Next Generation of the NCEP Flexible HPC Functionally Equivalent Environment (FEE): A Bridge From Operations to Research

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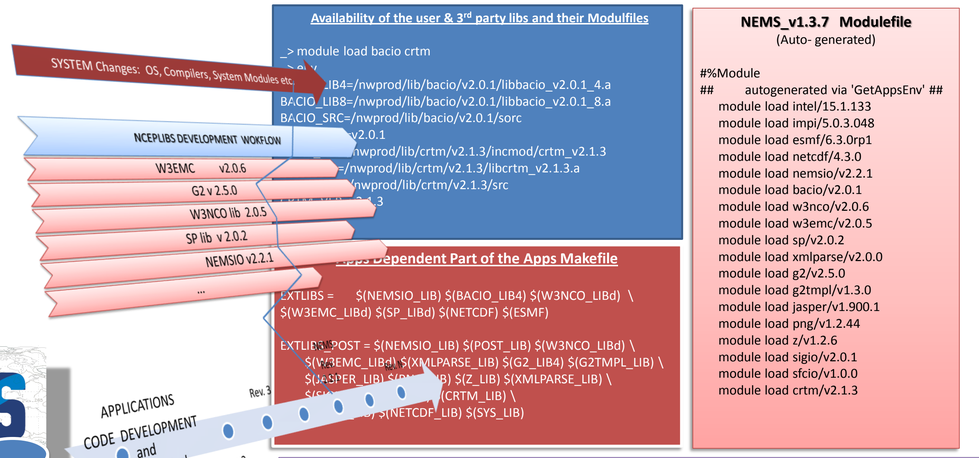
The Design of NCEP FEE Standards, Based on Integration NCEP Developmental and Operational Requirements

1. Computational FEE Standards: Based on the Requirements for Operations (builds systems, builds convention, naming conventions, build structure, the OPS workflow etc.)
2. Developmental FEE Standards: Requirements for collaborative development: Coding standards , Tools and IDEs compatibility, use of the Frameworks, Versions control, CM and Collaborative development env.
3. Model Integration Standards: Based on NOAA Environmental Modeling System (NEMS) Framework Integration requirements, ESMF with NUOPC layer
4. Targeted Standard Developmental Workflow: Collaborative developmental methodology with automation of coding standards analysis and validation
5. Equivalence Evaluation Standards: Based on OPS and DEV Requirements for verification and verification methodologies consistency, including unit and regression testing requirements
6. NOAA Standards for Collaborative Development (Virtual Lab), CM, VC and CI

(presented materials have been already fully deployed, or prototyped, or planned and under ongoing development as the solutions for EMC and NCO of NCEP

1. Objective : To Link Moving FEE & Apps Revision via User Modules



2. Auto Code EMC Standards Compliance Analysis using "Understand 4.0" of Scitools APIs

Perl API

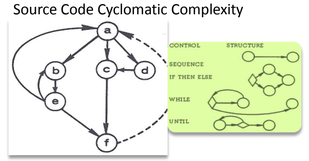
The ***"Understand 4.0"*** of Scitools Inc. includes a full PERL/Python API which allows you to directly query the database

Ready to go scripts:

Code Validation for the metrics like:

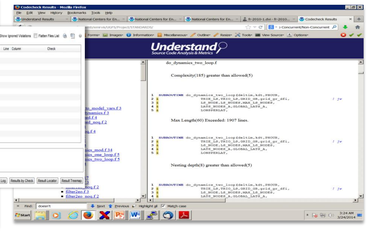
- Cyclomatic Complexity
- Function Length
- Nesting depth etc.

Source Code Cyclomatic Complexity

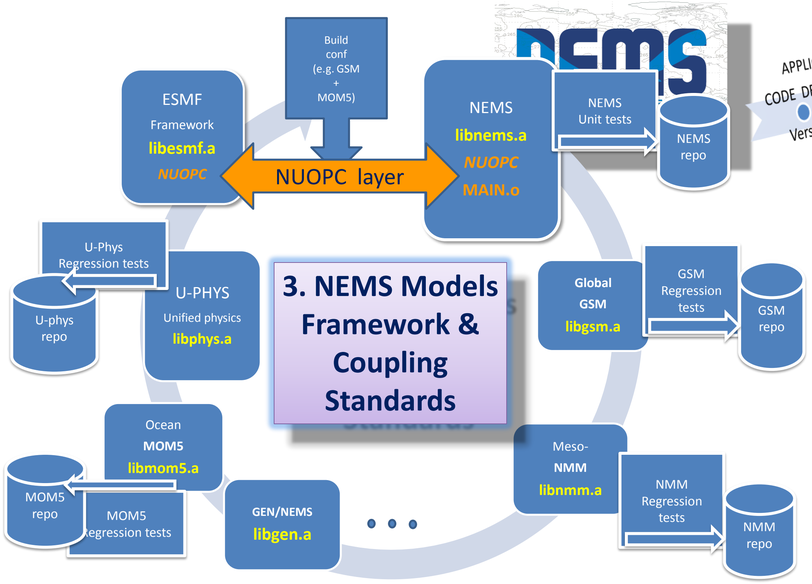


Source Code Corp Std violation tree

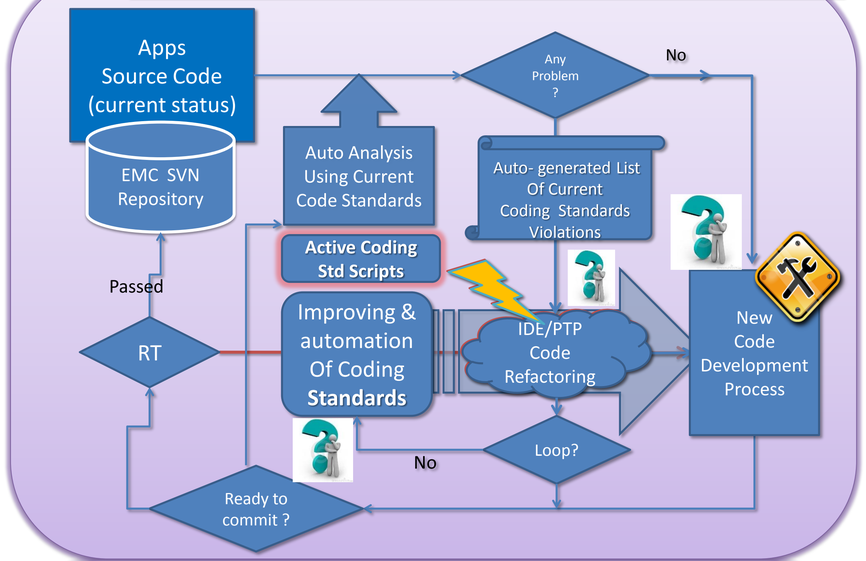
Std Metric Violations Report



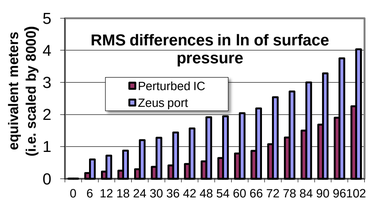
3. NEMS Models Framework & Coupling Standards

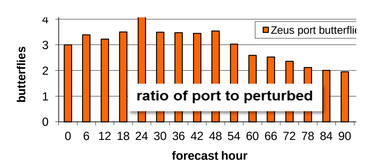


4. Targeted Standard Developmental Workflow

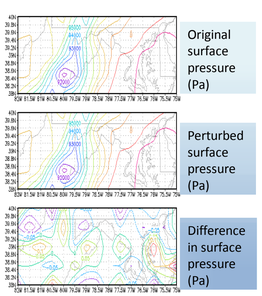


5. The Butterfly Std. Tests of the Functional Equivalence





In this example, the perturbation is applied only to the initial surface pressure for the 2011-08-31-12z GFS



Original surface pressure (Pa)

Perturbed surface pressure (Pa)

Difference in surface pressure (Pa)

6. NOAA Standards for Collaborative Development, CM, VC and CI