

SWx TREC Testbed: Facilitating Model/Algorithm R2O and O2R Development within a Cloud Computing Environment



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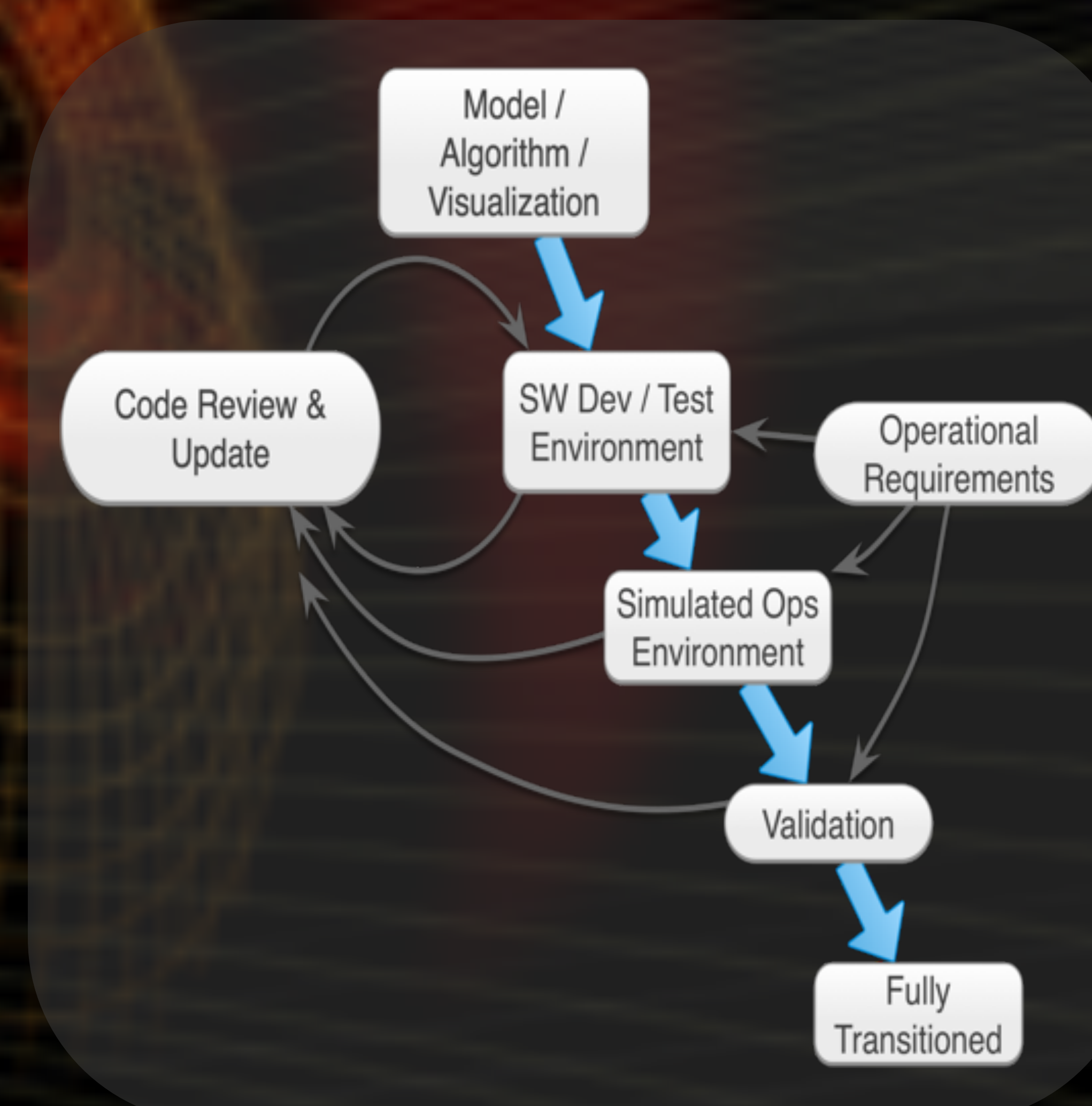
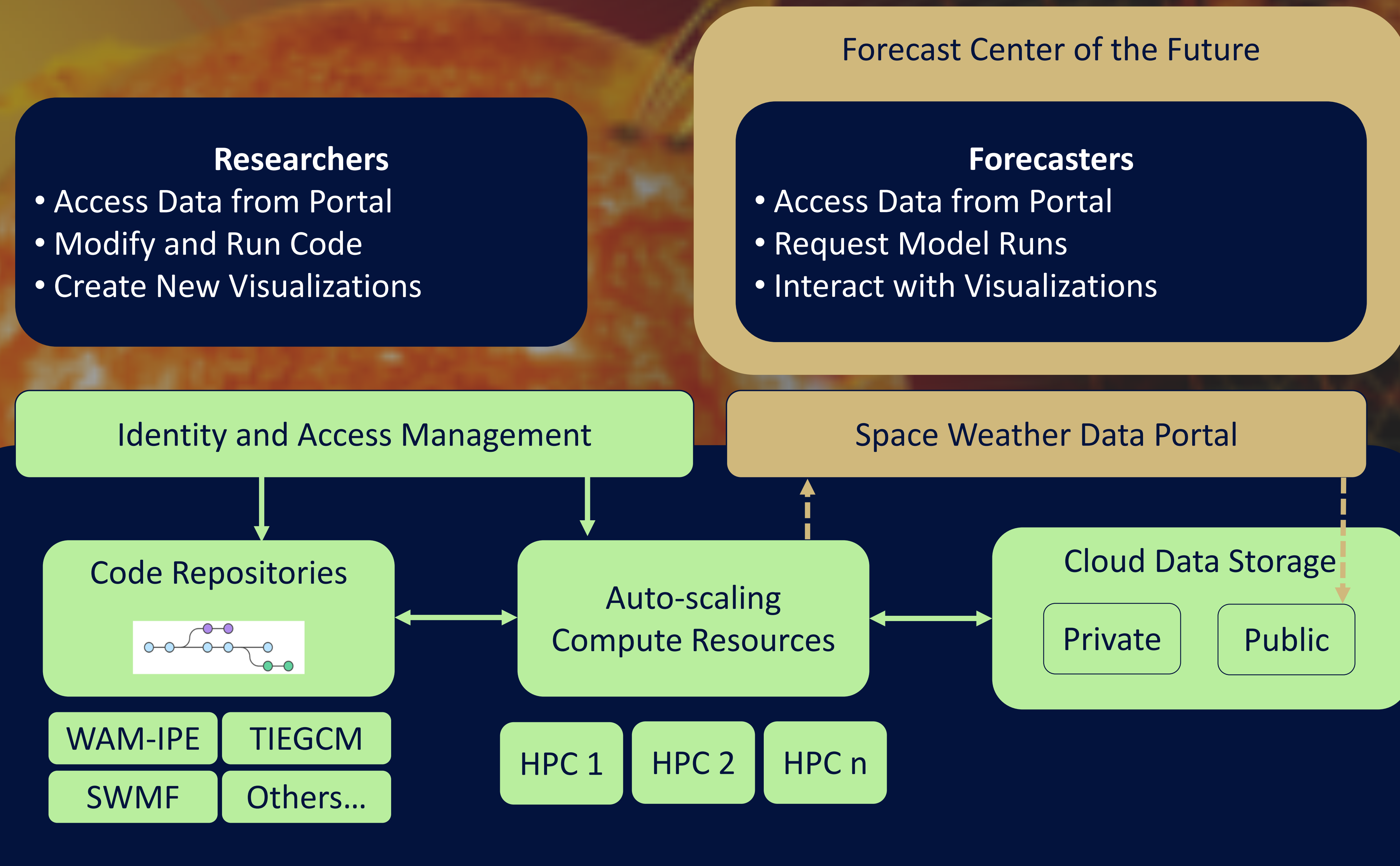
Community Desires

- Accelerate R2O, providing a bridge to the operational SWx environment
- Incubate and promote new model codes, data, tools, and information

SWx TREC Solutions

- Open computing environment to host 3rd party model, product, analysis, viz
- Hosted computing *Testbed* for model development and testing
- Full lifecycle code management, deployment, and testing environment.
 - Ownership and control maintained by researcher
- Versatile computing resources
 - Tools, libraries, and environments can easily be tailored to specific models

MADTech Enterprise Models Application and Development



The Testbed environment uses software engineering best practices to enable continuous integration and testing in the R2O/O2R pipeline. Current models often take years to validate and incorporate into an operational environment, by which time they are already stale from a researcher's perspective. Then all of the updates are incorporated and another years-long shakedown of the code is started. We are aiming to reduce the time to get codes deployed in operations by enabling incremental research updates to be tested in an operational-like environment before sending the codes off to the operational centers.

Researchers and Modelers can remotely login to the AWS resources to submit ad-hoc jobs with version controlled models. Forecasters will be able to interact with model data that are stored in the cloud through the Data Portal or develop new visualization tools to investigate the model data.

Status

- Current Model Suite
 - WAM-IPE, TIEGCM, SWMF, USGS E-fields, Atmodweb
- Auto-scaling AWS architecture for large physics models and ensemble runs
 - HPC-like environment with cloud storage
- Secure access to maintain the developer/researcher's IP is in place.
 - Only mount drives specific to each model/user with proper permissions

Outlook

- Integrating more models (Please get in touch if you want your model included)
- Visualizing and interacting with output from the models in real-time (Forecast Center of the Future)

Workflow

The system is designed with modular serverless components that automatically trigger the next step in the pipeline upon completion.

