zensar

Digital Twin

A Futuristic Approach to Resource Planning

White paper

An RPG Company

Executive summary

This white paper explores the use of digital twin (DT) in streamlining talent management (employee/resource allocation to projects) to maximize client experience. Digital twins are like a bridge between our physical world and the vast possibilities of the digital world that make how we live and work smarter. Serving as virtual replicas of physical objects/processes, digital twins can empower organizations to simulate real-world scenarios, optimize processes, and drive benefits along with innovation in business processes. This paper also highlights Zensar's approach to testing the use of DT in human resources (HR) applications such as resource allocation and planning.

Digital twin for the best possible CX and EX

Zensar is a people-first company – which means we prioritize our commitment to our workforce and place as much emphasis on employee experience (EX) as on client experience (CX). To deliver on this commitment, our HR Talent Team (TT) was looking to deploy best fit employees with relevant skills on client projects.

The objective was to ensure that employees receive opportunities aligned with their skills, stay updated on industry developments, and address client challenges firsthand. The HR TT was looking to streamline and expedite their deployment process to enhance their own and the employees' readiness to meet client demands. It chose to explore the digital twin solution for the following reasons:

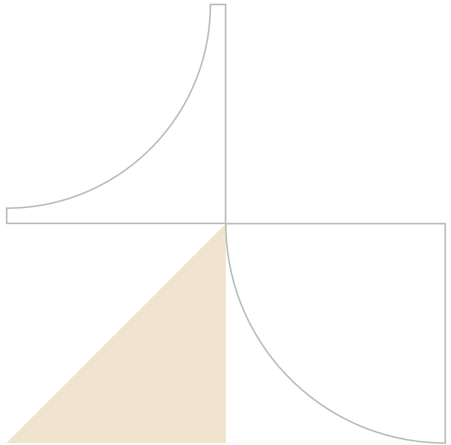
The existing process is manual and reactive. Its life cycle starts when a client requests for employees. However, with changing and continuous demands, the primary challenge is scalability and optimization. Secondly, the data involved in the allocation process is diverse. It includes variables such as employee categories based on experience, skills, current allocation status, lead times in resume selection, interviews, client feedback, selection probabilities, etc. Thirdly, if there is frequent back-and-forth in the allocation process, it could contribute to significant delays, leading to a negative client experience.

Streamlining resource allocation with digital twin

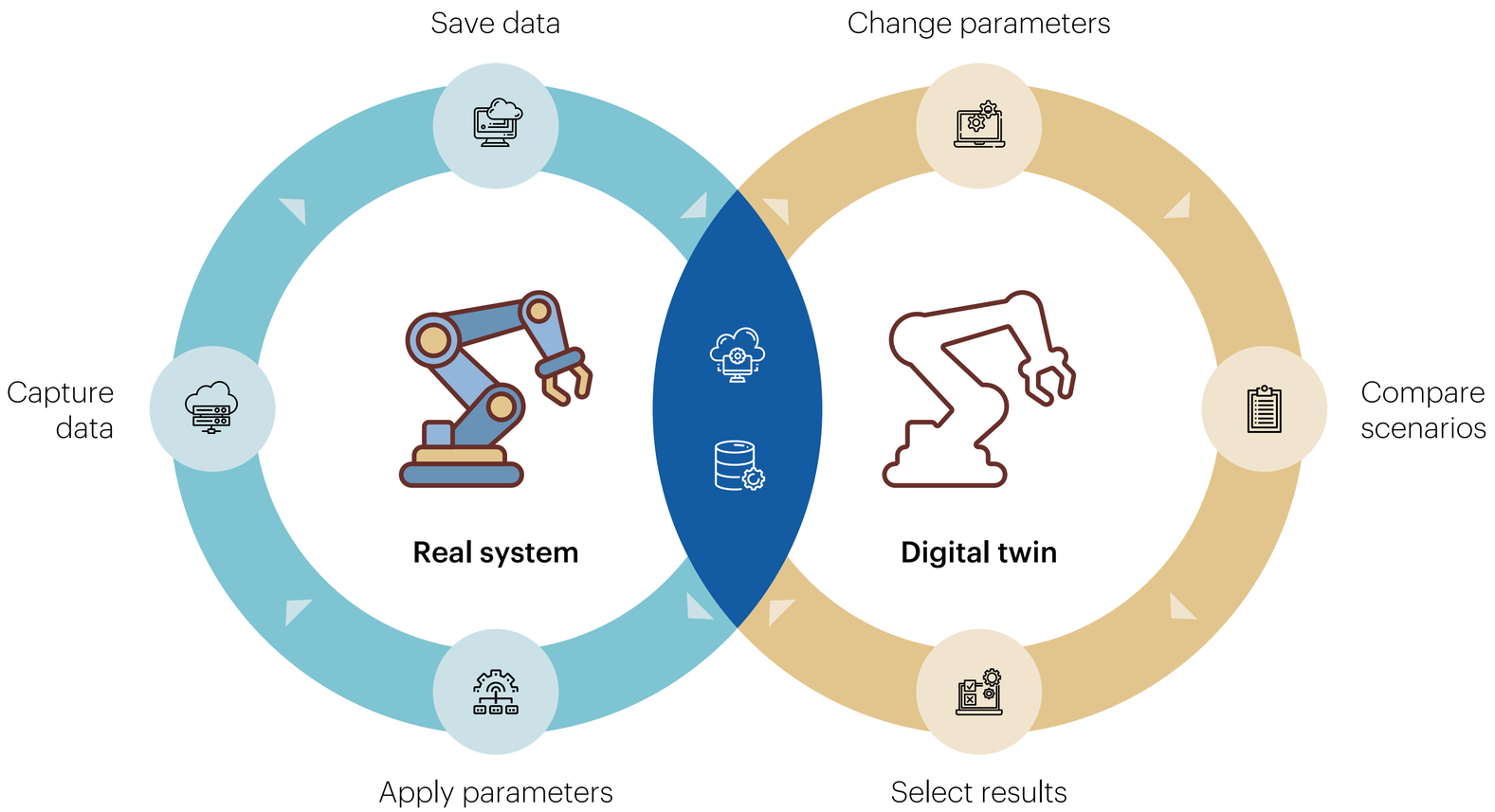
A digital twin is a virtual representation of an object, system, or process that spans its life cycle. It can be updated using real-time data and some assumptions. It uses simulation, machine learning, and reasoning to help decision-making with data-driven insights.

Furthermore, this live, futuristic, virtual replica can be used for real-time monitoring, analysis, and optimization of any scenario based on user or business needs. A user can input the desired changes during DT simulation, and they will reflect in the real-time outputs.

The use of digital twins has gained popularity due to the massive amount of data being generated by technologies to improve usefulness and precision. This data can now be used by organizations to develop detailed replicas – something that wasn't so easy in the past.[1]



How digital twins work[2]



From the figure, we can see that DT has the ability to combine real system data, provide control to users to change parameters, and answer questions about how business processes work, the potential impact of process changes, and possible optimization in processes so as to improve strategic decisions. Thus, they are a valuable tool in the digital transformation journey.[2]

How is DT different from a regular simulation? While a simulation typically studies one process, a digital twin can run several simulations in order to study multiple processes interlinked together. Digital twins are also designed to have an inflow of real-time data (wherever relevant).[3]

There are two features of DT that make it promising for the problem statement:

- **Forward simulation:** Exploring various "what if" situations and having a forward simulation, i.e., forecasting future performance based on the current state and the estimated parameters.
- **Reverse simulation:** In this, the user specifies the desired outcome. Optimization rules are used to estimate the parameters by learning from the process' real data.

In the context of talent management, DT offers an innovative approach to resource allocation and planning. This virtual simulation platform enables human resources professionals to visualize different scenarios and optimize future resource distribution.

A digital twin for resource allocation can create a virtual replica of the process followed, input various parameters, identify the bottlenecks, and predict a timeline to meet the raised client demand. DT shares insights with the HR Talent Team on the ongoing skill/demand changes from different projects and related planning. It can also inform the TT to make strategic decisions to either upskill the employees on relevant skills or hire more employees to address the demand well in advance.

Zensar's approach to talent management with a digital twin

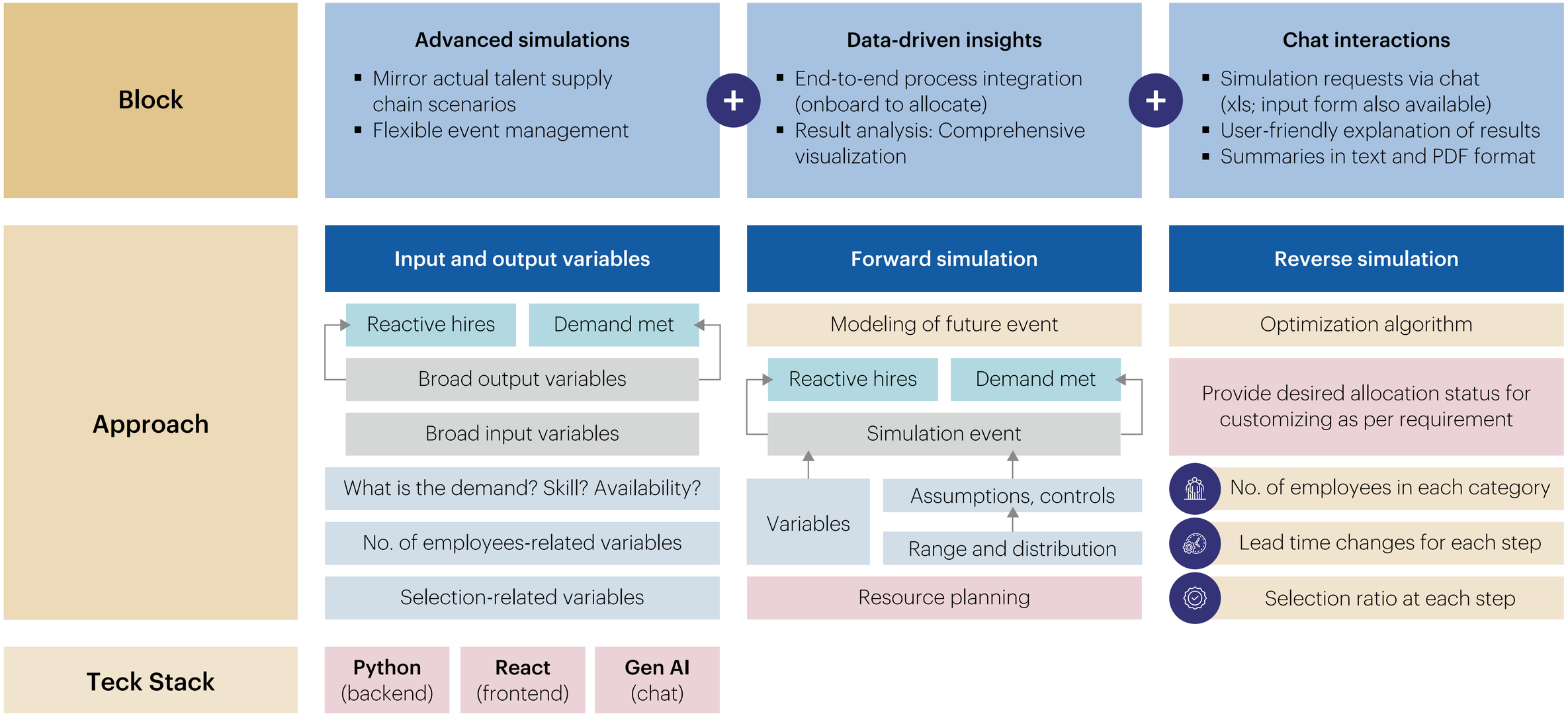


Figure 2

Figure 2 highlights our approach to creating a digital twin for talent management using a hypothetical skill set and example non-comprehensive reference example.

Here, the first step is to take user inputs for all variables and constraints. For example, current employee numbers, client demand, lead time, percentage selection, etc. Users can input this data through chat, upload data files, or manually fill the available form with the relevant fields. The user is also required to select the necessary and optional events in the process flow for the simulation to get the output in the form of a table.

Once the input data is available, a forward simulation is run on the data. Forward simulation entails generating the output based on the input data and incorporating the process flow and constraints on variables. The output is then displayed as a week/day/customized timeline-wise allocation status table. The Gen AI-powered chatbot can be used to explain forward simulation results in user-friendly language and summaries in text or PDF formats.

Another feature available in DT is reverse simulation. In reverse simulation, the user can specify the desired outcome/inject conditions at various touchpoints, and the system will indicate the necessary process changes to achieve this outcome.

Challenges in implementing DT

The implementation of digital twin carries challenges in data integration, security, and interoperability. Further, issues like scalability effort and high costs can complicate DT adoption. Other technical challenges can revolve around the complexity and quality of data, modeling accurate scenarios, and constraints around the validation of input variables.

Our experience:

- **Data quality and assumptions:** Obtaining representative and comprehensive data for testing digital twins is a challenge. Edge cases or constraints may be rare in real-world datasets but are essential for accuracy. We addressed this by testing multiple scenarios to gain confidence on the model.
- **Data visualization:** Representing the output data in a user-friendly manner was challenging because the output variables were numerous and diverse. We tried to simplify the obtained output with tables and by integrating a Gen AI-powered chatbot to explain the output in natural language.
- **Event handling:** The simulation design process had a mix of necessary and temporary events. It was important to carefully model the algorithm to ensure that the process was closest to the manual version.
- **Privacy concerns:** Technology raises ethical considerations related to privacy and consent, especially when dealing with personal or sensitive data. Thus, we avoid collecting sensitive information such as name, gender, etc., and also ensure that output data doesn’t leak any confidential information.

Significant improvement in key metrics

Digital twins allow organizations to improve on metrics such as costs, operational efficiency, turn-around time, and sustainability.[4]

The DT for talent management can be leveraged for the benefit of the 3Ps – people, process, and profits:

Employee experience:

- Seamless onboarding to projects in a timely manner
- Relevant skill alignment – inclusivity and fair allocation
- Employee attrition control with improved experience

Business process optimization:

- Identify resource bottlenecks, delays in processes, etc.
- Optimize and streamline resource allocation
- Strategic planning with data-driven insights to design the process to meet optimal scenarios

Revenues and profitability:

- Reduced time and cost associated with hiring and allocation
- Reduced TAT to meet client demands

Beyond these benefits, a digital twin is a sustainable solution as it can be reused in any scenario. It is also capable of adapting to changing user needs with updates to the backend process flow.

Digital Twin use cases

As an evolving technology, digital twin continues to find new applications across various sectors, such as:[5]

- **Manufacturing:** DT can streamline product design, simulate production processes and lines, and optimize supply chains. It can also be integrated with IoT to enhance smart manufacturing.
- **Quality control and maintenance:** DT can enable real-time monitoring to ensure quality control and reduce downtime by predictive maintenance of products/parts.
- **Training and collaboration:** DT can help employees familiarize themselves with equipment/tools in a virtual environment. Such setups are crucial in fostering a problem-solving environment and making collaboration with others a key soft skill in employees.
- **Smart city design:** DT can be modeled to mimic urban infrastructure like transportation systems, traffic, energy consumption, etc., to identify how these systems work and how they can be improved. Thus, it can contribute to efficient urban planning, infrastructure development, and optimizing resource utilization.
- **Healthcare:** DT can be used to model and simulate biological systems and check the effects of personalized medicine in surgical planning – resulting in treatment optimization.
- **Retail planning:** DT can be used to create store replicas, optimize layout and product placements, and analyze client behavior using history and real data.

Dynamic solution

Digital twins are constantly learning new skills and capabilities – making them powerful for dynamic, real-time, and detailed simulations. They are better than existing solutions, particularly in handling diverse scenarios – a significant deviation from structured business processes.

DT's ability to make accurate and dynamic copies of objects/processes and to facilitate managing complex systems with ease opens a wide range of possibilities for organizations to improve their operations and decision-making processes.

It is recommended that organizations explore the use of digital twins and understand how DT can benefit their specific use cases and industries. DT has the potential to improve the way businesses operate, and organizations should consider how they can leverage this technology to gain a competitive edge.

References

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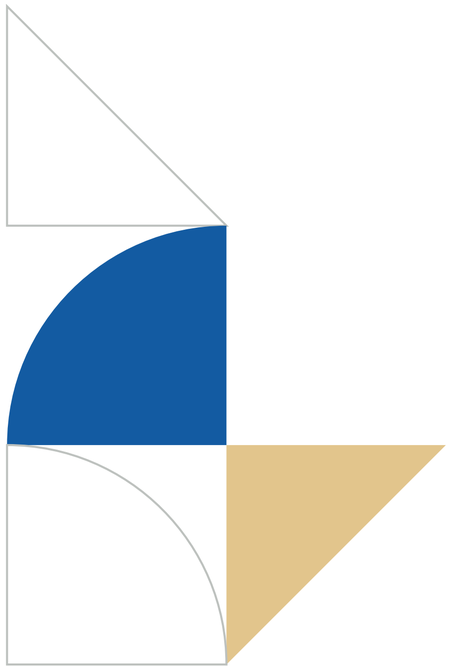
3. "What is a Digital Twin". IBM (https://www.ibm.com/topics/what-is-a-digital-twin)
4. "The top 7 reasons to Buy Digital Twin Technology in 2023" XR Today (July 27, 2023)
5. "Digital Twin Market". Markets and Markets



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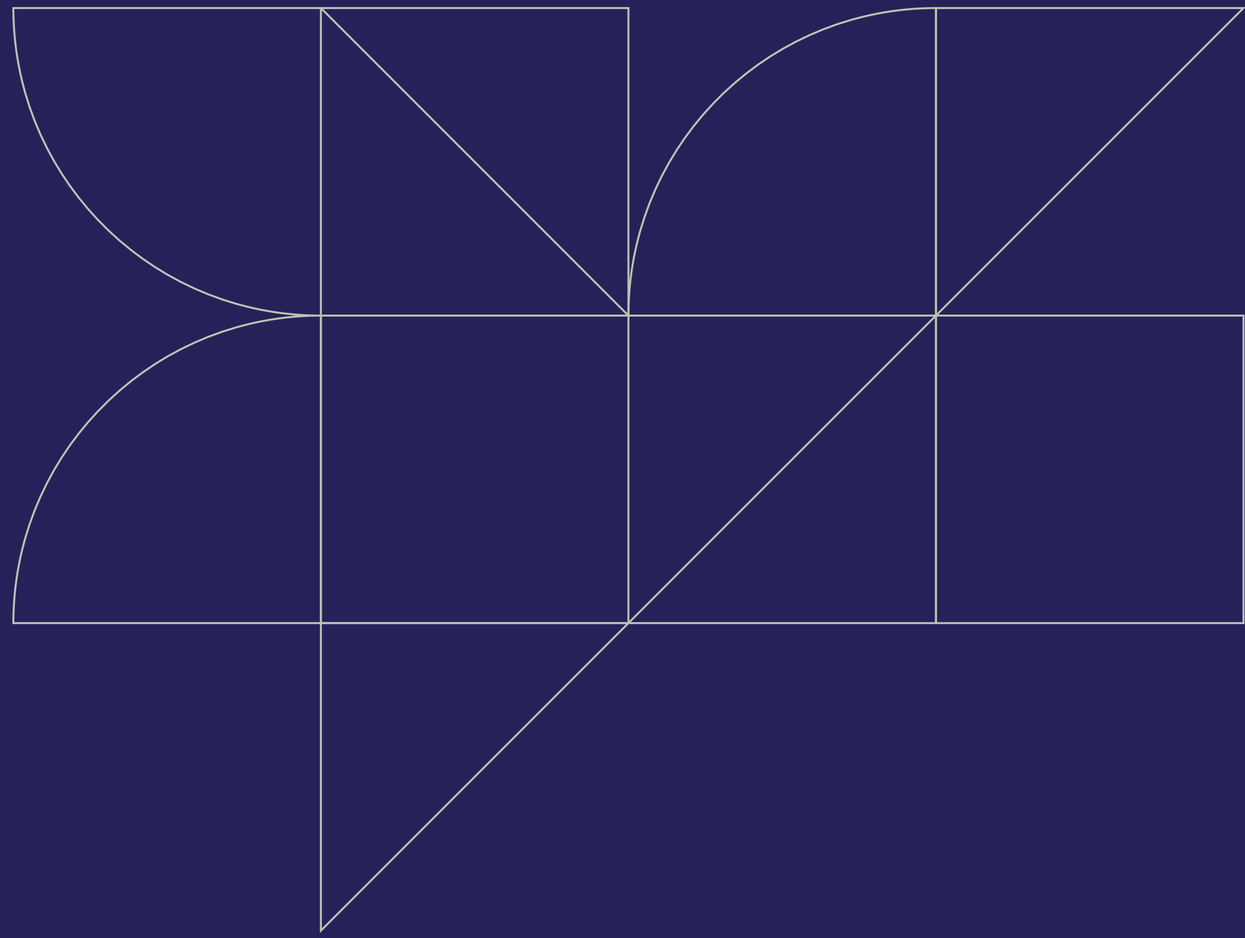

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We conceptualize, build, and manage digital products through experience design, data engineering, and advanced analytics for over 145 leading companies. Our solutions leverage industry-leading platforms to help our clients be competitive, agile, and disruptive while moving with velocity through change and opportunity.

With headquarters in Pune, India, our 10,500+ associates work across 30+ locations, including Milpitas, Seattle, Princeton, Cape Town, London, Singapore, and Mexico City.

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