Apptunix

A Comprehensive Guide

ELECTRIC VEHICLE SOFTWARE DEVELOPMENT

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01

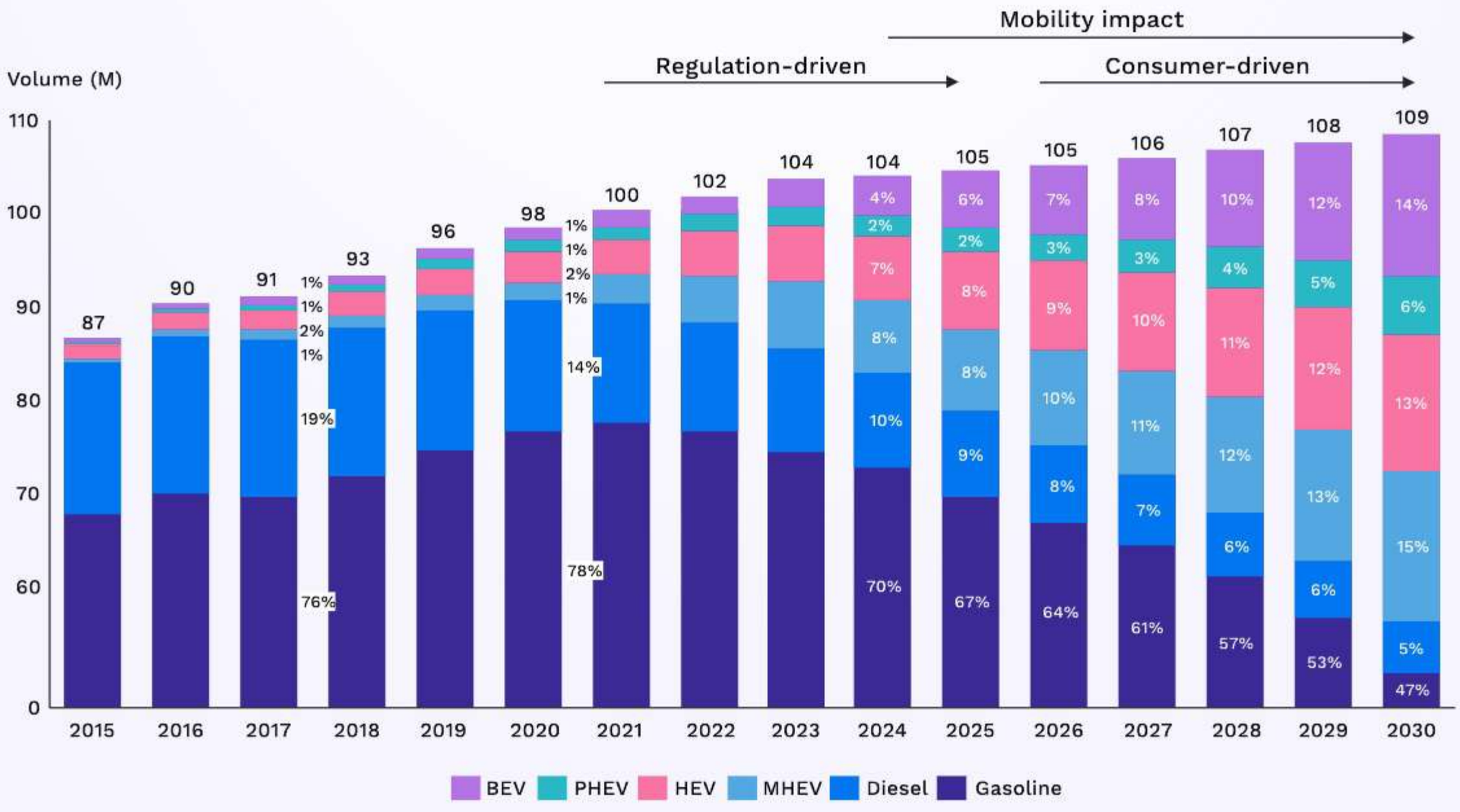
INTRODUCTION

If we go back a decade or two, futuristic renditions of automobiles looked like vehicles running on water instead of fuel. Although it is also possible, if we take the current scenario into account we have managed to run vehicles on electricity. A big thanks to Tesla which has taken motivation from the early 90s worked in this direction and introduced fully functional luxury Electric Vehicles in the market with huge success.

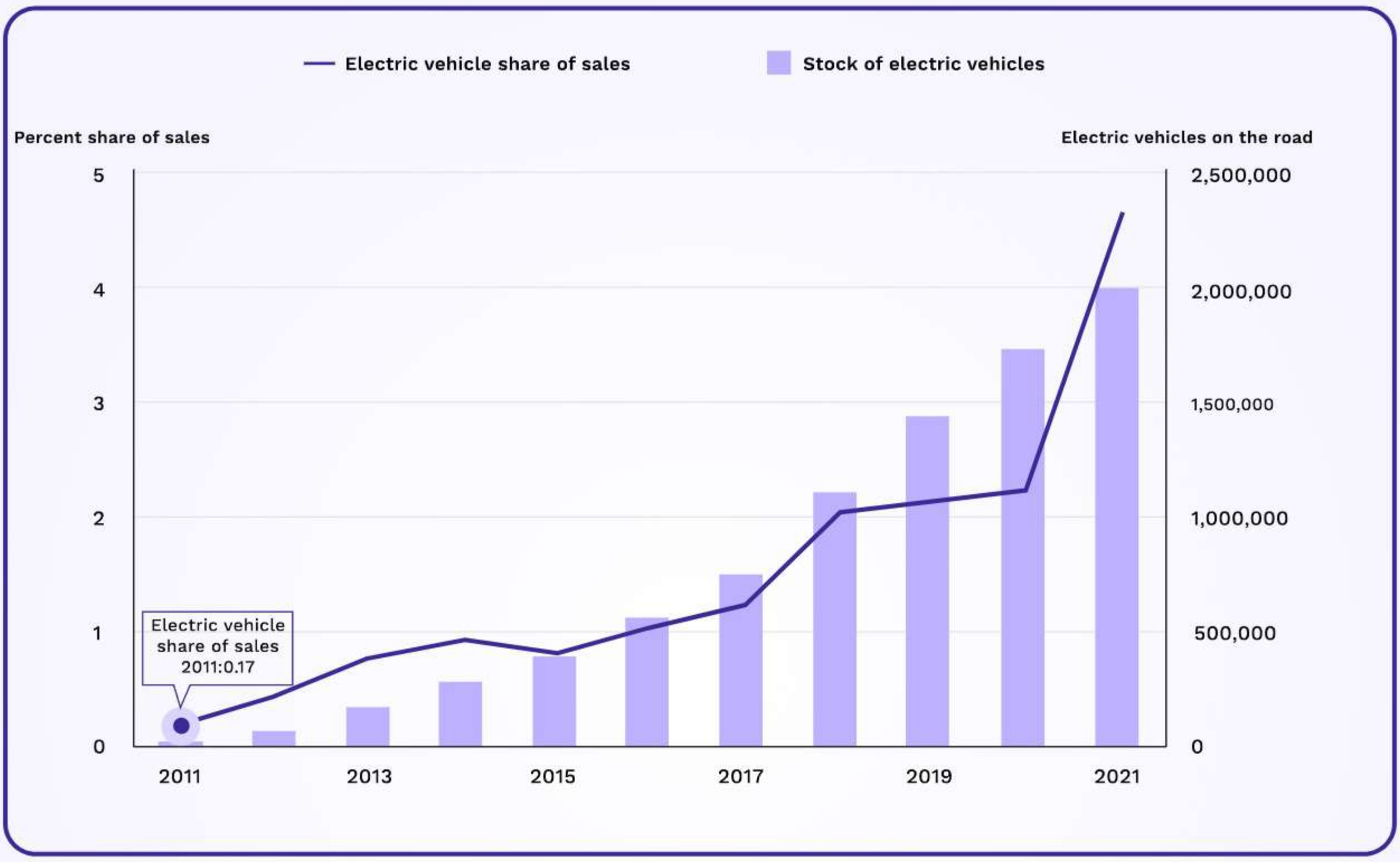
As a result, automobile manufacturers from around the world are fueled to take this mission to the next level. Whether we talk about Jaguar, Nissan, BMW, or other bigger automotive giants, all are ready to set the EV market on fire.

This can easily be evident from a survey conducted by Boston Consulting Group, which states that by 2030, about 14% of Battery Electric Vehicles (BEVs) will be on the road with plug-in hybrids (PHEVs) making up 6% and gasoline vehicles up to 47%.

BCG market forecast to 2030 (global view)



Another survey reveals that the number of EVs has significantly risen from about 22,000 to more than 2 million over the 2011–21 decade.



But the question is what is the key factor that is driving this EV adoption?

Well, when it comes to factors there are many but software has played a crucial role as compared to the hardware. A reason why EV software is in huge demand. If we consider the case of EV charging software alone, it is expected to grow to $25 billion by 2030. What a rise from $1 billion in 2021, Isn’t it?

So what does it mean?

Well, it means if you are looking forward to making an entry into the EV software market, you are on the right path. But being on the right path is not enough as you are not alone. Many investors are keeping an eagle eye on the same. As a result, you are required to stand apart from the growing cut-throat market competition.

To help you out on the same, this guide will present you with all you need to know about electric vehicle software development.

So let's begin the journey without any delay.

UNDERSTANDING ELECTRIC VEHICLE SOFTWARE

Before diving into depth let’s understand what EV software is all about and what purpose it serves. EV is a huge space where a generic comprehensive software package is delivering a multitude of services and feature-specific software packages with a focus on specific functionalities. For example, if we take the case of Tesla, the Tesla autopilot offers complete self-driving capabilities.

In simple words, EV software is essential for the proper functioning of the EV vehicle. Let’s go through some of its major types

TYPES OF EV SOFTWARE

Well, there is a variety of EV software available in the market that are either written for specific EV manufacturers or are used to manage EVs. If we take a basic overview, EV charging & Parking, Battery Health Monitoring, Navigation, Rental, Fleet Management, Virtual Test Drive, etc. fall into this category.

But generally, there are 4 types of software that are used to control and manage EV vehicles worldwide. Let's go through them all.

01. CAR DESIGN SOFTWARE

This software is particularly used to manage the performance of EVs. Its key responsibilities are to manage and control batteries, electric motors, lights, brakes, entertainment systems, heated seats, and various other key systems.

02. MONITORING SOFTWARE

Needless to say, there can be a lot of issues while driving the vehicle, hence there is a need for a certain system that can continuously monitor the vehicle for even minor issues. This job is done by the monitoring software.

Apart from monitoring a vehicle, this software also informs about a need to check or replace a particular part. In addition to this, if there is a requirement for a software update the driver will be informed about the same.

03. NAVIGATION SOFTWARE

Refueling issues are common, especially during long journeys. You have to locate a nearby gas station in advance to refuel your vehicle. Well, this software identifies & calculates the journey routes, apart from locating charging points depending on the current battery status.

As EVs require large charging hours compared to instant refueling in vehicles operated with gas, this software can eliminate charging anxiety by providing the necessary information.

04. MAINTENANCE SOFTWARE

EVs demand maintenance checks on a regular basis. Maintenance software keeps the driver updated regarding any requirement for repair or servicing. It keeps tracking the vehicle's batteries and management system for the smooth and safe functioning of an EV.

SMART FEATURES IN PRESENT -DAY EVs

When it comes to features, there is no specific list. Features may vary from brand to brand as per the specific business or user's need. But if we consider end-user requirements here is a list of features you can go with.

01. ON-BOARD NAVIGATION

Onboard navigation is crucial as it not only offers turn-by-turn instructions but also provides notifications (call alerts, warnings, etc) thus enabling drivers to follow safe driving practices and not get distracted by smartphones.

02. RANGE & CHARGING PREDICTIONS

This feature enables drivers to get an estimated range that can be covered effectively with the remaining charge in the battery. All a user needs to do is to put in the destination address to find out whether the battery is charged enough to cover the distance without a need to charge in between. Apart from this, this feature also provides nearby charging facilities in case a need for the same arises at any point.

03. PRE-EMPTIVE REMOTE DIAGNOSTICS

Data on the vehicle's health is important as it enables predictive maintenance and troubleshooting. Whether it's heat, vibration, sound, or some other parameters, data on all these are collected in order to offer a safe and hassle-free driving experience.

04. OVER THE AIR (OTA) UPDATES

Whether it's the automatic installation of the latest available version or firmware updates through cloud connectivity, it is essential to go with this feature in order to reap the maximum benefits of the EV software.

05. ANTI-THEFT FEATURES

Geo-fencing, Geo-location, vehicle locking/unlocking, and so on are some of the significant features that make EV software a necessity. Where geofencing allows a user to create a virtual boundary to limit vehicle movement within a defined area, geo-location helps to locate a vehicle. This becomes handy when a user has to spot a vehicle from a large or fully occupied parking lot.

06. SOS BUTTON

This is an emergency feature that sends a notification to authorities as well as to emergency contacts in case of battery discharge, tire bursting, accident, or some other unfortunate event with the exact location of the EV.

OTHER FEATURES

There are also some other features like user profile management, access ride history, max speed limit, automatic roadside assistance, and so on that can be added to offer a rich user experience.

Want to know more about advanced features that you can add to your **EV software?**

We are available 24*7.

Schedule a free consultation

KEY CHALLENGES IN DEVELOPING EV SOFTWARE

Well, when it comes to EV software development, there are a lot of factors that are required to be considered in order to offer the best possible solutions. Some of the top challenges are

01. SYSTEM ARCHITECTURE

EV software development is a challenging task because of its intricate integration requirements and complexities. As a result, developers have to face architectural difficulties. Hence to ensure the safety & reliability of architecture, Automotive Safety Integrity Level (ASIL) accreditation is taken into consideration.

Moreover, if we go with the current trend, the combined structure for electric vehicle functionalities is in use on a large scale. This involves integration into a single electronic control unit (ECU). It not only helps reduce complexity but weight and cost too.

02. DRIVER'S SAFETY

Needless to say, the safety of the driver is a major concern as it can not only put the life of the driver at risk but also of other attendants in the vehicles as well as people on the road. So, the power inverters must be capable enough to meet high functional safety standards.

In addition to this, the battery management system (BMS) must be capable enough to ensure the proper functioning of the EV's battery.

03. OVERCOMING CYBERSECURITY ATTACKS

When it comes to EVs, the role of the internet is crucial in its proper functioning. But with the ease of access to the internet, the risk associated with cybersecurity as well as online threats becomes a challenge. Needless to say, EVs are highly susceptible to DDoS and malware attacks as they require access to Wi-Fi and USBs for various purposes.

Apart from this, EVs can become easy prey for hackers that can use the online activity performed by the driver to damage the battery pack. This can put the grid network at high risk.

04. PROTOCOLS

As EV technology is growing at a random pace, so do the sets of protocols for charging station connectivity. The problem is, these protocols vary across multiple EVs specifically based on the station's physical location and the manufacturer itself.

So it becomes necessary for the ECUs to use a network stack that guarantees interoperability across all EV components in order to ensure that drivers can keep moving without any issues.

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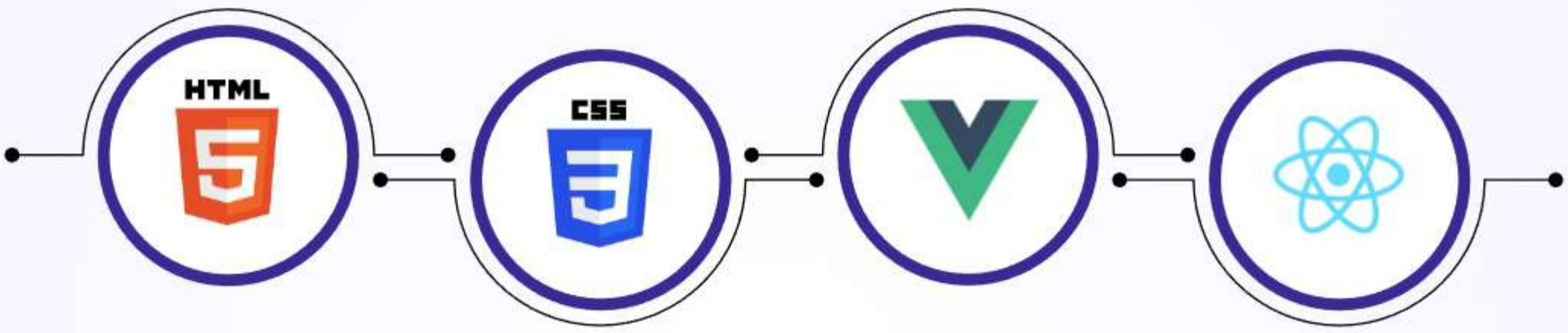
EV SOFTWARE DEVELOPMENT - TOOLS & TECHNOLOGIES

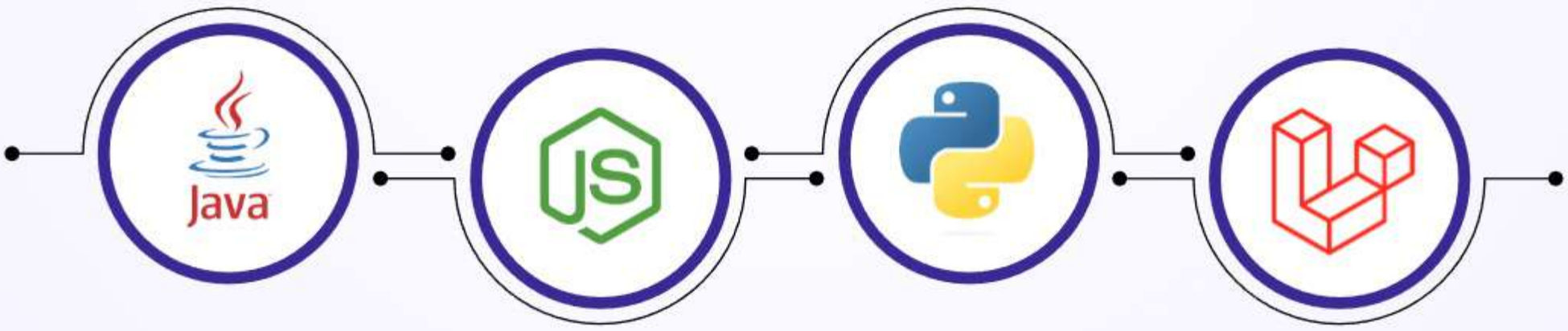
After going through major challenges, you might be wondering what is the right tech stack that can eliminate most of these challenges. Well, here is a list of the advanced tools and technologies that Apptunix uses to offer safe, robust, and scalable EV software solutions.

FRONT-END



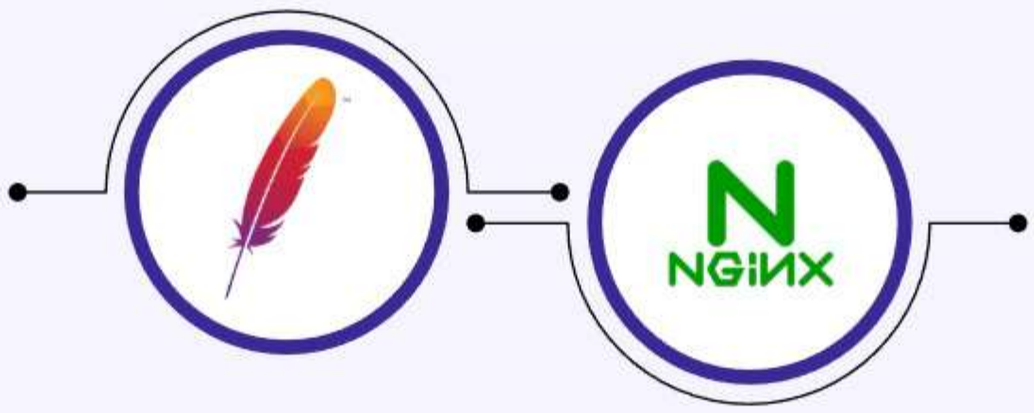
HTML CSS Vue.js React.js

BACK-END



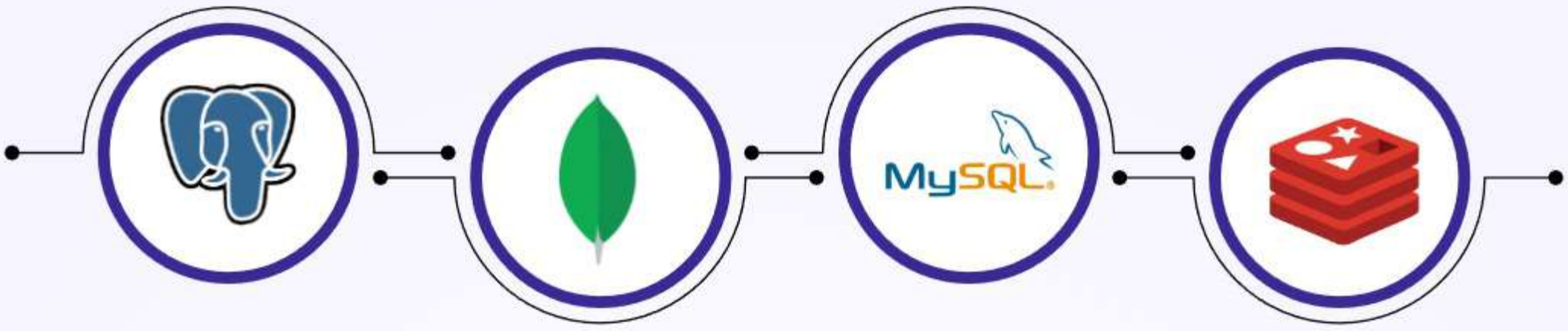
Java Node.js Python Laravel

SERVERS



Apache NGINX

DATABASE



PostgreSQL MongoDB MySQL Redis

APIs

Google Maps | Core Location | Google Places

PUSH NOTIFICATIONS

Push | Twilio | Firebase

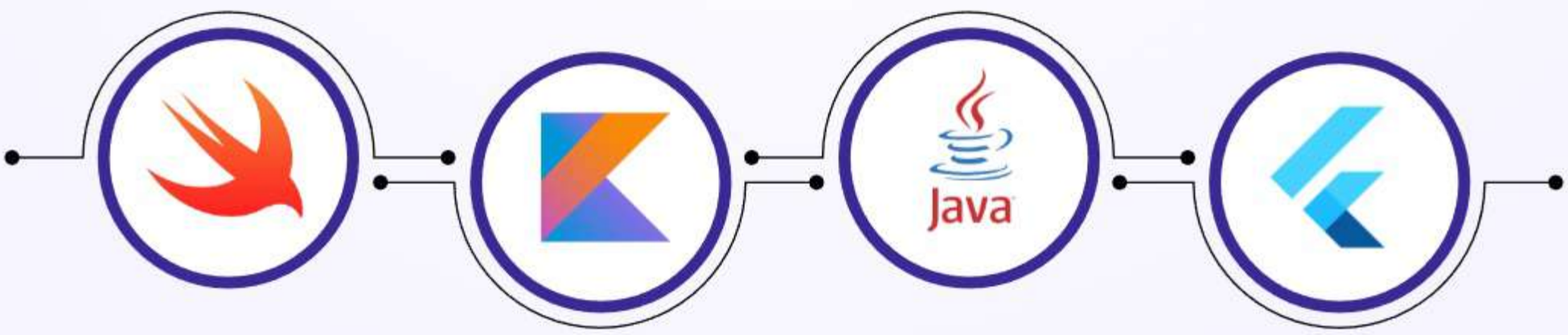
CLOUD SERVICES

Google Cloud AWS Azure

ANALYTICS TOOLS

Hadoop Apache Flink Big Data

MOBILE PLATFORM



Swift Kotlin Java Flutter

HOW MUCH DOES IT COST TO DEVELOP EV SOFTWARE?

So you have gone through the whole guide, the next question that might be striking your mind will be regarding the estimated cost and time to develop EV software.

Well, when it comes to the cost, it depends on specific business requirements, the company you hire, the features you want to add, protocols, and various other factors. If we consider a general scenario, the cost and time for the EV software based on the complexity level will be as follows.

Simple	$40,000 to $60,000	3-6 months
Medium Complexity	$60,000 to $120,000	6-9 months
Advanced	$120,000 to $300,000	9-18 months

Want to know the estimated cost and time for your **EV software development**?

We are just one call away.

Schedule a free consultation

GIVE WINGS TO YOUR EV SOFTWARE DEVELOPMENT VENTURE WITH APPTUNIX

With the exponential growth of the EV market and countries like the UK that are planning to become Net-Zero by 2050, while imposing a ban on both the sale and production of gasoline vehicles by 2030, the demand for EV software is going to rise unprecedentedly.

But with a growth in demand for EVs, the competition is also going to rise at an alarming rate. Electric Vehicle drivers will be looking for a more rich & smooth experience. Whether it's passenger safety, wireless charging, remote diagnostics & maintenance, and so on, your app will be in dire need of such features that can target these objectives.

As a result, you have to find the right EV software development company that carries enough hands-on experience with the latest technology and tools along with a team of experts to utilize them wisely in favor of your app. And when it comes to such a company, what can be a better option other than Apptunix?

Contact Us

Pair Your Business With a Fully-Functional and Robust Mobile App. Explore Our Services!

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