

Precise, Fast, and Parallel Simulation

The simulation solutions of IPG Automotive's CarMaker product family enable virtual test driving with high-performance computing clusters

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As the complex technologies required for advanced driver assistance systems and automated driving functions in particular call for extensive validation tests, the test effort in vehicle development has risen significantly. Given that development departments cannot cover all test cases with real test drives, virtual test driving is increasingly coming to the fore. Due to the variety of potential test scenarios, solutions are in demand that run as many test drives as possible in the shortest time achievable with concentrated computing power. The new release 7.0 of the simulation solutions of IPG Automotive's CarMaker product family now enables the parallel simulation on several processors or rather processor cores using high-performance computing (HPC) clusters.

For tests of advanced driver assistance systems, and especially for the release of highly automated driving functions, a vast number of test kilometers is necessary to cover any conceivable traffic situation. In the case of Google's self-driving car project and the relevant test cases, for instance, more than three million miles are simulated every day, which roughly corresponds to 4.8 million kilometers, or circling the equator five times per hour. These complex calculations can only be managed by drawing on the capacity of large data centers. Using HPC, it is possible to run tests even faster thanks to distributed computing on high-performance computers. Vehicle development requires the validation of a multitude of scenarios. Using such high-performance computers to test these brings a massive reduction of computing time and thus major savings in time and costs.

The open integration and test platform CarMaker by IPG Automotive has two qualities that are indispensable for a simulation environment to be suitable for large-scale parallelization and thus for HPC: stability and performance. "This requires a software architecture that accommodates the requirements and the setup of HPC clusters. With the release 7.0, CarMaker enables the parallelization of test catalogs with one scenario per CPU core," Andreas Höfer, Product Manager at IPG Automotive, explained about the new product feature.

For straightforward parallel computing on a workstation with several CPU cores, CarMaker offers the “HPC Light” mode, enabling engineers to simultaneously test new functions in a variety of scenarios with little investment of time. As a result, users can achieve major savings in time even when working on common workstation computers or laptops. For more complex computer architectures and larger numbers of cores, HPC in its original sense is made possible using a scheduler. A cloud-based solution can also be implemented as an alternative to the conventional HPC options. This solution involves running jobs on an external infrastructure, offering high flexibility at a relatively low organizational effort since own hardware is not required.

More information at <https://ipg-automotive.com/products-services/simulation-software/carmaker/>

About IPG Automotive GmbH

As a global leader in virtual test driving technology, IPG Automotive develops innovative simulation solutions for vehicle development. Designed for seamless use, the software and hardware products can be applied throughout the entire development process, from proof-of-concept to validation and release. The company’s virtual prototyping technology facilitates the automotive systems engineering approach, allowing users to develop and test new systems in a virtual whole vehicle.

IPG Automotive is an expert in the field of virtual development methods for the application areas of ADAS & Automated Driving, Powertrain, and Vehicle Dynamics, committed to providing support to master the growing complexity in these domains. Together with its international clients and partners, the company is pioneering simulation technology that is increasing the efficiency of development processes.

By taking real test driving into the virtual world as a complement to on-road testing, IPG Automotive contributes significantly to technical progress and shares in shaping the mobility of tomorrow with regard to comfort, safety, economic efficiency and environmental friendliness.

In addition to the company headquarters in Karlsruhe, Germany, IPG Automotive provides innovative development services to its clients and partners at the national offices in Braunschweig and Munich as well as in France, China, Korea, Japan and the USA.

Further information at www.ipg-automotive.com

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Image: Using CarMaker on high-performance computing (HPC) clusters, users benefit from an increase in computing power while simultaneously running a very high number of tests.



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