Logistics automation and Diagnostic software

Case Study

SOFT INDUSTRY ALLIANCE

Industries


Manufacturing & Industrial Automation


Logistic & Supply Chain


Hospitality


Healthcare


Education, Entertainment & Media


Governmental

Services


Software engineering & DevOps


Big Data & Analytics


Artificial Intelligence (AI)
& Machine Learning (ML)


Internet of things (IoT)


Virtual Reality (VR), Augmented Reality (AR)
& Mixed Reality (MR)

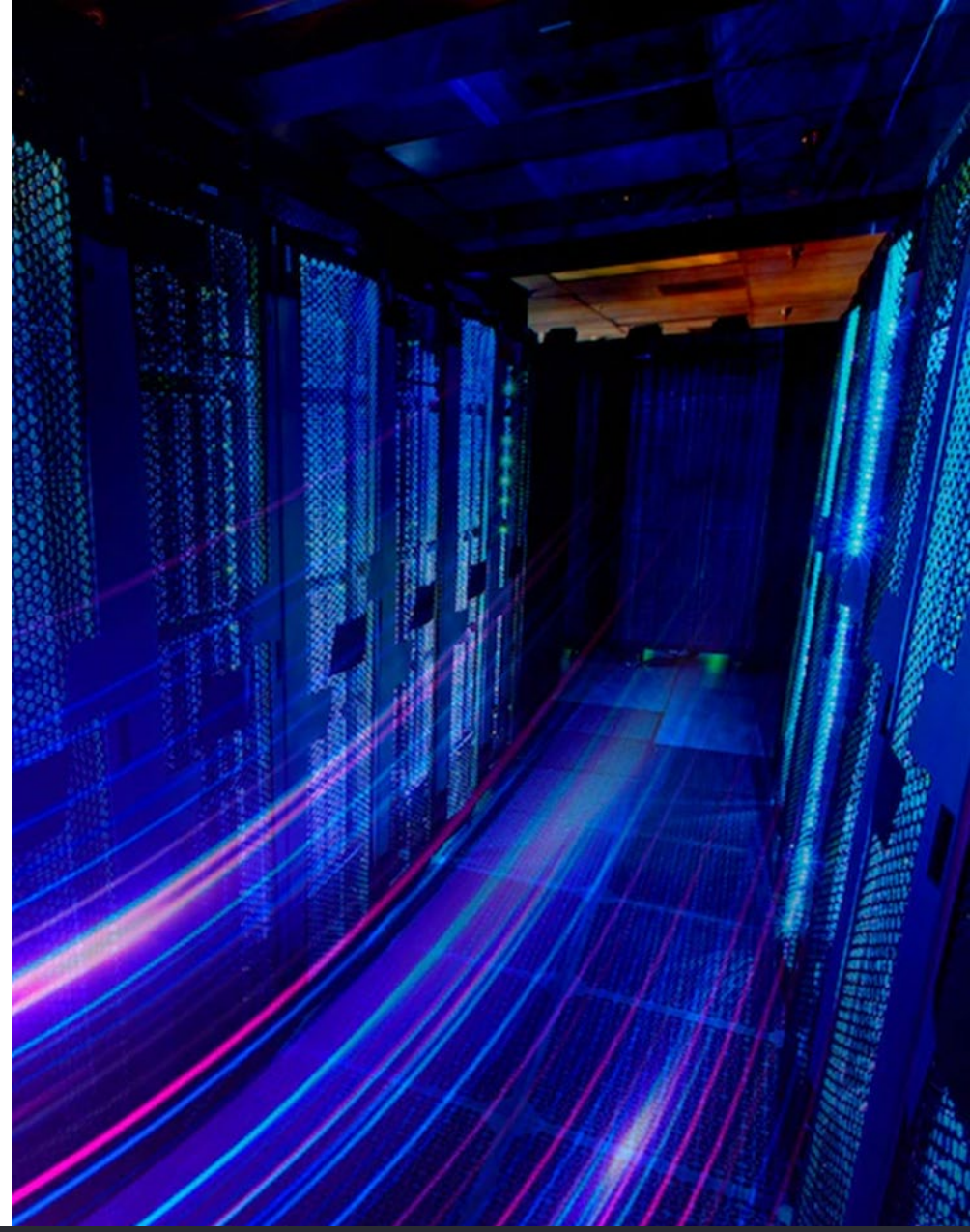

Cloud


Robotics

According to our 22 years of experience we have collected for you examples of our works. You could make sure we have relevant experience for solving your problem.

Continuous growth, development, and at the same time, stability and harmony – this is the concept of the infinity sign. Being placed on our logo, this symbol reflects the Soft Industry's business model: **full software development life cycle and focus on win-win long-term partnership.**

CONTENT



PROJECT DESCRIPTION

Product company from the USA that specializes in software for the largest Fortune 500 logistics and retail operators.
The software solution allows you to identify, diagnose, and solve problems while processing large-scale logistics operations, more than a million per day, such as: sorting, scanning, or sizing equipment, and so on.
The solution allows:

- to determine and collect a large quantity of data on the physical parameters of the cargo that moves along the production line;
- to monitor the status of sorting equipment and conveyor belts in real time at all parts of the chain;
- to analyze, to visualize, and to provide users with the collected information in the form of customizable reports, in accordance with access rights;
- to optimize the work of logistics hubs and the used equipment, based on the collected data

BUSINESS CONTEXT

The customer company has created its own product that covers the needs for automatic cargo tracking of large logistics companies. The product is wider in functionality, lower in cost, and easily customizable compared to similar systems offered to the market by global operators.

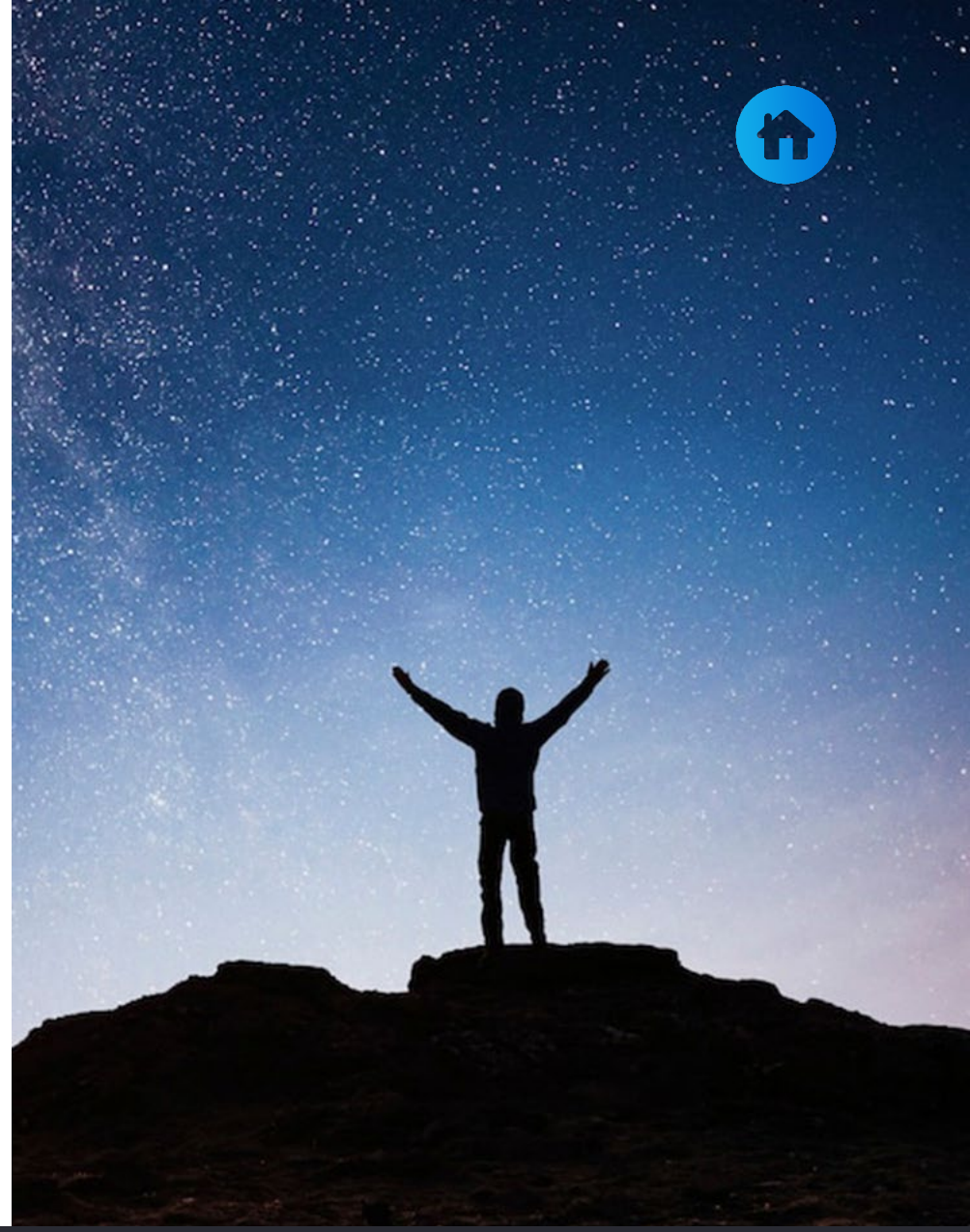
The main pain points of logistics companies:

- speed and safety of processing large amounts of cargo data;
- low speed of calculation of the delivery costs;
- using human labor to recognize bar-codes (noreads) previously unrecognized by scanners;
- loss of operational efficiency of thousands pieces of equipment due to the lack of a system for monitoring their performance in real time;
- limited capabilities of the systems used in the analysis, visualization of reports on the operation of equipment, tracking the location and integrity of cargo

Our specialists were involved in the recommendation for the project from its first stage, as previously, they had successful experience with a similar project in a relevant domain with bigger data and the Splunk analytical system, which was used for the development of the first version of the product.

BUSINESS GOALS / KPIS

- To increase the financial, operational, and service efficiency of customer's logistics client companies
- To increase the speed and accuracy of the processing and recognition of cargo by existing equipment in the clients` logistics hubs;
- To reduce the financial and time costs of using human labor to recognize the types of parcels and to determine damage to the cargo;
- To find ways to increase productivity and optimize the use of logistics equipment;
- To determine the optimal set of hardware in terms of cost / power / wear resistance to maintain the most efficient and uninterrupted operation of the system at high loads;
- To develop a system for prompt access of internal users to information about the location and integrity of the cargo, necessary to provide feedback to customers in case of claims;
- To integrate the Splunk system with the Google Cloud storage and transfer data to cloud servers. Create a single base of 2000 tunnels.



TECHNICAL GOALS / KPIS

We were required to develop a software solution with a wide range of capabilities. Using it, client companies will be able to: quickly receive accurate data on cargo in logistics tunnels, quickly process large amounts of information with subsequent sorting of parcels. The entire array of data is deposited in a secure storage (at the final stage of the project, all information was transferred to cloud servers), which ensures the uninterrupted execution of the client's software functions. An important part of the solution was the ability to collect and analyze data on loading and breakdowns of hardware and logistics equipment in order to keep them up and running in an ever-increasing operational load.

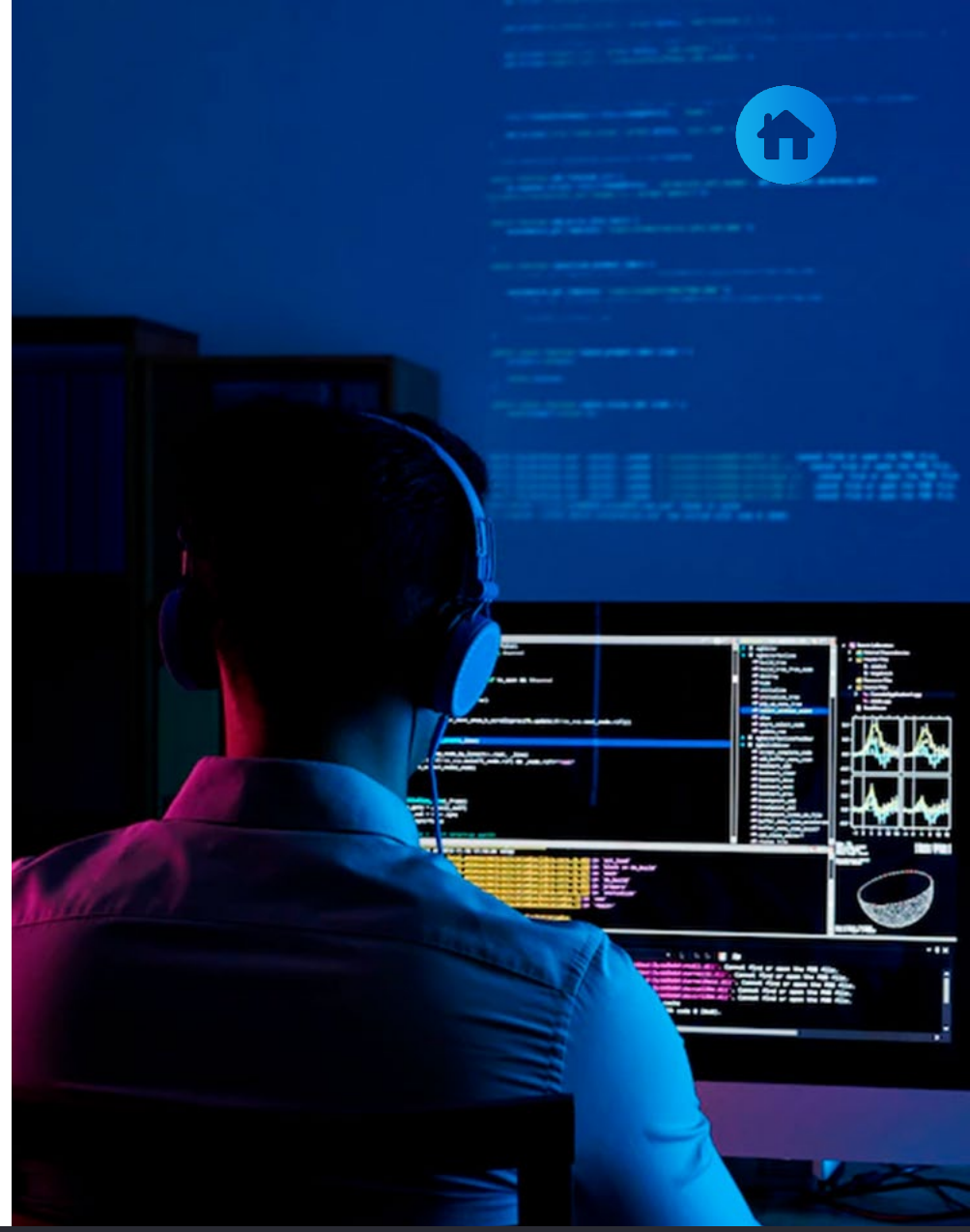
For the effective implementation of the tasks:

- A remote center for testing hardware and software load has been created, where the work of the system and logistics equipment is simulated without their direct participation.
- Round-the-clock software support was provided for all elements of the system of client companies.
- The process of automated remote installation and updating of OS and software was implemented without the participation of the staff of the client companies.

STACK / TECHNOLOGIES USED

Technologies:

- OS: Linux (Centos, Red Hat, OpenSuSe)
- Databases: SQL, MongoDB
- Languages/Platforms: Java, Java Script, Python, BASH
- Frameworks/Libraries: Splunk, Ansible, java enterprise server, Flask, React
- Servers/Cloud: java enterprise server
- SQA standards: ISO 25010, ISO/IEC 12119, ISO/IEC 27000
- Technical environment: HyperVisor (ESXI), WSGI, VM, Jenkins, Docker
- Cloud standards: GCP, Google Cloud AutoML, Google Cloud Storage
- Machine Learning: OpenVino, Tensorflow, Triton, TensorRt, Tunnel onsite
- Integrations: Splunk



TECH CHALLENGES

Non-obvious choice of the technology stack for working with huge amounts of data in the early stages of the project.

High pace of updating models of logistics equipment which were not adapted to a specific system.

Restrictions from client companies on the used versions of Java and Linux.

The need to constantly update those stack for machine learning.

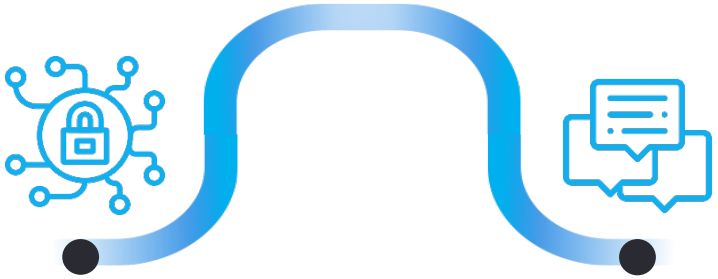
Inability to use available equipment in logistics hubs.

A large number of hubs and tunnels that required constant monitoring of workload and performance.

Lack of widely used AI training technologies to automate cargo recognition.

The need for remote installation of software on more than a thousand pieces of equipment of a client company with wide geography.

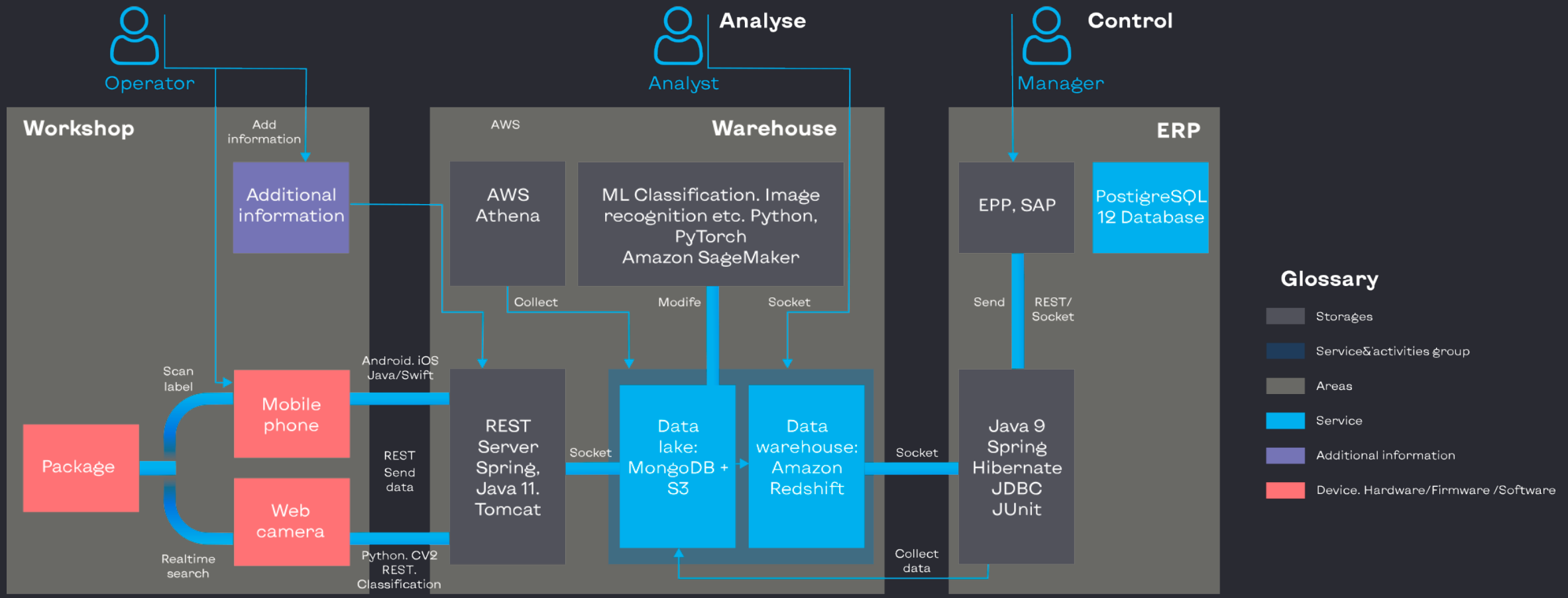
BUSINESS CHALLENGES



Compliance with the information security requirements to the F500 list leader standards.

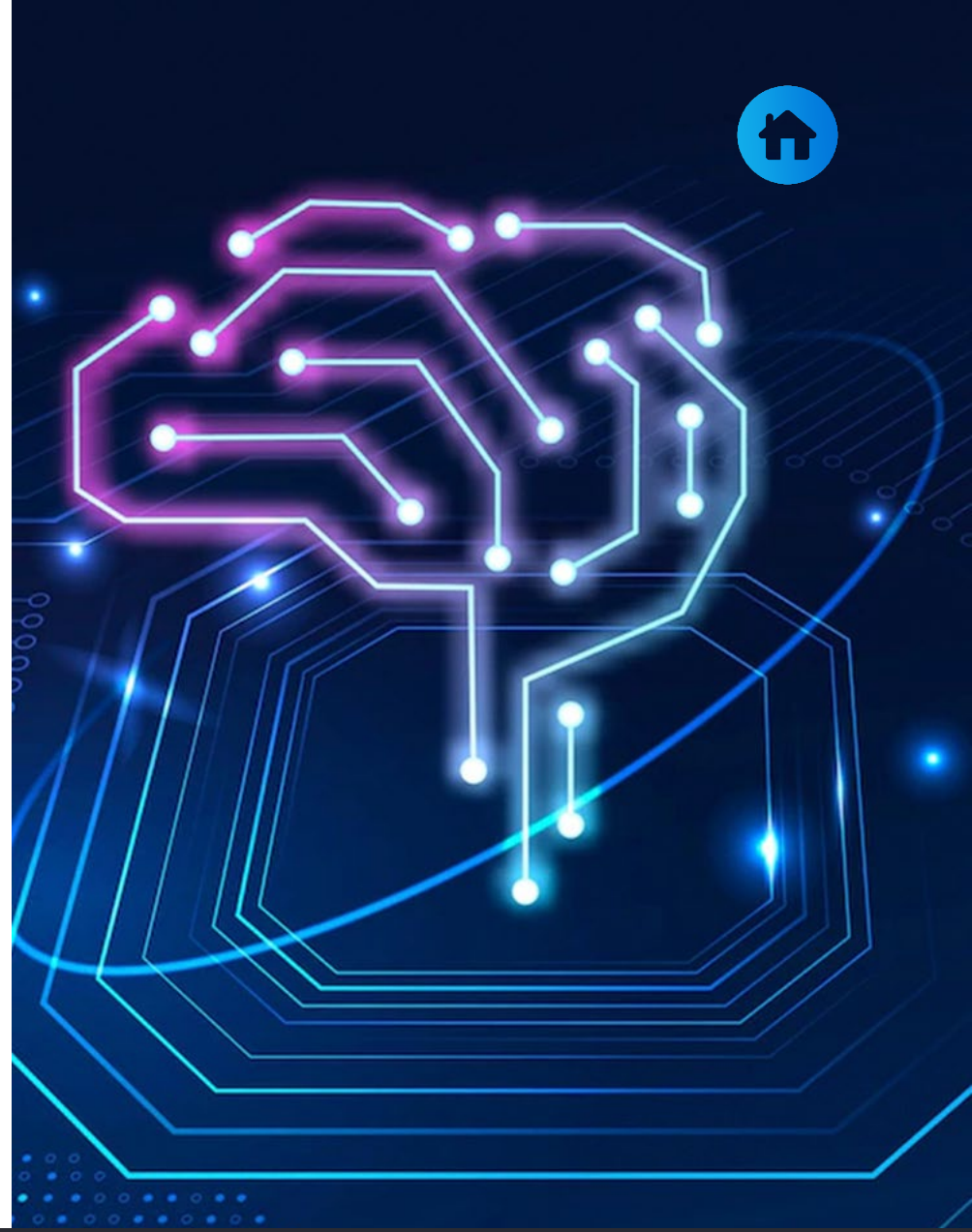
All tasks and feedback are transferred without direct access to the customer's system in a limited format.

SYSTEM STRUCTURE



TECHNICAL OUTCOMES

- The ability of the system to collect, analyze and store millions of terabytes of information according to the security standards of the client-customer.
- Access to system data was provided in accordance with the functional staff hierarchy.
- Automated synchronization and acceleration of the process of installing and updating OS and software on existing equipment in the logistics hubs of the client companies.
- Automation of the process of the cargo type recognition.



IMPACT ON BUSINESS

Reducing failures, increasing uptime and efficiency, and predicting equipment breakdowns through continuous monitoring and analysis

Increasing the overall efficiency of the logistics hubs by predicting the workload and redistributing the load

Increasing the efficiency of staff work due to the rapid response of the system to receiving data on the cargo

Reducing the involvement of the human resources by automating the system of monitoring and recognition of noreads (unreadable barcode)

Up to 20 times increase in noread recognition with constantly learning AI

Reducing the period and amount of equipment downtime due to the work of the support service

Reducing downtime of the logistics hubs through synchronized automatic installation and software updates

Maintaining system performance by backing up and storing data on servers located on different continents

TEAM

01 **Analytical stage:**
Project manager, Data analyst

02 **Supporting stage:**
Project manager, Team lead, QA

03 **Developing stage:**
Team lead, Splunk Python developer, AI Python + Java developer, Java developer - 1, Java Script + React.js developer, Front End (interface layout), DevOps – 2 person, QA, AQA

IMPLEMENTATION

Timing: 2 years.
MVP: Development of a system for analytics and visualization of large amounts of data

- creation of a software solution for collecting and storing millions of terabytes of data on cargo parameters;
- visualization of operational and reporting information with the provision of a certain access to the system functions.

Timing: 2 years.
MVP: Expansion of the information collection and analytics system, improvement of the functions of existing applications

- adaptation and implementation of the existing analytics system for new customers.
- reconfiguration from the CentOS operating system to Red Hat for integration with the custom architecture.
- development and implementation of a software solution for remote installation and updating of software on all customer equipment connected to the system.
- introduction of new logistics models, measuring and recognition equipment in the logistics tunnels.
- development of a system for analyzing existing equipment and recommendations for its optimization and replacement.

IMPLEMENTATION

Timing: 11 months.
MVP: Development of an algorithm for the support service and its launch. Main stages and tasks

- development of a software solution and the formation of a system support department with the function of diagnosing the operability of the system and equipment, identifying congestion, errors in the operation of logistics hubs and consulting local staff to eliminate them.

Timing: 11 months.
MVP: Development and transition to a new version of the software solution in order to increase the speed of data processing and increase the accuracy of recognition

IMPLEMENTATION

Timing: 4 years, under development.
MVP: Automation of the process of collecting information and determining the type of parcels using Artificial Intelligence and Machine Learning. Main stages and tasks

- development of a solution based on AI technology to automate the process of collecting cargo data;
- creation of a laboratory for modeling the workflow of a logistics hub and training artificial intelligence;
- using machine learning to improve the percentage of recognition of unidentified cargo moving through logistics tunnels up to 20.

Timing: 1 year, under development.
MVP: Transition of the system to cloud servers. Main stages and tasks

- integrate multitude of tunnels into a single database with shared access and storage.
- Integrate Splunk and Google Cloud Service.

OUR CONTACTS

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