TBO in Flight Planning
&
Risks and potential issues of the FF-ICE implementation from a CFSP perspective

FL/GHTKEYS

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A CFSP based in Vienna, Austria

Presentation at the ICAO APAC FF-ICE Ad hoc Group Workshop
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TBO in Flight Planning

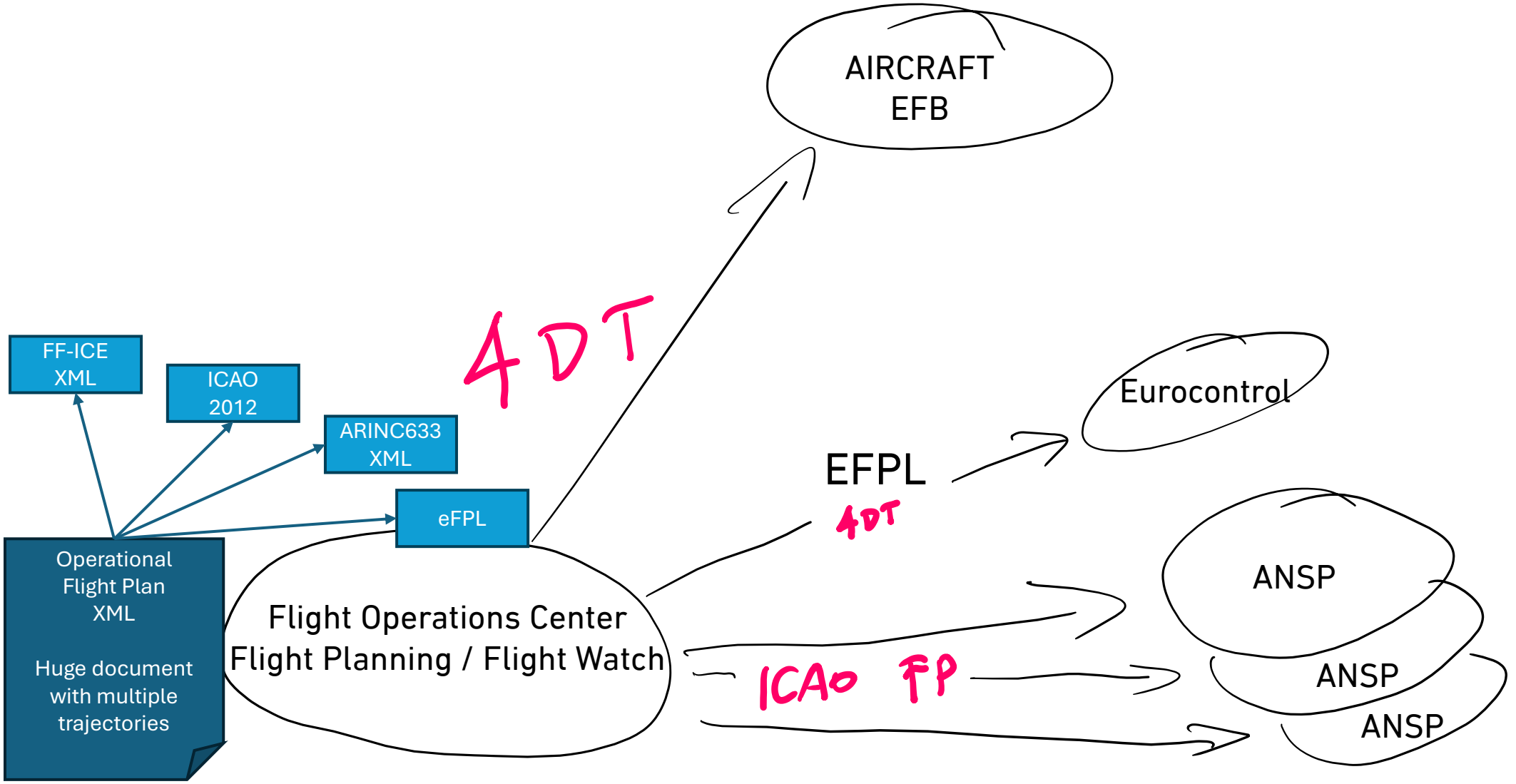
FL/GHTKEYS

- Youngest CFSP (~9 years since the founding)
- We developed the most modern flight management system from scratch
- We are the largest Provider of RAIM prediction services
- Flight Planning Customers:
  - Largest provider for flight planning for Business and General Aviation with > 250.000 flight plan computations per day on average
  - Three major US airlines
  - Major airline out of New Zealand
  - Major European operators (Jet2.com, TUIFly, VistaJet)
  - And many more....
- With our system our airline customers flight plan and flight watch ~ 10000 flights per day, soon > 15000
- Inflight trajectory re-optimization tool called Loretta

TBO activities

- Flight Planning systems are per se **trajectory based** (already **since the 1990s**)!
- We started to work on TBO in **2010** (SESAR)
  - Predecessor of FF-ICE (FIXM) called *extended flight plan* (eFPL)
- First TBO trials with Eurocontrol in **2012**
- In Europe (ECAC region / Eurocontrol) the filing method **is already 4DT capable** since 10+ years
- Trials with the FAA with CSS-FD in **2022**
  - Main limitation is FAA's ERAM system, which is not TBO capable
- Trials with the Eurocontrol's FF-ICE Services in **2022**
- SESAR TBO project started in **2023** for FF-ICE **R2**
  - With first trials in **Q1 2025**

Where does a 4D trajectory go today already?



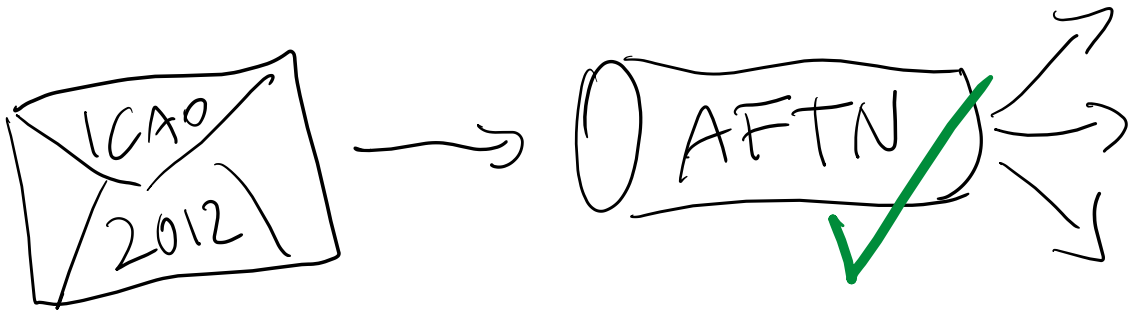
Risks and potential issues of the FF-ICE implementation from a CFSP perspective

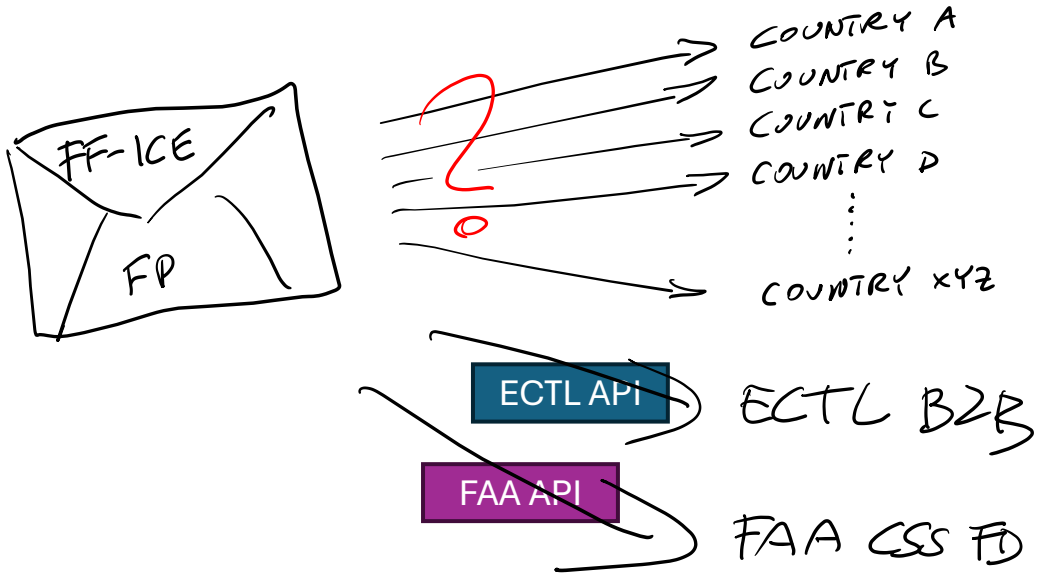
No standard message channel defined

ICAO FF-ICE defines the message payload via the FIXM XML Schema.

ICAO FF-ICE **DOES NOT** define the message channel to be used to distribute (file) FF-ICE Flight Plans. This creates a huge problem and complexity, since large parts of the world are not collaborating via a centralized SWIM and the individual SWIM networks are also not connected.

In the worst case each CFSP would need to **implement 100s of different APIs for each country**, which is not feasible.

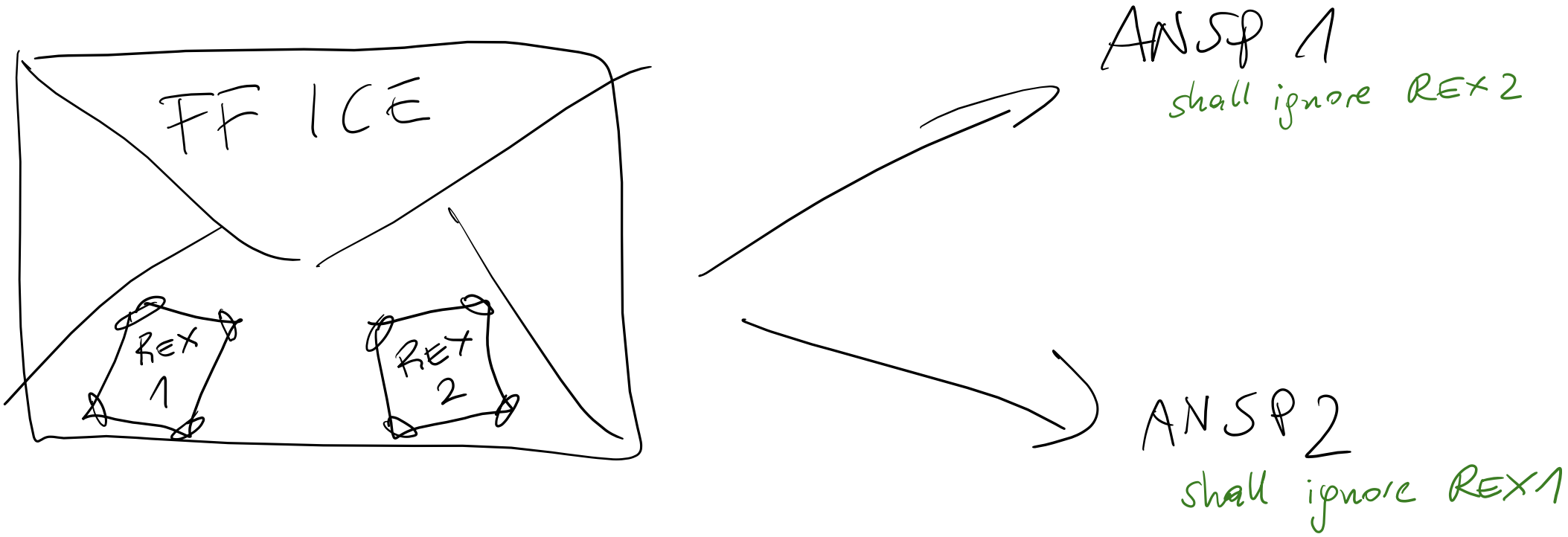




Conflicting regional extensions

“Unknown” Regional Extensions shall not cause an FF-ICE Flight Plan to be rejected. If an authority does not understand a regional extension, it shall be ignored.

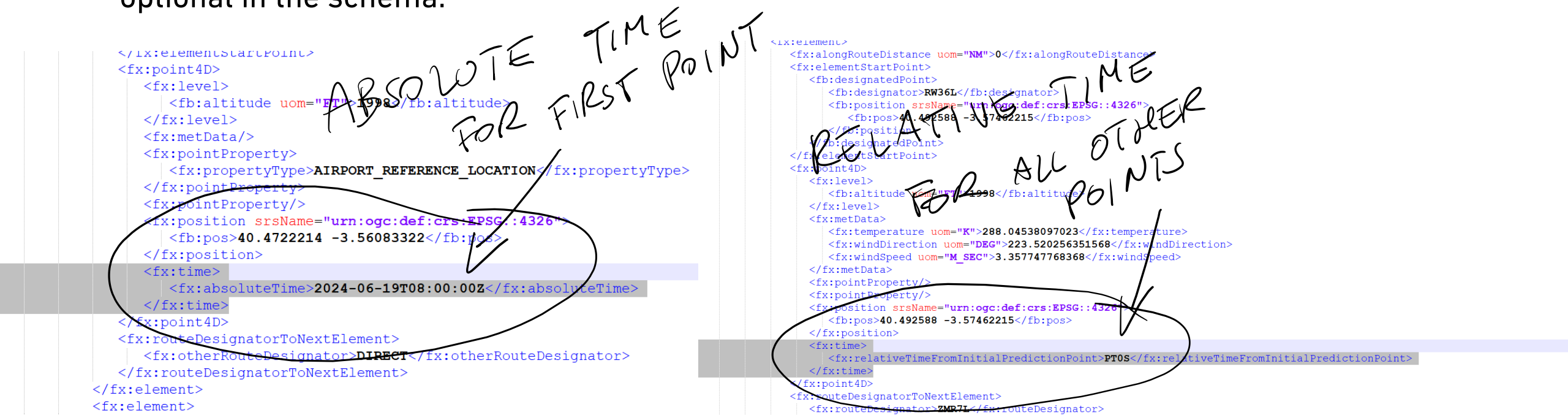
This is to avoid that multiple individual FF-ICE Flight Plans have to be filed.



Local rules

Local soft rules applied to the FF-ICE Flight Plan shall be kept at an absolute minimum. We are currently seeing soft rules being applied in a contradictory way by different authorities, which prevent a single FF-ICE Flight Plan to be filed.

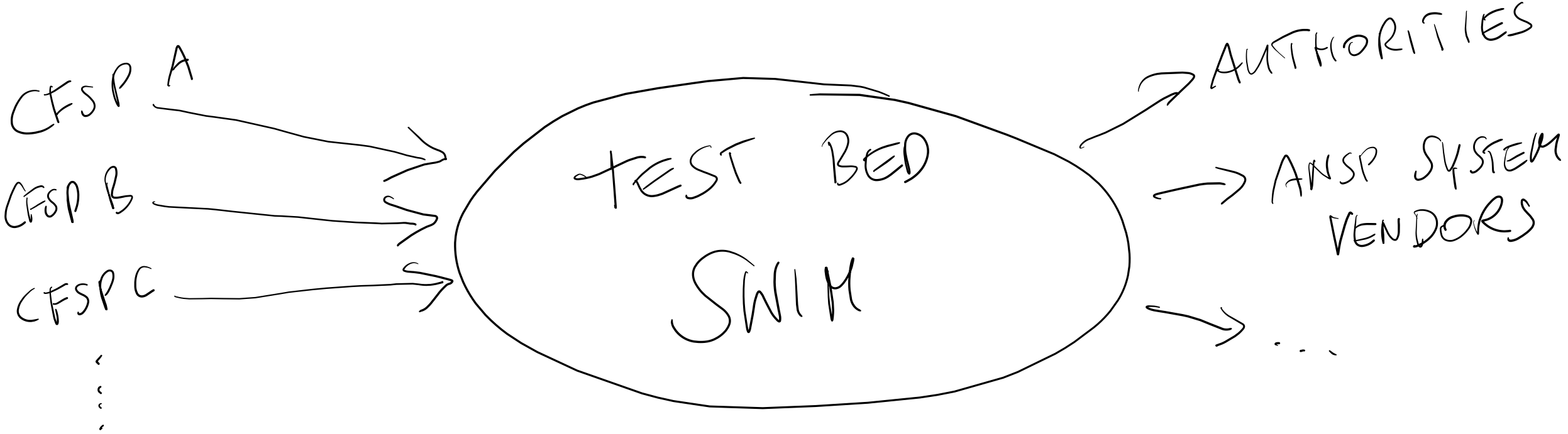
Example of a “soft rule”: a field is conditionally mandatory for a certain authority, even though optional in the schema.



Lacking A Centralized Global Test Bed

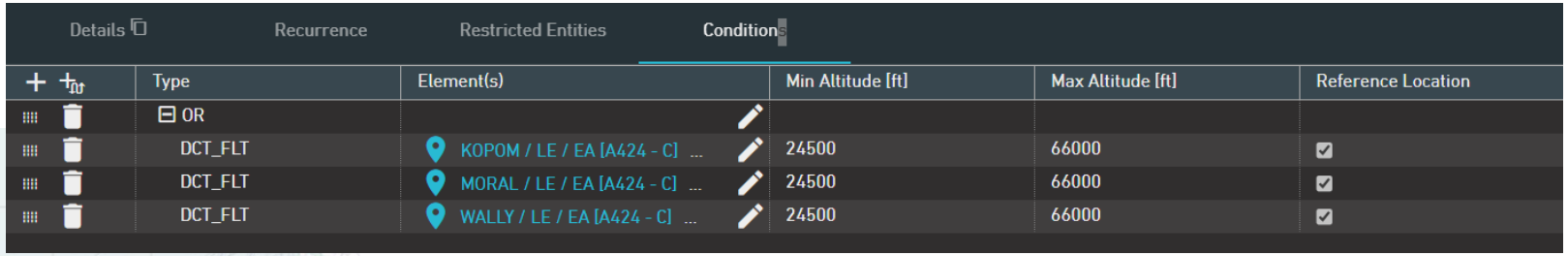
For CFSPs as well as ANSP system providers around the globe it would be very beneficial (if not even required) having a centralized test bed, to avoid the burden of testing FF-ICE flight plans which each country individually.

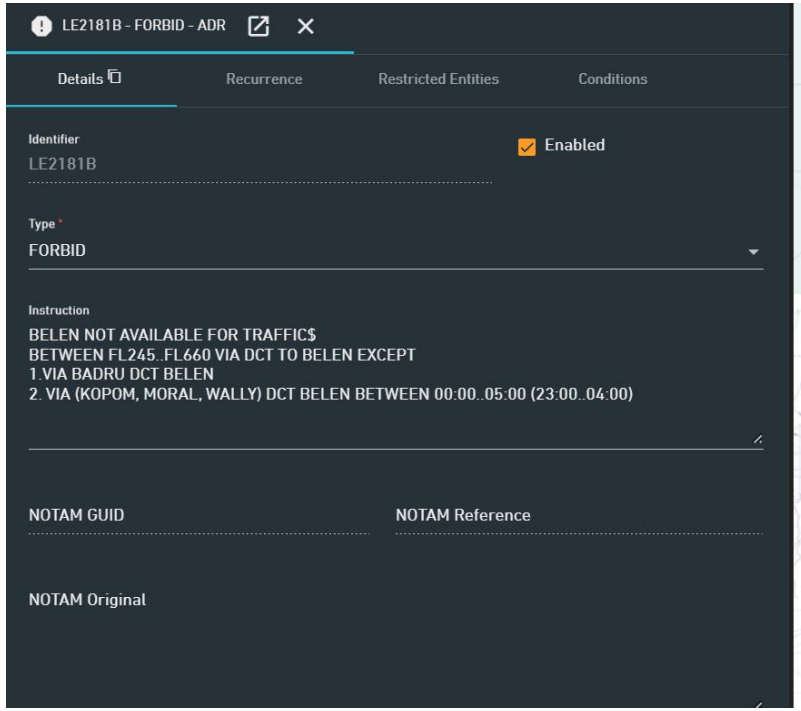
This is expected to be a very critical piece in ensuring the global timelines can be met.

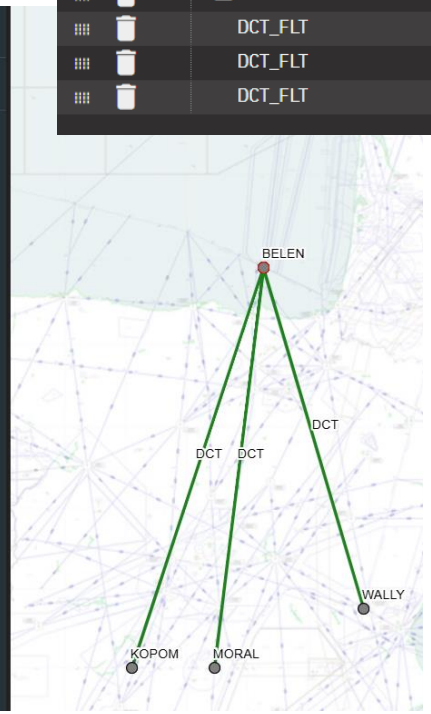


Lacking Standardized And Centralized Constraints Publication

Constraints publication must be standardized and ideally centralized and modelled in a collaborative way, to avoid that each country implements a different flavor.



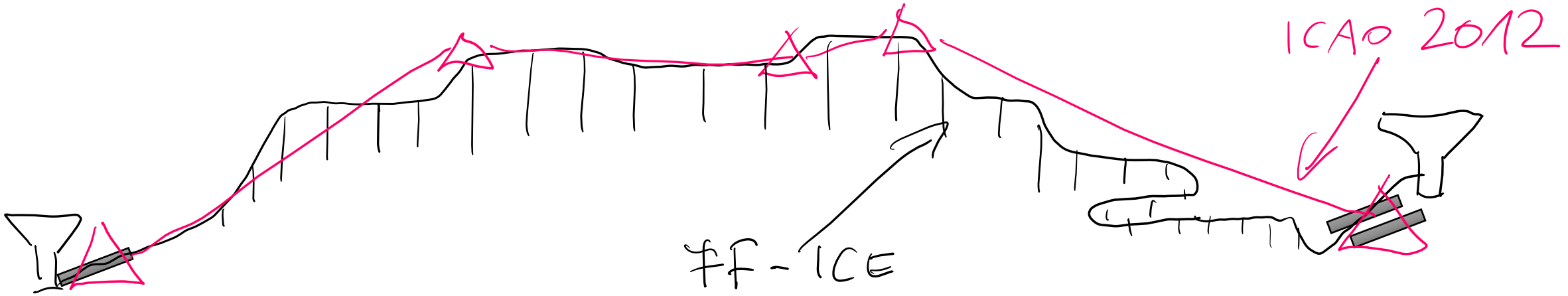




Expect 4D Trajectory Surprises

The FF-ICE Flight Plan contains much more fidelity compared to the ICAO2012 Flight Plan. This must be considered for flight data processing.

- Multiple CLBs or DESs on long segments
- Complete lateral SID/STAR route
- FL profile in SID/STARs
- Trajectory is planned from gate to gate
  - ABCD RW01 SID1A AB123/F250 SID1A AB234 SID1A
    PTA/F320 DCT PTB/F380 AW123 PTC/F240 STAR1B XY456/F180 STAR1B XY678/F080 STAR1B RW18L EFGH



Thanks!

Thanks for having had the chance to be here this week!

Hopefully in the future,
more CFSPs can be part of such discussions and meetings
and ANSP system providers should as well

If you want to stay in contact:

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