

FULLPOS **and its possible evolutions**

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INTRODUCTION

- FULLPOS is the **post-processing package** contained inside the software ARPEGE/ALADIN/AROME.
- It was conceived **inside the ARPEGE/ALADIN software** in order to
 - re-use the model scientific operators
 - benefit from the High Performance Computation architecture of the model
- It is used both for
 - **back-end post-processing** (maps, ...)
 - **models geometry conversions** (change of resolution, lateral boundary data, etc)



THE PRICE OF THE FAME

- There are **more and more demands on Fullpos** :
 - **from the end-users** (more fields, on various grids, at higher frequencies)
 - **from the forecasting models** (more ensemble members, more coupled models, higher frequency of couplings)
 - **from the research in assimilation** (object-oriented code)
- not to mention the **perpetual HPC pressure** to get the products faster and faster

RECENT SUCCESSES ... AND PITFALLS

- **FULLPOS-2** : a major re-write for the early developments of OOPS, to the benefit of flexibility and performance
- Boyd biperiodization, output grids larger than model grids : **bringing innovating concepts**
- ✘ SURFEX fields interpolated by Fullpos :
Scientific operators without data locality are hardly compatible with HPC

WHAT IS HAPPENING AT ECMWF ?

- ECMWF uses FULLPOS and is happy to rely on Meteo-France for its maintenance
- There are other tools under development at ECMWF to do interpolations but (I believe) for other purposes (at least for a couple of years) :
 - Interpolation software (MIR) for end-users (MARS, Web, ...)
 - Atlas for constructing grids (model first)

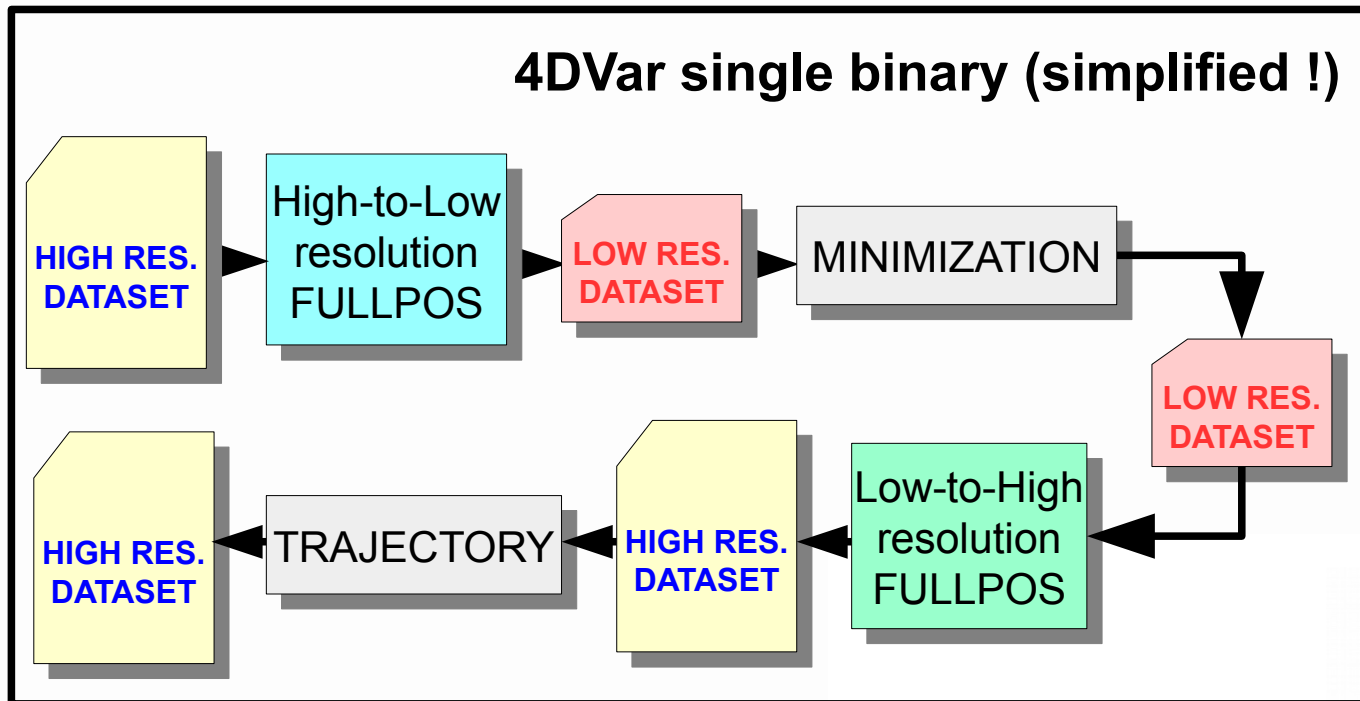
WHAT'S UP IN THE OUTSIDE WORLD ?

- The volume and performance of the post-processing seems to be a growing issue
 - *ICAS 2015 : more time spend in post-processing of ensemble forecasts than running the ensemble forecast !!*
- But the definition of « post-processing » can lead to mis-understandings (it can be far-end post-processing for users, statistics, ...)
 - *=> beware of the diversity of post-processing products and its compatibility in the HPC world !!*



Coming soon : FULLPOS AND OOPS

The so-called « OOPSification » of the post-processing package FULLPOS aims to execute the 4DVAR assimilation inside a single executable file.



SUGGESTED STRATEGY

Let's be pragmatic :

Progress steadily toward a complete
Object-Oriented framework for Fullpos

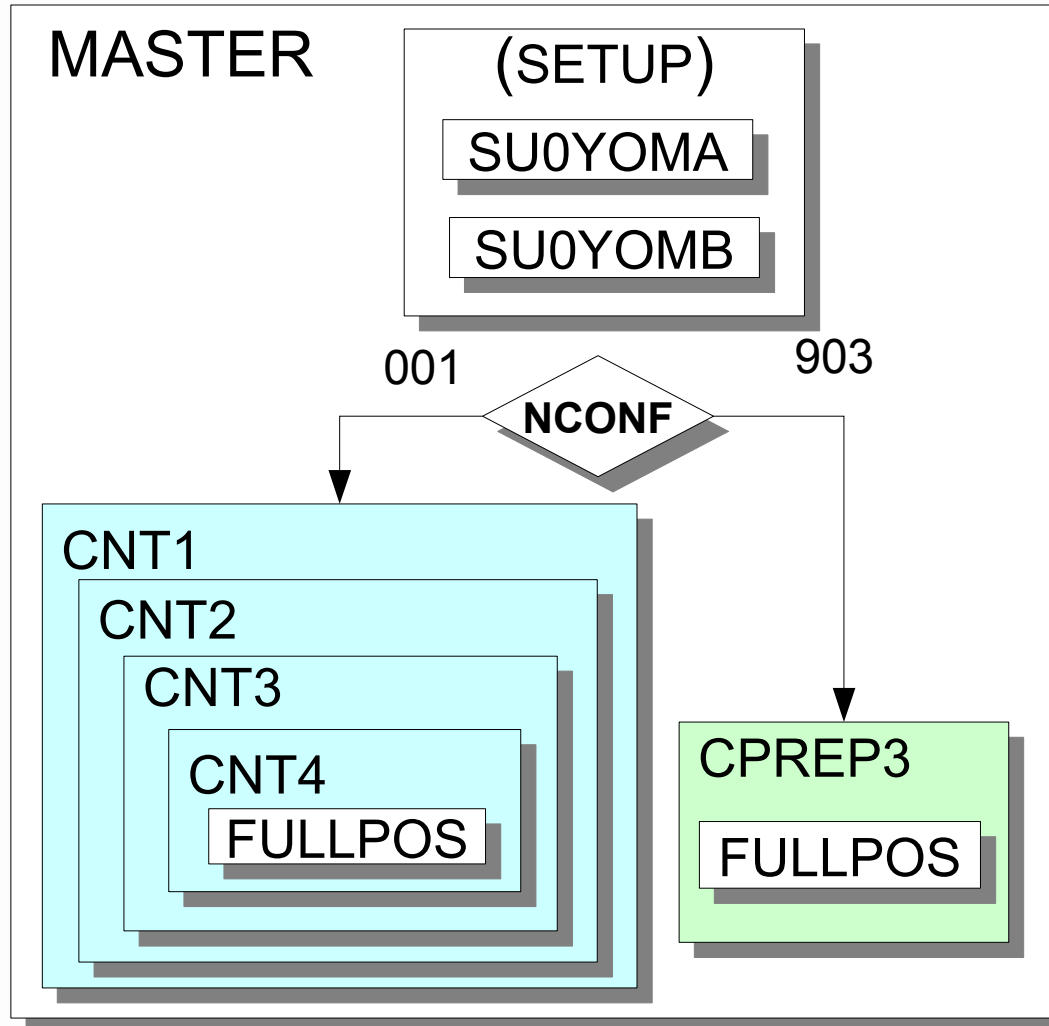
via intermediate steps where the code
refactoring enables

innovations to the benefit of
flexibility and performance.



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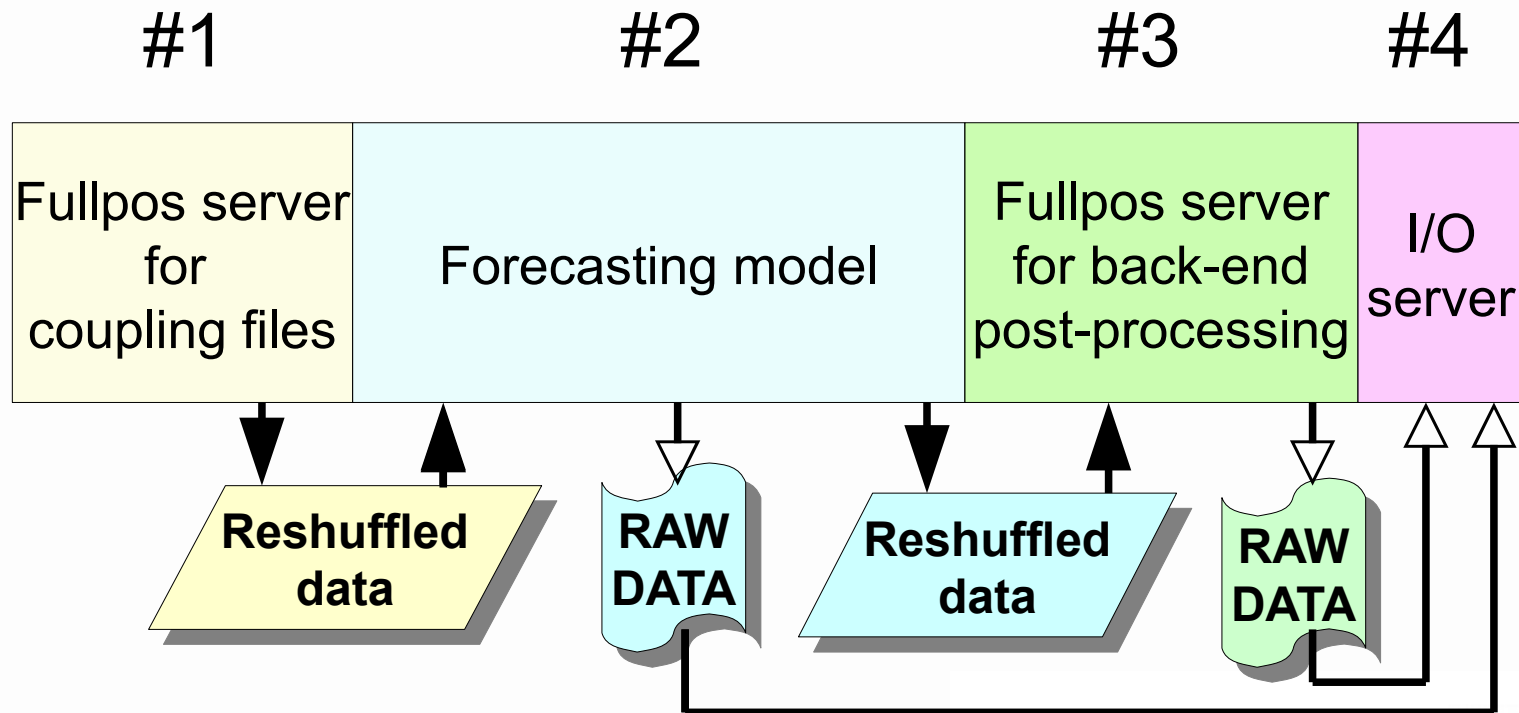
New configuration 903 : a swiss army knife



- ▶ **Off-line FULLPOS server (for any Interoperability purposes)**
- ▶ **Testbeds for Fullpos in OOPS**

Advanced post-processing servers

Single binary, multiple MPI communicators



**Thank you
for your attention !**



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