Outline of some new features for SHOP

ECCC,CMC,CMDE

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Overview I

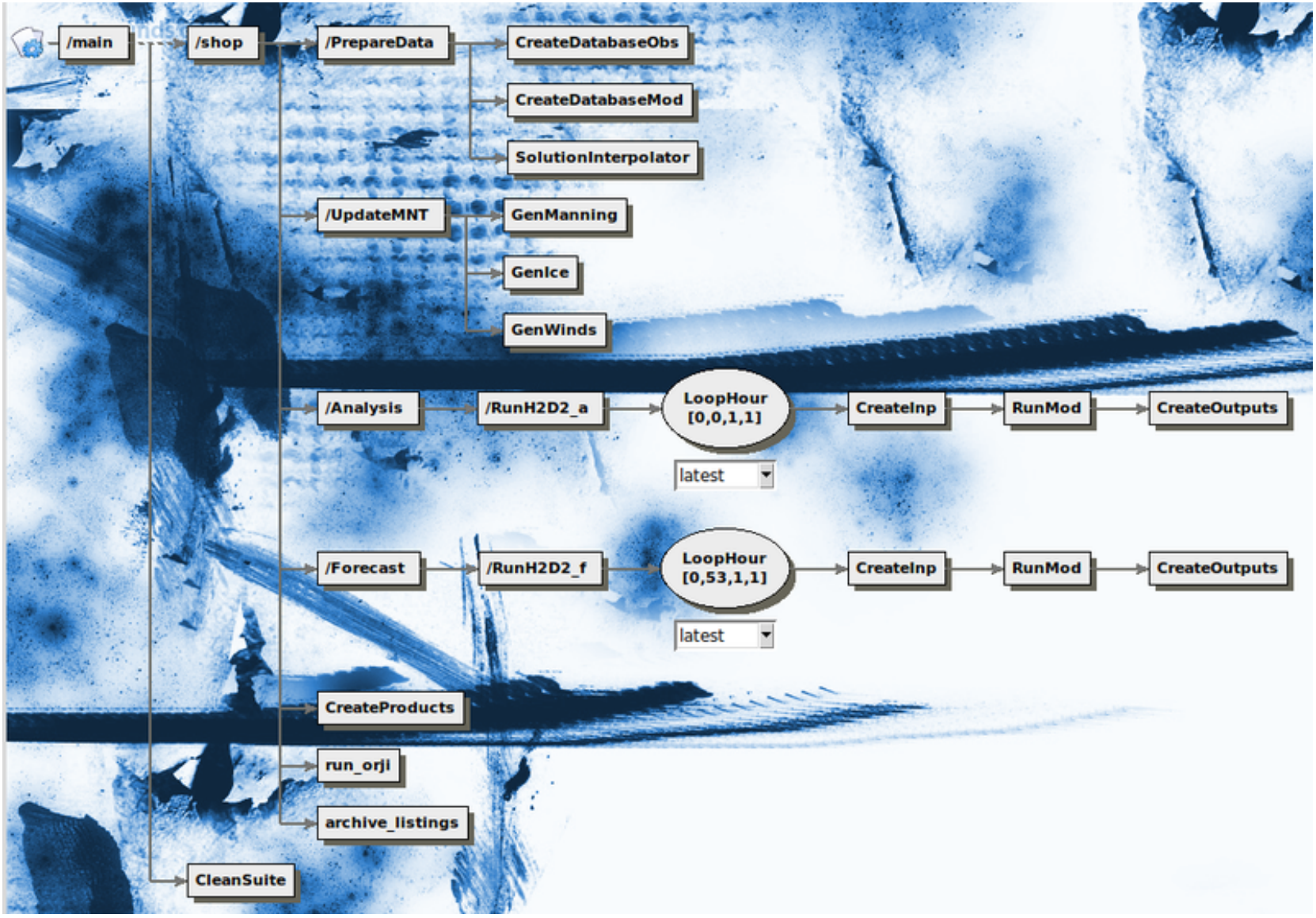
The model has two main components:

- Analysis cycle:
  - Launch every 6h (from 00 to 18:00)
  - Run in steady-state mode. Estimate average hydraulic variables in the last 24h.
  - Initial conditions: The model is initialized with the average hydraulic variables estimated 24h ago.
  - Boundary conditions: Used observed hydraulic variables averages in the last 24h. Source of data: hydrometric data (CanHyS); water levels (SJR); wind data (HRDPS)
  - Domain: St. Lawrence river from Montreal to Trois-Rivieres.

Overview II

- Forecast cycle:
  - Launch every 6h
  - 54h forecast (6h analysis + 48h forecast)
  - I.C. and B.C. for the 6h analysis, see below (the analysis cycle is embeded in the forecast cycle for a different domain!)
  - Initial conditions for the 48h forecast: The model is initialized with the output of the previous 6h analysis cycle.
  - Boundary conditions for the 48h forecast: from: Water Cycle Prediction System, SPINE, and HRDPS (wind fields)
  - Domain: St. Lawrence river from Carillon and Beauharnois to Saint-Joseph-de-la-Rive.

Maestro's model structure I



Maestro's model structure II

Main Maestro's modules under `/shop` (root module)

- `/PrepareData`:
  - `CreateDatabaseObs`
  - `CreateDatabaseMod`
  - `SolutionInterpolator`
- `/UpdateMNT`:
  - `GenManning`
  - `Genice`
  - `GenWinds`
- `/Analysis`
- `/Forecast`

both `/Analysis` and `/Forecast` include this module `/RunH2D2` and these tasks:`LoopHour[]` `CreateInp` `RunMod` `CreateOutputs`

Other tasks include: `CreateProducts` `CleanSuite`

We propose: I

Organize the code into:

- Pre-processing (`/PrepareData`, `/UpdateMNT`)
  - Data clean-up and harmonization
  - Set boundary conditions
  - Data extraction system for multiple domains and set-ups.

We propose: II

- Post-processing (`CreateProducts CleanSuite`)
  - Data and visualization products.
  - Conversion of output data (e.g. NetCDF)
  - Data validation and model assessment performance
  - Output data interpolation into mgrid

Currently working on ...

Toolbox design for model validation and assessment of model performance:

- Collect, clean-up and harmonize observed data (water level, flow velocity, streamflow) at multiple locations.
- Define performance metrics
- Assessment of model uncertainty