

Lean risk management philosophy to reduce flight delays

„By 2040 average flight delay in Europe will increase by 66%”

- Eurocontrol

WHY FLIGHT DELAYS ARE ONLY GETTING WORSE

Average delay per flight in Europe in 2016 was 12 min. and according to Eurocontrol's forecast the number will hit 20 min. delay per flight by 2040 and especially large European hubs will be congested. Each minute of delay for the whole network costs on average 81 EUR. 45% of delays in Europe are reactionary— caused by delay on the same aircraft, crew member or connecting flight earlier that day. The largest remaining group - 30% of delays relates to ground handling, which in turn then create additional reactionary delays.

While Eurocontrol has some initiatives to gather and combine inter-airport data to optimise flow management (while aircraft is in the air), there is lack of tools to systemically

optimise activities while aircraft is on the ground. A lot of flight data is available, but due to lack of experience and newness of technology, aviation actors already do not know what to do with the data that they have, let alone strive for multiple data set fusion and optimisation on the system level.

Rather than being told to somehow make use of the data, aviation industry needs a strong framework that pre-digests the data and highlights the areas they should analyse deeper. Current trend of employing data scientists and try to do everything in-house is neither fast, nor efficient and highly unnecessary. Technology that can help replacing this is there: it is time to open up for it and let it do the magic.

EL SIS SOLUTION: LEAN PHILOSOPHY COMBINED WITH RISK FOCUS

With low margins, aviation industry players can really benefit from implementing LEAN philosophy. Many aim to do that and look for small reductions of waste, however some old habits are hard to change. One of the reasons is extreme focus on safety – for a good reasons. Most employees are trained to not question, but always follow the process to the minor detail. This is done to ensure that no safety procedure is missed. However, that also means that some legacy processes that are left from the times back when airtravel was rare and luxurious.

The way forward is to implement LEAN philosophy together with risk based analysis. Any process can be analysed and changes simulated at the same time making sure that risk profile does not increase. This helps to separate processes that are truly wasteful from those that may seem wasteful but instead help to improve safety. Our solution automates this analysis by combining internal and external data with insights in the existing processes and KPIs. The customers can get a visualised overview of the current status, simulate changes and – once they are ready – let the system learn and autonomously decide the best solution.

Compliance and risk management are not the opposites of LEAN – they can go hand in hand.



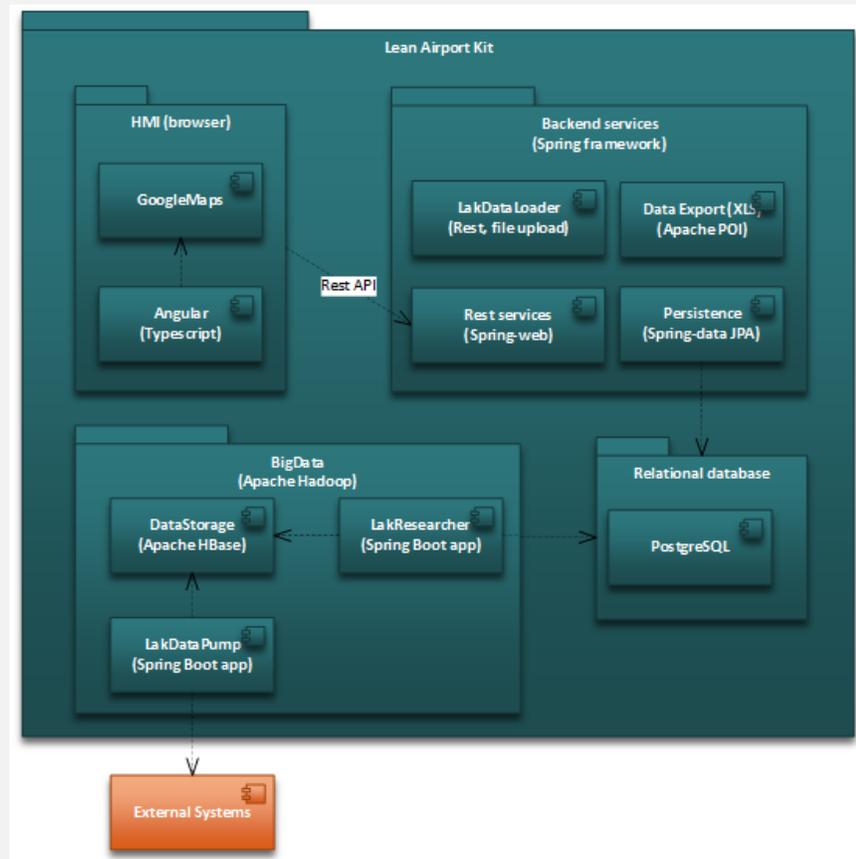
LEAN DATA MANAGER ARCHITECTURE

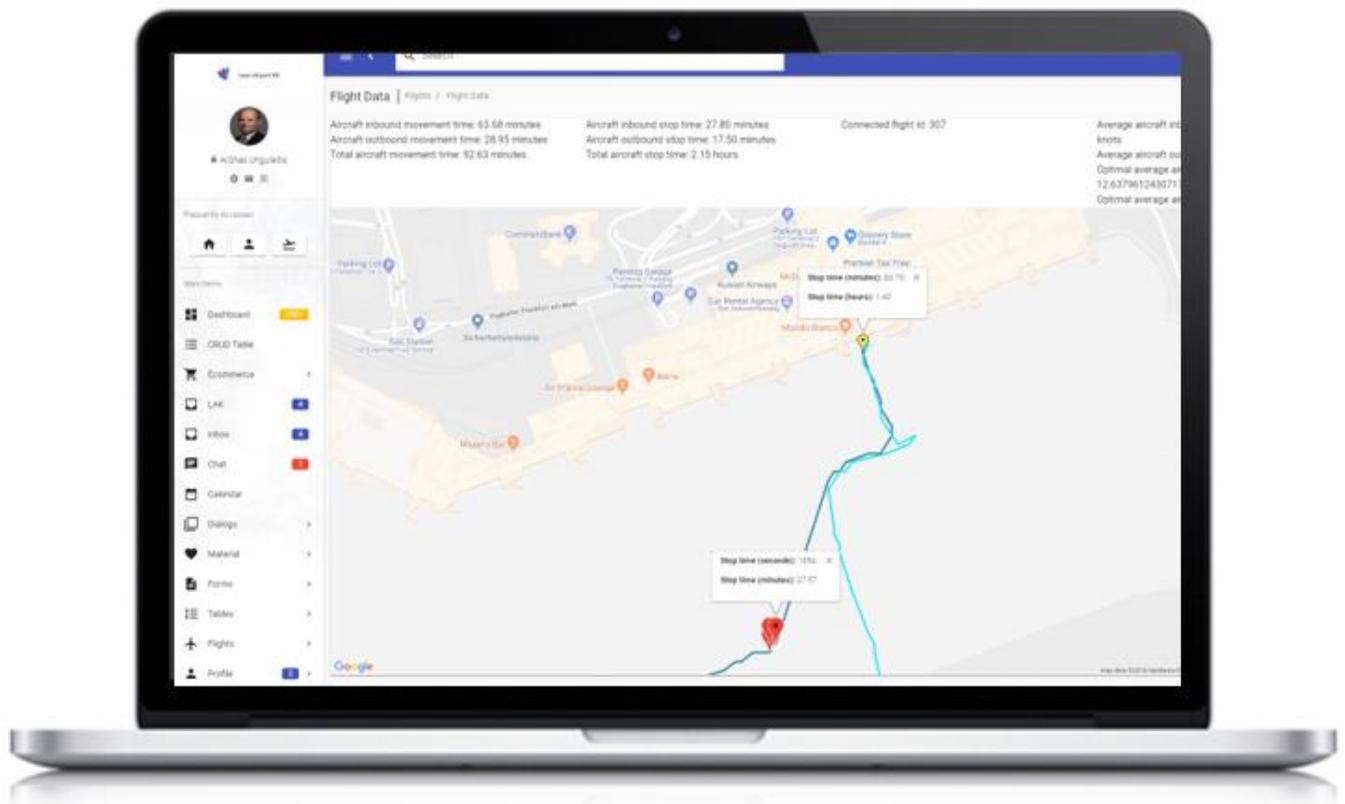
Lean Data Manager a service platform with ground activities optimisation algorithm, which allows airports and airlines increasing throughput and reducing delays by delivering:

- **One common database:** it collects flight data using ApacheHadoop framework from both publicly available sources and customer's proprietary data and calculates aircraft movements as well as ground handling operation data for each flight for each actual airport or airline, which are not available due to lack of aggregated and timely information in centralized location.

- **Visualization for easy decision making:** the system visualizes the data using LEAN philosophy and d3.js framework to clearly show bottlenecks and inefficiencies (HMI part in the architecture). For organizations that add their own proprietary data the system will provide more insights according to the added data.
- **LEAN risk management based algorithm:** Currently, causes of delays are identified post factum. Lean Data Manager helps to identify problems in real time and using risk management methods suggest optimal solution (LAKResearcher part in the architecture).

Aviation ecosystem misses valuable insights despite creating massive amounts of data.





HOW ELSIS DECISION SUPPORT KIT CAN HELP OTHER INDUSTRIES

Process analysis, optimisation using LEAN risk management approach and potential to autonomously manage it using internal and external data sources can be applied beyond aviation industry and used in:

- **Smart energy distribution** (enhancing or replacing currently existing control centers)
- **Healthcare** (efficiently managing processes and resources within a hospital)
- **Transportation** (creating systemic overview and removal of bottlenecks in a transportation system)
- **Manufacturing** (enhance existing SCADA systems with continuous LEAN optimisation)
- **Smart Buildings** (proceed towards autonomous solution that continuously works towards optimal conditions and lowest energy consumption).

ABOUT ELSIS

- Elsis was established in 1991 and has over the past 26 years grown to be a leading player in the Baltic region within information technology and communications (ICT) and intelligent engineering systems.
- We create innovative decision support software and custom-made integrative solutions combining our experience with newest technologies and non-standard thinking.