UFS-R2O Progress & Year 3 Plan

Application Support

Development Cross Cutting Team

6&7 December 2021

EMC, PSL, GSL, CSL, NSSL, ARL, NESDIS

Application Support - Description and Goal

Description: Community outreach (user-facing) activities to promote engagement in and development of UFS Applications.

Scope: Contributing to App release preparations, providing user and developer support, establishing thorough documentation, offering training events, and governing procedures for code management

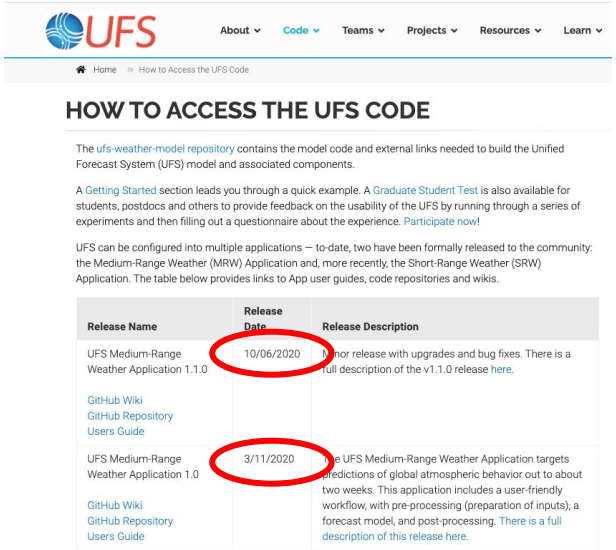
PoCs: DTC/GSL - Ligia Bernardet, Evan Kalina, Jeff Beck; DTC/NCAR - Mike Ek, Kathryn Newman, Jamie Wolff; EMC - Jun Wang (in kind)

Application Support - Progress and status update

- Completed
  - Annual UFS Users' Training
    - MRW Application Focus UFS Users' Training: 4-9 Nov 2020
    - SRW Application Focus UFS Users' Training: 20-24 Sep 2021
  - Governance strategy for the HAFS code repository
- Ongoing
  - Provide UFS MRW App community support by answering questions on the forum
  - Support EMC and the larger community in preparing a UFS MRW App release
  - Provide Hurricane App community support by answering questions on the forum
  - Assist Hurricane App developers in creating and maintaining branches that contain their innovations in the HAFS code repository

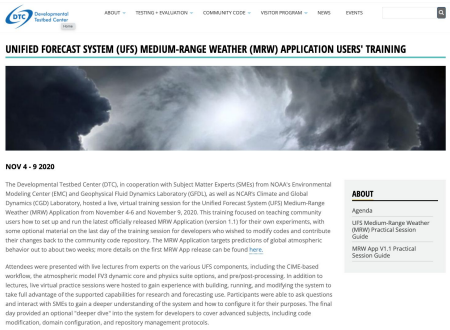
Application Support - Major Accomplishments

MRW Releases:



https://ufscommunity.org/science/code/

4-9 Nov 2020

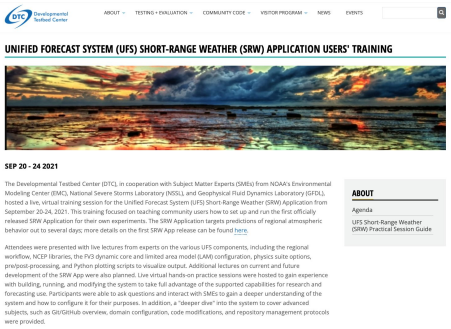


MRW App Training:

https://dtcenter.org/events/2020/unified-forecast-system-ufs-medium-range-weather-mrw-application-users-training

SRW App Training:

https://dtcenter.org/events/2021/unified-forecast-system-ufs-short-range-weather-srw-application-users-training



20-24 Sep 2021

Application Support - Major Challenges

- MRW releases are having limited use
  - Propose to drop MRW support in Dec 2021
- MRW workflows have diverged: release uses CIME and developers use *global_workflow* for uncoupled runs and *CROW* workflow for coupled runs
- Workflow unification/consolidation is needed to engage the community
- The UFS does not have a path/plan for upcoming releases
- Roles/responsibilities for release are unclear
  - UFS (SC and groups), UFS-R2O Application Teams, EPIC, EMC, DTC,...
- Roles/responsibilities for supporting components vs. Apps are unclear

Application Support - Vision for Transition of DTC work to EPIC

- The Earth Prediction Innovation Center (EPIC) project is part of the broad R2O2R effort to help accelerate getting research innovations into operational systems. EPIC cannot encompass the entire R2O2R domain, rather, it supports the R2O2R process.
- EPIC will provide basic software infrastructure for the continuous development, testing, and integration of innovations for the UFS Weather Model (WM) and UFS applications.
- DTC will continue to be a clearing house to support the research community in conducting scientific testing and evaluation of UFS innovations.
- The support of UFS WM and UFS applications, such as the MRW and SRW Apps, currently in DTC, will gradually move to EPIC. DTC will still play a role as Subject-Matter Experts.
- DTC has been and will remain the primary developer CCPP (including CCPP SCM) and METplus (for verification), which includes continuing to provide community support. These are key tools for the Hierarchical System Development and Testing.
- Given CCPP (including CCPP SCM) and METplus (for verification) are important components of the UFS models/applications and corresponding workflows, it will be important for EPIC to gain a basic understanding of these packages.

Application Support - Work Plan for Year 3

Overview: Engage in a limited capacity in release preparation and support as this role transitions to EPIC. Overall goal is to continue to provide and sustain engagement of the broad community with the UFS.

Task
Contribute to answering MRW/SRW/Hurricane questions on the UFS Forum as a SME
Support EPIC and the larger community in preparing a UFS MRW/SRW App release
Contribute to Annual UFS Users' Training
Contribute to UFS Users' Workshop
Assist HAFS developers in creating and maintaining branches that contain their innovations in the HAFS code repository
Update/expanded documentation on using the HAFS workflow available to developers

Application Support - Deliverables

- Contribution to UFS Users' Training(s)
  - Lectures and hands-on exercises
- Contribution UFS User’s Workshop
  - Member of organizing committee
- Contribution to MRW and SRW releases
  - Planning and documentation
- Contribution to MRW, SRW, and Hurricane App support
  - Answering questions on forum
- Contribution to Hurricane App code management
  - Feature branches creation and maintenance

Application Support - Assumptions/Constraints/Risks

- Assumptions
  - UFS community will adopt App releases, contribute to code development, and participate in support of components and Apps
- Constraints:
  - Unknown amount of subject-matter expertise and engagement from EPIC
  - Lack of a portable/documented workflow for MRW
  - Lack of a UFS-wide body for release planning
- Risks:
  - Release does not meet the goals or needs of developers
  - Community makes limited use of release

Application Support - Compute Requirements

Small amount of HPC resources are needed in a large variety of platforms to prepare the release, provide support, and do (NOAA RDHPCS, NCAR Cheyenne, cloud, etc.)

Application Support - Anticipated in kind effort

- UFS support and releases requires collaborative effort involve community subject-matter experts from many institutions (EMC, GFDL, GSL, NSSL, AOML, NCAR, DTC, etc.)
  - Integrated application teams
  - Main developers of (sub-) components (preprocessor, ESMF, FV3, CCPP, stochastic physics, workflow, METplus etc.)
- EPIC is expected to play a big role in release and support but the timeline for ramp-up is yet-to-be-determined
- DTC is currently supported via NOAA base funds for SRW App code management and user support. Continuation of this funding is TBD and relates to timeline of transition to EPIC and on support received from UFS-R2O project.

Application Support - Summary & Closing Remarks

- Community engagement is key for the success of the UFS
- Historically, the UFS-R2O project coordinated releases and support and this role will gradually transition to EPIC on Year 3
- Releases and support require involvement of the entire UFS community (e.g., App teams need to set goals and help prepare code, subject-matter experts need to answer questions)
- For EPIC to meet its goal to release MRW and SRW by June 2022, the scope of the release must be defined soon
- The new initiative for development of a modular/unified workflow is critical for the success of community engagement; Subject-Matter Experts should be consulted as this is developed