Role of Connectivity in EVSPs' Security, Scalability and Revenue

THE ROLE OF CONNECTIVITY

For Electric Vehicle Service Providers (EVSPs), the success of an EV charging operation depends on the status of the stations – so it is crucial to have the means to manage, assess, and troubleshoot them. In order for these functionalities to work, reliable data connectivity must be present.

Data connectivity can be delivered via fiber, WiFi, or cellular networks. Because WiFi technology is dependent on connections provided by local, public, or private networks, cellular connectivity is the most logical solution for EVSPs to consider.

Connectivity must be reliable, secure, and affordable in order for the operation to succeed and scale. Choosing the right connectivity partner matters, and poor connectivity can disrupt an operation and expose companies to cybersecurity breaches, hold them back from expanding, and cause them to incur a loss of revenue opportunities.

Why Wireless Connectivity is Crucial in EV Charging

Let's look at how cellular connectivity can address cybersecurity issues, help an operation scale, and increase revenue.

Cybersecurity

The current Director of the Cyber Center For Security and Analytics at the University of Texas at San Antonio, Dr. Elias Bou-Harb, coauthored a relevant study titled Power Jacking Your Station: In-Depth Security Analysis of Electric Vehicle Charging Station Management Systems (EVCSMs). The in-depth study of Internet-enabled systems and the connected critical infrastructure exposed an array of security vulnerabilities, demonstrating that EVCSMs are susceptible to cyber-attacks.

Most of these vulnerabilities had to do with missing authentication and cross-site scripting, with which attackers can cause several issues – including manipulating the firmware or disguising themselves as actual users to access user data. With the burgeoning integration of EV charging in the power system of the future, the implications of cyberattacks against EV charging systems may also put critical infrastructure at risk.

Suggestions for improvement focused on these three areas:

CELLULAR INFRASTRUCTURE:

Obtaining a **private and secure cellular network infrastructure** that is reliable and minimizes downtime.

EVALUATION:

Evaluating all **software, firmware, hardware, and applications** of the EV charging device.

CLOUD CONNECTIVITY:

Enabling a **secure transfer of data through the cloud** that connects the network and utilizing the correct platform for managing the data and IoT devices.

The study encourages EV service providers to find partners who provide the right solutions to address these challenges. Private cellular connectivity was specifically highlighted, in addition to having access to an IoT data and management platform that provides real-time alerts.

Scalability

The complexity of an EV charging ecosystem is astounding. From each location's characteristics, data protocols, and regulatory compliance, to billing, legacy systems, customer-facing applications, electric utility engagement, and more, there are many pieces that comprise the system.

Data connectivity is a foremost consideration, as it plays an intrinsic part in an EVSP's success. EV charging stations need to stay connected without interruption to reach their uptime goals – with the real objective of being readily available for EV users. In order for an EV charging operation to be successful in scaling, connectivity should also be easy to implement and manage. That's where staying current with connectivity technology and avoiding technology lock-in plays a big role.

Not having to deal with multiple providers for connectivity is a key component of successful scalability for EVSPs. Dealing with multiple carriers raises costs, leads to resource waste, and becomes cumbersome when managing data.

A managed service provider for IoT with multi-network connectivity capabilities is the solution. **Engaging with a provider that can offer the following services reduces obstacles and eases scalability:**

→ Standardizied billings
→ Assistance with certifications
→ Tech support through the spectrum of connectivity providers

Revenue Loss

Out-of-service chargers or payment systems not only take a bite out of revenue, but cause poor customer experiences. Whether an EV charger has embedded connectivity or uses local networks for aggregation, a backup solution for connectivity can prevent these losses.

A connectivity solution tailored specifically for EVSPs gives greater operational control, remote access for most troubleshooting, and clear identification of the need to dispatch on-site (and expensive) maintenance. Operational visibility is key, and knowing that a charger needs servicing is an important aspect of a well-maintained network.

Dispatching technicians to EV charging sites is expensive, but sometimes necessary. Having the ability to troubleshoot network signals issues and fix these issues remotely is a game changer. When remote troubleshooting can be done in hours instead of days and on-site service is eliminated, downtime is reduced and the business avoids the potential loss of millions in lost revenue.

Other technologies, such as eSIMs, are also being used to provide enhanced network coverage. These provide the ability to remotely update carrier profiles if needed without physically switching SIMs.

Using one provider with access to multiple carriers reduces the need to deal with multiple contracts, set up fees, and manage numerous relationships. It also allows for pooling and rollover of data across networks and devices, which is beneficial when looking to reduce costs.

The University of California - Berkeley recently released a study in which the functionality of about 650 EV charging units across the United States were evaluated. Although EVSPs claimed to have units running 95-98% of the time, the study showed that units were functional only about 72.5% of the time. Failures ranged from unresponsive or unavailable screens, payment system failures, charge initiation issues, or network downtime.

Abstract

In order to achieve a rapid transition to electric vehicle driving, a highly reliable and easy to use charging infrastructure is critical to building confidence as consumers shift from using familiar gas vehicles to unfamiliar electric vehicles (EV). This study evaluated the functionality of the charging system for 657 EVSE (electric vehicle service equipment) CCS connectors (combined charging system) on all 181 open, public DCFC (direct current fast chargers) charging stations in the Greater Bay Area. An EVSE was evaluated as functional if it charged an EV for 2 minutes or was charging an EV at the time the station was evaluated. Overall, 72.5% of the 657 EVSEs were functional. The cable was too short to reach the EV inlet for 4.9% of the EVSEs. Causes of 22.7% of EVSEs that were non-functioning were unresponsive or unavailable screens, payment system failures, charge initiation failures, network failures, or broken connectors. A random evaluation of 10% of the EVSEs, approximately 8 days after the first evaluation, demonstrated no overall change in functionality. This level of functionality appears to conflict with the 95 to 98% uptime reported by the EV service providers (EVSPs) who operate the EV charging stations. The findings suggest a need for shared, precise definitions of and calculations for reliability, uptime, downtime, and excluded time, as applied to open public DCFCs, with verification by third-party evaluation.

1

Find the full report **here**

The Solution

Kajeet provides private, cellular multi-network connectivity and other managed services for EV charging service providers. We work with all major carriers and give EVSPs access to data pooling and sharing across networks and devices under one contract, providing ease of service and cost reduction.

This is enhanced by a robust IoT and data management platform, Sentinel, which provides insights into usage, device inventory, and real-time alerts for improved response to possible threats.

What Kajeet can do for EVSPs:

Multi-network approach
Reduction of SKU complexity and cellular site surveys. No need to worry about which carrier is supported in a specific region or what happens if a carrier network goes down.

Superb customer support
Timely call-back when connectivity isn't working. Our support team is available 8 am to 8 pm EST, and 24x7 for major outages. We pride ourselves on responding to every inquiry in under 7 minutes.

One contract, one bill
Avoid dealing with multiple companies and management platforms.

Powerful management platform
Data visibility via Sentinel, which provides data management, data filter and policy management, device inventory, real-time alerts and more – all on a single pane of glass. Customize your alerts and build them with our suite and tools or engage with our team of engineers to develop what you need.

Private LTE
Reduction of cybersecurity issues by using a private network and management tools that gives real-time feedback on trends and aberrant behavior.

Other services
Streamlined managed services, from router hardware procurement and logistics to ongoing configuration management.

We do all this and more for our EVSP customers every day and would like to learn more about your operation and how we can assist in your growth. We are waiting for your call.

Acknowledgments

About Kajeet

Kajeet provides optimized IoT connectivity, software and hardware products that deliver safe, reliable, and controlled internet connectivity to nearly 3,000 businesses, schools and districts, state and local governments, and IoT solution providers. Kajeet's Private Network solutions simplify private wireless to allow customers to design, install and manage their own private wireless networks. Kajeet is the only managed IoT connectivity services provider in the industry to offer Sentinel®, a scalable IoT management platform that includes visibility into real-time data usage, policy control management, custom content filters for added security and multi-network flexibility. Kajeet is available for hybrid and multi-network access across all major North American wireless networks, globally with coverage in 173 countries, and on multiple licensed and unlicensed networks. Kajeet holds 43 U.S. patents in mobile technologies. To learn more, visit kajeet.com and follow us on Twitter at @Kajeet.

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