Strategic Implementation Plan (SIP) for a Community-based Unified Forecast System (UFS)

Infrastructure Working Group

Presented by
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Coordination Meeting for UFS SIP
02 August, 2018; College Park, MD
Infrastructure WG
Membership

- Arun Chawla (NOAA/NCEP/EMC) **
- Cristiana Stan (George Mason University) **
- Rusty Benson (NOAA/GFDL) **

Repositories Sub-Group
- Cecelia Deluca (NOAA/ESRL/GSD & CIRES/ESMF)
- Gerhard Theurich (NRL/ESMF)
- Jun Wang (NOAA/NCEP/EMC)
- Mariana Vertenstein (NCAR)
- Seth Underwood (NOAA/GFDL)

**Co-Chair
Infrastructure WG Projects

Community end-to-end workflow preparation

Data Portal to serve the community

UFS applications in open-development community

UFS Repository Creation

- May 2017: Version 0 released to community for exploration
- Mar 2018: Version 1 released to community incl. utilities, workflow, UPP, etc.
- Sep 2018: Demonstrate community workflow using a prototype seasonal prediction application
- Jan 2019: Release operational FV3GFS for open development
Infrastructure WG
Project Milestone Accomplishments

**SIP project accomplishments to date:**

- Defined governance rules and processes for open-development projects with cooperation of ESPC Model Liaison Committee
- Repository strategy briefing to UFS-SC (08 June 2018)
- Preliminary report shared with EMC Director and Office of the Director, NCEP
- Finalized report available with recommendations and milestones for Repositories, Data Portal, and Community Workflow

**SIP project issues:**

- Uncertainty of NOAA/NCAR MOA activities and timelines
- Fiduciary obligations for Data Portal and Repository management
- Workflow requirements to satisfy GST yet overlap with operations (where appropriate)
Coordination:
Steering Committee – approval on repository strategy
System Architecture WG – repository management strategy
System Architecture WG – workflow

Dependencies:
NOAA/NCAR agreement(s)
Current NEMSfv3gfs repository contains:

- regression workflow system
- NEMS mediator source code (sub-module)
- FV3GFS source code (sub-module)

List of authoritative repositories for source code:

- NEMS
- FMS infrastructure
- FV3 dynamical core
- Interoperable Physics Driver (IPD)
- GFS physics
- Stochastic physics
- FV3GFS driver system (incl. NUOPC cap, write component, etc.)
- NCEPlibs
Umbrella Repository Strategy

UFS Weather Forecast app: new physics development

Authoritative Repositories
- Workflow – UID
- FV3 – UID
- Physics branch – UID
- NEMS – UID
- IPD – UID
- FV3GFS interface – UID (NUOPC cap, I/O utils etc.)
- FMS – UID
- Build System – UID (modules, template compile options etc.)

manage_externals

config files points to UIDs

documentation

1 https://github.com/ESMCI/manage_externals
General repository practices:
- Authoritative central repository with versioning and management system
- Governing body who sets and enforces policies and establishes terms of use
- Periodic reference releases with unique ID
- Documentation of incremental changes and outdated/unsupported logic
- NUOPC cap managed internally

Additional rules for “community” component models:
- Code is either fully open or available through a registration process
- Publicly documented policies, including procedures for changing code, repository use, policy change
- Responsive support contact or mechanism, e.g. a forum - not personal email
- Issue tracking mechanism is provided with timely feedback

Participation in UFS system:
- Well-defined, regression testing strategy
Q. What are the resources needed for maintaining umbrella repositories?

A. This depends on the applications that make up the UFS and their complexity. As a rule of thumb, the more complex the development repository and the number of active developers, the larger the number of code managers needed. Data from CICE5 and MOM6 indicate a minimum of 2 part-time individuals (1 FTE) are necessary. Back of the envelope calculations for the Weather Forecast app and a Seasonal Prediction app indicates a 6 - 10 FTE effort. This does not include the integration team needed to test the end-to-end modeling systems. This is only sustainable if all the agencies involved make a commitment to share the support functionality.
A full report (pdf) with Use Cases, FAQ, and more is available at:

https://drive.google.com/file/d/1hFFUHNRAIjB43HxhUVpBvfd_3npoxjiv