IOOS Cloud Sandbox

Coastal Coupling Community of Practice November 2021

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Who is the IOOS Cloud Sandbox for?

- Is developed with IOOS and others to run regional coastal models
- Multiple models have been setup and tested:
  - NOSOFS ROMS and FVCOM Models
  - LiveOcean – University of Washington
  - WRF/ROMS - ESMF Coupled - Hurricane Irene test case
  - ADCIRC - Hurricane Florence test case
- IOOS Regional centers
- Scientists and researchers
- Universities and students

IOOS Integrated Ocean Observing System

RUTGERS THE STATE UNIVERSITY OF NEW JERSEY

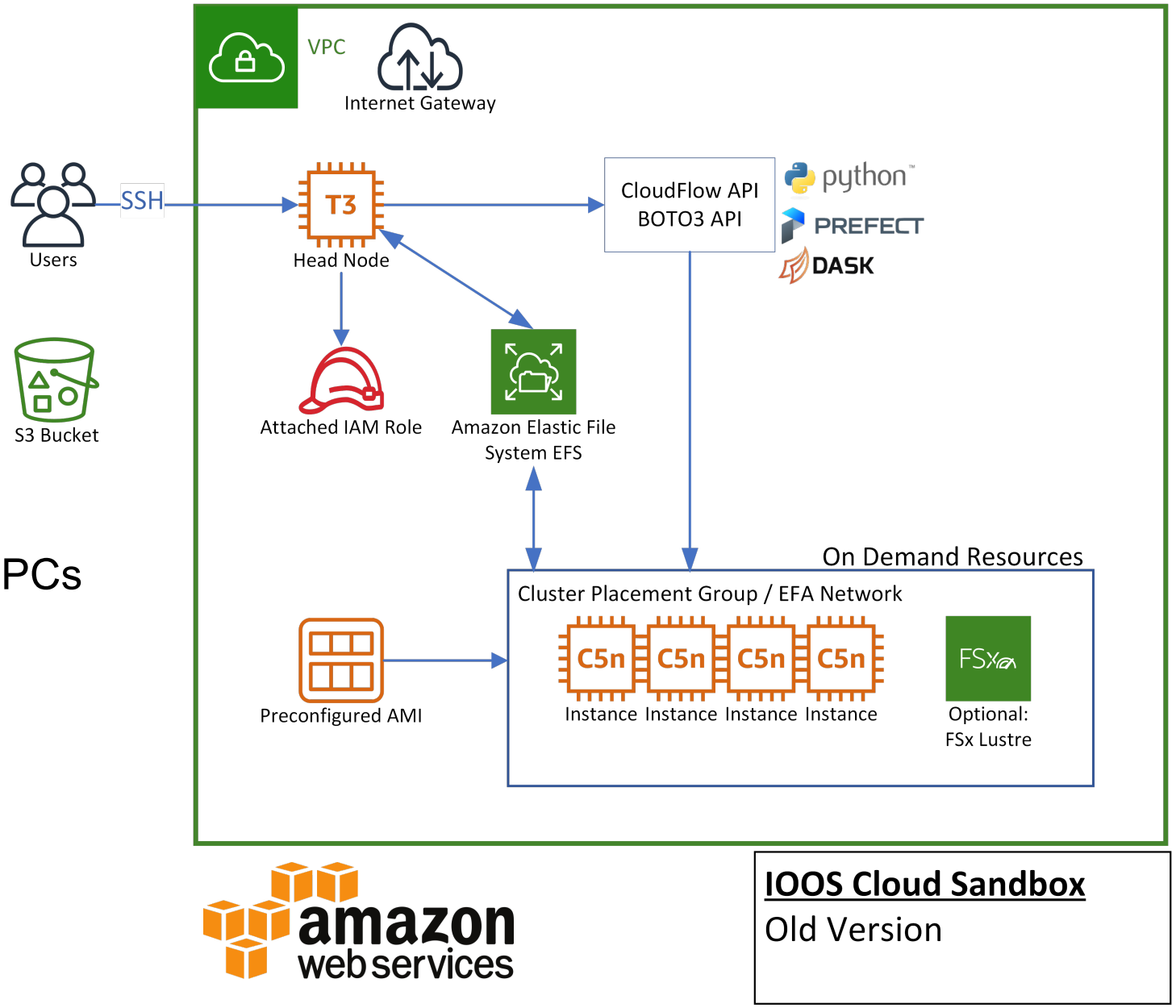
UNIVERSITY of WASHINGTON

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

What is the IOOS Cloud Sandbox?

- Cloud HPC Infrastructure (AWS)
- Software libraries and tools
  - Intel and GCC Compilers
  - NetCDF, MPI, wgrib, etc.
  - Run scripts and workflows
- Environment similar to operational HPCs

- Model analysis and validation
- Research R2O2R
- Operational fail-over
- Hindcasts



amazon web services

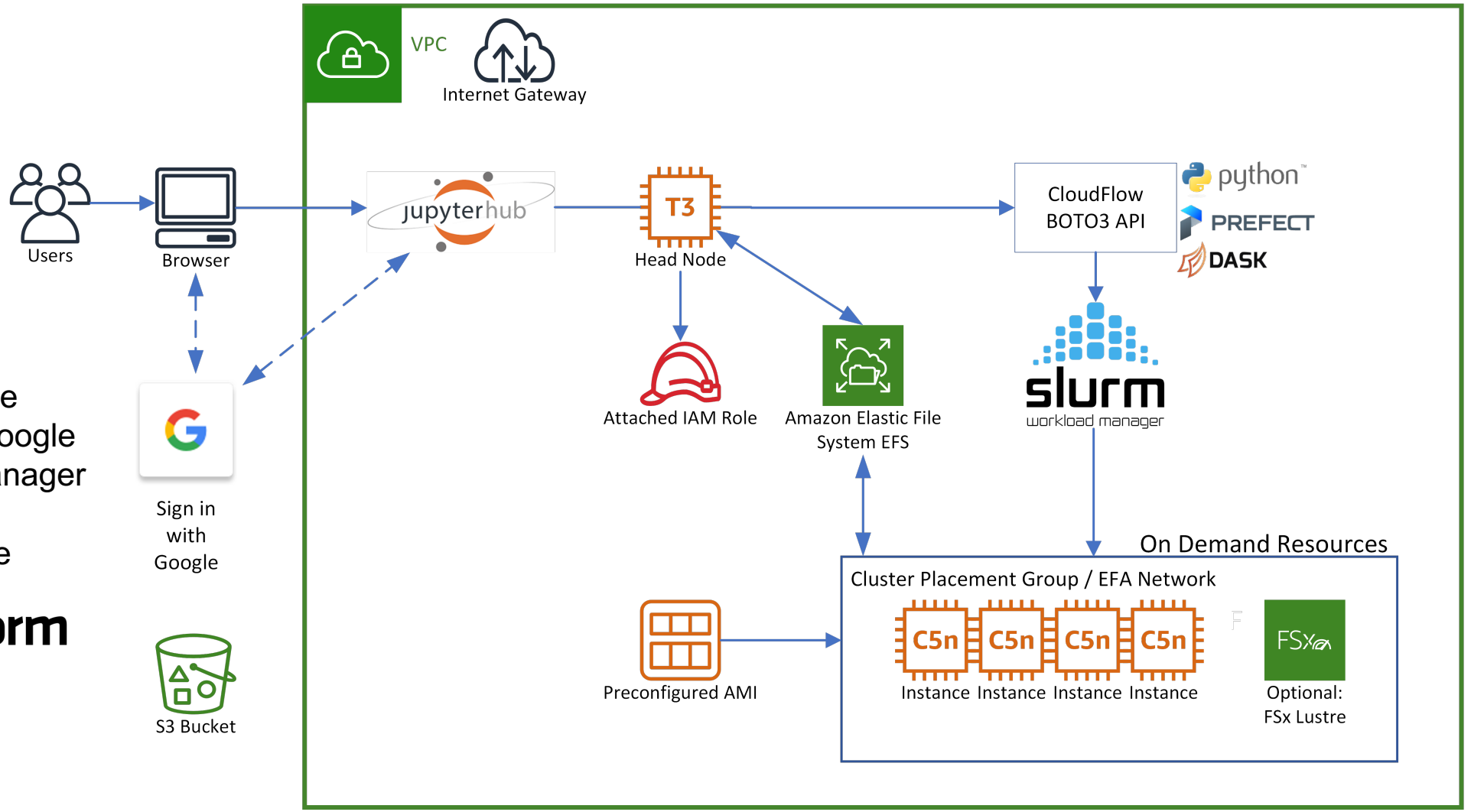
IOOS Cloud Sandbox
Old Version

IOOS Cloud Sandbox Updates

New Version

- JupyterHub head node
- Authentication with Google
- SLURM Workload Manager

- Infrastructure as Code
  - Terraform



amazon web services

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How to get started!

- Use your own AWS account – self governance
- or have someone else manage the AWS account and resources

- github.com/ioos/Cloud-Sandbox

- 15 minutes to run the setup

  - Creates the AWS infrastructure
  - Installs all of the required software and libraries
    - NetCDF, HDF5, Intel MPI, Intel Compilers, GCC Fortran, Python3, etc.
  - Creates the AMI (Amazon Machine Image) that is reused for the on-demand compute nodes

- github.com/ioos/nosofs-NCO

Currently Supported and Tested Models

- NOSOFS ROMS and FVCOM Models
  - CBOFS, CIOFS, DBOFS, GOMOFS, TBOFS, LEOFS, LMHOFS, NEGOFS, NGOFS, NWGOFS, and SFBOFS
  - Quasi-operational

- LiveOcean
  - Quasi-operational with operational fail-over triggering

- Coupled WRF/ROMS w/ ESMF v8
  - Hurricane Irene test case

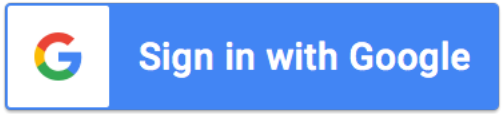
- ADCIRC
  - Full test suite in ADCIRC repository
  - Hurricane Florence test case

Currently in Development and Testing

- JupyterHub integration on the head node
  - sign in with Google account
  - or sign in with GitHub account
  - or sign in with other OAuth providers

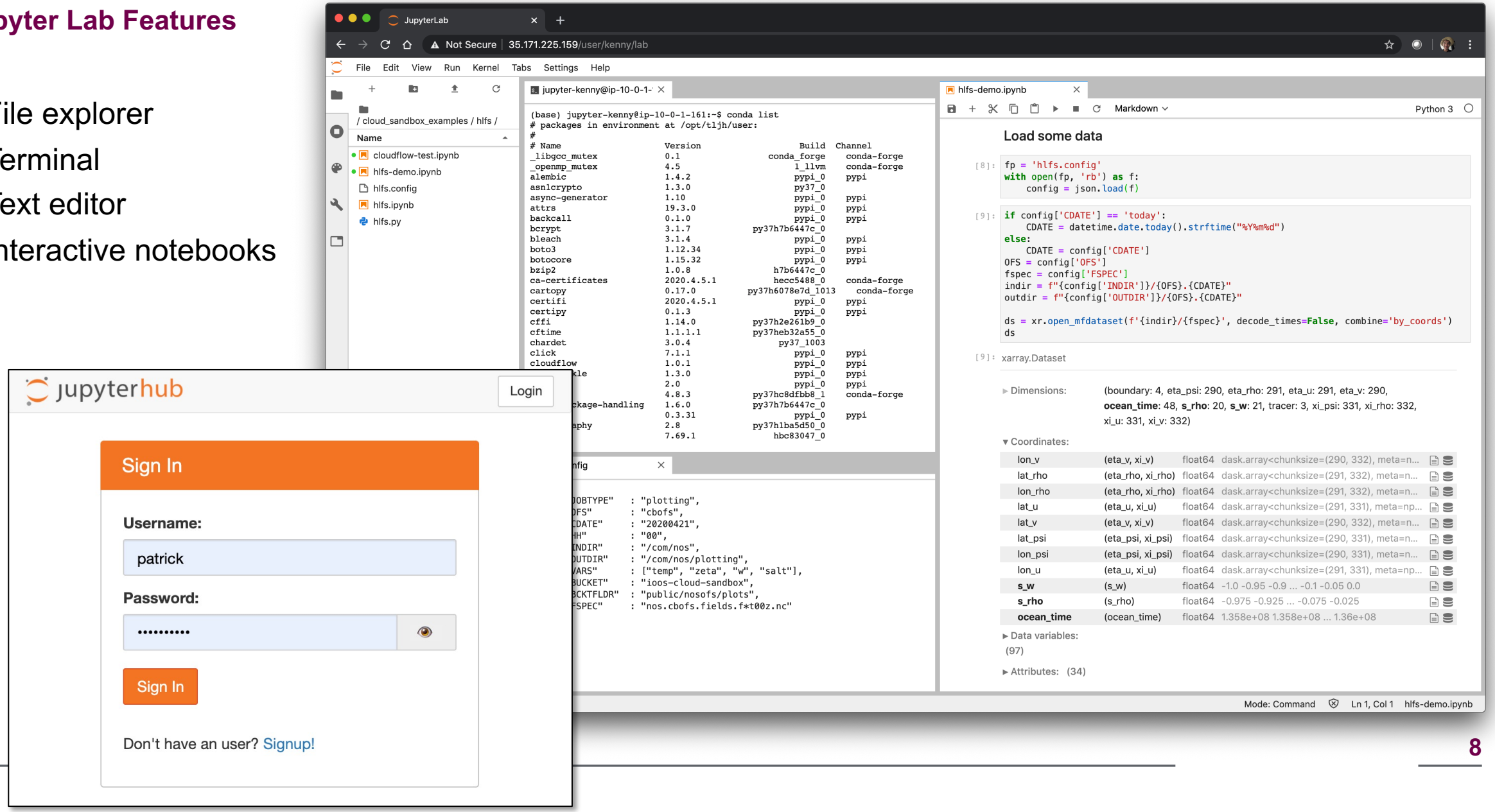
- SLURM Workload Manager
  - Manage the compute resources
  - Fine grained accounting of usage

- Spack Package Manager



Jupyter Lab Features

- File explorer
- Terminal
- Text editor
- Interactive notebooks



Links

GitHub Repositories

https://github.com/ioos/Cloud-Sandbox	- Terraform, Python, and BASH tools
https://ioos.github.io/Cloud-Sandbox	- API documentation for above
https://github.com/ioos/nosofs-NCO	- copy of NOAA operational version with local changes

Questions and Comments