

FACE TO FACE

face to face with **Daniel Campbell**

VP of MBD at Capvidia



The future of digital manufacturing starts with Model-Based Definition (MBD)

by Enrico Boesso EnginSoft

Concepts such as Industry 4.0, digital twin, digital thread, and model-based enterprise (MBE), all rely on data-rich 3D models to create the foundation for integrating digital technologies throughout the product lifecycle.

In this Futurities Face to Face interview between Enrico Boesso, Senior Dimensional Management Engineer at EnginSoft, and Daniel Campbell, VP of MBD at Capvidia, we explore the importance of model-based definition (MBD) and how it is transforming industry.

Enrico: In the 12 years that I have been with EnginSoft I have seen changes in the manufacturing sector – particularly in the areas of digital twins and digital thread technologies.

I would like to explore some of the underlying terms and technologies with Capvidia's Daniel Campbell and these start with model-based definition or MBD. Daniel, could you explain what MBD is?

Daniel: Certainly, Enrico, thank you. Model-based definition uses a digital 3D model as the single source for all product design information. Instead of engineers juggling separate 2D drawings and documents, all critical details — such as dimensions, annotations,





and manufacturing information — are embedded directly in the 3D model, eliminating the need for traditional paperwork.

Enrico: So, it is a drawing-free approach?

Daniel: Well, yes and no. MBD is about much more than just going paperless. Its **key feature is that it is machine-readable,** meaning that the data can be read and processed by other software and machines, enabling automation and less reliance on manual work. The big wins are better accuracy, faster time to market, and lower costs.

Enrico: So all the dimensions, tolerances, material specifications — everything — is embedded as information directly in the 3D model. This model is then used throughout the product lifecycle because its data is interoperable with other programs, right?

Daniel: That is correct. The 3D model is the definitive single source of truth, creating a digital thread in the process, both upstream and downstream.

Enrico: In theory, MBD sounds like the perfect solution for manufacturers to adopt, so why don't all companies do it?

Daniel: Implementing MBD can be challenging, especially for companies used to working with 2D drawings. *The biggest hurdle is the cultural change* — accustoming teams to working with 3D models. There is also a learning curve for the new software and for ensuring that systems are compatible. The company's workflows may also need to be restructured. Overall, there is a significant upfront investment in terms of training, time, growing pains, etc. but the long-term benefits of faster, better, and cheaper production make it worthwhile.

Enrico: Yes, at EnginSoft we usually find that cultural change is one of the biggest hurdles to overcome. Many companies are used to their bespoke methods and do not see the change as adding value.

Daniel: We see the same thing at Capvidia. However, many of us older team members remember life and work before and after the Internet. In many ways, the rise of Internet-enabled e-commerce and its impact on brick-and-mortar stores parallels the digital transformation taking place in manufacturing.

Enrico: Exactly! The Internet changed so much in such a brief time. Everyone has a smartphone now.

Daniel: And every business has either a website or offers e-commerce. And those that did not adopt or adapt found themselves playing catchup to competitors, while others went out of business. Another good example is how Netflix disrupted the movie rental business.

Enrico: So, are you saying that MBD is disruptive?

Daniel: Whether it is MBD today or some future technology tomorrow, the primary goal in manufacturing will always be "better, faster, and cheaper". MBD enables manufacturers to achieve this real value today and will be inevitable in the future as we increasingly move into an AI, automation, and data-driven world.

Enrico: Speaking of value, what are the specific benefits of MBD for designers, quality inspectors, and suppliers?

Daniel: *MBD simplifies real-time collaboration because everyone is working from the same 3D model.* Since engineers, manufacturers, and quality teams are all accessing the same data, miscommunication is reduced. For designers, MBD streamlines the process by embedding everything directly into the 3D model, reducing the potential for errors. Quality teams can use the same model to inspect parts and ensure everything matches the design. Suppliers benefit by using the digital model to program machines, speeding up production and improving accuracy. Overall, it makes the full process more efficient and keeps everyone on the same page.

Enrico: Another related buzzword is model-based enterprise or MBE. How does MBD relate to MBE?

Daniel: MBD is the backbone of an MBE. In an MBE, digital models are used across all functions, from design to production to maintenance. MBD is the technology that keeps the design consistent throughout the product lifecycle, connecting all data and eliminating the need for paper or separate systems.

Enrico: Can you explain the relationship between native and neutral formats with MBD, which is another question we are often asked.

Daniel: Native formats, such as Catia or Creo, are specific to the software used to create the 3D model and are best suited for in-house processing. *Neutral formats, such as STEP AP242, 3D PDF, and QIF*, are more flexible and can be used by different systems, making them ideal for sharing models across teams and suppliers. Native formats are great for internal use, while neutral formats allow for easier collaboration across the supply chain.

Enrico: How does an MBD transformation process begin?

Daniel: The *lowest hanging fruit for an MBD pilot project is the characterization and generation of inspection plans* such as first article inspection (FAI) and production part approval processes (PPAP). These tasks are extremely important and typically very manual and time consuming. In these situations, MBD provides immediate results and implementation can build from there. Of course, it also helps to work with technology partners and service providers such as Capvidia and EnginSoft who can provide not only the software but also the support needed to make the transition to MBD.

Enrico: Thank you, Daniel, for these insights. I hope they prove useful to our readers as they consider their own digital manufacturing futures.

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