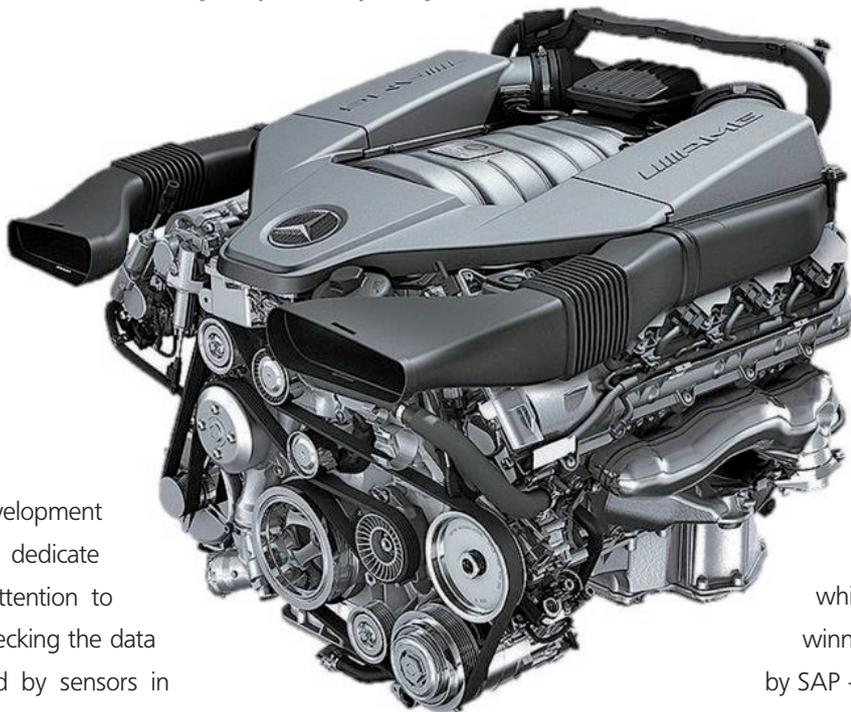


In Time with the Engine

SAP's new data base technology SAP HANA: The key to real-time analysis of automobile engines during testing and beyond. And the goal is clear – to continuously improve quality.



In the vehicle development process, engineers dedicate a great deal of attention to the engines. By checking the data which is measured by sensors in very narrow intervals they can observe the interactions of the up to 100 main components and can assess how changes influence the individual parameters. Until today they could only receive a limited cutout of the data. This applies, not only to measurements at the test-bench, but more importantly at the test-tracks and during the test of endurance in long-term test vehicles. This is a result of the fact that the current technology, which is used for these measurements, is only partially able to collect the amount of data needed for processing in real-time. The modern engine test beds and test vehicles produce data streams of 10-Hertz frequencies. Together with the increasing amount of sensor points connected to the engine a data volume of a gigabyte range can easily be reached during one day. Thus, the results of the (partial) analysis are at times quite inaccurate. This in turn can cause a negative impact on the quality of the engine and in the worst case lead to a product recall. Mieschke Hofmann und Partner (MHP), in collaboration with a premium automobile manufacturer, are working together on this

drawback within the scope of a development project which they began in hopes of winning a competition organized by SAP – the SAP HANA partner race.

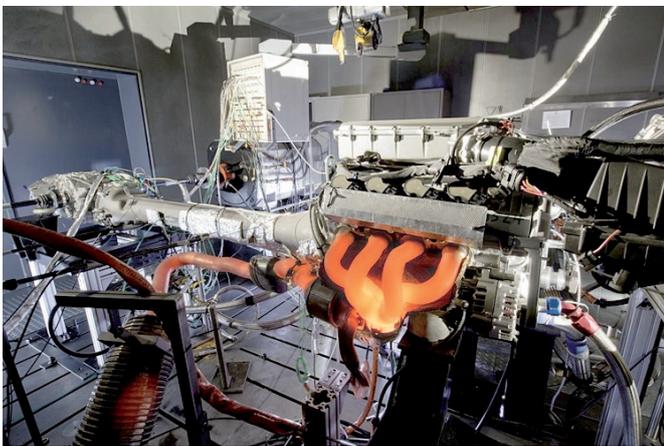
All motor data which are captured through the sensors should be read out and analyzed, by using the real-time platform SAP HANA, an “in-memory” database. The goal is to improve the quality of the engines through built-in preventive maintenance, and ultimately fully avoid product recalls in the future. Another advantage of real-time monitoring is that faulty test runs during the engine’s quality assurance can be recognized and terminated within minutes, thus eliminating the necessity to wait until the entire 50 minute test cycle has elapsed, only to find that an error has occurred. Therefore real-time monitoring also means a real improvement in productivity.

Furthermore, the captured data can be compiled and stored to serve as a knowledge base which can be applied to simulations for future engine-development. The engineers now have the opportunity to refer to an extensive breadth and depth of data – the whole range of data produced during all test trails and not just extracts of it.

From Competition to Business Case

For the last 2 years HANA has been an important on-going area of interest as a technology with immense potential. However, only a few impressive cases of application are known so far. This was likely a driving force behind SAP's decision to initiate this competition, in which 27 official SAP partners are participating – MHP is one of them. The task for the SAP HANA Race was to submit a business case with a practical orientation including a market implementation concept by the end of February, 2013. The winner would then be selected by a jury and present their business case at the SAP showcase at the CeBIT trade show.

The real-time analysis of the motor data, which has been realized by the premium automobile manufacturer and MHP, sets a new benchmark in the requirements for the provision of data and analysis processes. It is important that a delivery of precise results can occur even at high speed – which makes it an ideal race topic. With this competition SAP has not only targeted the classic HANA business cases, but has also taken an important step toward the discovery of new business cases beyond the ERP-applications like e. g. these developments of primary processes for the automobile industry. When taking all this into account it's almost a minor detail that the information obtained will be retrospectively integrated as a quality control certificate into the process of SAP R/3.



Current Status

Presently, the HANA-support within the phase 1 has been completed – i. e. the quality assurance tests on the engine test-bench. The sensors used for the test-bench transmit the data in ASAM/ODS standard to a HANA-system, which is equipped with specially programmed analysis software. Whereby the underlying automated envelope calculation accesses the HANA integrated predictive-analysis, a collection of components that efficiently apply statistical methods.

In the second phase the MHP HANA Race Team is working to increase the amount of test vehicle engine data captured via a telemetry connection to the HANA system. There the data will be compared with the test-bench data and, in the next step, will send back the resulting test instructions to the vehicle via mobile connection. With this procedure, two completely separated data surroundings will be connected with each other on the real-time platform – this way new processes, with significant advantages for development and quality assurance, can be established. The

possibilities for the establishment of long term quality assurance processes broaden significantly when imagining the application to vehicles that are taking to the streets every day!

A Glance into the Future

The HANA-supported engine development is planned to be a standard at the partnering automobile manufacturer once the development project is finished. This case of application makes it clear that HANA is more about a radical process orientation than about the technology itself. To achieve real competitiveness it is essential to think about the development of new processes, the acceleration of existing processes, as well as the achievement of a combination of both approaches. Areas such as crash tests, wind tunnel testing, or virtual engineering are also dealing with large data volumes. These are also potential fields of application for the innovative HANA solution. MHP's "Design Thinking" approach makes it possible to identify such cases of application quickly and methodically. This requires profound process competency on the side of the service provider and underscores, once again, MHP's position as a process supplier for the worldwide automobile industry.



Dr. Hagen Radowski is a partner at Mieschke Hofmann und Partner (MHP) and responsible for SAP HANA as well as for real-time processes in the automobile industry.

He was invited as a speaker at the automotiveIT congress, on 7 March as at the CeBIT, the world's largest technology fair, in Hanover, Germany with the main topic "technologies are changing the auto industry".



MHP zum zweiten Mal in Folge als „Best of Consulting“ (Project Excellence IT-Management) von der WirtschaftsWoche ausgezeichnet.

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