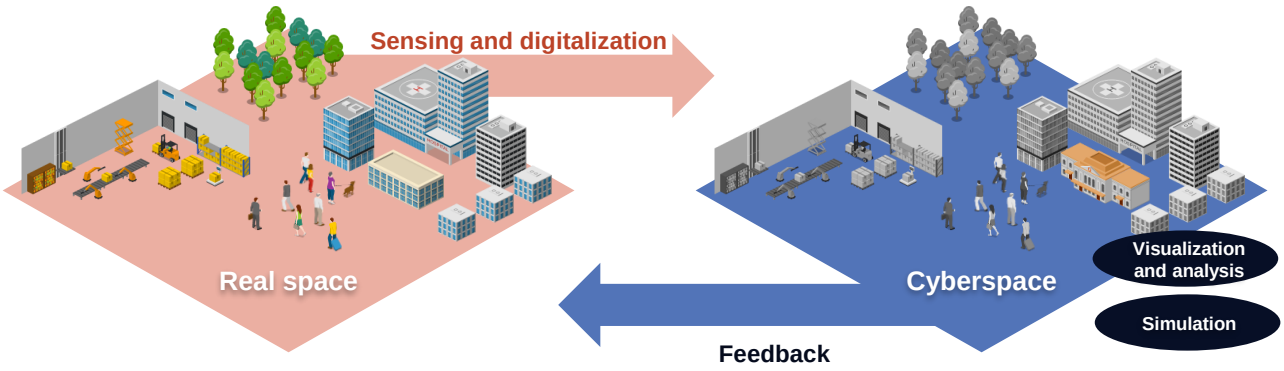
What is a Digital Twin?

This is an advanced technology for representing, in cyberspace, various digital copies of people and things from real space. A twin just like the original in real space is created in cyberspace, so it is called a digital twin. This is garnering attention as a technology concept enabling evolution of society and business processes, in areas such as neighborhood development and improvement of factory and production lines, by executing simulations such as data analysis and future prediction in the associated cyberspace, and providing feedback for the real space of optimal methods and actions based on the results.



Wide Range of Applications

We can provide wide-ranging support tailored to the purpose of the client's use of digital twins, as well as the industry and situation. Here we present examples of use cases, so please feel free to contact us.

Optimization of manufacturing lines and logistics processes (manufacturing)

Optimization of energy efficiency (manufacturing)

Alleviation of traffic jams and congestion (public)

Consumer behavior prediction and recommendations (retail, services)

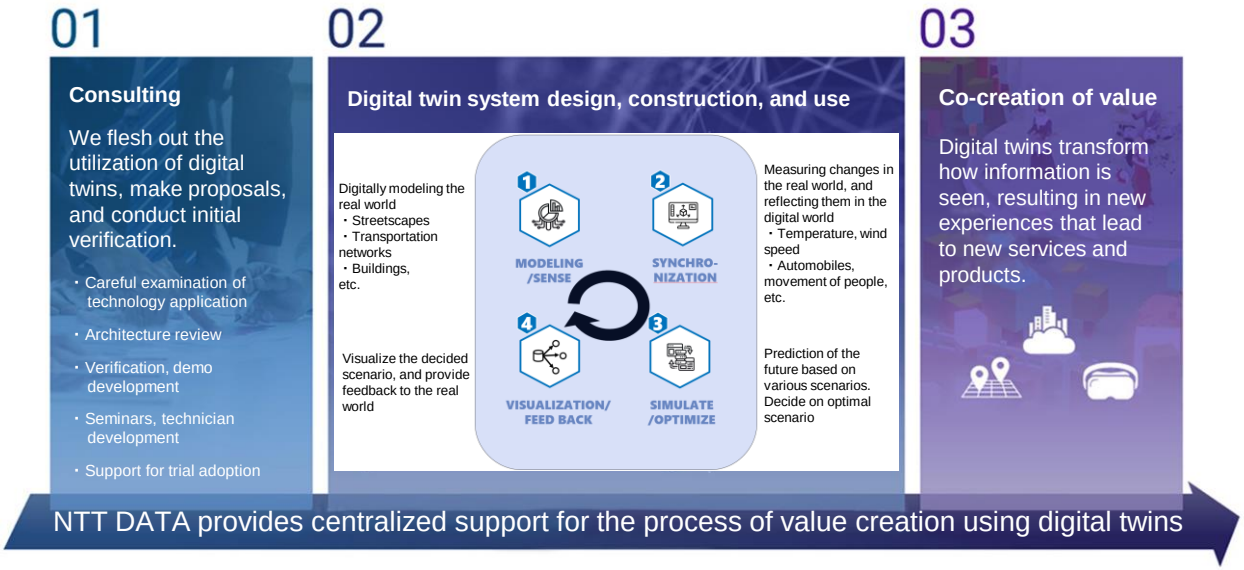
Health risk prediction, health management (healthcare)

Digital Twin Services Provided by NTT DATA

NTT DATA provides digital twin services to enhance efficiency and profitability through resolution of client problems, by leveraging our expertise in designing, constructing, and using digital twin systems, and our various data processing tools.

01 Consulting on business use of digital twins

02 Digital twin system design, construction, operation, and feedback to the real world



Advantages of NTT DATA for Digital Twins

Together with the client, we consider what sort of value to create with digital twins, and we proceed steadily and securely through the steps for adopting digital twins, from “3D model generation,” to “system construction and visualization,” “simulation and optimization,” and “visualization and reflection in the real world.”

Model construction and data gathering

We provide a framework allowing safe business use of a wide range of data, including data possessed by the client, data acquired from sources such as sensors and 3D scans (position information, etc.), data generated by using AI, and various types of data handled by NTT DATA.

Data synthesis

We carry out digital twin co-creation programs with clients in various industries, and we have many types of expertise on digital twin construction and verification. In combination with our extensive track record as a systems integrator, we build systems with optimal architectures, suited to requirements.

Data analysis and optimization

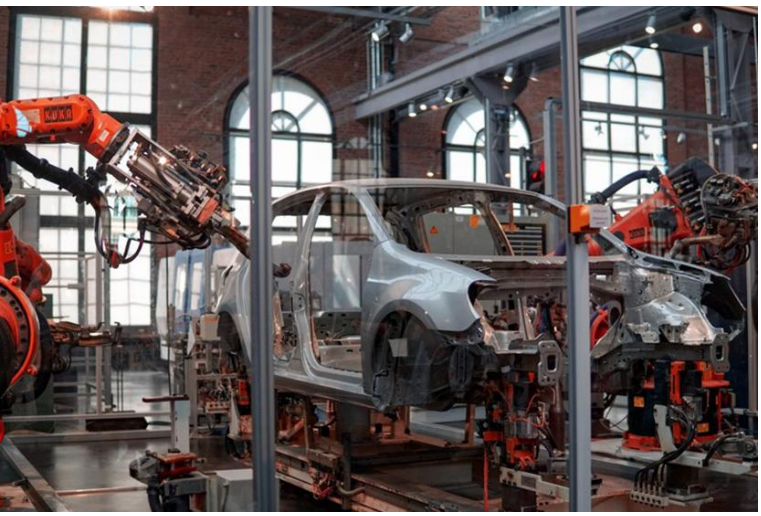
If clients have simulation tools they are already familiar with using, we use those as a basis, and if they do not, we prepare various tools that can provide the necessary analysis from both inside and outside our company, and derive the optimal conditions. We provide a one-stop combined optimization approach using quantum computers and mathematical analysis.

Visualization and reflection in real world

Results of data analysis and optimization are visualized in a form people can readily perceive, and optimal results are provided as feedback to the real world. By using metaverse technology for visualization, multiple involved people at remote locations can perceive a future situation with a high sense of presence. Various types of robotics technology are also useful in feedback.

Client Use Cases

Here we introduce specific cases of implementation by NTT DATA, organized by field and application.



Verification of automobile design and manufacturing processes with digital twins, checking for problems, and confirming the finished image.

Industries: Manufacturing, automobiles

Business needs

- Optimization of assembly line layout
- Detailed preview of finished image

Solution approach

- Development of digital twins for factories and automobiles by using NVIDIA Omniverse and related applications
- Implementation of 3D car configurator enabling interactive operation (door opening/closing, changing colors, etc.)

Obtained results

- Reworking cost improvement
- Prevention of misunderstandings when making sales proposals

Virtual recreation of robot arms, for efficiently learning complex movements under various conditions.

Industries: Automobiles

Business needs

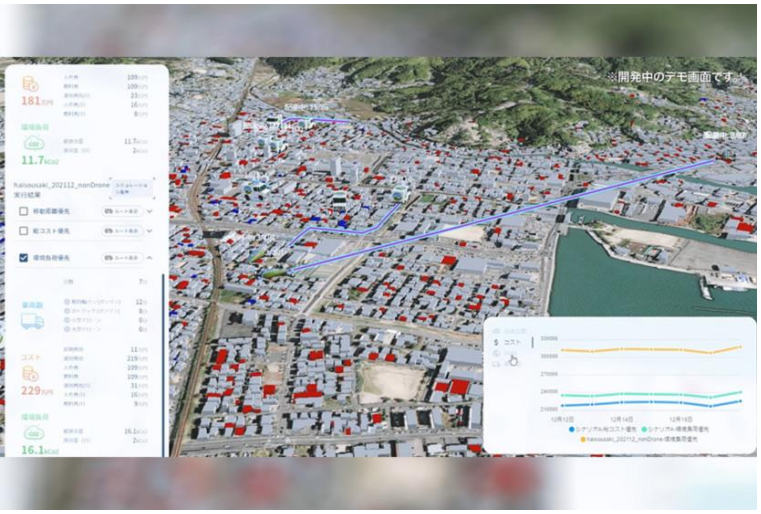
- Realization of high-precision robot control in a short time and at low cost
- Gathering image data for training in diverse environments

Solution approach

- Creation of 3D model and connection to Nvidia Omniverse
- Realization of sophisticated simulations that even reproduce lighting conditions

Obtained results

- Shortened time for training and optimizing movements
- Reduced risk of physical damage
- Reduced work for on-site program updating and operation checks



Setting new locations for logistics bases in a digital twin, and verifying/optimizing delivery and route conditions

Industries: Logistics, urban

Business needs

When setting up a new base, we want to take into account various conditions, and decide on the location likely to be most effective

Solution approach

- Recreate urban environment in digital twin, and carefully examine the effects of various parameters in logistics
- Estimate effectiveness through simulation, and verify optimal conditions

Obtained results

- Delivery cost optimization
- Maximization of base investment effects and improvement of sales

Virtual analysis of behavior trends of local people and tourists, and prediction of behavior with high precision

Industries: Urban, public facilities, retail, event management

Business needs

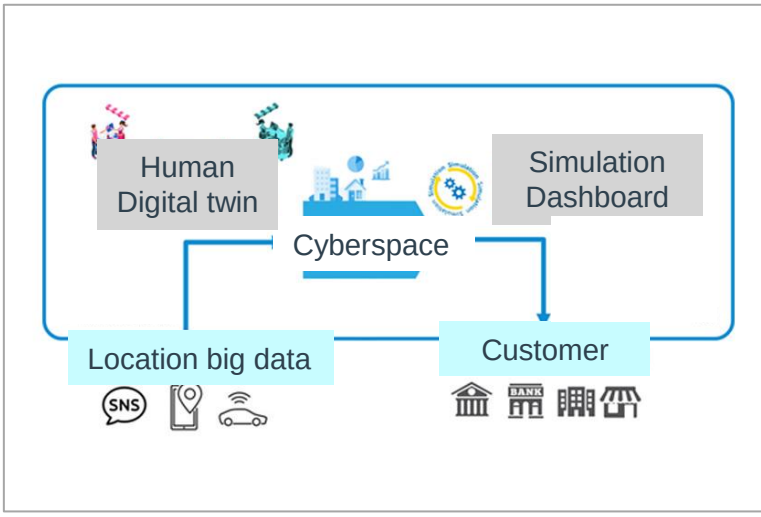
We want to anticipate people's movements, and estimate the degree of crowding and promotional effectiveness at commercial facilities, events, etc.

Solution approach

- Parameter representation of factors such as people's degree of concern, interests, and movement tendencies in a digital twin environment
- Prediction and simulation using AI

Obtained results

- Alleviating congestion
- Increased sales volume and revenue at commercial facilities

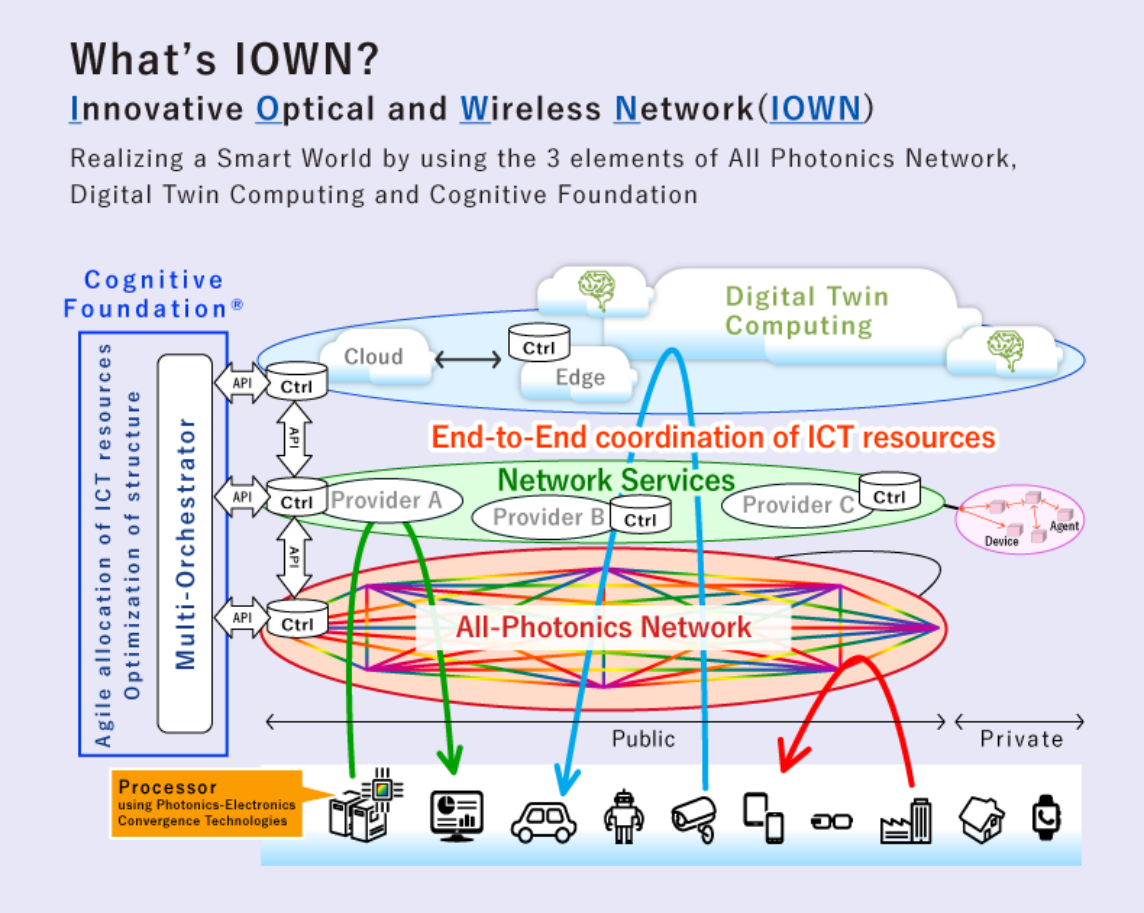


IOWN Initiative

NTT is implementing the IOWN (Innovative Optical and Wireless Network) initiative as a networks and information processing infrastructure to support a smart society in the near future, aiming for realization in 2030. Digital Twin Computing (DTC) is positioned as one of the main constituent technologies of IOWN. This technology develops the previous concept of digital twins, allows flexible combination of digital twins for diverse industries, people, and things, and thereby allows various sorts of simulation and prediction of the future. In addition to providing digital twin solutions, NTT DATA is also moving forward with research to develop technology for fusing digital twins, and for digitalizing people's consciousness and thoughts, in order to realize digital twin computing in the IOWN initiative for the future.

IOWN | NTT R&D Website (dint)

What is Digital Twin Computing?



Thought Leaders

At NTT DATA, human resources with deep knowledge and experience of digital twins support problem-solving and transformation together with clients by using evolving, related technologies.

Head of Data and Analytics at NTT DATA (Chile), Digital Twin Consortium Ambassador

Dr. Carlos Toro

Dr. Toro's areas of expertise include Smart Manufacturing, Oil and Gas, Industrial Robotics, AR/VR, M2M Communication, AI, and Composable Digital Twins.

His experience spans for more than 20 years and includes different roles in Europe, APAC (Singapore) and LATAM. He has been distinguished with a Marie Curie research visitor grant funded by the EU Commission and his publications record is represented in 70+ published articles in high impact Journals and conferences.

His current work is centered on developing high impact solutions for customers of different domains with an agentic based approach where AI becomes the heart of the Digital Twin.

Publications

Here we gather information about NTT DATA's digital twins.

White Paper

Manufacturing + Digital Twins

➢ Read report

NTT DATA Focus

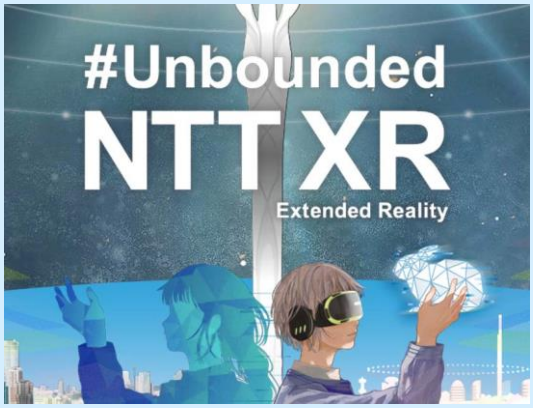
Transforming Golf's Original Championship: How NTT DATA's Technology Innovations Enhance the Global Golf Fan Experience

➢ Read article

Related links

NTT XR

➢ Click here for details



News

Dec 7, 2023	Utilizing NVIDIA Omniverse™ for Digital Twin Projects at the NTT DATA Innovation Center | NTT DATA Group
Oct 13, 2023	NTT DATA collaborates with NVIDIA and FANUC Germany to create a digital twin of robotic arms for industrial digitalization use cases | NTT DATA Group
May 19, 2023	NTT DATA reinforces B2B advisory service for Blockchain, Digital Twin and Quantum Computing

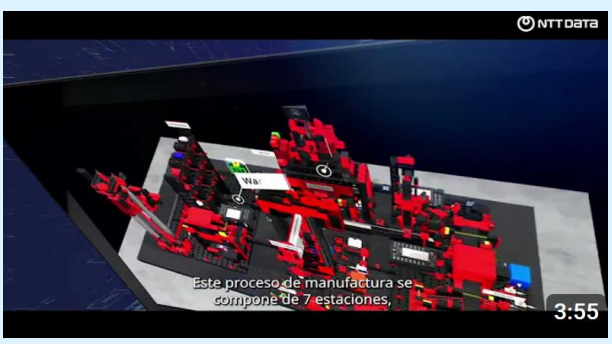
Related videos

30-Sec Tech Talk ～ What is Digital Twin?

https://youtu.be/Zmq0G11in-Y

Digital Robotics Twin in Omniverse

https://youtu.be/w4zIVwsiQUk



Digital Twins | NTT DATA Chile

https://www.youtube.com/watch?v=lfgyzniGV04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