



Top 5 EV Charging Application Development Challenges

How to succeed in powering the next generation of EV-vehicles.

So You're Thinking Of Developing An **EV-Charging** Solution?

The electric vehicle (EV) market's boom has turned EV charging applications into a lucrative frontier. It's the new gold rush and we get it.

EVs comprise around 6% of new U.S. vehicle registrations and the market is expected to hit \$2 billion by 2031. However, the development process is far from straightforward, presenting complexities beyond the surface - so before you dive head first, we're summarizing the top five challenges we see for launching a connected, reliable, charging solution.

Key Stats

600,000

Slow chargers installed globally in 2022

330,000

Fast chargers installed globally in 2022

10

Vehicles per public charger globally

What to expect

In this guide, we'll cover 5 key areas including:

- The significance of user experience (UX),**
- The critical role of platforming,**
- Cybersecurity concerns,**
- Connectivity and OTA needs,**
- Scalability and more.**

The infographic is divided into two main sections. The left section, 'Platforming: Don't Reinvent The Wheel', discusses the importance of platforming for EV charging solutions, mentioning that it can save time and money by leveraging existing infrastructure. It includes a 'TOP TIP' to look for ISO 21434 and ISO 21448 as international standard reporting protocols for safety and functional safety. The right section, 'Cybersecurity Must Have', highlights the need for robust security measures. It features three statistics: 37% of users already installed data brokers, 40% of all data is shared with third parties, and an upward arrow indicating that 40% of users already targeted by phishing attempts. Below these statistics, there are several key takeaways: 'Secure Authentication' (multi-factor authentication), 'Secure Authorization' (role-based access control), 'Secure Data' (encryption and secure storage), and 'Secure Detection' (intrusion detection systems). The infographic also includes a diagram of a 'Secure Platform Services' architecture.

We'll also be talking about industry standards, development methodology to ensure success and more. So plug in, make sure your device has enough charge, and get ready to drive your way to EV charging solution success.

User Experience - More Than Just a Pretty Face

It's not a surprise that users expect an interface that simplifies the charging process. When you look at the demographics of EV charging users, they range from pensioners to first-time car buyers, so a sleek, simple and intuitive design that is universally adopted is paramount.

The layout, buttons, and reactivity all contribute to your charger UX, but if you take a wider step back into your soon-to-be ecosystem, it will take more than developing a good-looking GUI, you need a web-based application that services a whole world of needs.

Two key problems we see emerging time and time again:

1.

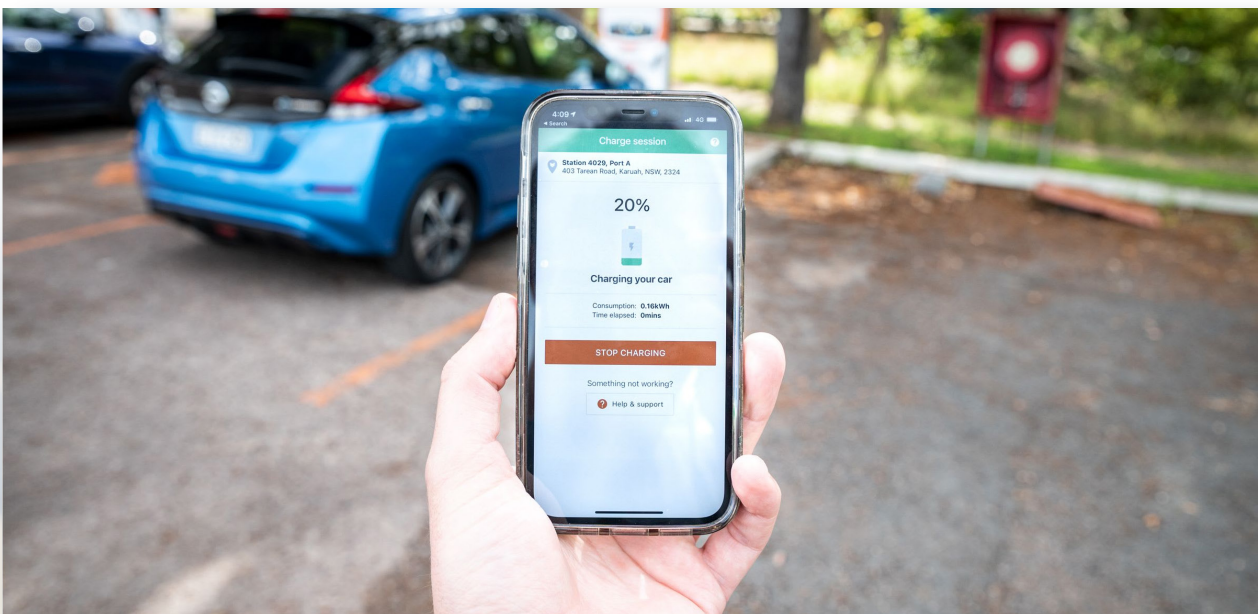
Mapping functionalities

Yes, you need a web or mobile application that enables the public to find the charges and these often lack essential features, such as accurate distance measurement, absence of charging speed indicators, and inadequate integration with platforms like Google Maps.

2.

Insufficient information provided to users

So someone follows your map and gets to a charger, only to find it's in use. Information on the availability of chargers, compatible plug types available, associated costs and payment options, can all lead to user frustration and hinder the charging process.



So How Can You Prepare For This?

Think of the development of your UX as a journey, not a marathon, and like any good journey, you first need an itinerary.

Gather your team and relevant experts (or hire consultants like Witekio to help with this workshopping part) and list everything you want your charger to have. Then list everything that can go wrong with it.

For instance:



Payments: To enable payments you will need internet connectivity. You must also ensure security between your device and encrypted payment gateways.



Pre-booking services: Developing a software application that allows users to schedule and manage reservations, integrating it with the device's control system for access management based on the reservation schedule.



Maps syncs: Ensure accurate listing of your EV charger on maps by submitting correct location data, including precise geographical coordinates and relevant details to mapping services, and regularly update this information through API integration.



Functionality reporting: Along with listing charging options, enabling real-time status information, implementing effective error reporting mechanisms, and integrating with the charger's monitoring system for seamless data synchronization will avoid UX frustrations.

Platforming: Don't Reinvent The Wheel

Prioritizing efficiency and adaptability is crucial for OEMs seeking a competitive edge in this EV charging race. Embracing a platforming approach is not just a choice but a strategic imperative from day one.

What does platforming mean for you? Basically, do it once, do it right, then multiply across various different types of charging stations without needing to remake everything. If you plan to create low-power, fast power and other charging solutions, platforming will get all of your devices to market quicker and with a more uniform look and feel.

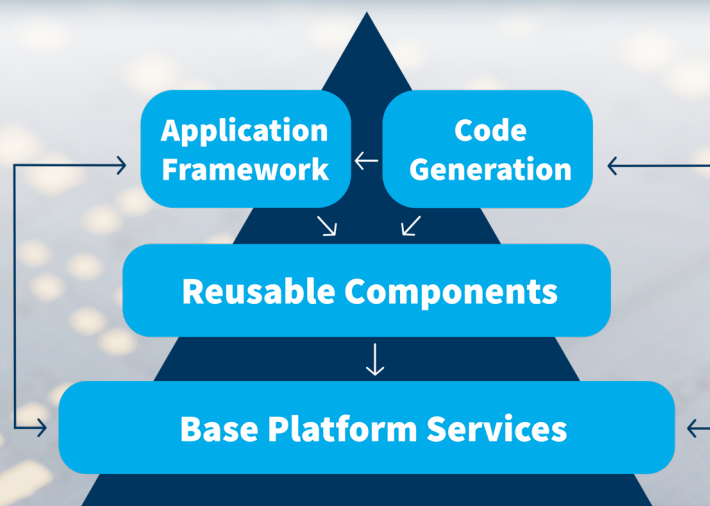
So how can you take a platforming approach from day one?

You need to develop a unified, modular codebase for efficient integration with different systems. Opt for cross-platform development tools for consistency across operating systems, implement robust API strategies for interoperability with charging stations, and conduct continuous testing to ensure a seamless user experience.

Most importantly, however, make sure that the codebase adheres to standardized protocols for secure communication.

TOP TIP

When establishing protocols for electric vehicle communication and charging infrastructure, consider referencing ISO 15118, OCPP (Open Charge Point Protocol), and the North American Charging Standard (NACS) regulations, depending on your location. ISO 15118 is an international standard that outlines secure and standardized communication protocols between EVs and charging infrastructure. OCPP is a widely adopted open standard for communication between charging stations and central systems and NACS provides specific guidelines for EV charging in North America.



Cybersecurity Must Haves

Cybersecurity is a critical concern in EV charging application development. Hacking, data breaches, or unauthorized access to charging stations can have devastating financial and reputational consequences. Not only is sensitive user information at risk but the integrity of the application and the safety of the charging infrastructure itself could be compromised.

37%

Of 2023 automotive cybersecurity incidents involved data breaches

40%

Of all attacks targeted backend servers



Of all attacks directly targeted EV charging infrastructure

Upstream, H12023 Automotive Cyber Trend Report

Upstream, 2023 Global Automotive Cyber Report

Our list of 'secure by design' development must-haves include:

Encryption: Implement strong encryption protocols for communication, ensuring that sensitive data such as payment information is secure during transit (TLS for communication).

Secure Authentication: Employ robust authentication mechanisms to prevent unauthorized access, including secure login processes and multi-factor authentication.

Access Control: You need strict access controls to limit permissions and prevent unauthorized users from tampering with the device.

Intrusion Detection Systems: Deploy intrusion detection systems to monitor and identify suspicious activities in real-time, triggering alerts or automatic responses.

Regular Security Audits: Conduct regular security audits and vulnerability assessments to identify and address potential weaknesses in the system.

Monitoring and Logging: Implement robust monitoring and logging mechanisms to track and analyze system activities, aiding in post-incident analysis and response.

And of course...

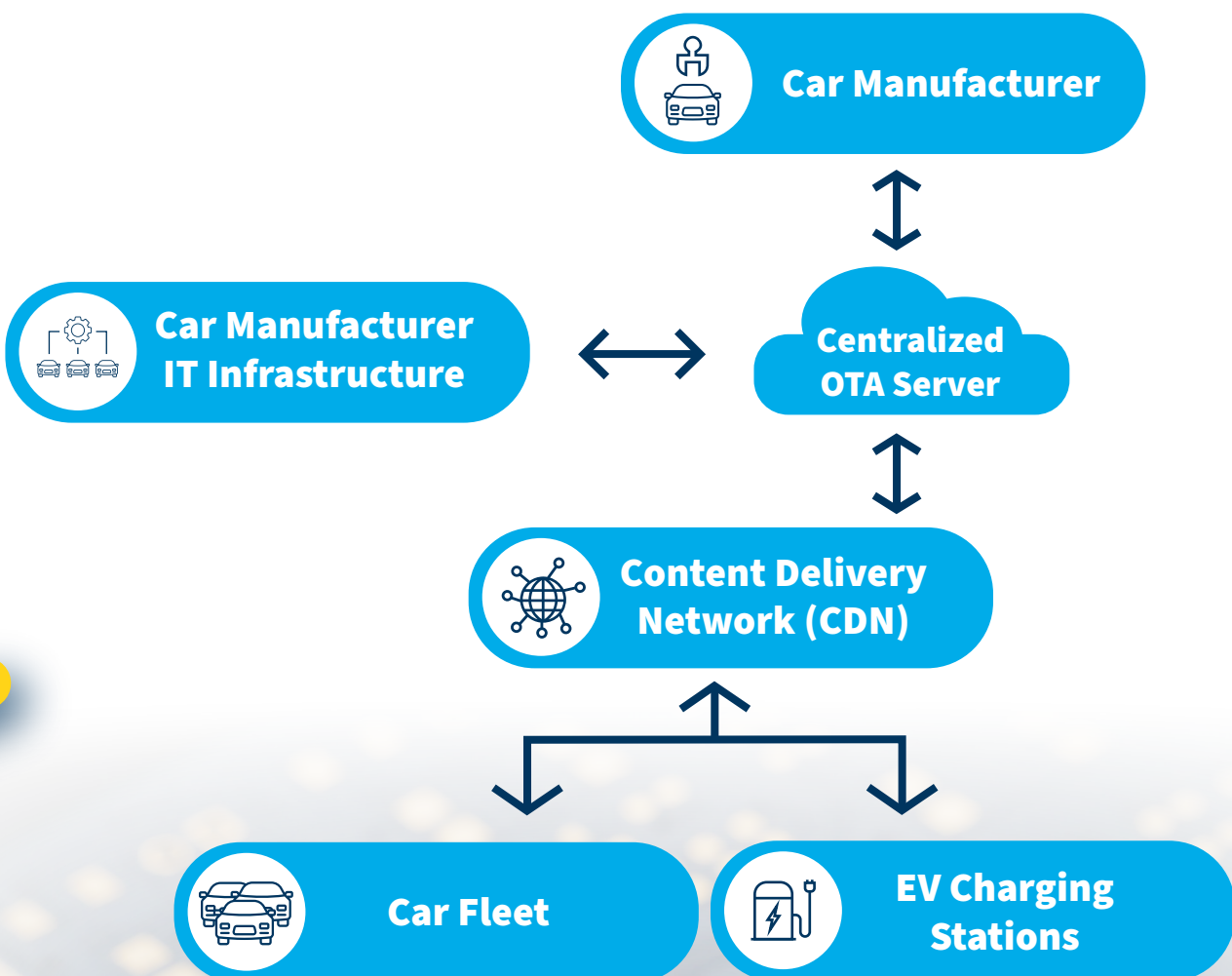
OTA Updates & Long-Term Software Maintenance

Developing an EV charging app is not a one-shot task. Constant maintenance and upgrades are needed to keep your device at peak operation, as well as to deliver new functionality. The only feasible way to do this across an entire network is through over-the-air (OTA) updates.

OTA will enable you to regularly update firmware and software to patch vulnerabilities and employ code integrity checks to detect and prevent unauthorized modifications.

Secure OTA updates are at the centre of your app's stay-in-market strategy. Providing users with continuous improvements in functionality, while protecting them from threats and bugs is a must for any OEM looking to succeed in the modern EV market.

Long-term maintenance might seem like something that is in the far distant future, but failing to prepare for that future could leave you with an unsupported and insecure device.



Scalability - The Cherry On Top

Imagine a scenario where the number of EVs exceeds the capacity of the charging stations or the application, your device could suddenly be in high demand, with round-the-clock use.

Is your solution prepared for this demand? have you thought about:



Surges in Demand

Ensuring that the app infrastructure can seamlessly manage high user volumes, prioritize charging sessions, and provide real-time updates on charging station availability is crucial in guaranteeing a smooth and efficient charging experience for all users.



Evolving Tech

With the continuous evolution of Software-Defined Vehicles (SDVs), incorporating advanced software features within EV charging apps has become essential. Apps need to be built with this growth in mind, leaving space for more users, new features, and higher volumes, all while maintaining the app's performance and user interface efficiency.



Reliability

Ensuring reliable and robust network connectivity for users accessing EV charging apps is crucial. Managing network bandwidth effectively to accommodate a growing number of users and data-intensive transactions is essential for maintaining app performance, especially during peak charging hours or in areas with high user concentration.



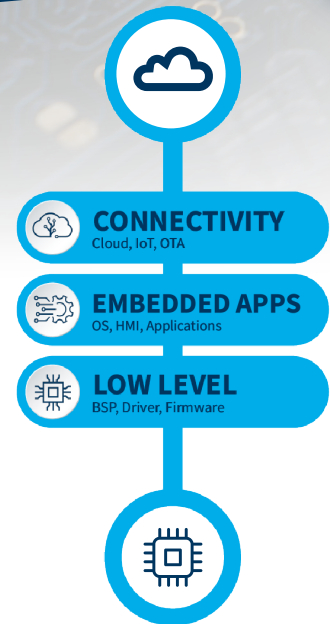
How Can Witekio Help?

Now you have a wider view of the new ‘gold rush’ of EV charging solutions, you understand that there is much more complexity than first meets the eye. You’ll need an end-to-end development team able to cover all skills from:

Luckily - this is exactly what Witekio can offer, so no matter which part you need help with, we act as the co-pilot for your EV charging device development.

From low-level OS kernel development to application building, internet connectivity, security and long-term software support.

Best of all our collaborative approach puts you at the heart of the development process. We adopt agile methodologies, ensuring your active participation and real-time feedback, so your product aligns seamlessly with your vision.



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In IoT, it is “relatively” easy to make a prototype. However, industrializing, running hundreds of devices and operating 24/7 is another story.

Witekio helped us to setup our IoT cloud, and create a reliable product with battery swapping stations. Thanks for helping us overcome our hurdles & grow!

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JÉRÉMY HENRY
HEAD OF DIGITAL PRODUCT
AT ZEWAY
ELECTRIC SCOOTER SUBSCRIPTION SERVICE

ZEWAY

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Witekio had the manpower, the expertise and the flexible approach we needed from a partner.

For the co-development of our IoT solution they were the best choice.

W

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