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The DIGITAL TWIN does not come alone

PROSTEP

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Are the digital twin and the results of digital prototyping initiatives the same thing? Is "3D master" just another name for the digital twin? And by the way: What role do investments in a company's own PLM structure play? We are, after all, talking about figures in the tens of millions. Good questions and even better answers from MARTIN STRIETZEL from PROSTEP AG (Darmstadt).

Dr. Strietzel, digital prototyping concepts from the past are well documented. So what makes the digital twin new?

I've been involved in the field of simulation and computation for a good 25 years. Even back then, we tackled our work with the desire to simulate and calculate all the phenomena relevant in the real world in order to understand exactly what impact they have on the product. The digital twin also follows in this tradition, but the possibilities have increased enormously. For one thing, we get a more comprehensive picture of the functional characteristics of the future product. The digital twin now not only brings together multiple engineering disciplines, there is also the extended horizon of the product lifecycle. In the past, people were always talking about the product lifecycle, but only the engineering aspect was actually ever taken into consideration. Today, however, it is also possible to use IoT technologies to map production and the entire after-sales sector. This is basically a new dimension that allows us to look at the whole.

So much for theory. What is the situtation with your customers?

They are attempting to implement their own vision of the digital twin that is geared to their products. For the automotive industry, for example, it's all about creating a complete representation of each vehicle delivered, which initially leads to an "as-built" bill of materials and later to an "as-maintained" bill of materials. They want to make sure that they know exactly which components were installed and which software was used. It is intended that this complete bill of materials be directly linked to the vehicle identification number so that, if a problem occurs for example, they know exactly what configuration they are dealing with. In plant engineering, it's more about accurately simulating the machines and their operation. The aim is to understand the entire production process in detail, so that if a malfunction occurs, an immediate response is possible. Running through the production process in real time and then, if problems occur, making decisions based on the digital twin is very appealing. Many of our customers have launched digitalization initiatives and are creating new business models in order to define their products to a greater extent via software in the future, for example, or to place a much greater emphasis on product-related services.

And what position is PROSTEP taking?

We've come to realize that it's imperative to create an infrastructure that enables the relevant data to be generated and maintained. For us, the PLM infrastructure, in which massive investments have been made over the course of many years, provides the framework for the digital twin.

Does PROSTEP now have a new "Digital Twin" division?
We do indeed see the digital twin as an essential capability of any PLM infrastructure that is geared to digitalization. We take PLM to mean the entire process along the lines of the motto "from cradle to grave". In this respect, the digital twin is a perfect fit for this view of the PLM world. If you so will, the digital twin lives in a PLM infrastructure as a data model. The PLM infrastructure needs to be further developed in order to meet the needs of a digital twin.

Like PLM consulting, do you think that consulting on the digital twin is useful and necessary?
As I've already indicated, we don't look at the digital twin in a context separate from PLM. The digital twin "lives" in the PLM infrastructure that maps the product. Viewed in this light, the formulation of a strategy for a digital twin is always an integral part of PLM consulting. It is therefore a question of extending the PLM infrastructure if certain properties of the digital twin are required.

I'll note down your key statement: The digital twin is dependent on the PLM infrastructure.
We advise our customers to use their PLM investments to provide the digital twin with the data. Now is the perfect opportunity to recoup these investments.

Which key components of the digital twin are we talking about?
I prefer to refer to them as "dimensions". It's important to think about which business model the digital twin should be based on beforehand. Typically, however, it always includes the BOM. This goes hand-in-hand with variant management, so that each instance delivered can be precisely identified for concepts involving batch sizes of 1. In addition, there is the complete geometric representation, which I like to call the "3D master". This also involves the decision regarding the format in which the geometry should be published. Should I use the original CAD format? Or a different format like JT or 3D PDF? A way of accessing the different levels of maturity of the product needs to be found. After all, changes are repeatedly being made to the design, for example in the concept phase or at the start of production. Some people refer to this as "baselining", i. e. drawing a baseline. However, the term "configuration lifecycle management" is more widely used. We here at PROSTEP take this to mean the ability to access a PLM infrastructure and derive the digital twin from this system environment at a certain stage of development.

In the meantime, concepts are also being discussed to document the customer's experiences with the product. What do you think about approaches that try to document what led to the purchase decision?
A key development in the PLM industry was to first try to master the world of engineering. This cosmos, which opened up as a result of what were then new PLM approaches, is now being filled with content. It is slowly becoming very complex and very big. And it is indeed important to map the customers' entire world of experience. You notice that the different PLM system providers are approaching the digital twin from different perspectives. Dassault Systèmes, for example, focuses on the product with an as realistically depicted environment as possible. Everything is simulated in great detail there. The Living Heart Human Model heart is a very impressive example. The term "experience" already implies an emotional approach to the topic. I'm curious to see what engineers and managers make of this perception. Other system providers are focusing on other aspects. Siemens PLM, for example, is placing its focus on production.

It's often said that data is the new oil...
That's right, data is the fuel for digitalization and the PLM infrastructure is where this new "oil" is stored, including the fuel logistics.

But, if we stick with this metaphor, what is the refinery?
Good question. I think it's the business model. The PLM industry is taking itself too seriously in this respect in particular, because the business model must come from the customer. We are a powerful catalyst when it comes to implementation. You could of course hit on the idea of relying on only one PLM backbone. In practice, however, experience has shown time and again that the data is stored in the databases of the various departments in such a way that a consistent, unifying logic must be implemented across the individual data stores if the information in this federated environment is to be accessed effectively. It is exactly this advice that we provide to our customers: how to set up this type of federated data management layer.

Thank you for the interview.

Interview: BERNHARD D. VALNION