Communicating and Processing Data on Grids in the New Next Generation Water Resources Modeling Framework Paradigm

SESSION NUMBER: 121

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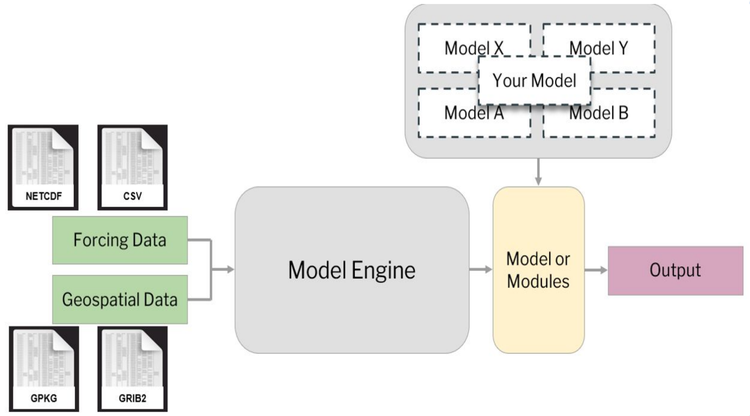
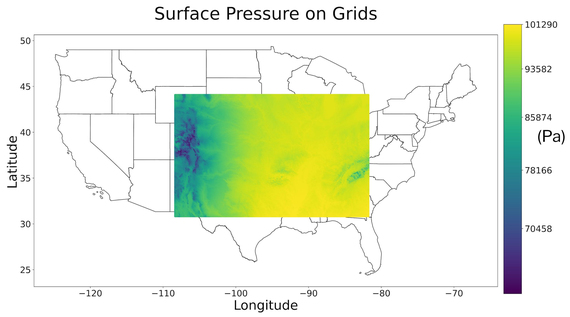
Fast and Efficient Data Processing Tools for Gridded Domains in a NextGen Framework



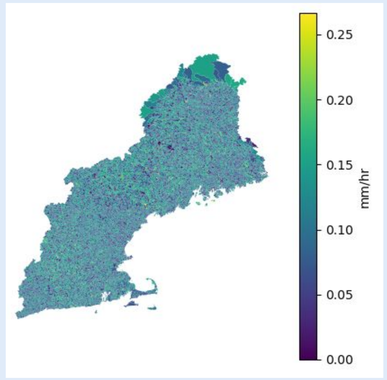
Input data formats vary greatly amongst hydrology and coastal models. The goal of NextGen is to transform and standardize all data dependencies within the framework. This greatly simplifies a modeler's ability to run different model formulations.

- The figure below is a result of running NextGen framework [1] in Python module in gridded mode with gridded forcing data that take directly from meteorological forcing data then output the results to files for processing. The gridded outputs depend on the Basic Model Interface (BMI) [2] modules: C, C++, Fortran, and Python; and hydrologic models such as CFE, or Topmodel for user interest and accuracy.



- The NextGen Forcing engine BMI [3] can also directly provide regridded input meteorological forcing data on the hydrofabric catchments (lumped), gridded domains, or unstructured mesh domains using ESMF libraries with Python modules (ESMPy).

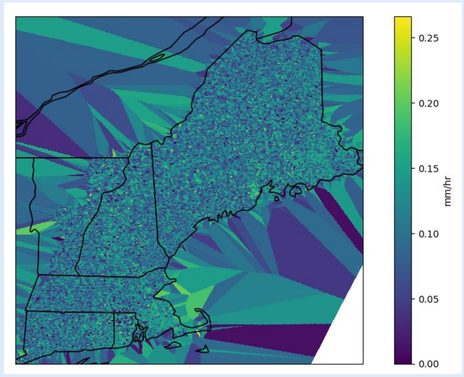
Methods for efficient and versatile data communication and processing on hydrofabric and grids in NextGen Framework[1].



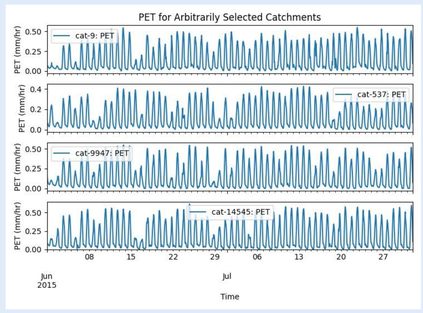
Gridded

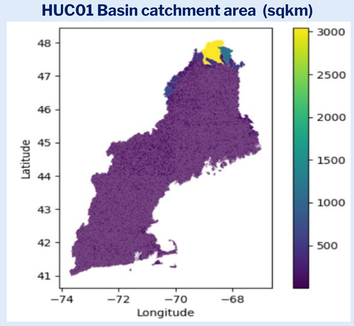
NextGen Model Spatial Coupler

Lumped



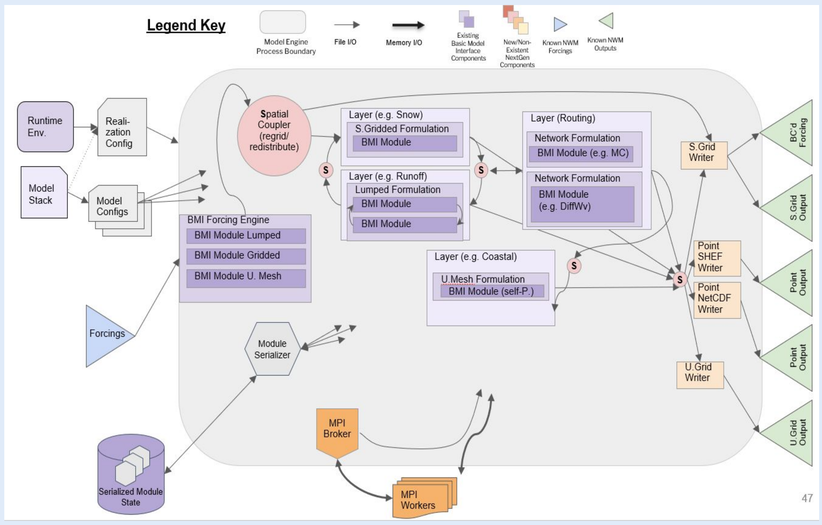
NextGen Output within Hydrofabric





NextGen Framework Can Process Universal Data Streams and Communicate Data Throughout the Hydrofabric Network and make them available in lumped and/or gridded format

NextGen Framework Workflow Controlling Data Processing End Goal



NextGen Framework GitHub Repository

ACKNOWLEDGEMENTS:
Ahmad Jan & Keith Jennings, Formulation Inputs
Xia Feng, Formulation Data

REFERENCES:
1. https://github.com/NOAA-OWP/ngen
2. https:// bmi.readthedocs.io/en/latest/
3. https://github.com/jduckerOWP/ngen-forcing

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