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The Future Lies in the Cloud

Automotive software development requires the combined efforts of ever-increasing numbers of globally distributed teams from numerous companies. Each team has its own particular focus: some work on embedded systems, others on software for autonomous driving or infotainment. And each of these domains has its own preferences with regard to the methods and tools it uses. In essence, then, automotive software development is based on heterogeneous structures with custom tool chains, which lead to inefficiencies. One challenge is that some of these decentralized teams do not work with the latest software version or are unable to quickly access testing and validation results. In siloed, segregated spheres, errors resulting from that go undetected longer than necessary, which can set back the development process for everyone involved. Increasingly complex technologies and agile ways of working lead to exponential increases in the testing workload, which current organizational structures are no longer able to cope with.

What's needed is a solution that facilitates efficient collaboration where all developers of a project integrate into the same software state, wherever they may be located when they switch on their computer. At the same time, the ongoing development of individual software tools in a tool chain, including security updates is centralized. The working environment would be based on real user data and user preferences in order to achieve optimal usability and efficiency. Developers would continue to use their preferred tools and methods but, at the same time, they would have access to a highly efficient, virtual test environment that would put each use case through hundreds of thousands of simulated test kilometers overnight while also covering boundary situations. Parallelized and automated tests would radically increase simulation speed, thereby quickly pinpointing errors.

This is no longer just a distant vision. We are currently working on solutions that will enable the operation of centrally maintained tool chains and virtualized high-performance test environments on public or protected cloud platforms at the highest security level. This will provide a new basis for collaboration. In the future, specialist teams will program, test, and validate specific software in the cloud. Collaboration will also be the watchword in future development environments. Payment for working environments will no longer be made through licenses, but on a per-use basis. This will put tool manufacturers under increasing pressure to innovate, since only the most intuitive and roundly compelling tool chains will be used. Yet the ability the cloud offers to gather extensive user feedback will also produce entirely new approaches to iterative optimization. This will contribute further to the boost in efficiency we so urgently need to tackle the rapidly growing workload of developing and securing automotive software.