Platform Guide:

Enabling smart business solutions with the Waylay platform

This guide is a high level introduction into Waylay's modular architecture. It describes its major functional building blocks and how these can be packaged to respond to different specific use cases

Introduction

Waylay is a cloud-to-cloud orchestration platform, enabling applications for digital transformation at the intersection of the Internet of Things, AI and advanced automation. Waylay comes with a unique offering in the IoT ecosystem, combining data aggregation, integration and next generation automation onto the same platform.

The Waylay platform is being leveraged by both product and service companies across a range of different IoT verticals to solve specific business challenges that they face. For product companies, these challenges have to do with real-time processing of incoming data, operationalizing big data insights and getting the right information to the right people and tools/processes at the right time. The challenges for service companies revolve around coping with multiple siloed IoT applications and bridging the gap between IoT, legacy back-end enterprise software and third-party cloud-native apps.

We believe that advanced software automation is key to handling the vast amounts of data provided by the internet of things. Not only automation within the IoT solution itself, but extending the automation perimeter to enterprise IT assets and external applications, in order to improve operational processes or introduce new digital services to market. Waylay does this by easily connecting and automating data from multiple sources, across vendors and technologies.

In order to better explain the modularity of the Waylay platform, we are going to break it down into five main components, which we present from the perspective of what happens to data as it moves through each one of them.

Platform breakdown: five component layers

01 | Data ingestion

Data & event acquisition for cloud-to-cloud integration
The first Waylay service component manages when, where and how does data enter into the Waylay system. Waylay is able to ingest data from a multitude of sources and it is important to note here that these are always 'cloud' sources. We never ingest data straight from the device itself, but always communicate one level above, and get the data from that device's cloud. These clouds can be major public clouds on the market, the vertical device cloud of that device's vendor, traditional IoT device management platforms, LPWAN backends or LPWAN private/public clouds.

Therefore, the Waylay ingestion layer is responsible for the interaction with the third party clouds and takes care of functions like authentication and authorization, data collection & scheduling, protocol normalization, etc. This powerful data acquisition framework is a foundational layer for value creation by combining data from vertical siloed clouds.

02 | Data automation

Rules & automation engine
This service component is where the core Waylay data processing takes place. The orchestration layer comprises a powerful rules engine and the whole lifecycle management of rules for automation & alerting. Through microservice orchestration, it becomes possible to process IoT data in sophisticated ways and to operationalize big data insights e.g. for such services as anomaly detection or battery lifetime prediction.

The framework comprises functionality for rules creation, debugging, deployment, bulk management and diagnostics. The Waylay rules engine is an inference type engine based on Bayesian networks and leverages the concept of smart agents for sensors, logic and actuators. The data automation service component also includes a native alarms service and facilitates integration with enterprise backend IT systems and cloud services.

03 | Data management

Resource management (time series storage + metadata)
This service component is responsible with the various data storage levels and data administration and manages resources, resource types, resource time series data and metadata.The resource is a flexible concept within Waylay - a resource can indeed correspond to a device but it can also correspond to a "system of devices" such as a "home" or any other abstract object for which Waylay stores data.

Unique to Waylay is that resource metadata can be leveraged for automation as well, such as e.g. the automated instantiation of rules based on customer, device type or firmware fields. In addition, aggregated data can be exported for offline analytics, which may eventually result in new insights and rules as well.

04 | Data access

APIs exposing both rules engine and resource management capabilities
This is a REST/JSON Application Programming Interface (API) that exposes the capabilities of the Waylay platform to other applications. It includes APIs to get access to resource data, metadata and the orchestration engine. With Waylay, customers can build vertical specific interfaces that aggregate data across verticals and allow the instantaneous instantiation of automation and alerting use cases over the API.

05 | Data visualisation

Off-the-shelf B2B dashboard that integrates with the Waylay API
Our customers choose to either white label our ready-made dashboard for convenience or instead they opt to leverage the API layer to develop custom applications that suit their particular business needs.

Depending on the market you are acting in and the technology assets that you already have available or have built on your own, you may be interested to leverage Waylay's technology building blocks in different ways. Product companies, service companies and system integrators compose business solutions using the Waylay platform in different ways.

Pictured: High-level architecture of the Waylay platform components

USE CASE 1: Focus on data automation

Waylay for product companies

Customers interested in automation and looking for the best rules engine for IoT are mostly product & technology companies that have data aggregation and analytics capabilities as part of their IoT stack but are in dire need of a scalable rules engine framework.

If that is your case, you have already securely connected your products, are collecting the data they send through and maybe started running some intelligence on top, but are struggling to operationalize your data insights, namely to turn intelligence into action.

Building something from scratch is not scalable, often times you begin with writing small scripts on top of your database but as your business cases complicate and data piles up, this approach becomes unscalable and harder to debug and deploy.

This is exactly what the Waylay orchestration layer can help with: automation, integration as well as a scalable debugging, rules deployment and lifecycle management framework. Waylay will integrate with your existing IoT infrastructure in either a data pull or a data push model. In the latter case, data can be pushed to Waylay either of REST, MQTT and Websockets. Essentially, you will be using the Waylay IoT platform as a PaaS building block in your overall IoT offering.

So when using Waylay for automation, these are the components that you will be leveraging: ingestion layer (data and acquisition), orchestration layer (automation/rules engine) and the API layer for API access to the rules engine.

Real-life application

One example of where Waylay IoT for automation is successfully used is in **connected building applications** by building automation companies moving into the IoT space. Waylay automates building intelligence and empowers smart building companies to optimize energy costs, comfort and productivity while improving the building's environmental performance through better resource management.

USE CASE 2: Focus on data aggregation & integration

Waylay for service companies

Customers interested in Waylay as an IoT aggregation cloud are typically service companies that are confronted with multiple IoT solutions being deployed in parallel and need a way to create a holistic view across those different solutions.

If that is you, you are probably a business dealing with a wide variety of smart devices, appliances or equipment coming from different vendors or an organisation that needs to coordinate multiple IoT solutions between various business lines in order to get the most value out of them. Again, connecting the products and capturing data is something already covered (usually by device-specific clouds) and the biggest challenges that you are now struggling with are interoperability, aggregation and integration.

Taking on the integration efforts yourself means that you will likely be moving slower than the market does and you risk multiplication of efforts- often a realistically unscalable approach.

This is exactly what Waylay helps with. You will be using the flexible integration framework supporting various cloud-to-cloud integration as well as authentication/authorization protocols. The Waylay rules engine enables you to automate across the different IoT solutions that you need to work with, as well as integrate with cloud services and your enterprise IT. You will also be using the scalable storage of time series data and metadata.

Both the time series data, the metadata and the rules engine are API exposed and enable you to build customized user experiences on top, be they business or consumer oriented. And finally, through Waylay's data & metadata export capabilities, your big data can easily be fed into third party BI and analytics tools.

So these are the Waylay components you will be needing when using Waylay as an IoT aggregation cloud: ingestion layer (data & event acquisition), orchestration layer (rules & automation engine), resource layer (time series storage + metadata) and API layer (exposing both rules engine and resource mngt capabilities).

Real-life application

One example of where the Waylay IoT aggregation cloud is successfully used is in **smart home applications** where the smart devices market is incredibly fragmented and service companies need to work with multiple IoT clouds and aggregate across all of them in order to bring integrated services to market.

USE CASE 3: Focus on data access and application enablement

Waylay for system integrators

As a system integrator, you want to offer impeccable end-to-end solutions to your customers. With Waylay, you can deliver smarter IoT solutions and offerings, aligned with the stack and products you already know and sell. End-to-end IoT platforms will only take your customers so far when they inevitably look at needing to integrate their device data with their existing systems. Waylay's IoT Application Enablement Platform is designed to provide that capability right from the start.

Waylay offers standard integration for LPWAN (off-the-shelf integration for Sigfox and LoRa) and ready-to-use support for the three major IoT clouds for device management: Microsoft Azure, AWS and Google IoT Core. The Waylay platform is ready build on customized offerings with specific devices, alerting use cases and different visualisation UIs for different end-customers.

Waylay's off-the-shelf B2B dashboard environment is ready to be white-labeled and you can support multiple customers from the same Waylay environment. Via device-type specific transformers,we provide interoperability with multiple device vendors, and also the possibility to add your own, so as to never be locked in a single solution or vendor.

As a system integrator, you will be using the following Waylay technology components:
- Ingestion layer (data & event acquisition)
- Orchestration layer (rules & automation engine)
- Resource layer (time series storage + metadata)
- API layer that exposes both rules engine and resource mngt capabilities
- Visualisation layer (off-the-shelf dashboard)

Real-life application

Examples of where the Waylay IoT platform is successfully used today for LPWAN deployments is in **smart asset management** and **condition monitoring**. We work with system integrators that have access to the best of breed hardware and software and the necessary sector knowledge of each vertical market, in order to bring a customized end-to-end solution to end customers.

Conclusion

This white paper presented a succinct overview of the Waylay solution in order to demonstrate its flexibility via a number of concrete use cases. We believe that not only doesn't the realm of IoT stop after data collection, but that true value creation actually starts once data has been collected.

It is here that Waylay plays a crucial role: it enables unlocking siloed data, it acts in near real-time on very large amounts of IoT data in a fully automated way and finally it annotates your data (with rich metadata) and offers seamless integration for advanced analytics.

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Ready to get into the specifics?

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