Introduction

Severe weather conditions can reduce the arrival capacity at any given airport. How can the Federal Aviation Administration (FAA) deal with arrival reduction in order to manage airport congestion?

Ground Delay Programs (GDPs)

The flights headed for this airport are delayed before departure (Ground Delay Program) in order to alleviate any further congestion at the airport.

Current resource allocation process:

- FAA: initial "fair" slot allocation
- Airlines: flight assignments/reassignments
- FAA: periodic reallocation to maximize slot utilization

- Ration By Schedule (RBS)
- Compression

Cost ($)

Delay (min)

Cancellation time/cost

Simulation

2-for-2 slot trading is a more restricted version of basic k-for-n slot trading. It simplifies the structure of the slot exchange, but does it allow for a fair amount of possible exchanges?

This simulation is based on real data, but we remodeled the behavior of the FAA and of the airlines.

- Cost function of the flights: to identify which trades the airlines would propose and the "internal value" of each one.
- Strategy of the FAA: FAA mediation strategy and efficient method to solve the problem.

First Results

On-time performance:

- All the flights have the same cost function.
- All the airlines try to minimize the number of flights that are delayed for more than 15 minutes.

Trade Mechanism

- Efficient offer representation
- Compression

How to Improve the Procedure?

Compression can be interpreted as 1-for-1 slot trading between different airlines. An advanced trade mechanism (2-for-2, k-for-n…) can substantially improve results…