

Automotive supply chain costs 100x lower thanks to Serverless

A Tier 1 car parts supplier was looking to optimise their forecasting and call-off process to enable effective just-in-time delivery. Their previous set up was based on a heavy ERP system, which was logistically and technologically complicated and, as such, was contributing to high warehousing costs and a messy multi-sequence delivery of parts.

Metrologx and PGS Software stepped in to help the Client save a bundle on their budget and significantly accelerated their previous ordering process by developing a fully automated Serverless solution. The platform is now 100 times less expensive than before and able to handle more than 1 million messages per day.

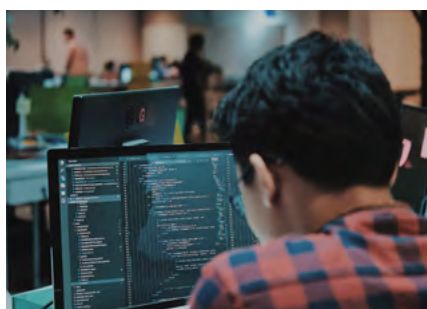
BUSINESS NEED

The metrologx company which has extensive experience in providing Cloud solutions to automotive industry clients, was looking to expand their Cloud-based platform, as they needed to meet the growing business requirements of their Client - a Tier 1 car parts supplier.

Metrologx runs a SaaS solution for the automotive industry and their innovative software framework which runs the EDI is called factoryworkx. Many of their automotive industry clients - such as Just-in-Time (JIT) and Just-in-Sequence (JIS) suppliers - benefit from metrologx's experience and expertise in providing managed Cloud-based EDI.

Seeking to further enhance their SaaS solution in order to realise the Client's primary business objectives, they approached PGS Software as the company has expert knowledge on how to improve Software as a Service (SaaS) solutions, stemming from years of experience with the AWS Cloud.

Metrologx's Client needed a new solution, because the Original Equipment Manufacturer (OEM) changed their overall forecasting process. Previously, the OEM provided Tier 1 suppliers with the bill of material (BOM) explosion, but once the OEM introduced their new line of products, they stopped providing



Tier 2 suppliers with vehicle-specific configuration lists. Therefore, the Client, being a Tier 1 supplier, was looking for a

way to provide their Tier 2 suppliers with vehicle-specific parts lists.

This new requirement needed to be supported by the EDI-as-a-service solution and metrologx was looking to have this new function implemented in order to be able to provide this functionality to their clients. An analysis of business objectives quickly showed that to ensure that the new platform would be future-proof, scalable, and highly available - it would have to be developed as a fully automated solution.

Furthermore, resiliency, reactivity, and unwavering performance are crucial factors to consider when creating an application for this industry, as penalty charges can amount to several thousand euros per minute, (e.g. during production line standstills). Therefore, the new platform would have to deliver all of the desired functionalities, while leveraging the Cloud's high availability capabilities to the utmost effect.

SOLUTION

The Serverless solution was developed using 5 lambda functions, which handle the entire ordering process, individually reacting to the event of the appearance of the initial order file. Each stage of the ordering process takes merely milliseconds, amounting to an impressively low total of approximately 3 seconds of processing time for every 250,000 orders.

The retry mechanism is the most complex part of the new solution as it is crucial for it to notify users (suppliers and car manufacturers) of any failures within a 24-hour period.

Thanks to this mechanism, suppliers and car manufacturers are guaranteed to receive a notification within this time period, allowing them to make the necessary corrections to keep everything running smoothly. Moreover, all the operations were designed to be idempotent, which guarantees that they always generate the same results - making the entire pipeline much more resilient.

Taking the complex and time-sensitive nature of the automotive industry's ordering process into account, metrologx and PGS Software decided that the best way to meet the required specifications would be to recreate the platform as a Serverless solution.

The ordering process in the automotive industry sends millions of EDI messages between car manufacturers and suppliers on a daily basis - making it an ideal use

case for Serverless functionalities. For example, when an 80Mb EDI message, consisting entirely of order-specific information, is sent to the supplier, a set of AWS Lambda functions segments and processes the messages, which enables automated communication with end suppliers.

The architecture uses carefully chosen AWS services to ensure that the solution's functionalities are optimally leveraged. With Amazon S3 implemented as a data lake, Big Data analytics can be implemented without having to move the data to a separate analysis system. Moreover, an analysis system can be built on top of the existing solution to provide detailed insight into ordering patterns, introduce process optimisation, and leverage ML algorithms to improve the supply chain by applying predictions.

Infrastructure-as-Code (IaC) ensures that the solution is managed fully automatically from an infrastructure and functionality point of view. An automated delivery pipeline enables development teams and Product Owners to quickly build

and release new features on production, without interrupting the ordering process (zero-downtime deployments). Additionally, the entire ordering process is managed by automated tools, which automatically manage infrastructure changes and eliminate the need for any manual involvement.

As a safeguard, the solution sends e-mail notifications to suppliers in the event of errors. AWS CloudWatch was used, which allows for data and actionable insights, the monitoring of applications, the tracking of performance changes, and the ability to respond to them. The resource usage can be optimised and the user gets an overview of the overall status.

Furthermore, the implemented retry ordering process, helps to minimise errors - this being a crucial feature since, if the solution were to stop working for a mere 4 hours, all involved car factories would completely stop working. Luckily, however, the implemented retry ordering process guarantees a lasting, positive user experience amongst suppliers and car manufacturers alike.



BUSINESS BENEFITS

Metrologx's Client didn't have to wait long for the desired optimisation of the ordering process as, working in tandem, they and PGS Software were able to develop the entire solution in just 4 weeks, launching its live release without any issues or delays.

is done in milliseconds and payments are only required for actual usage. If the solution is not used, the Client or the user bears no costs. Today, the high flexibility and nearly infinite scalability of the solution - born out of its automation and applied Serverless configuration - enables various car manufacturers and suppliers to use it on several different levels.

Moreover, the Client can now easily innovate and expand their business reach as the platform allows for the processing of millions of messages on a daily basis and costs 100 times less than similar solutions, which use heavy ERP systems - all while remaining unwaveringly fault-tolerant, scalable, resilient, and secure.

Additionally, this project has made metrologx decide to expand their business offer by choosing to transform all EDI mappings and translations into Serverless solutions. This shift now allows them to be able to provide their clients with the most technologically advanced and innovative automotive and manufacturing solutions.



Using Serverless has rendered the application significantly more cost-effective. Car manufacturers and suppliers are now able to save on converting orders, as they no longer need to be manually edited. Additionally, by moving away from traditional methods, which require cost-intensive specialists and by dispensing with conventional SAP or ERP solutions, the Client saves enormous labour costs.

Similarly, using AWS Lambda saves further expenses, because the calculation

Automotive supply chain costs 100x lower thanks to Serverless

PROJECT DETAILS

SOLUTIONS

AWS Cloud, Infrastructure as Code, Serverless, Resiliency Patterns, Reactive Manifesto, High Availability, Message Driven Principles

TECHNOLOGIES

Java, AWS Lambda, S3, SQS, CloudWatch, SNS, SES, AWS ElastiCache (Redis engine), REST

TOOLS

JIRA, Confluence, Terraform, AWS CLI, AWS CodeCommit, IntelliJ IDEA, Jenkins, Maven

TEAM

1 Solutions Architect, 1 QA Engineer, 2 Developers, 1 Project Manager



ABOUT THE PARTNER

For more than 25 years, metrologx GmbH, which runs a SaaS solution for the automotive industry, has offered a variety of consulting services and tools for the successful completion of projects for well-known customers in the automotive and manufacturing industry. The Managing Director, KarlHeinz Bulheller, began his career at Daimler AG.

www.metrologx.de

ABOUT PGS SOFTWARE

PGS Software delivers custom-made IT solutions to clients around the globe. We specialise in providing a range of services in Cloud Development, Data Science, and UX/UI Design. Our offer also extends to include Software Development, Business Analysis, and Quality Assurance. Among our existing clients are Yell, Ringier Axel Springer Media, Volotea, and many more.



FOR MORE INFORMATION ABOUT OUR SERVICES:
PLEASE CONTACT US AT **+48 71 79 82 692** OR **Info@pgs-soft.com**
OR VISIT **WWW.PGS-SOFT.COM**