ESMF Development Update

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05/28/2008
ESMF Release Map

Origin: 2.2.2

- Component/VM concept and State concept solidified.
- Infrastructure *top-down* approach with Grids, Fields and Bundles:
  - many limitations
  - not widely adopted yet
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**bottom-up: index space layer**

- **DELayout simplified:**
  - DE to PET mapping
- **DistGrid:**
  - general index space description
- **Array:**
  - distributed class for user data
  - fully TKR overloaded
  - communication methods

- **ArrayBundle:**
  - convenience
  - performance
ESMF_Array class

user data in index space
ESMF_Array class

sparse matrix multiplication

dstArray(i) = \sum_{j} factor(i,j) \times srcArray(j)
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build system overhaul

- robust, portable, well documented
- consistent use of environment variables
  - all start with ESMF_
  - no need to edit configuration files
- “install” target
- esmf.mk:
  - self-contained file of compiler flags
  - can be included in application build

ESMF 2.2.2r

ESMF 2.2.2rp1

ESMF 2.2.2rp2

ESMF 2.2.2rp3

ESMF 3.0.0

ESMF 3.0.1

ESMF 3.0.2

ESMF 3.0.3

ESMF 3.1.0

ESMF 3.1.1

ArrayBundle

DELayout DistGrid Array

Minor porting and minor patches
ESMF TypeKind
object initialization
error handling
public, pure “C” ESMC API
single set of Attribute methods
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general structured grid class

- logically rectangular physical grids:
  - uniform and rectilinear
  - curvilinear
- regular and irregular decompositions
- 1D, 2D, 3D, and higher dimensions
- predefined and custom stagger locations
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*reworked top of infrastructure*

- Field based on new Array and Grid
- most Field methods available
- Field communications disabled
- Bundle -> FieldBundle
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next step: 3.1.1

- Online Regridding:
  - bilinear regridding weights
  - 2D and 3D Grids
  - computed in parallel
- Field and FieldBundle communications, including Regrid()
- Arbitrary Grids
- Location Streams
- SMM optimization
- limited but usable public ESMC API
- Test Harness:
  extensive Regrid() and Redist() testing
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future

- Conservative online regridding
- Unstructured grid support
- Exchange grid support
- SMM generalization and optimization
- Halo communications
- Component/VM model and MAPL