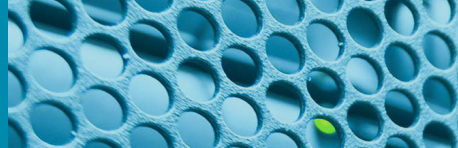


SOLUTION BRIEF

MACHINE DATA ANALYTICS FOR EV CHARGING STATIONS

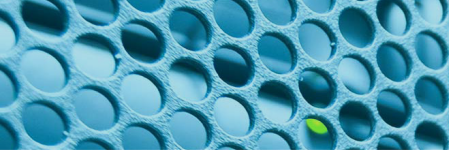




CONTENTS

| | |
|---|---|
| INTRODUCTION | 1 |
| THE GLASSBEAM ADVANTAGE | 2 |
| USING INSIGHTS TO IMPROVE EFFICIENCIES IN THE EV INDUSTRY | 2 |
| SUMMARY | 5 |





Many of the challenges in the EV charging industry can be overcome by making stations IoT-enabled – that is, instrumenting and connecting them to the Internet.

INTRODUCTION

The Electric Vehicle (EV) Charging Station and Smart Grid industry is set to explode over the next five years, growing from less than 1 million stations today to over 12 million in 2020, driving market revenue growth from US\$200M to US\$3.5B in the same period. This exponential growth has been propelled largely by the advantageous economics of electrical vehicle ownership and by the tremendous publicity around the favorable environmental impacts (and associated governmental benefits) that accrue from owning vehicles that limit or eliminate carbon emissions.

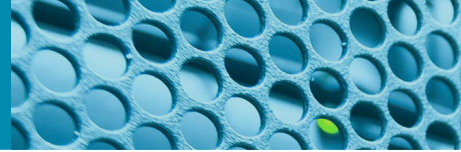
The EV Charging industry is broadly divided into three players: those that manufacture chargers and maintain them, those that just manufacture and those that just maintain these stations. For all these players, it is an ongoing challenge to constantly improve the economics of their business – by improving daily operations or by offering value-added services to end-consumers.

Since the industry is in its relative infancy, state-of-the art analytics and services are still not available to consumers. Common challenges include locating the charger closest to them, ascertaining if it is available and how much it will cost to charge the car, being informed when charging is complete, etc. If a consumer is unable to charge the car while traveling from their regular charging station, the manufacturer must send out a field service technician. This is not only costly and time-consuming; it adds to the bad publicity that such incidents bring to the brand and to the EV industry as a whole.

Many of these challenges can be overcome by making stations “Internet-of-Things (IoT)-enabled” – that is, instrumenting and connecting them to the Internet. By making them IoT-enabled, operators can realize the value of analyzing their machine data by deriving powerful and timely business insights to introduce efficiencies in numerous operational areas: Support, Product Management, Engineering, and Sales.

EV Charging Stations can be instrumented to collect and send back operational data to a central location – from where it can be aggregated, parsed and analyzed – and the results displayed through actionable dashboards, as well as other functionality like Search, Threshold/Anomaly detection and REST-based APIs. These Analytics greatly aid EV operators and manufacturers in maintaining these stations. Glassbeam’s cloud-based IoT platform is ideally suited to ingest, parse and analyze data sent from EV stations and to provide valuable business insights to help EV operators dramatically improve the economics of operating their charging stations.





The insights provided by Glassbeam's platform can be used to make informed business decisions that improve operational performance in many areas

THE GLASSBEAM ADVANTAGE

Glassbeam offers a powerful and versatile cloud-based platform for parsing and analyzing machine data sent from EV Charging Stations. Using its patent-pending technologies – Semiotic parsing language (SPL) and SCALAR – Glassbeam can turn raw data into actionable business intelligence. These Analytics greatly enable station operators to glean powerful insights that enable them to improve various areas of regular operations; in addition to providing timely and relevant data of great value to end-consumers.

Key elements of the Glassbeam platform include:

Dashboards: Delivered out-of-the-box as standard applications, or in customized format, Dashboards provide different views of the parsed data. These views can be filtered by a combination of variables, and are tremendously useful to drill down to the root cause of any support issue. Dashboards can also be a great visual tool to get high-level information – which stations are available versus down, capacity analysis, elapse time (time taken to charge a car), and so on.

Rules and Alerts: Also known as Complex Event Processing (CEP), this functionality helps you model threshold conditions with the goal of detecting anomalies in one or more operating parameters. Whenever an anomaly occurs, an alert is sent out to warn the user of a potentially harmful situation, giving them the opportunity to pre-emptively take remedial action. As an example, a Rule can be set up to alert a user when the temperature exceeds 55 degrees – as a precursor to a possible malfunction incident.

Workbench: This application offers an intuitive drag-and-drop interface to slice and dice your existing data to give a granular view of your installed base. This module is also very useful in intelligently segmenting your user base to answer questions like “How many stations in California are at a software version 3.0 or lower?”

USING INSIGHTS TO IMPROVE EFFICIENCIES IN THE EV INDUSTRY

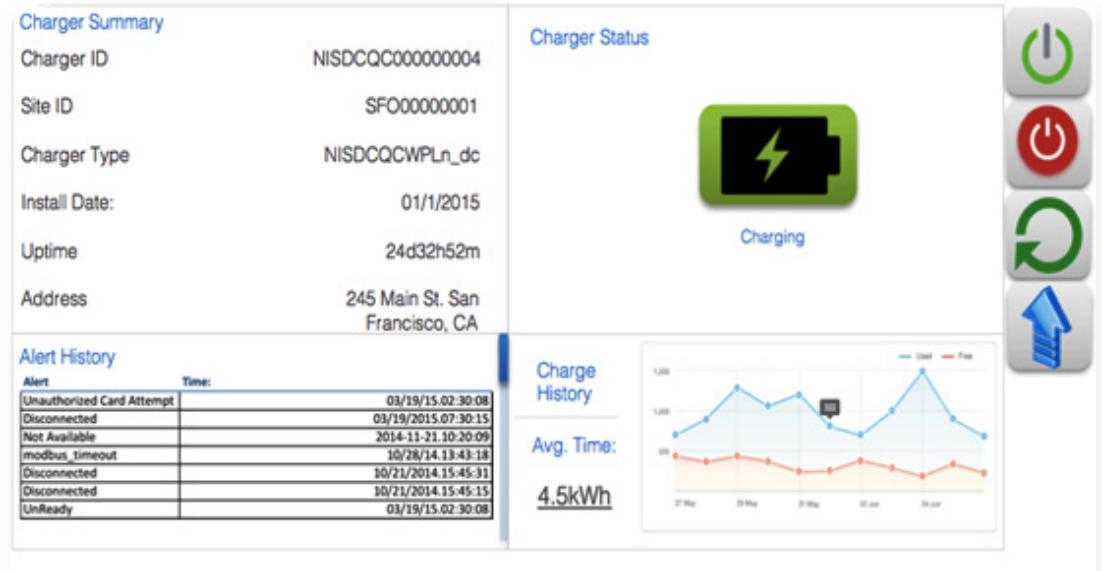
The insights provided by Glassbeam's platform can be used to make informed business decisions that improve operational performance in many areas. Some popular use cases include:

Remote Monitoring and Maintenance: Using IoT Analytics, operators can monitor stations remotely and take appropriate remedial action whenever downtime occurs. Monitoring stations from a remote location and taking appropriate remedial actions based on granular analytics greatly reduces the



Using insightful business intelligence a charging station operator can preempt incidences of downtime and rectify defects before they actually occur

maintenance cost by eliminating unnecessary “truck rolls” and by keeping downtime to a minimum.

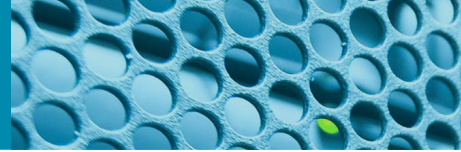


Predictive Maintenance: Using insightful business intelligence, a well-documented knowledgebase, and patterns in log data, a charging station operator can preempt incidences of downtime and rectify defects before they actually occur. Avoiding downtime dramatically increases revenue and, by extension, significantly improves the economics of operating these stations.

Glassbeam has a strong integration with Salesforce.com (SFDC) through a single-sign-on (SSO) capability. The integration enables automatic case creation based on patterns in incoming log file data and thereby alerts support teams in advance of a potential incident. Support engineers can proactively respond to these warnings, eliminating such incidents to a great extent.

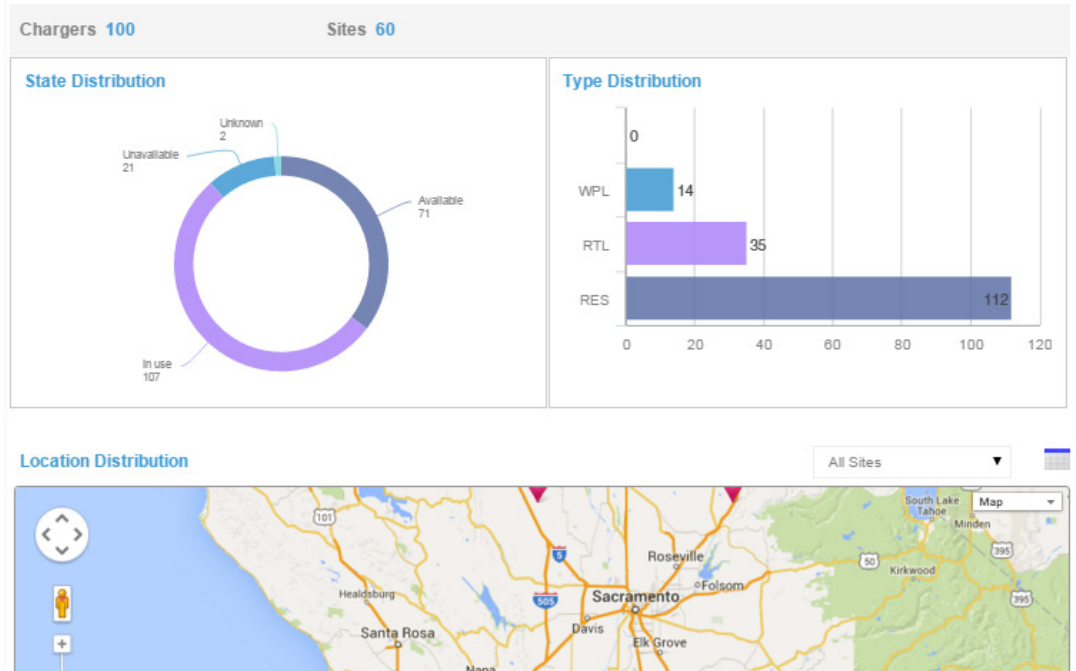
Installed Base Analysis: Glassbeam’s Analytics provide a detailed and granular view of the installed base. A user can create intelligent segments of the customer base by combining variables like usage, capacity, version number, extent of usage, geography, etc. Analyzing this data can help product managers create more informed product roadmaps and for engineering teams to build products of high quality.





Consumers could be alerted by text messages on a completed charge event and timely relinquishing of the station could greatly increase its utilization rate

Install Base Summary ▾



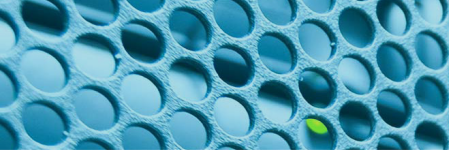
Consumer-specific Services: Status information, as well as data on basic parameters like elapse time, can be offered to tremendously improve the consumer experience. Consumers could be alerted by text messages on a “completed charge event” and timely relinquishing of the station could greatly increase its utilization rate. Creative marketing offers could be made by local merchants when a consumer starts charging a car and some of these benefits could be availed of by station operators.

Usage Analysis: Operators can use real-time data to understand usage patterns and make informed business decisions. For example, certain stations could be hard to locate or in inconvenient locations, which could be reflected in low usage numbers. Armed with this information, the owner could take appropriate measures like relevant advertising campaigns to improve usage numbers.

For properly functioning stations, operators could rollout marketing and/or sales campaigns to improve loyalty and increase revenue. Dynamic pricing could be created to maximize economic value for the station operator.

Further, engineering teams could use information from parameters like failure rates, charging rate, number of charges/day, temperature variance, and so on to create more informed product roadmaps that address pressing needs of the marketplace.





SUMMARY

Rapid innovation in the IoT field is finding many applications in the Smart Grid industry, and in the EV Charging industry in particular. Done right, IoT analytics of data generated by EV Charging Stations can materially transform the economics of operating these stations – and thereby remove key obstacles that are stymieing their adoption in the broad marketplace. Glassbeam’s cloud-based platform can provide valuable insights that can dramatically reduce maintenance costs and create new streams of service revenues.



Contact us at sales@glassbeam.com

Glassbeam, Inc.

5201 Great America Parkway, Suite 360 • Santa Clara, CA 95054

Phone: 408-740-4600 • www.glassbeam.com

Glassbeam, the Glassbeam logo, Glassbeam BI Workbench and Glassbeam Dashboard are trademarks of Glassbeam, Inc. All other trademarks and registered trademarks are the property of their respective owners.