



Schweizerische Eidgenossenschaft
Confédération suisse
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Eidgenössisches Departement des Innern EDI
Bundesamt für Meteorologie und Klimatologie MeteoSchweiz

Dispersion model workflows in EWC and public clouds

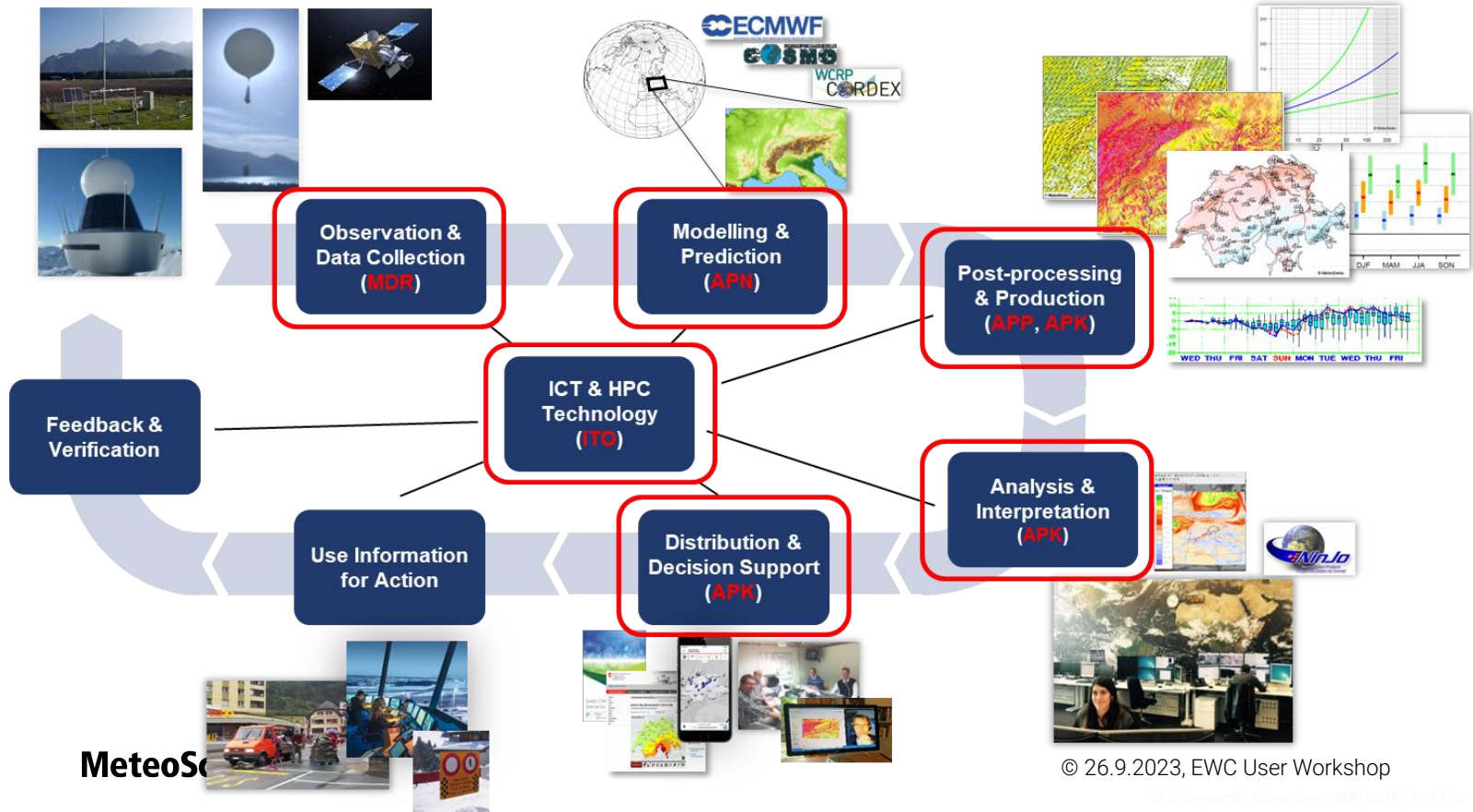
EWC User Workshop

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26.9.2023



MeteoSwiss Operations



MeteoS



Current and future MeteoSwiss HPC system

Pigne d'Arolla

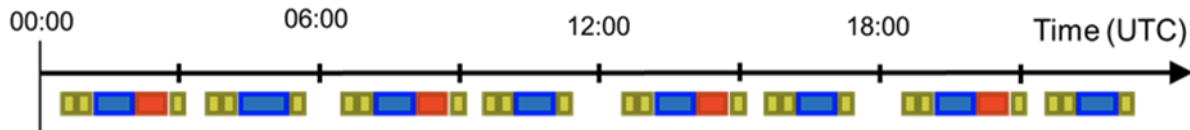


- Dedicated (Cray CS Storm) MCH system at CSCS
- Hybrid system:
 - 18 GPU compute nodes
 - 8 NVIDIA V100 GPU / node (32 GB mem)

Alps



- (cloud-like) Flexible sharing of resources with virtual clusters.
- MCH system based on A100 GPUs.



MeteoSchweiz

Maximum gap of ~60 minutes

KENDA-1 (S7)
COSMO-1E (S5)
COSMO-2E (S6)



Motivations for EWC - AWS



- For non HPC workflows, MeteoSwiss is migrating to AWS (for geo-redundancy).
- Flexpart is a business critical application. MeteoSwiss needs a geo-redundant solution that ensure business continuity in case of failure of the HPC centre.
- Gain experience with cloud workflows



Our Dispersion Workflow Today

The FLEXible PARTicle dispersion model (FLEXPART) is a Lagrangian Particle Dispersion Model used to simulate air parcel trajectories, and to determine the origin of observed emissions.



IFS data
ECMWF product
dissemination



ecFlow



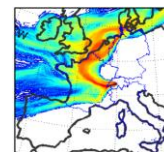
Fieldextra

Pre-processing

Eg: temporal aggregations, and
transformation of data into
required coordinate system



Flexpart-IFS



Pyflexplot

*All running at CSCS



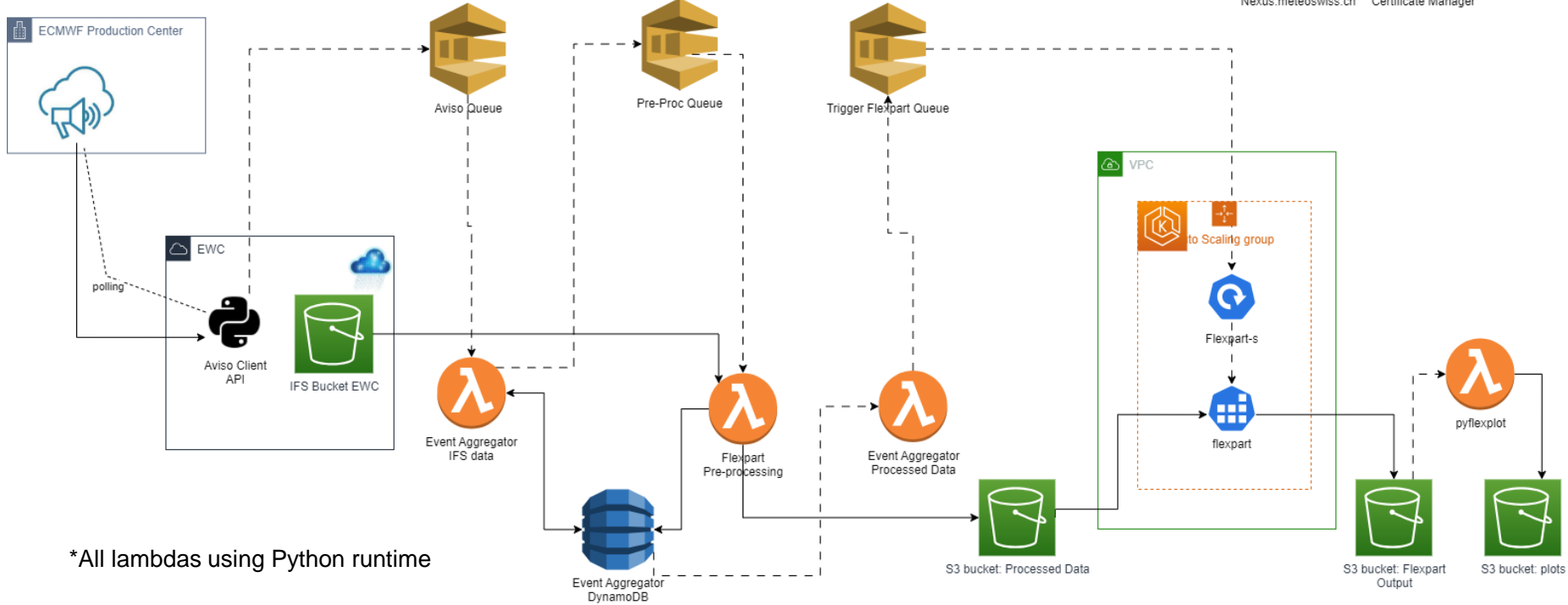
Flexpart - POC Architecture



Nexus.meteoswiss.ch



Certificate Manager



*All lambdas using Python runtime



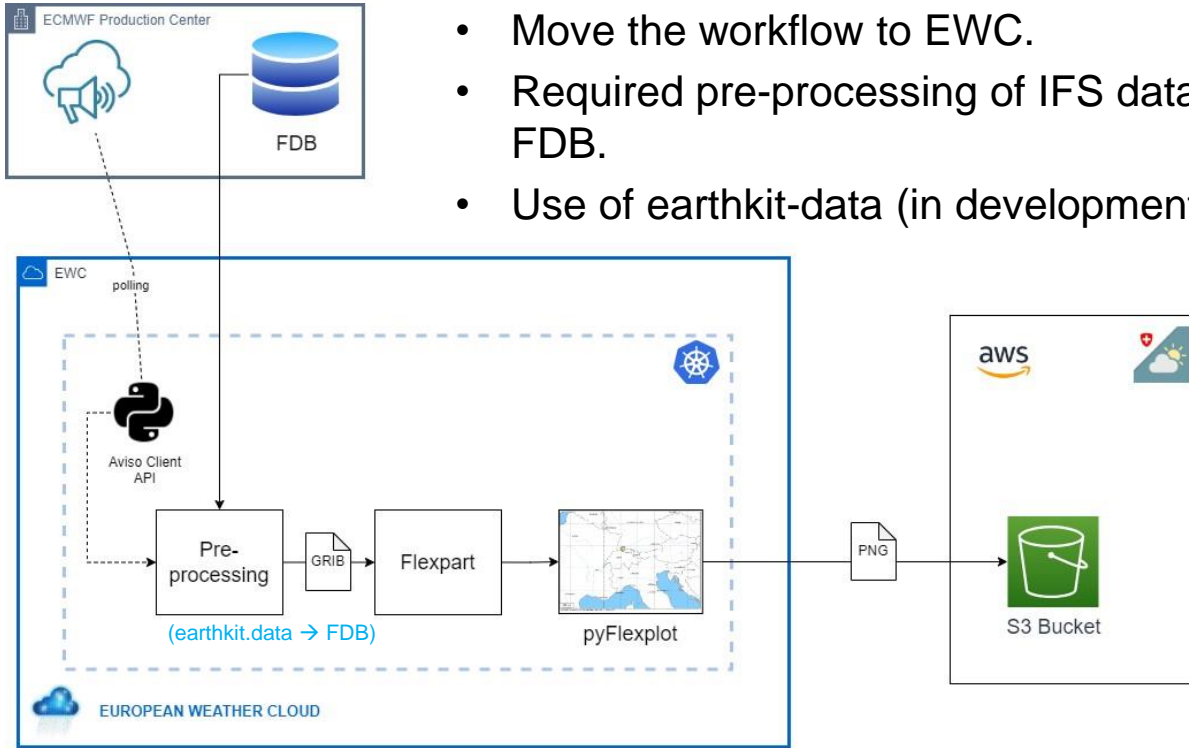
Evaluation

- Data aggregation and processing of large GRIB files is too heavy a task for AWS - Lambdas, or at least it is not the intended use.
- Data-processing would be better closer to the source (EWC).
- Debugging cloud based and event-driven workflows in a multi-cloud environment was challenging compared to HPC workflow.



Next Steps

- Simplify, single cloud (EWC) instead of multi-cloud.
- Move the workflow to EWC.
- Required pre-processing of IFS data directly from the production FDB.
- Use of earthkit-data (in development) in a python environment.





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