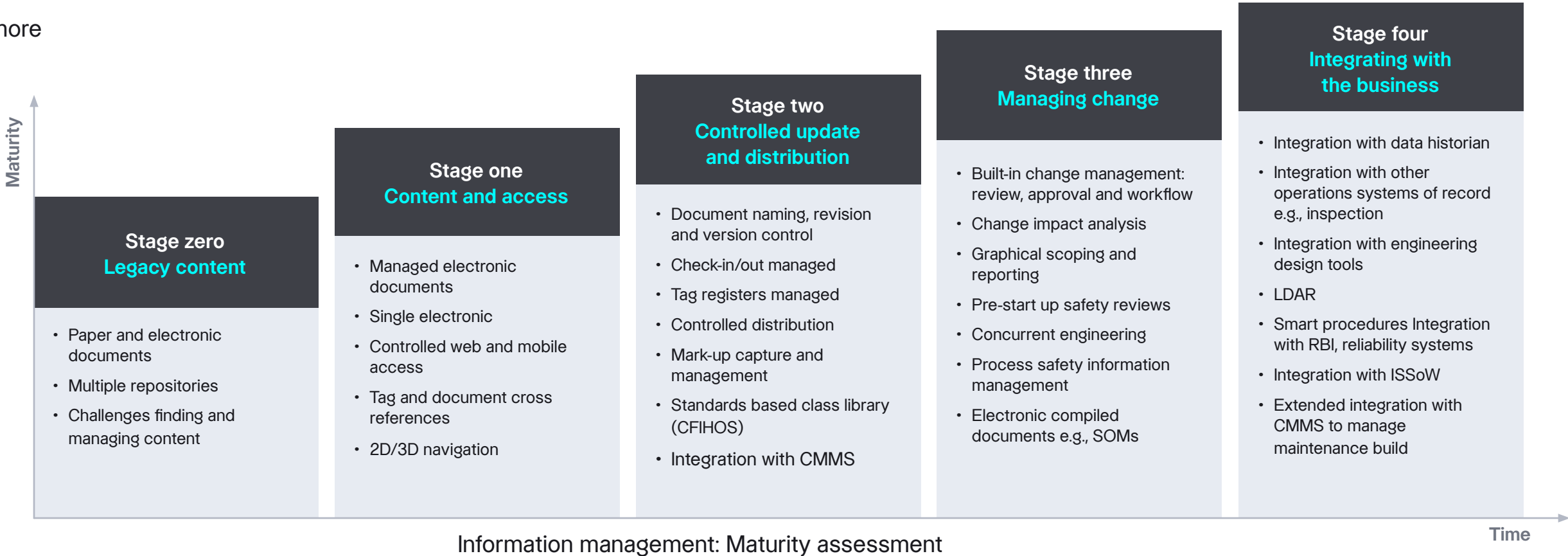
The goal of the operational twin, and what gives it its full power, is its ability to unify and give access to multiple types and sources of data, including:

- Human procedures
- Real-time and historical process data
- Maintenance work orders, which can be managed in solutions such as Octave Attune EAM (formerly HxGN EAM), IBM Maximo or SAP PM
- Engineering diagrams and schematics (for example, P&IDs)
- Technical documentation and user manuals
- 3D models and laser scans
- And more

For existing facilities, operational twins can often replace patchworked systems and practices, including disjointed software and networks, paper-driven processes and filing systems, spreadsheets, Word and PDF documents and homegrown databases.

In fact, research shows that digital twins can replace as many as 25 data silos—transforming fragmented data into an integrated, single source of truth.

The first step? Conducting a maturity assessment of information management—and developing a roadmap based on the result.



Intelligence: Transforming data with role-based context

Data alone is just data—even when it's integrated.

It takes the right context to transform it into actionable intelligence.

A digital twin contextualizes and normalizes data across a company's critical assets, with functionalities that give users access to rapid, role-based and contextualized intelligence:

- **Intuitive information browsing** that enables users to view and redline PDFs, AutoCAD, MicroStation, Octave data-centric schematics and models formats and third-party 3D models—without native application requirements.
- **Real-time dashboards** and visualization tools that provide immediate insight into both local and third-party data.
- **Tag, asset and model management** that connects engineering tags to physical assets, equipment models and manufacturer data for total traceability.
- **Document lifecycle management** that streamlines document tracking and revisions, plus communication mechanisms like transmittals and RFIs.

- **Work package management** that supports operation activities like inspection and maintenance, ensuring efficient workflow and task management.
- **Data book management** that centralizes complex structured documents, including vendor data books, manufacturing record books, fabrication record books and system operating manuals.
- **Engineering change management** that accelerates review, approval and implementation of workflows while supporting concurrent engineering across overlapping scopes.
- **Mobile field verification** that enables on-the-go access to information, discrepancy tracking, annotations and field observation logging.

These functionalities ensure that the digital twin's single source of truth offer relevant, role-based information to all users—from connected field workers to plant management, and all the way to the corporate headquarters.



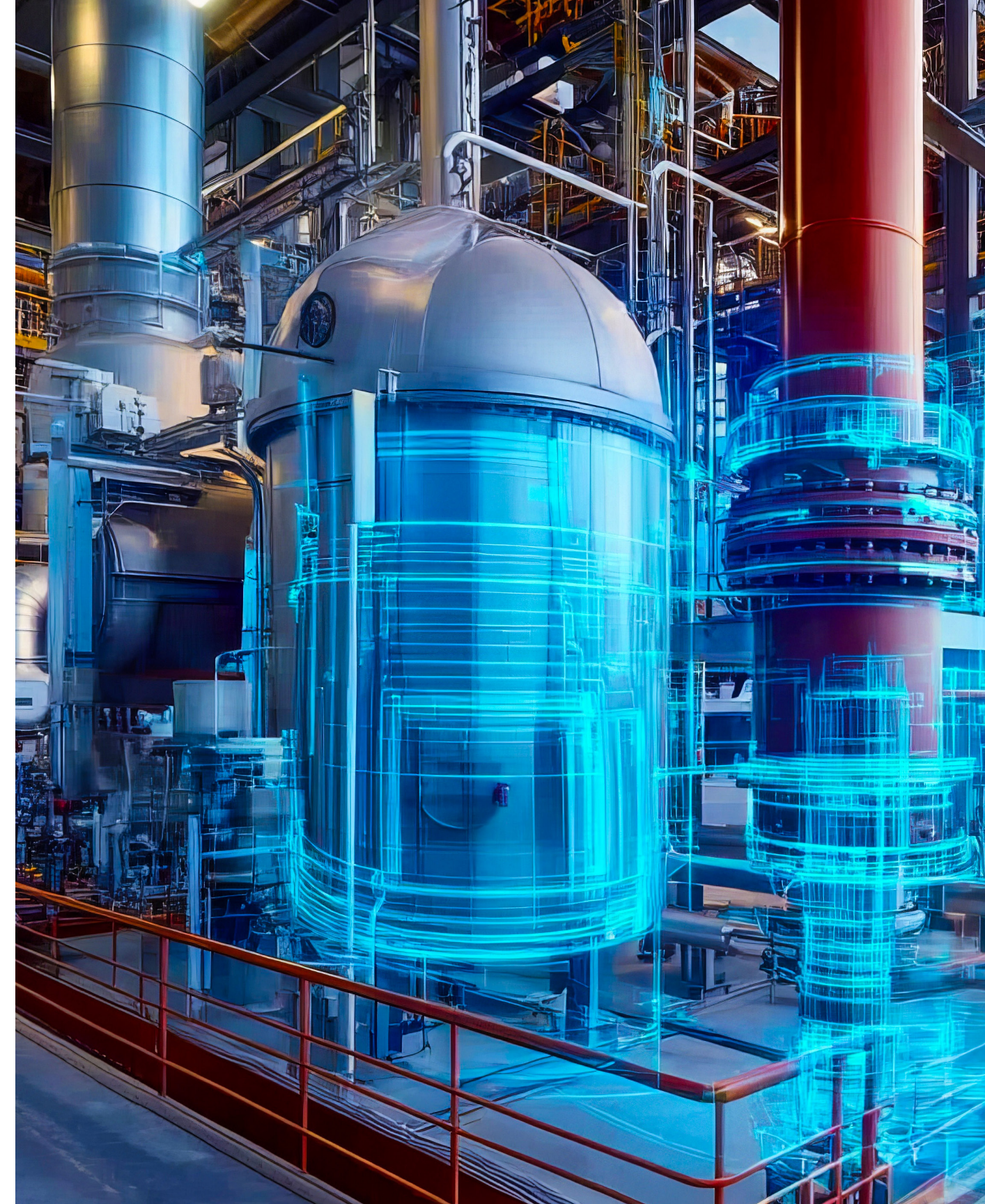
Key concept: Intelligence at scale

Octave unleashes a transformative approach for industrial companies seeking to elevate their digital twins. By bringing the freedom of autonomy and enabling real-time data capture and analysis, we transform the twin's function and utility far beyond a static source of truth.

In recognizing and addressing the complexity inherent in industrial operations, Octave helps organizations integrate diverse data sources into a comprehensive, single-pane-of-glass view infused with analytics and intelligence. Scaling is represented in multiple ways: Extensibility to configure business-driven workflows for today and tomorrow; performance that easily expands to meet peak system demands, and contracts when usage levels return to normal; and autonomous technologies, like machine learning and AI, that enable our customers to create systems that reduce and even eliminate human intervention, scaling the productivity of your workforce. The result? Safer, more productive and more sustainable industrial facilities that leverage the full power of automation and remote operations.

"We used to pull up all the PI System tags to match what was on the P&ID. We can now pull up the P&ID in Octave InConcert Core. To me, it's completely game-changing to have all this information readily available on one screen. This is the first time an end user can go to one place and get all the operations, maintenance, engineering and process data they need to do their duties in a digital twin."

President and CEO
subsea engineering company



Insight: Optimizing decision-making and outcomes with AI expertise

The combination of domain expertise, statistical analysis and quality data-driven machine learning models can unlock powerful insights into industrial operations—amplifying everything from safety and efficiency, to uptime and compliance.

Strategic objectives	How operational twins deliver results
Reducing operational risk	Octave Tempo Operations Management (j5 Operations Management) captures consistent information on incidents and near misses to discover trends and prioritize improvements. Advanced analytics and machine learning algorithms analyze vast amounts of data from sensors and operational systems to identify patterns indicative of future issues, allowing for preemptive action to mitigate risks. Worker safety is enhanced by virtually simulating risky scenarios and devising safer operational procedures.
Increasing efficiency and removing value leaks	Through the application of AI and machine learning, the operational twin can uncover hidden patterns and relationships in operational data to highlight suboptimal practices. By enabling ‘what-if’ scenario analysis, digital twins help managers make informed decisions that boost productivity and reduce waste. For example: mapping the complete maintenance processes can help identify redundancies, bottlenecks and areas for improvement.
Decreasing downtime	Combining an operational twin with a leading enterprise asset management solution such as Octave Attune EAM (HxGN EAM) enables predictive and reliability-centered maintenance and root-cause analysis, allowing the prediction of equipment failures before they occur. In addition, maintenance operations are streamlined by automating processes, scheduling work orders and optimizing resource allocation.
Meeting internal and external compliance	Digital asset engineering information that’s maintained with rigorous change control and auditable traceability serves as an “as operated” asset representation. When kept evergreen and accurate, this information drives performance excellence and helps operators meet compliance obligations. Real-time monitoring and automated reporting help ensure facilities operate within established guidelines at all times—avoiding penalties, fines and damage to the company’s reputation. Operational twins can be used to simulate the impact of changing regulations or policies, assisting in strategic planning and compliance management.

Three obstacles to operational twin success

To achieve transformative effects, it is important to understand and address what can get in the way—including these three top obstacles:

01

Failure to integrate

Operational twins effectiveness relies on its ability to integrate with other enterprise systems such as enterprise resource planning (ERP), enterprise asset management (EAM) or manufacturing execution systems (MES) for a cohesive view of operations, maintenance, inventory and supply chain.

For constructing an operational twin, InConcert has designed pre-configured connectors to link with a variety of third-party software and data sources. These include Aspen InfoPlus.21, IBM Maximo, the AVEVA™ PI System™, and modules for SAP Plant Maintenance (PM), among others, allowing for effortless consolidation of information from diverse existing systems.

Where pre-existing connectors are not available, InConcert has a rich set of read/write ODATA4 compliant RESTful APIs to enable the rapid integration of external systems.

02

Cybersecurity oversights

Robust OT and ICS cybersecurity are a prerequisite for digital twin success. Digitalization initiatives bring new cybersecurity risks, as operations become increasingly connected and reliant on digital technologies. Due to its central role within the facility's ecosystem, an operational twin heightens the stakes of robust operational technology (OT) and industrial control systems (ICS) cybersecurity.

Areas of importance include:

- **Inventory management** to ensure all assets and end-points are accounted for and effectively tracked.
- **Risk and vulnerability identification and remediation** for the proactive identification of security gaps in the operational twin and prompt action to mitigate associated risks.
- **Configuration management** ensuring operational twin settings adhere to security best practices, reducing potential attack vectors and maintaining its integrity.
- **Backup and recovery** to speed time to recovery from major events, cyber incidents and unplanned outages.

03

Lack of stakeholder management

The successful implementation of an operational twin is a long-term digital transformation initiative—one that requires thoughtful change management.

For example: Engineers at Perstorp, a specialty chemicals manufacturer, historically relied on physical binders containing logical sequences of drawings. Shifting to an object-oriented solution, where designs are represented as collections of digital objects with properties and behaviors, required a challenging shift in thinking and information retrieval processes.

Despite the learning curve, this approach yielded significant benefits over time. Tor Lindström, Perstorp's director of asset integrity, notes that "in many areas at stake, such as core documentation or P&ID, it has become much easier to find the right information than before. Not only is it clear where everything is, but the information is interconnected to relate to equipment and tags, which is very efficient. And due to the integration with SAP, it is easy to interface information with [Octave solutions],"

"The single greatest recipe for digital twin failure is a lack of commitment from key stakeholders."

Waldir Pimentel Junior
Customer Success Manager, Octave

Obtaining support from key stakeholders requires articulating what benefits they can expect:

- For engineering departments, it can help retain momentum during project phases and ensure that the right information and history are kept in one place.
- In operating facilities, beneficiaries include plant management, engineering and operations teams. Management staff can use information collected to support decision-making and obtain key performance indicators (KPIs) at single or multiple sites.

Similarly, it is essential to involve and support the people working in areas where data will be collected. Operations supervisors, for example, may have to use new software, such as Octave's Tempo Operations Management, to move away from paper-based processes. As with any digitalization effort, the move to smart digital reality depends just as much on what happens on the shop floor as on what is decided in the boardroom — and organizations that get both right are the ones that see lasting results.

**Ready to put your digital twin to work?
We're here to help.**

Contact us

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we’ve partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what’s possible from day one onward.

©2026 Octave Intelligence plc and/or its subsidiaries and affiliates.
All rights reserved.

EBOOK

