How Telco companies can enhance strategic assets

How to improve through the use of digital twins the communication, sharing and efficiency of the technical presale phase

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What is a Digital Twin Interoperable Solution?

Infrastructure companies manage assets that are essential to the functioning of the economy, homes, and production facilities.

The field of wireless network infrastructure is particularly complex: its objective is to support networks that provide excellent coverage in densely populated urban areas such as some Italian city centers and other public areas, as well as in large enclosed spaces such as stadiums, train stations, concert areas, historic villages, museums, touristic areas.

One of the most powerful tools currently available for planning, design, implementation, management and development of this type of infrastructure is the digital twin.

An infrastructure digital twin is a virtual replica of the physical infrastructure created using digital technologies like sensors, data analytics, and 3D modeling. The digital twin incorporates data from various sources to create a complete and accurate digital representation of the infrastructure system, including its geometry, materials, components, and behavior.

To express the potential of digital twins, it is necessary to integrate them with other systems and with the business processes they are involved in: interoperability is the ability of digital twin different systems, technologies, or products to work together and exchange information or data seamlessly.

Our objective is to define an interoperable solution merging the technical pre-sale process and digital twin: infrastructure digital twins can help increase customers' understanding and awareness of the infrastructure, improving the quality of the technical presale phase and facilitating the purchase decision.

In order to achieve the best impact when presenting the services that can be provided by the infrastructure, we decided to explore the use of augmented reality: to create a collaborative, immersive experience that focuses the customer's attention and makes the understanding of the possible configurations clear.

This document aims to provide an overview of the results of the current phase of experimentation based on collaboration with our clients operating in the strategic infrastructure sector.
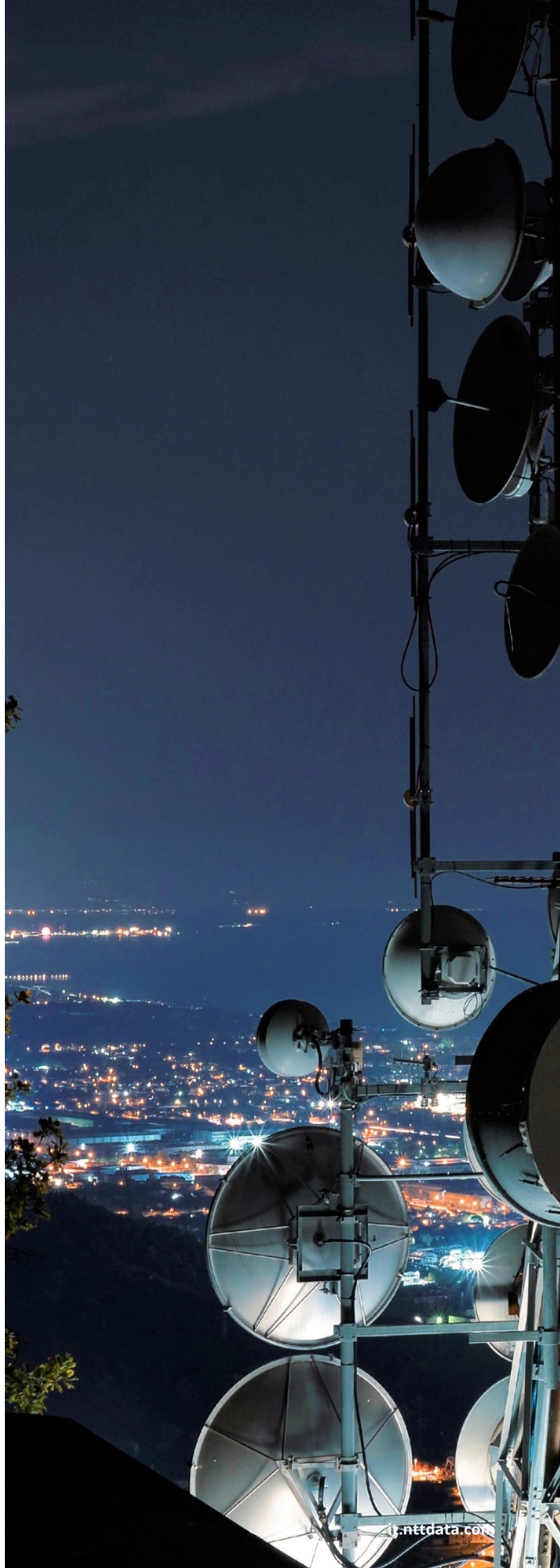
The opportunity provided by the application of Augmented Reality technology to technical presale

Augmented Reality (AR) is a technology that allows virtual elements to be superimposed on the real world, providing an enhanced view of reality. This technology offers numerous opportunities to enhance understanding and interactive presentations, especially in sales settings.

One of the main opportunities offered by augmented reality is the ability to visualize products virtually, creating a more detailed and realistic view. This allows customers to explore the products and services offered in greater depth, evaluating their characteristics and behaviors more effectively.

In addition, augmented reality can enhance interactive presentations, allowing salespeople to show product features and benefits in a visual and engaging way.

Augmented reality can also provide effective support for sales staff training. For example, augmented reality can enable salespeople to virtually simulate sales situations, providing examples of customer interactions and practicing specific sales techniques.

In addition, augmented reality can provide salespeople with a competitive advantage by enhancing customers' buying experience and creating an innovative and modern image of the company. Finally, augmented reality can enable salespeople to collect data on customer behaviors, improving the effectiveness of sales and marketing strategies.

In summary, augmented reality offers numerous opportunities for improved understanding and interactive presentations, especially in sales settings.

With its ability to provide an enhanced view of products and create engaging and personalized shopping experiences, augmented reality can become a key element in the sales strategy of innovative and modern companies.
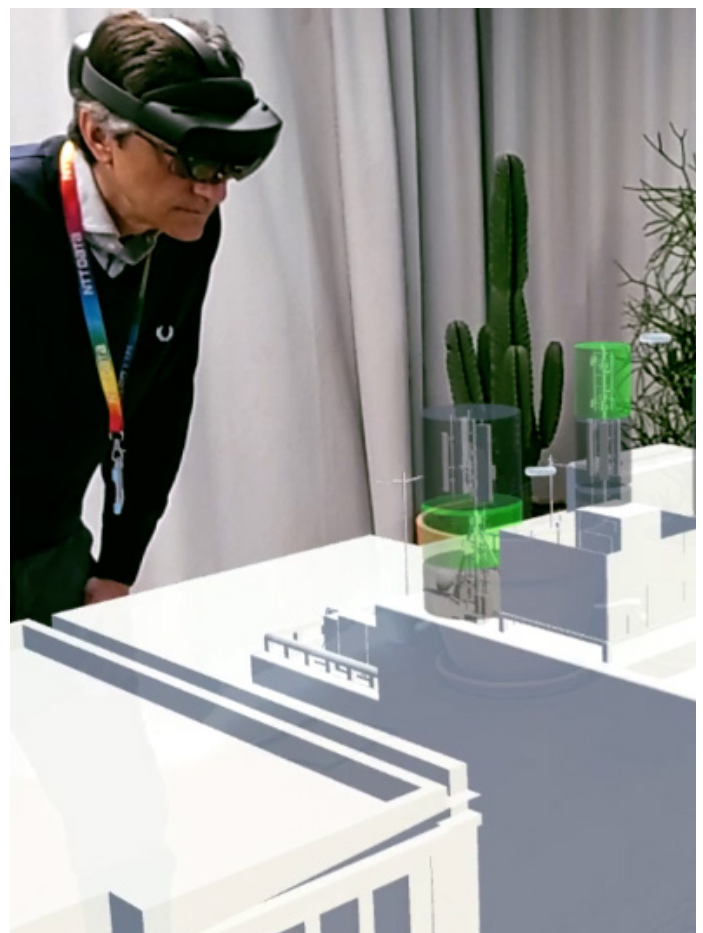
Challenges to enable Digital Twin Interoperability with AR

To leverage the business advantages provided by Digital Twin Interoperability, it is necessary to successfully integrate all the significant digital data available and to design an engaging experience.

To enable a Digital Twin interoperability solution with Augmented Reality is necessary to address technical, organizational, and cultural challenges. The main objective is to create powerful, immersive solutions that combine the benefits of both technologies.

There are several challenges that need to be addressed to achieve successful interoperability.

Data Compatibility

The first challenge is the compatibility of data formats between the Digital Twin and AR systems. Digital Twins are often based on complex 3D models, while AR applications rely on different data types and formats. Achieving interoperability requires creating a common language between the two systems.

Integration of Hardware and Software

AR systems require a range of hardware and software components, including sensors, cameras, and tracking systems, which need to be integrated with the Digital Twin. This integration can be complex and time-consuming, requiring expertise in both AR and Digital Twin technologies.

Scalability

Digital Twins and AR systems are often designed for specific use cases, making it challenging to create interoperable solutions that can be scaled for wider applications. Achieving scalability requires considering interoperability at the design stage and using open standards and interfaces.

Real-Time Synchronization

To create an immersive experience, AR systems need to synchronize with the Digital Twin in real-time. This requires fast and reliable data exchange, which can be challenging in large-scale, distributed systems.

Security

Interoperability requires exchanging sensitive data between the Digital Twin and AR systems.
Ensuring the security of this data is critical, and interoperability solutions need to incorporate robust security measures to protect against unauthorized access and data breaches.

AR Support for Business Process

The adoption of Augmented Reality based solution to support business processes needs a significant change in the way employees work.

Integrating Augmented Reality (AR) technology into business processes can be a complex challenge, but it also presents a unique opportunity to enhance the efficiency and effectiveness of various operations.

To be effective, AR applications must be intuitive and user-friendly and employees may require specific training to learn how to use AR applications effectively.

AR has the potential to significantly impact existing business processes, which may need to be re-engineered to fully leverage the technology.
This can be a significant challenge, requiring careful analysis and planning to ensure that AR integration efforts are aligned with business goals and objectives.

Needs

- Show the infrastructure to clients and internal **non-technical staff** more easily and clearly

- **Improve** and **simplify** the decision-making by sharing more infrastructure information through greater and **optimal use of data**

Goals

- Enhancing clients' site visits by offering a new way of representing the infrastructure capabilities

- Create an immersive experience (AR) through interactions with the virtual replica of an infrastructure (digital twin) discovering new content

Scope

Work on a solution (PoC) that demonstrates the functionality and potentiality of the Digital Twin technology for Business Infrastructure companies to enhance their offering (external) and ease sharing information (internal)

Infrastructure Digital Twin Case Study

NTT DATA is supporting clients in the wireless network infrastructure sector exploring how to enhance their customer experience during presale activities and facing the technical constraints described in the previous chapters.

With one of our clients, a leading tower operator, we are working to leverage the potential of Digital Twin and Augmented Reality to build a business solution (PoC) to visualize and interact with stations (models/infrastructures/towers) scattered throughout the territory.

The solution ensures accessibility to different types of users of the client, both internal (e.g., sales, marketing departments, HR, etc.) and external (e.g., final customers) to improve the visibility of the relevant info to take a decision and at the same time, introducing a new innovative way of presenting the offering to clients in this sector.

The customer has a large infrastructure fully digitalized: a lot of information is available but not accessible to everyone or easy to use.

The objective is to offer an immersive experience to enhance customer meetings and allow the sales department to show a virtual copy of an infrastructure of interest, avoiding inspections, saving time, financial resources and highlighting the most strategic KPIs during sales.

As an innovation partner, NTT DATA proposed to launch a proof of concept for an interoperable Digital Twin solution based on AR.

We defined the experience with the client using a design-driven approach based on co-shaping and information sharing, validating the scenario and the high-level goals with stakeholders' interviews.
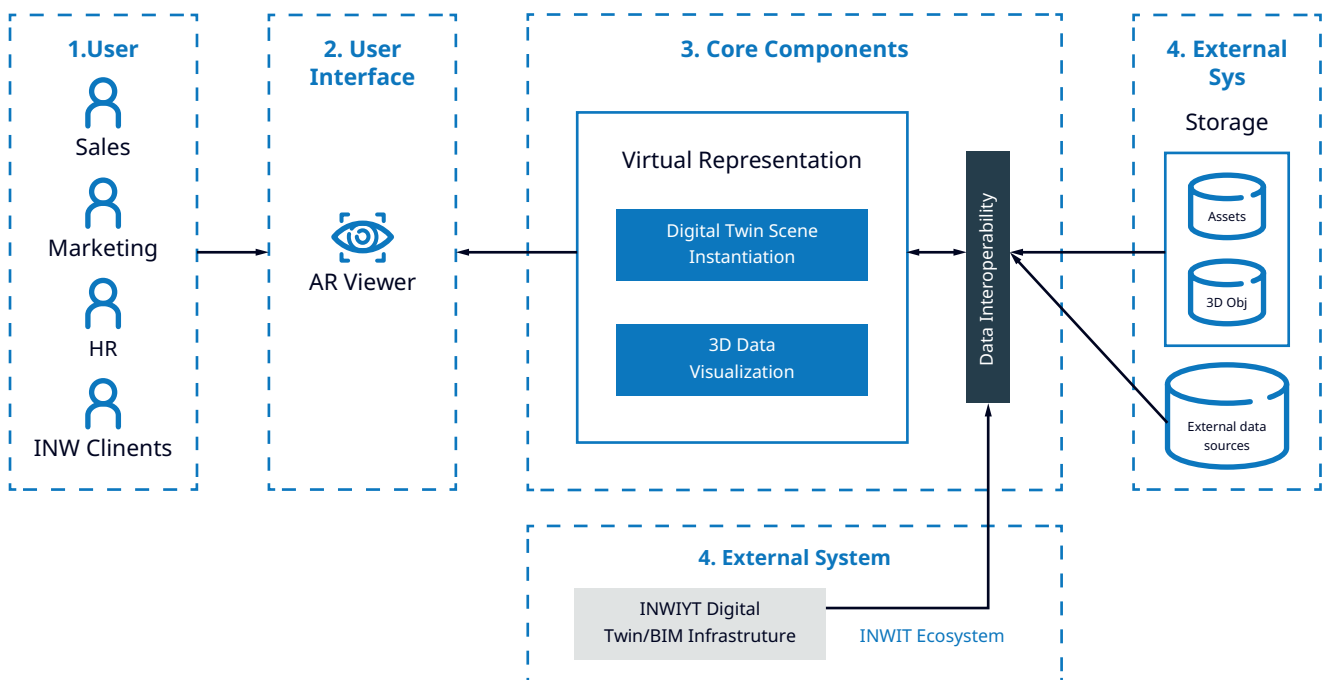
How Infrastructure Digital Twin Works

Infrastructure Digital Twin is composed of different steps. The first part of the solution involves the integration of data from external systems, mainly from the existing BIM platform that contains the 3D models and engineering models of all company assets.

At this level it's possible to integrate other data relevant to the proposed business case.

The second part of the solution is about the instantiation of the Digital Twin with all the relevant data and the preparation of the business case itself. At this level the Digital Twin Editor is used: the users link materials to the imported BIM model, create the environment, set viewpoints, select information to show and choose disguise elements from the library.

The third part of the solution is the Augmented Reality application for Microsoft HoloLens 2 devices: the Digital Twin Player. It allows an immersive experience where the users can visualize the virtual replica of assets through AR and can select available space, move through viewpoints, create screenshots, focus on a specific component, change background, and so on. This is a multiuser experience, where different users (i.e. salesperson, marketing personnel, final customer) can collaborate to define the configuration of the asset (tower) in an immersive and shared way.
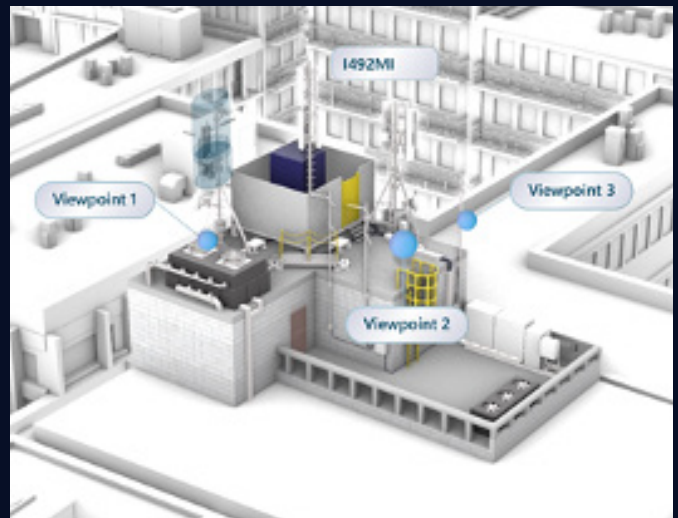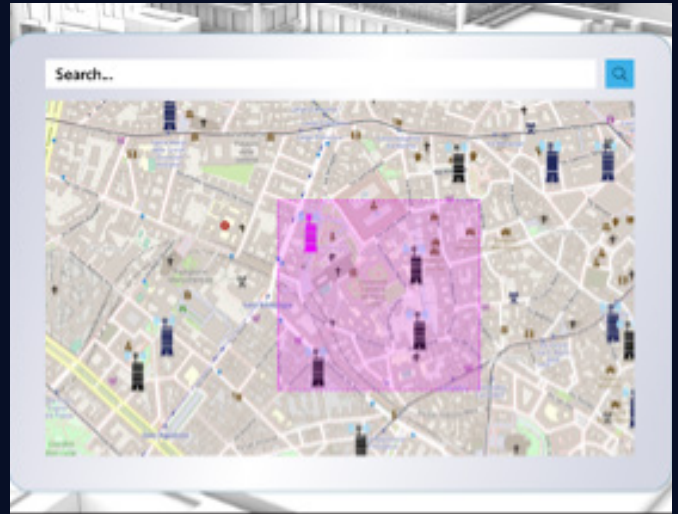
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The NTT DATA Innovation Centre comprises a Strategy Headquarters, the headquarters that defines the technology strategy, and local centres in six countries (Japan, the United States, Italy, Germany, China and India), each one dedicated to specific technology areas with around 100 experts, mainly researchers, consultants and engineers. Thanks to joint R&D initiatives with leading companies, technology partners and collaboration with universities and start-ups, these centres will be among the first to gather information on advanced technologies to set future strategies. success and combine global reach with local client attention to serve them in over 50 countries.

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