

USE CASE

Service Management of Your VPP

Renewable Energy
Assets with Waylay
Digital Twin

waylay





introduction

VIRTUAL POWER PLANTS (VPPs) are a network of distributed energy resources (DERs), such as solar panels, wind turbines, and battery storage systems, that are connected to a central control system (often running in the cloud). By aggregating the power of several DERs, a VPP can deliver the same service and redundancy and subsequently trade on the same energy markets as large central power plants or industrial consumers¹.

In the early days, commonly used DERs were mid- to large-scale combined heat and power (CHP) units, wind farms, solar parks, industrial back-up generators, bio-gas, etc. Recently, consumer households can also participate in a VPP network with their rooftop solar PV, home battery systems and electric cars². Monetary incentives like electricity bill credits are offered by Utilities to convince these households to join.

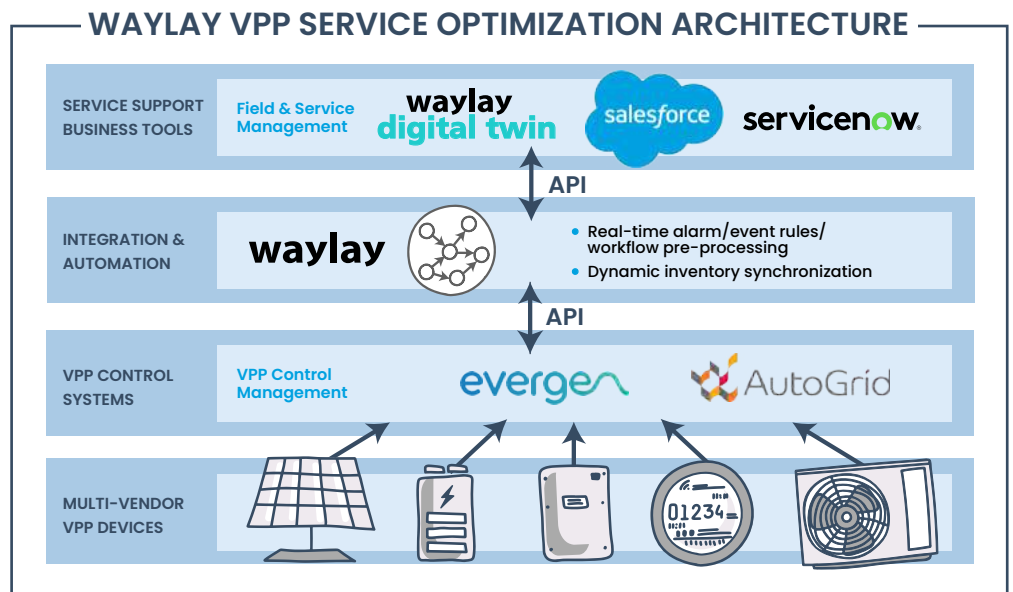
According to *Fortune Business Insights*³, the global virtual power plant market is projected to reach USD 6.74 Billion by 2028, growing at a CAGR of 32.89% from 2021 to 2028. The VPP market growth is driven by the cost-effectiveness of renewable technology, with CAPEX often cheaper than traditional centralized power plants. Of course, also the heavy incentives from local and state government policies and laws to ensure energy security and independence, are fueling that growth as well.

1. "Virtual Power Plant: How to Network Distributed Energy Resources". Next Kraftwerke. <https://www.next-kraftwerke.com/vpp/virtual-power-plant#:~:text=A%20Virtual%20Power%20Plant%20>
2. "Welcome to PowerResponse: Get Paid to Use Less Electricity". Energy Australia. <https://www.energyaustralia.com.au/home/electricity-and-gas/power-response>
3. "Virtual Power Plant Market Size, Share & COVID-19 Impact Analysis." Fortune Business Insights. <https://www.fortunebusinessinsights.com/industry-reports/virtual-power-plant-market-101669>

challenges

THERE ARE ALSO a number of challenges associated with providing scalable service support for VPPs. One of the main challenges is the complexity of the systems involved. VPPs typically consist of a large number of distributed assets, each of which may have different owners, operators, and maintenance requirements. This can make it difficult to coordinate maintenance and repairs, as well as to track the performance of individual assets. We believe that automation and predictive maintenance is the key answer to address these challenges.

With the Waylay hyperautomation platform, we can efficiently bridge the gap between the VPP central control systems and the service operations tools of the VPP utility. In the image below, we illustrate how Waylay is positioned in the VPP service operations architecture.



At the lowest layer, we consider the DER units from various vendors. The centralized VPP control systems control and balance the power generation and power consumption of the electricity on the grid. These control systems usually provide RESTful APIs through which the Waylay platform can retrieve low level data, events and alarms. The Waylay platform processes these and looks for patterns over time and irons out any false positives before taking action in the service operations platforms, like Salesforce and ServiceNow.



patterns

TYPICAL PATTERNS that the Waylay platform can assess:

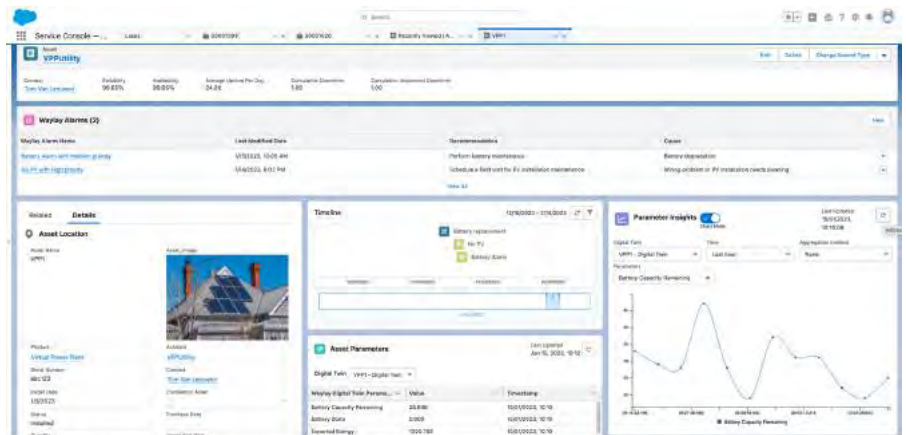
- VPP equipment fault code analysis and filtering
- On-prem installation electrical or mechanical malfunctions, e.g., PV earth faults
- Unexpected low/high power consumption or generation
- Long unplanned downtime of VPP systems
- Illegal tampering of VPP equipment
- And more.

When these patterns are detected, the Waylay platform can automatically create support cases or incidents in the service operations tools. This provides the following benefits for the VPP utility service operations teams:

- VPP installation performance overtime is visible and is enriched with subscriber contractual and account information in the service support tools. The service agent has a single pane of glass and no longer has to log into multiple platforms to make decisions.
- Automatic root cause analysis is completed by Waylay and is provided in the case or incident records such that costly manual diagnosis can be avoided or significantly reduced.
- Condition-based monitoring rules automate the maintenance and support business processes that are needed to optimally schedule field support teams.
- Predictive and preventive rules provide automated issue detection and handling to increase the lifetime of the VPP assets and prevent unplanned downtime.



benefits

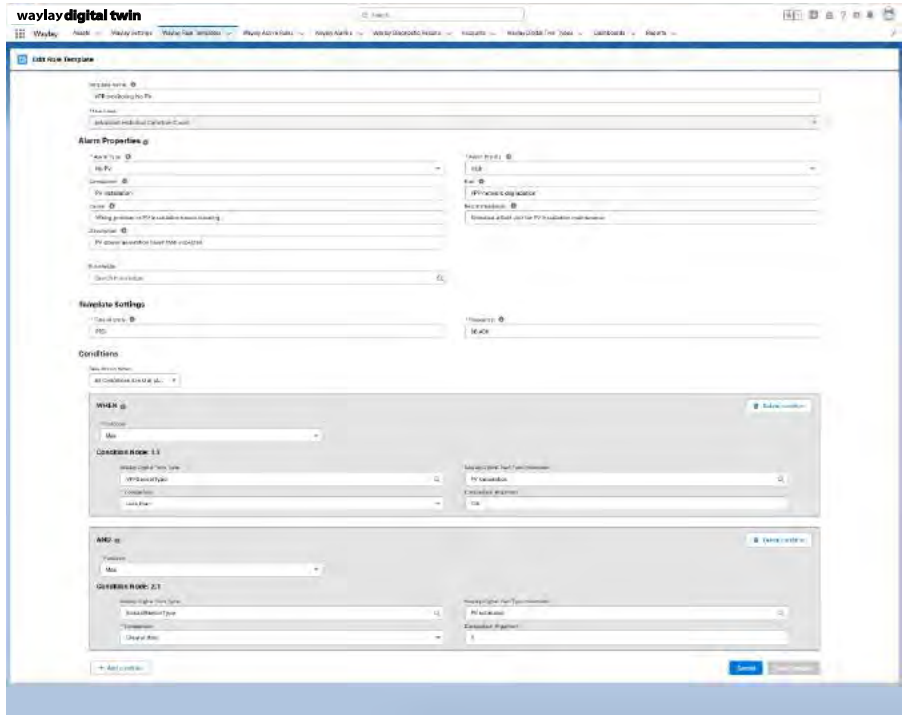


SHOWN IN THE MAGE above is the Waylay Digital Twin application for Salesforce in action. The service console offers the VPP utility service agent a detailed view of the household that is participating in the VPP network with its solar roof PV and home battery installation. The service agent can drill down into the historical performance of the installation as well as get a real time view of the current performance without leaving the Salesforce experience. Waylay's platform runs conditional and predictive maintenance rules that detect this installation needs urgent maintenance on both the battery and the PV installation.

The benefits that come with the Waylay hyperautomation solution help to reduce the strain on the limited resources that are available in a VPP utility support organization. The Waylay platform AI/ML rules offload this team and allow the organization to grow in a scalable way with the growth of the VPP network. It also provides a means of meeting the high support experience expectations of the end users and businesses that enjoy the VPP power services.

capabilities

WHEN USING THE WAYLAY Digital Twin business applications for Salesforce and ServiceNow, the rule patterns can be created by business experts using the Waylay no-code rule building and rule management capabilities. There is no need for long and costly IT implementation cycles.



In the above picture, an example of the standard rule patterns the Waylay Digital Twin application ships out-of-the-box is shown. In this example, the VPP utility business user has set up a predictive monitoring rule that monitors the PV power generation of a household and compares that to the expected PV power generation-based on the Solcast irradiance forecast for the location and orientation of the home. If the discrepancy is too large then Waylay raises an alarm with the recommendation for a maintenance field visit to be scheduled.



summary

WHILE VIRTUAL POWER PLANTS offer many benefits, they also present a number of challenges in terms of service support. Coordinating maintenance and repairs, optimizing performance, and ensuring reliability and security are all critical to the success of a VPP. By addressing these challenges with a hyperautomation platform like Waylay, VPP operators can ensure that their service organization is not overwhelmed and that they are able to deliver consistent, reliable, and cost-effective power to the grid and their customers



ABOUT WAYLAY

Waylay is a Belgium-based technology company providing progressive orchestration and automation platforms for businesses to automate anything and everything. Our low-code solution is a fundamentally new way to rapidly build automation, workflows and complex rules to easily integrate into an existing complex ecosystem of software applications and in combination of IoT devices, sensors and systems. Our platforms are based on the principles of AI, ML and big data and are designed to be flexible and scalable, making our suite of products—Enterprise, Digital Twin, Edge and Lite—suitable for a wide range of industries and use cases.

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