SESAR JOINT UNDERTAKING

9th SESAR Innovation Days

SlotMachine

A Privacy-Preserving Marketplace for Slot Management

Research Content & Motivation:

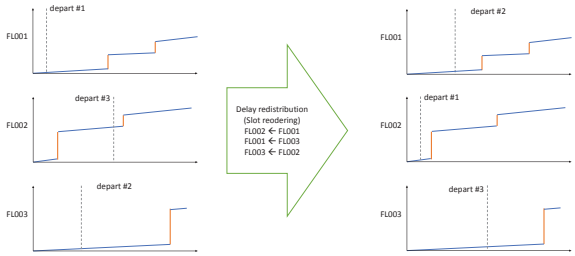
User-driven Prioritisation and Slot Management
- improve utilization of available resources
- prioritize flights to save costs
- execute ATFM slot swapping

Digital Marketplace and Privacy
- design efficient market mechanisms
- preserving business secrets such as flight-specific estimated costs

Blockchain and Cryptographic Methods
- enable trustworthy and privacy preserving slot swapping
- hide individual bids in a decentralized setting
- perform Multi-Party Computation for best bidder determination

Solution:

Each flight has a unique and non-linear cost structure based on passenger flow, airport curfews, crew and pilot constraints, or aircraft maintenance. Significant cost savings are possible by optimizing the departure sequence across airlines.



Outlook & Benefits:

- **Reduced delays** due to optimising flights ordering across airlines' fleet
- **Less CO_2 emission** because of prioritizing operationally important flights
- **Evolutionary Algorithms** recombine and mutate existing slot configurations ranked by fitness value to obtain new solutions
- **Privacy Engine** balances trade-off between business secrets and traceable auctions

Consortium:

SlotMachine proposal was submitted to SESAR-ER4-27-2019: Future ATM Architecture:
- **FREQUENTIS** AG – Consortium Lead
- **Austrian Institute of Technology** GmbH
- **Johannes Kepler University Linz,** Institute of Business Informatics – Data & Knowledge Engineering
- **EUROCONTROL**
- **SWISS** International Air Lines AG

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2 – 6 December 2019
Athens, Greece

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