Worldwide operating logistics company: AI-based system transparency increases customer satisfaction

"T-Systems designed and deployed an AI-based real-time alerting system notifying all relevant channels (customer support, incident response team) in case of outages."

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Transport and logistics play an important role in the business activities of enterprises. In an era of intense collaboration beyond the borders of an enterprise, efficient supply chains are key to business success. Big logistics companies deliver hundreds of thousands of packages each day to keep supply chains alive.

In the business customer segment, logistics providers offer their customers enhanced flexibility: Customers are provided with, e.g., access to the logistics company's systems. They can then print shipping labels for their goods and packages on demand and on their own. The availability of the respective system is essential for an efficient package delivery process. If the system is down, delivery will be delayed. This will negatively impact the customer relationship and the company-internal processes, both of the sender and the receiver of the goods.

All things considered, the reputation of the logistics provider will suffer from unavailable systems. Results are a negative customer experience and revenue loss. The customer, a global logistics company, approached T-Systems to create a solution that would enable effective monitoring of critical interfaces to their customer-facing systems.

At a glance

- Disruptions and outages of the landscape for customer-facing shipping label system
- No transparency on the outage makes informing clients impossible
- T-Systems implemented a machine learning model to detect anomalies in internal metrics as well as external data based on the application and alerts relevant channels in real time in the event of an outage
- The client now has real-time insights and gets an early warning about system outages
- His customers get an early heads up reducing incoming customer support inquiries
- The new AI-based solution shortens downtimes and costs
- Improved customer satisfaction

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Reference in detail

The challenge

A multi-national logistics provider was repeatedly facing disruptions and outages of their landscape for these customer-facing systems. Business customers were not able to print shipping labels. What's more, the logistics company had no information about the outage and could not inform their customers. The outages were occurring without any warning or indication from the source systems that were causing them. And even though the heuristics for these issues were known, they were not automated, making the redressal process complicated, time-consuming, and costly. The company needed rapid root-cause analysis and problem resolution to maintain trouble-free operations at all times.

In 2021, the customer approached T-Systems to create a solution that would enable effective monitoring of critical interfaces to their customer-facing systems.

The solution

T-Systems systematically addressed all the pain points of the customer through a machine learning model that detects anomalies in internal metrics as well as external data based on the application and alerts relevant channels in real time in the event of an outage. T-Systems collected and prepared the relevant customer's data, developed and trained the machine learning model with process insights of the customer's experts. The data-based approach reliably detects anomalies in the operations processes.

The solution comprises three functionalities: It enables early and automatic detection of outages for the shipping logistics system for business and major customers. It introduced an alerts system with automated workflows which enabled outage notification to central monitoring systems giving the logistics company the opportunity to inform their customers. The notifications from this real-time alerting system are sent out to customer support, incident response teams, and systems via e-mail, SMS, or Teams Webhook.

Last, but not least, the solution also mimics the strategies of the experts to perform root-cause analysis for incident detection.

Data Sourcing & Processing

- Application metrics (#successful/failed requests, error codes, response times)
- Systems metrics (SPU/memory load, network metrics)
- External outage notifications

▶ Feature Generation

- Basic features like gradient, difference, moving average/std. dev., quantile ranges…
- Short time Fourier transform, wavelet transformation
- Topological features: persistent homology, time delay embeddings

Anomaly Detection

- Heuristic model and decomposition model as reference
- Combination of different weak learners and boosting model
- Autoencoder Forest & Transformer Model

Monitoring & Alerting

- Dashbord
- Model Monitoring
- Alerting System (E-Mail, SMS, Webhooks)

Outage detected

Systems Dashboard
Status RED since 17:56:15.423 CEST
Prior: ORANGE
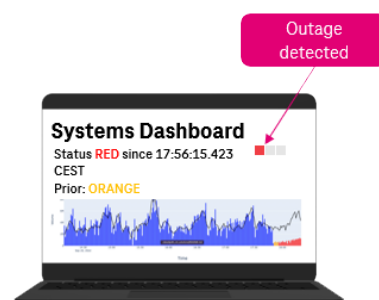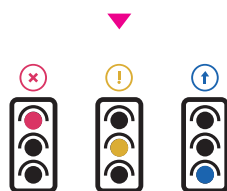
Customer benefits

The solution solves a bugbear. The customer now has real-time insight and gets an early warning about system outages. He is able to give their customers an early heads up reducing incoming customer support inquiries.

Furthermore, the new AI-based solution shortens the downtime considerably as root-cause analysis is performed automatically. This also means that internal efforts for problem resolution are substantially decreased minimizing costs for downtimes.

The solution leads to higher system availability and transparent information to all parties. The logistics company can reduce the impact of system disruptions leading to a better customer satisfaction in the long-term. In the next step the machine learning model can be developed into a predictive maintenance model allowing the logistics provider to be ahead of outages and to avoid them.