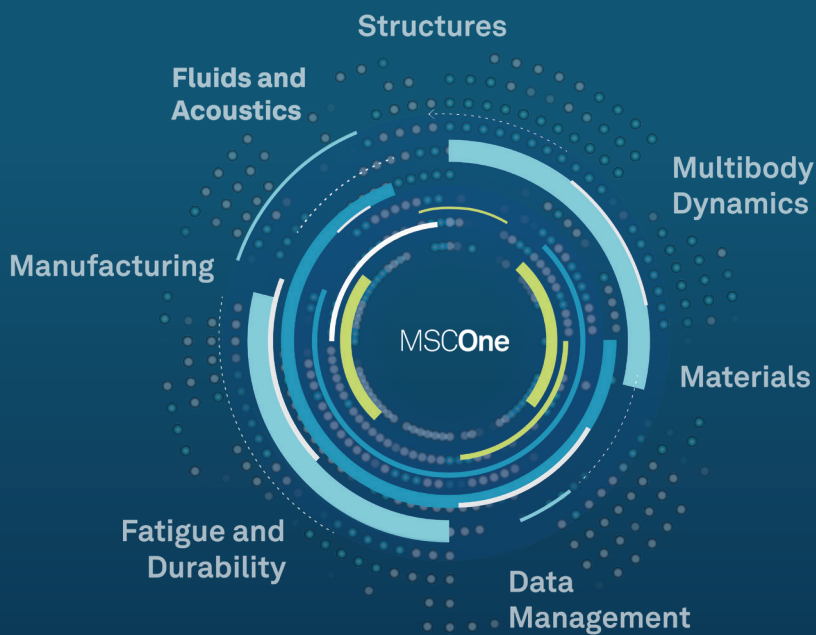


MSC bolsters our technology partner program

By Sam Wade, Technology Partner Program Manager, MSC Software

With Hexagon Manufacturing Intelligence's acquisition of Romax Technology in 2020, we have expanded our Hexagon MSC Technology Partner Programme to expand and accelerate the development of compelling computer-aided engineering (CAE) partnership solutions to the benefit of our users and partners around the world. As a software and technology company, MSC Software's partners include key industry players, software vendors and academic institutions, and its long-standing Technology Partner Program forms a crucial part of its commitment to deliver best-in-class CAE solutions to its customers. We are building an extensive ecosystem that revolves around our core technologies and product offerings coupled with those of our parent company, Hexagon, by establishing lasting relationships with like-minded organisations in order to share knowledge, cultivate development and extend the influence of CAE in markets that benefit from our collaboration. Ultimately, being part of the Hexagon family enables both Romax and MSC Software to further expand the reach and the impact of our solutions and toolchains in the industries we serve. As part of this endeavour, we will continue to develop workflow solutions and product integrations with our technology partners in order to empower our clients to utilise unified tools to solve the most complex problems with collaboration always being at our core. We want to build an extended ecosystem that puts cutting-edge technology in the form of partner solutions at users' fingertips, giving them limitless ways to bring incredible products and innovations to market. These powerful solutions should each offer unique capabilities yet integrate tightly to form a true ecosystem, allowing our customers to build integrated, multi-faceted workflows that are genuinely seamless. We are excited to extend the platform we offer and to begin this new chapter in our history of working with our partners and collaborators so that we can achieve our shared goals together.



MSC Software Technology Partner Programme

The concept of partnerships and alliances is not new; countries and nations of like minds have been forming alliances for thousands of years, often when their values and beliefs align. In the highly competitive engineering simulation & testing markets of the twenty-first century, businesses are facing increasing pressure to stay ahead of the curve whilst delivering high quality and more innovative products and services to their customers at competitive prices. Everyone needs to get products faster to market, lower costs, maintain or improve quality, and achieve higher productivity. This is made even more challenging due to constant technological advancements and innovations allowing new competitors to enter and disrupt markets like never before. The advent of the COVID-19 pandemic in 2020 has only accelerated the digital disruption we have seen in many industries even further as new patterns of working and digital transformations are embarked upon. Consequently, forming partnerships to build a comprehensive ecosystem of solutions is an advantageous strategy to help our customers tackle their biggest problems and thus stay ahead of their competition.

The rush towards electrification generally presents a paradigm shift in the manufacturing industry today. With the need for clean, efficient, high-performance products, it is easy to observe why the eMobility and electric vehicle market is expanding so rapidly. However, a high demand for low-carbon vehicles globally poses fresh challenges for design and analyst engineers in the transportation industries as they require new product design and manufacturing methods to address these demands, all while reducing noise and emissions to meet new environmental and sustainability regulations. Additionally, after generating decades of knowledge and experience of Internal Combustion Engines, interactions that occur within electro-mechanical systems are relatively unknown and present unfamiliar challenges for Automotive engineers. It is not as simple as replacing an IC Engine with an Electric Machine and Automotive engineers are beginning to accept that a once predominantly mechanical device is becoming a complex electro-mechanical system. Hence, the need for collaboration continues to increase, as Electro-Mechanical powertrains are increasingly integrated into transportation meaning that all the physics simulations need to be brought together at a single point without error.

Manufacturers have been adapting to combat these megatrend challenges by delivering products through a virtual and integrated product development process. The overall aim of a virtual product development process is to reduce costs, improve collaboration, increase innovation and instil confidence in designing the product Right First Time as Hexagon strives for. This digital integration of product development from concept to manufacturing will ultimately reduce the need for real-world prototyping, so engineers must have confidence in the Computer Aided Engineering (CAE) tools they use. Furthermore, the unprecedented challenges caused by the global COVID-19 pandemic has only reinforced the necessity for greater collaboration through the use of CAE simulation.

In order to achieve this smarter, more agile virtual product development process, engineers need interoperable tools that can quickly and seamlessly pass the correct data between applications. And 'data is the new oil' that needs to be passed forward from R&D to production and operations and fed back from manufacturing and operations to improve the early design cycle. Industry is changing at pace as we enter Industry 4.0, 5G, the world of Digital Twins and autonomy, and simulation software is leading the way. We cannot be locked away in one department or silo anymore; CAD/CAM/CAE models need to be shared throughout departments, across the organisation and, in the industry 4.0 paradigm, beyond our organisation. Thus, we need the help of ecosystems to extend our capabilities so that users have access to robust workflows and simultaneous use of tools across different physics disciplines or stages of development.

To help designers and analyst engineers overcome these challenges, Hexagon MSC's open partner ecosystem can sit at the heart of your CAE process, empowering teams to collaborate and champion innovation. Our product portfolio and solution suites have strong ties with partners' products, ranging from integrations with major tool suppliers to interfaces with niche application vendors. The ultimate benefactors of these integrations are you, our end users,

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as working within our uniquely dynamic ecosystem provides access to innovative technology all in one place, leading to significant improvements in design and development, crucially reducing your product’s time to market. Collaborating with key industry players not only creates a stronger workflow for you, our users, it also allows us to spend more of our time focusing on the challenges industry is facing. This kind of philosophy spurs collaboration across all fields to deliver new innovations for numerous domains and applications.

Our experience over decades has enabled us to develop an approach to partnering that allows us to be open, collaborative and straightforward with partners who wish to build links with our ecosystem. We greatly appreciate all those partners that match our openness and enthusiasm for providing the market with ever better products and best-in-class toolchains. We look forwards to achieving great things together in the future.

MSCOne^{XT} – extending our CAE ecosystem

MSCOne is Hexagon MSC’s unique cross-product token system. It orchestrates flexible token licensing to provide users access to any CAE software in our suite that you need instantly throughout your product development lifecycle – from materials R&D and engineering to virtual manufacturing and product testing. It covers best-in-class technologies and products for simulating acoustics, fluids, structures, system dynamics, manufacturing, materials and autonomy. It offers leading engineering companies the agility to provide immediate access to CAE simulation tools when and where the software is needed and thus allows organizations to maximize their return on investment, no matter what their CAE budget is. MSCOne customers today can easily access additional simulation tools that their company may not be able to justify with a separate license purchase. For example, a design team that uses MSC Apex could also use Simufact Additive to validate a new part design for Additive manufacturing. This flexibility also allows an organization to allocate resources by distributing tokens across teams and regions, or to use on-premise computing interchangeably with cloud HPC centres. MSC Software has also extended access to its extensive CAE e-learning platform through MSCOne tokens. This enables any MSCOne user to develop new skills and certifications for any discipline, physics, or product group with structured on-demand courses and step-by-step workshops using the tools available through the platform.

Launched in June of this year, MSCOne^{XT} (MSCOne Extended Edition) enhances our MSCOne token offering by including some industry-leading technology partners. MSCOne users are now able to try new products that extend and complement the capabilities of their existing MSC tools using our tokens. Engineering projects will be able to take simulation one step further with access to partner software tools that enhance their workflows, but without the complexity, risk, or cost of managing agreements with multiple CAE suppliers.

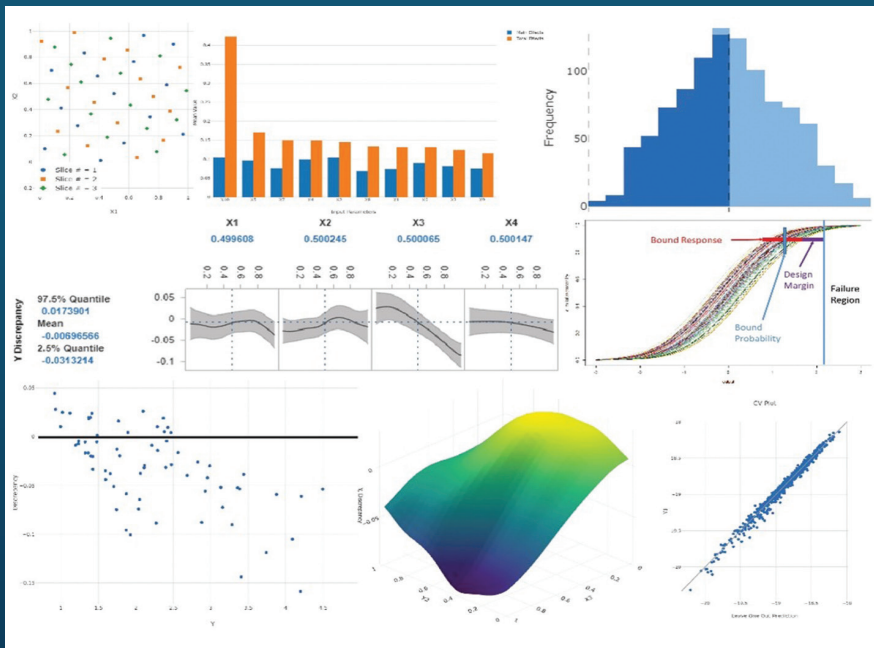
John Janevic, Chief Operating Officer of MSC Software, explains this innovation:

“Companies in every industry are turning to simulation to improve cost, quality, and innovation from R&D through to manufacturing and testing. By extending MSCOne to our technology partners, we are offering our customers a smarter way to access tools that enhance our offering to help them achieve greater innovation and productivity.” He adds that “manufacturers have more reasons now to become agile than ever before and CAE underpins many manufacturing decisions. Through MSCOne, customers can now access our extensive simulation portfolio and e-learning wherever and whenever it is needed, so they can respond to their engineering and commercial priorities and adapt to new working practices.”

MSCOne^{XT} supports the entire CAE ecosystem – from supplier to user – by providing an easy way for engineering and design professionals to try new products, and for partners to gain exposure to a new customer base. MSCOne^{XT} is available to companies of all sizes, budgets, and skillsets so that we can lower barriers to the digitalization of manufacturing and help companies move towards ‘industry 4.0.’ New partners and tools are constantly being added, and prospective partners are invited to join the program.

SmartUQ - predictive analytics software for working in an uncertain world

SmartUQ from Wisconsin, USA, is the first technology partner to join the MSCOne^{XT} Program to help mutual customers solve difficult analytics problems while reducing costs and saving time. SmartUQ (www.smartuq.com) is a powerful predictive analytics and uncertainty quantification (UQ) software tool that incorporates real world variability and probabilistic behaviour into engineering and systems analyses. It was built from the ground up to solve some of the most challenging analytics problems faced by manufacturing companies. In industries like Automotive, Aerospace & Defense, Turbomachinery, Heavy Equipment, Medical Device, Semiconductors, Energy, Oil & Gas, Heating, Ventilation,



and Air Conditioning and Consumer Products, SmartUQ software has saved customers millions of dollars and thousands of hours of work.

“With SmartUQ’s integrations with MSC products, customers now have access to a powerful predictive analytics and uncertainty quantification (UQ) software tool that incorporates real world variability and probabilistic behaviour into engineering and systems analyses,” shares Dr. Peter Chien, CEO and Chief Scientist at SmartUQ. “Model calibration and validation, Digital Twins, and Manufacturing Analytics are just a few of the advanced applications SmartUQ adds to the MSC solution set” he adds.

Smart UQ applications:

- Acceleration of simulation efforts
- Testing and evaluation planning
- Uncertainty analysis
- Optimize decision making under uncertainty
- Real system applications
- Model calibration and validation
- Digital Twins/Thread
- Additive manufacturing
- Root cause analysis

Software features:

- **User-Friendly GUI** - Powerful, yet intuitive, SmartUQ is designed for Engineers and Data Scientists alike. SmartUQ’s clean, straightforward user interface, including software wizards, makes performing complex

analyses easier than ever before.

- **Integration** - Analytics software is only as powerful as it is compatible with other systems. SmartUQ has built-in integrations with MSC Software products like Adams, Digimat, and Nastran. Additionally, with SmartUQ’s application programming interface (API), you can seamlessly integrate SmartUQ tools into your workflow. SmartUQ’s API significantly reduces time spent on performing analyses while still providing the full benefits of its GUI.
- **Automated Predictive Modeling** - With an existing data set or a connected simulation model, SmartUQ runs, builds, and compares predictive models until it meets your accuracy requirements.

SmartUQ benefits:

Save time

- Reduce duration of simulation and testing
- Catch problems early, reducing development time
- Prevent unnecessary design iterations

Decrease costs

- Increased utility of simulations
- Fewer tests & prototypes
- Reduce cost associated with unexpected failures

Improve quality and reduce risk

- Validate that the simulation agrees with reality
- Maximize Product Reliability and Durability
- Meet oversight requirements (FAA, FDA, DoD)

SmartUQ capabilities:

- **Modern Design of Experiment** tools designed to efficiently collect data from simulation, physical testing, or digital twins.
- **Unique Data Sampling** tools for subsampling or dividing large data sets into evenly distributed batches to build large-scale machine learning models.
- **Flexible Predictive Modeling and Machine Learning** tools to cover a wide range of scenarios including high dimensional problems, large sample sizes, spatial data, and functional/transient responses.
- **Statistical Calibration** tools to determine model calibration parameters even with limited simulation and test data and provide model discrepancy to improve simulation and perform model validation.
- **Inverse Analysis** tool to calculate the probability distribution of inputs based on a set of outputs from a system, helping verify hard-to-measure system properties.
- **Sensitivity Analysis** library to rapidly determine which factors have a relatively low or high impact on the outputs, allowing engineers to focus efforts appropriately.
- **Optimization library** handles multiple objectives and accommodates very large numbers of inputs.

To find out more about the MSCOne^{XT} Partner Program or to inquire to join, please visit our partner webpage or contact me via email at: sam.wade@hexagon.com.