

The Role of Modeling and Simulation in the Experience Economy: An Update on Dassault Systèmes' SIMULIA Brand

CIMdata Commentary

Key takeaways:

- *Dassault Systèmes' has made significant progress in refining and implementing their next generation strategy and platform for "realistic simulation"*
- *Performance simulation technology from SIMULIA, CATIA, and the new BIOVIA brand portfolio is a key element and enabler of Dassault Systèmes' 3DEXPERIENCE strategy and platform*
- *The ultimate goal and the challenge for Dassault Systèmes is delivering their robust simulation technology not only to the traditional SIMULIA analysis specialists, but making the results of simulation best practices available to and readily consumable by the broader base of engineers and management within the 12 major industry segments that they serve*

Dassault Systèmes held their annual SIMULIA Community Conference, an international event, from May 19-22 in Providence, Rhode Island. The agenda included keynote briefings from Bernard Charlès, CEO of Dassault Systèmes, as well as the executive team of SIMULIA including Scott Berkey, CEO of Dassault Systèmes Simulia Corporation.

Passionate and engaging as always, Mr. Charlès kicked off the event by updating the audience of over 700 attendees on the company's 3DEXPERIENCE vision and platform strategy. A common concept used throughout his talk and the other SIMULIA keynotes was the "Experience Economy," and the positioning of SIMULIA as the "realistic simulation brand." The goal according to Mr. Charlès is "using the virtual universe to improve the real one." He essentially presented the 3DEXPERIENCE as the Scientific Method, enabling hypotheses of the real world to be explored, simulated, and tested in the virtual world. He emphasized that the 3DEXPERIENCE is a cloud-native, business platform focused on enabling better decision making by all enterprise stakeholders through the judicious use of enterprise knowledge and product information, including performance simulation technology—a key link between the virtual and real worlds. The market trends highlighted as business drivers for 3DEXPERIENCE were:

- Increasing product diversity and satisfying consumers' desires for mass customization
- Companies' needs to collaborate globally in developing new products
- The need to continuously develop and deliver quality products faster
- The rapidly accelerating move to "smart products" and the Internet of Things

Other SIMULIA speakers reinforced these points from the perspective of the role of simulation and analysis in achieving these business objectives. They highlighted the need to integrate simulation more strategically into the enterprise business processes, leveraging the value of simulation to drive from market requirements to functions to the logical and physical design. Capturing and automating multi-physics simulation processes and sharing simulation results across the broader enterprise were highlighted as enablers to achieve these goals, and have led to the development of the initial 3DEXPERIENCE simulation applications:

- ABAQUS Structural Mechanics Simulation
- ABAQUS Dynamics Simulation
- ABAQUS Fluid Mechanics Simulation
- Simulation Physics Results Reporter & 3DPlay Simulation Extension

The Dassault Systèmes presenters also reinforced to the audience, comprised primarily of advanced analysis specialists, that their current SIMULIA tools, which they know and rely upon (e.g., ABAQUS, ABAQUS CAE, Isight and SLM), would definitely not be going away and could still be used in their current forms independent of the new 3DEXPERIENCE Platform. Scott Berkey and his management team all reinforced that SIMULIA would continue to invest heavily in R&D for the new multi-physics and multi-scale simulation features and capabilities needed to deal with systems of increasing complexity and to extend their solutions to add time and spatial scales to analysis fidelity, as well as deal with massive parallel computing (>1000 CPUs). In CIMdata's opinion, this is perhaps the greatest challenge that the Dassault Systèmes team faces. Even though they plan to use the same highly regarded SIMULIA solvers and meshing technology in the 3DEXPERIENCE Platform, they now have another user experience and graphical deployment environment that they must invest in and maintain in addition to their "classical" modeling environments, such as ABAQUS CAE, Isight, FE-Safe, and TOSCA. This requires additional software R&D resources and infrastructure as well as new skill sets to develop web-native and mobile applications in addition to the more traditional engineering desktop applications.

During the event, there was a formal announcement of the completion of the acquisition of Accelrys and the creation of a new Dassault Systèmes brand—BIOVIA. The Accelrys technology brings robust capabilities for modeling and knowledge management of biological and life sciences systems and materials. This opens up a new dimension to modeling and simulation at the atomic and nano level, often referred to by Mr. Charès and the Dassault Systèmes team as "micro-scale." It was stated that the SIMULIA team would be working closely with the BIOVIA team to cross-leverage their respective technologies to extend multi-physics and multi-domain modeling and simulation all the way down to the "micro-scale" for applications in the life sciences and medical devices industries. The impact of this acquisition is that BIOVIA brings chemistry and non-continuum physics capabilities for materials and process modeling into the SIMULIA toolbox of simulation capabilities. In CIMdata's opinion, this will prove to be very significant as simulation extends into human body modeling for applications such as crash safety, predictive life sciences and medical devices, and for materials integrated as part of a customized product design. Adidas, for example, presented a vision where a shoe is made for a particular athlete, and the precise properties of the sole are tailored by the way the polymer materials are processed during manufacture of that particular shoe.

Of particular note in this area is the research work being performed on the Living Heart Project (<http://www.3ds.com/products-services/simulia/solutions/life-sciences/the-living-heart-project/>) by a consortium including leading research universities such as Stanford and MIT, medical device manufacturers such as Medtronic, and the SIMULIA team. The mission of this research project is to develop and validate personalized digital human heart models and establish a unified foundation for cardiovascular in silico medicine (aka "computational medicine"). These models can serve as a core technology base for education and training, medical device design, testing, and regulatory science; thereby creating a path for rapidly translating cutting edge innovations into improved medical diagnostics and patient care. In CIMdata's opinion, extending traditional product performance modeling and simulation tools into the biological and chemical domains at the atomic level is groundbreaking work and holds great promise to benefit humankind. We applaud the efforts of the SIMULIA team in spearheading this forward thinking effort

and look forward to seeing the positive impact of this next generation modeling and simulation activity on patient care.

Several other SIMULIA customers including Pratt & Whitney and MIT presented keynotes highlighting their current use of traditional SIMULIA technologies such as ABAQUS, Isight, and TOSCA as well as their future strategy, requirements, and plans for extending their use of simulation into new product areas with the 3DEXPERIENCE Platform. An underlying theme of the event, expressed by SIMULIA and their customers alike, is to integrate simulation into the business process by delivering a “business experience” platform. Process orchestration (Isight) capabilities and results analytics (data mining) and visualization are built into the base 3DEXPERIENCE Platform, making it much easier for those who are not traditional CAE experts to leverage simulation tools and results. Further, the 3DEXPERIENCE Platform will enable the model-based systems engineering process chain of RFLP (Requirements, Functional, Logical, and Physical models) to more closely link simulation to the definition of the conceptual product architecture.

Overall, this was an excellent event, with a compelling strategic vision for the role of virtual modeling and simulation as a key business enabler for innovation based on the new 3DEXPERIENCE Platform and some concrete progress demonstrated in defining the initial 3DEXPERIENCE applications for simulation users as well as consumers. Next year, we look forward to hearing about how Dassault Systèmes customers have adopted and used the 3DEXPERIENCE Platform-based performance simulation solutions to reach the business objectives and value identified by Dassault Systèmes. Achieving the promised customer benefits of product innovation will help demonstrate the values possible through a focus on the Experience Economy.

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