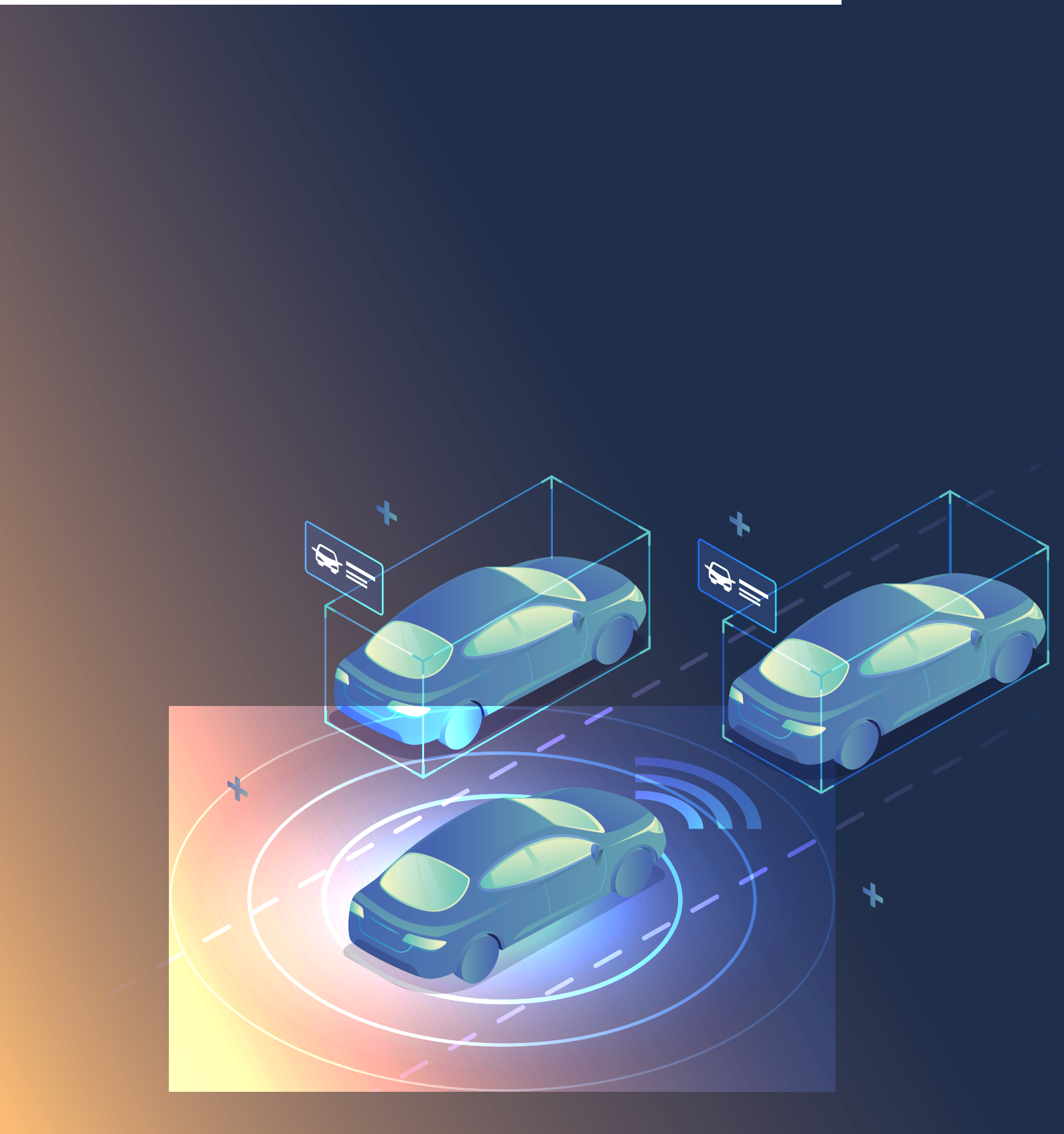
Grape Up, Inc. 2021

Software-Defined Vehicle

4 core pillars that drive the automotive industry to change



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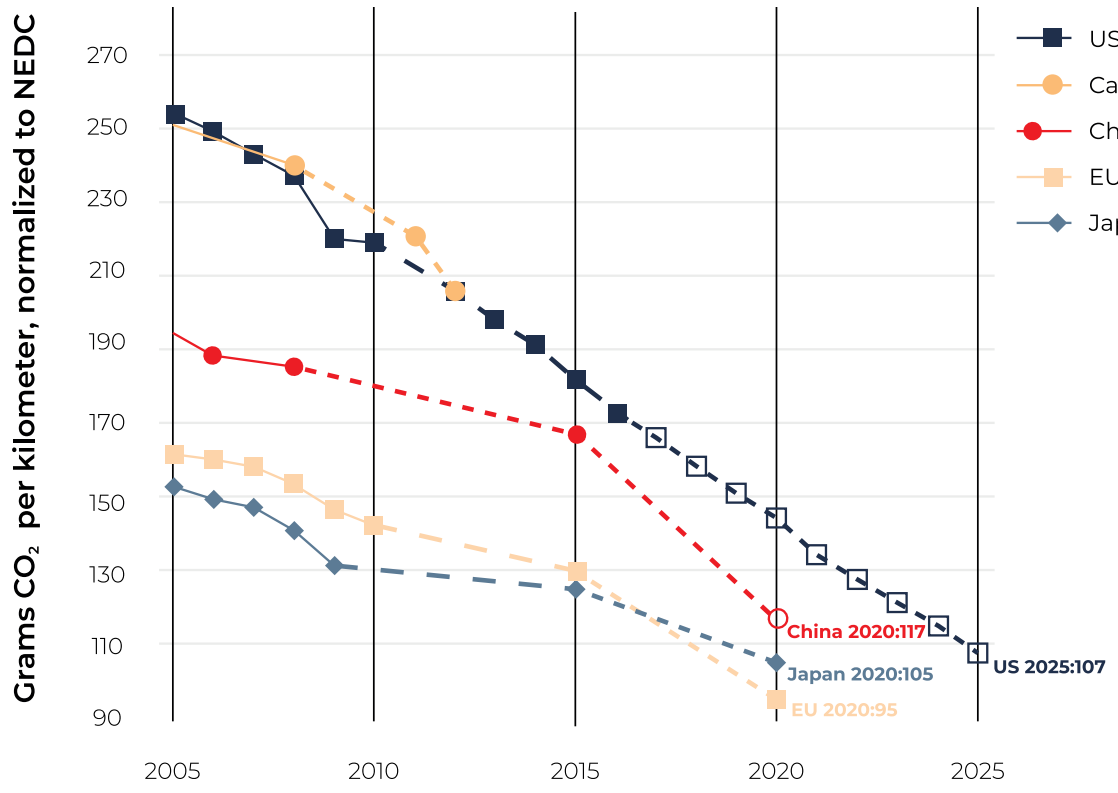
Preface

Modern challenges, modern solutions

Perhaps the most famous car of all time is the Ford Model T. In order to keep costs low, Ford focused efforts on improving production methods. His moving assembly line began operation in 1914, making it possible to lower the cost of the Model T and, as a result, increase sales and the number of potential customers. It's fair to say that from that moment, a race between car manufacturers has begun.

For years automotive industry put its whole effort into inventing new features that will change the way we drive cars but also how we differentiate brands from each other. Car performance and comfort seemed to be the key. Bigger engines, bigger interiors, better materials – luxury and performance, were top priorities for most of the brands. American big-block V8s, German V12s, and luxury interiors made of wood and leather were consuming enormous amounts of fuel and resources.

Many years after the first Model T went off the production line, humankind changes its focus – global warming, predicted fossil fuels shortage, and movements towards ecology forced a shift in the automotive industry. Smartphones, internet popularization as well as the rise of the shared economy movement played their part as well.



Source: ICCT

Electric engines and fuel cells were introduced in parallel with more efficient than ever combustion engines. This, along with mild-hybrid and KERS, helped greatly with reducing CO2 emissions.

The emergence of new disruptive technologies also affected OEMs. Today, modern vehicles should contain big touchscreens, digital instrument clusters, and constant internet connections. Customers demand access to a better navigation system, music streaming services, mobile key, and remote operations of the vehicle – retaining a similar experience as they have with their smartphones.

The other highly demanded technology is autonomous driving. Self-driving cars or trucks are a step-up over simple driver-assistance systems like line keeping or adaptive cruise control – combining them with more precise sensors to allow "hands-off driving." The most prominent and well-known example of this kind of technology is Tesla Autopilot. Again, this system can only exist because of sophisticated software, machine learning, and deep learning.

This new customer demand forced the Automotive Industry to change the way they think about the way their cars are produced, how they are driven, and most importantly how are they "used".

In order to be able to comply with customer demand, OEM's have turned their sight into a new way of building their vehicles. This approach, where the importance of the in-vehicle software is higher than its performance resulted in a **software-defined vehicle.**

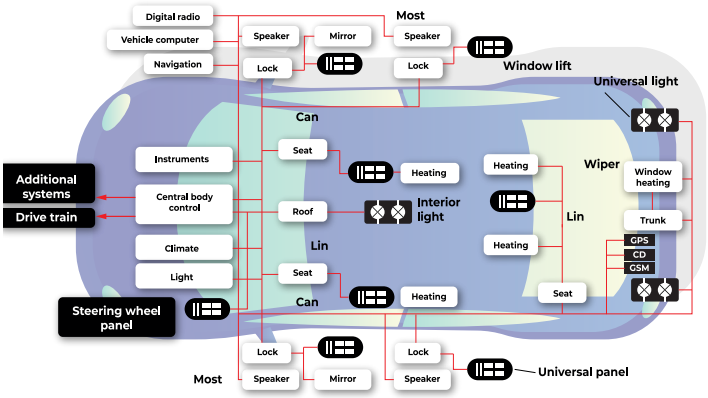
What is the Software-Defined Vehicle?

It is a natural evolution of the vehicle caused by digitalization and evolution of the computer hardware. New SoC's (System on a Chip, integrated board containing CPU, memory, and peripherals) are multipurpose and powerful enough to handle not just a single task but multiple.

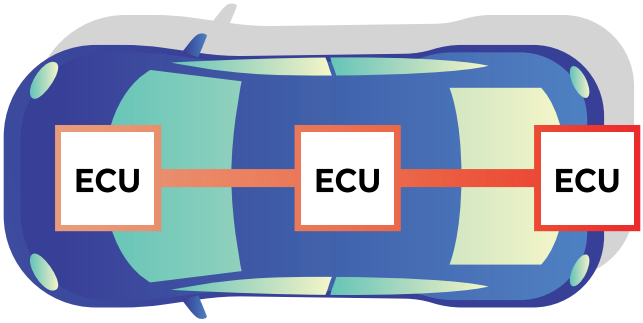
Because of that, there is no need to have a "control unit per vehicle component." Computation happens in few centralized units, which handle multiple domains and sets of sensors. Transformation to a software-centric approach improves development agility and further enables the reusing of a common platform while still being able to deliver to market different types of vehicles – matching exactly customer needs.

From marketing, sales and offer management perspectives, SDV is the key to fully adapt to the needs of the constantly changing market. And of course, one of the core steps for electrification, connectivity, and automotive industry digital transformation.

Conventional Architecture



Software Centric Approach



Download the entire ebook and dive into the Software-Defined Vehicle

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