GSI Data Assimilation System Community Support and Tests

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&

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DTC Developmental Testbed Center

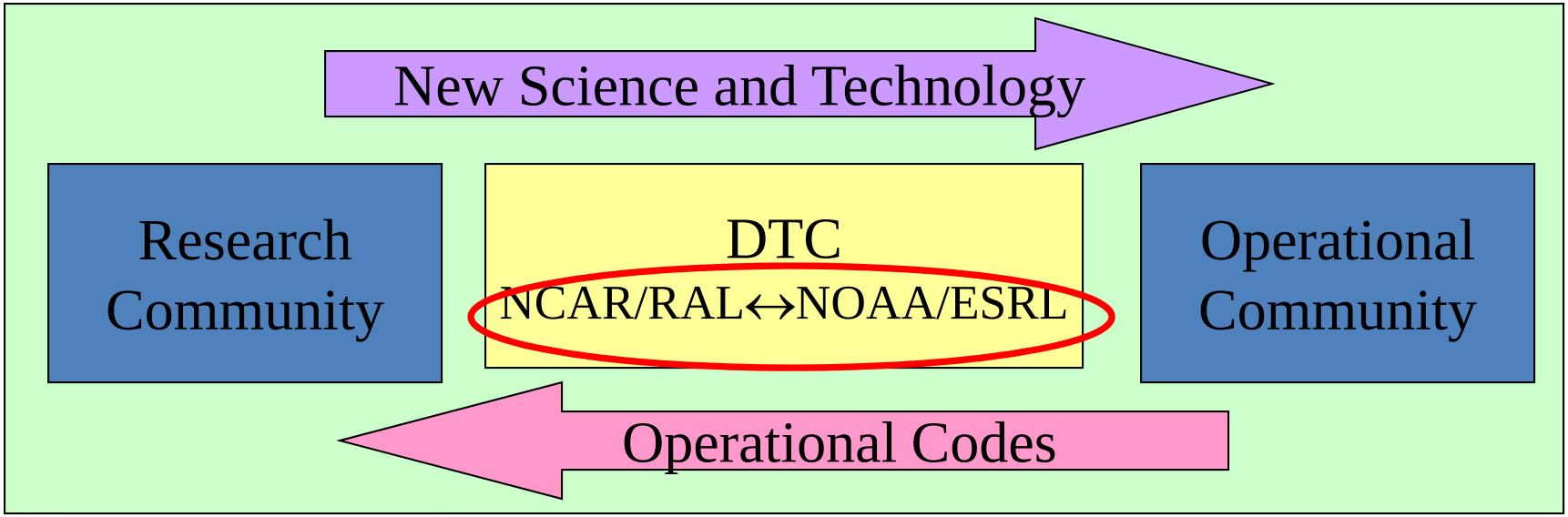
Outline

- Overview of Developmental Testbed Center (DTC)
- Objective and duties of community GSI work
- Community GSI repository and features
- Community support and outreach
- Community GSI Testing and evaluation (Please refer to Kathryn Crosby's talk "DTC GSI Testing and Evaluation")

Fundamental Purpose of DTC

To serve as a bridge between research and operations to facilitate the activities of both halves of the NWP Community

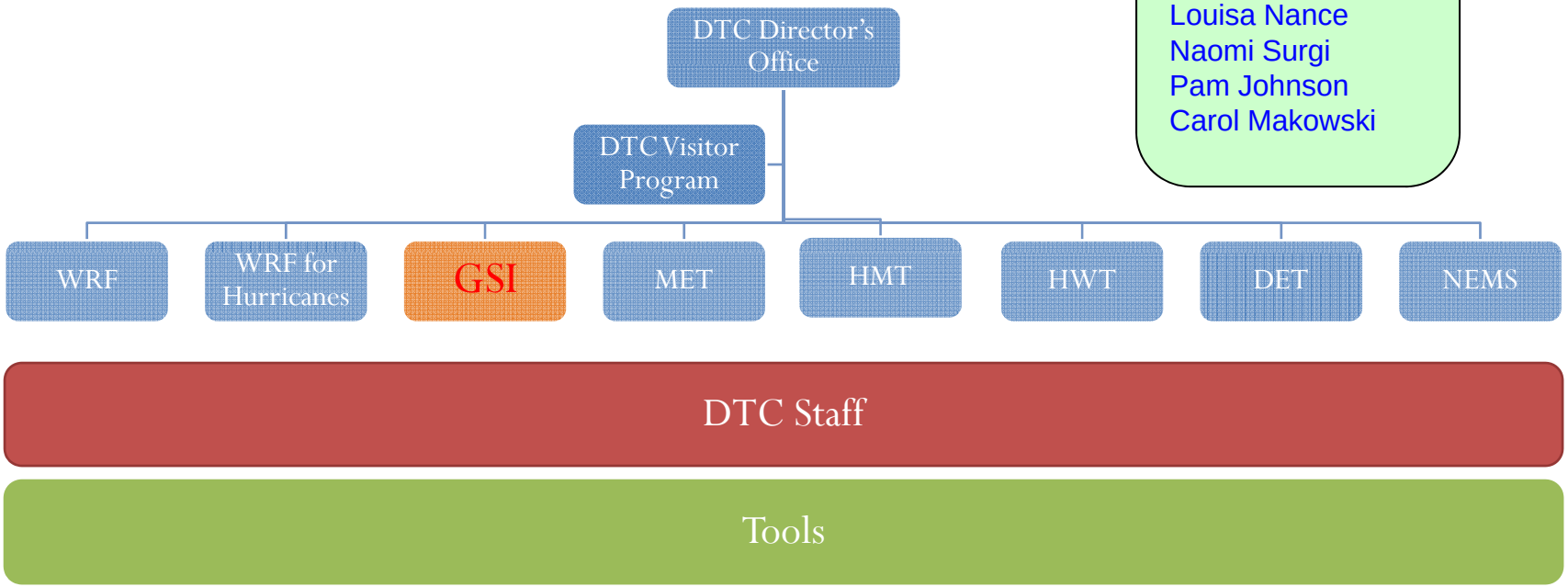
- **Research:** functionally equivalent operational environment to test and evaluate new NWP methods over extended retrospective periods
- **Operational:** benefits from DTCT & E of strengths and weaknesses of new NWP advances prior to consideration for operational implementation



DTC Organization

DTC
Director's Office:

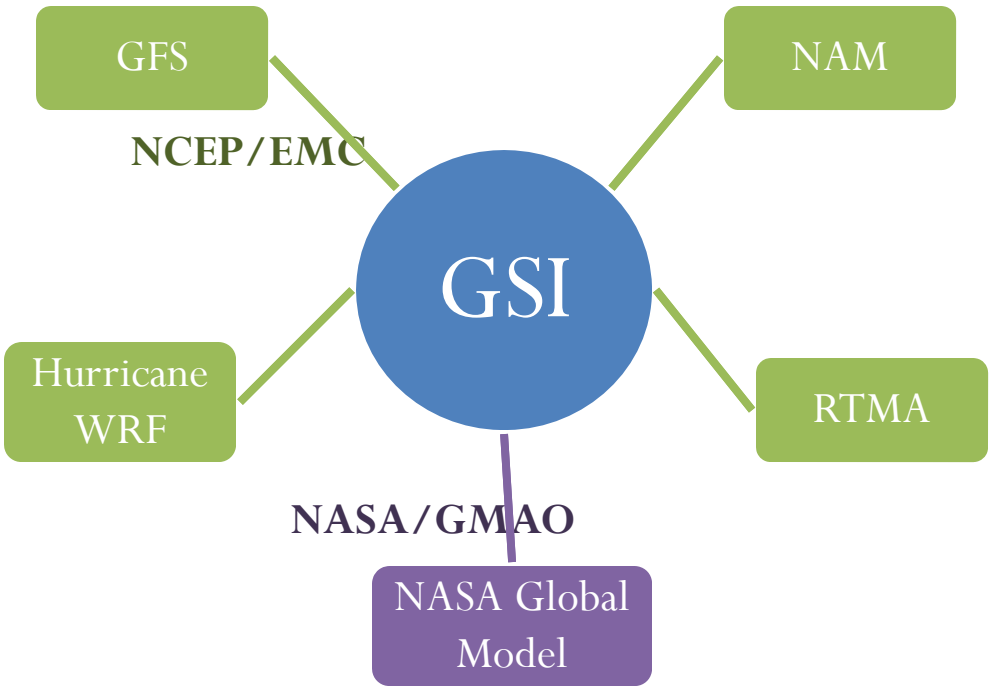
Bill Kuo
Steve Koch
Barbara Brown
Louisa Nance
Naomi Surgi
Pam Johnson
Carol Makowski



Task Leads:
- Develop work plan
- Ensure successful execution of task

Director's Office:
- Coordinate resource allocations
- Resolve staffing issues
- Overall planning and reporting

A unified data assimilation model for global and regional applications:



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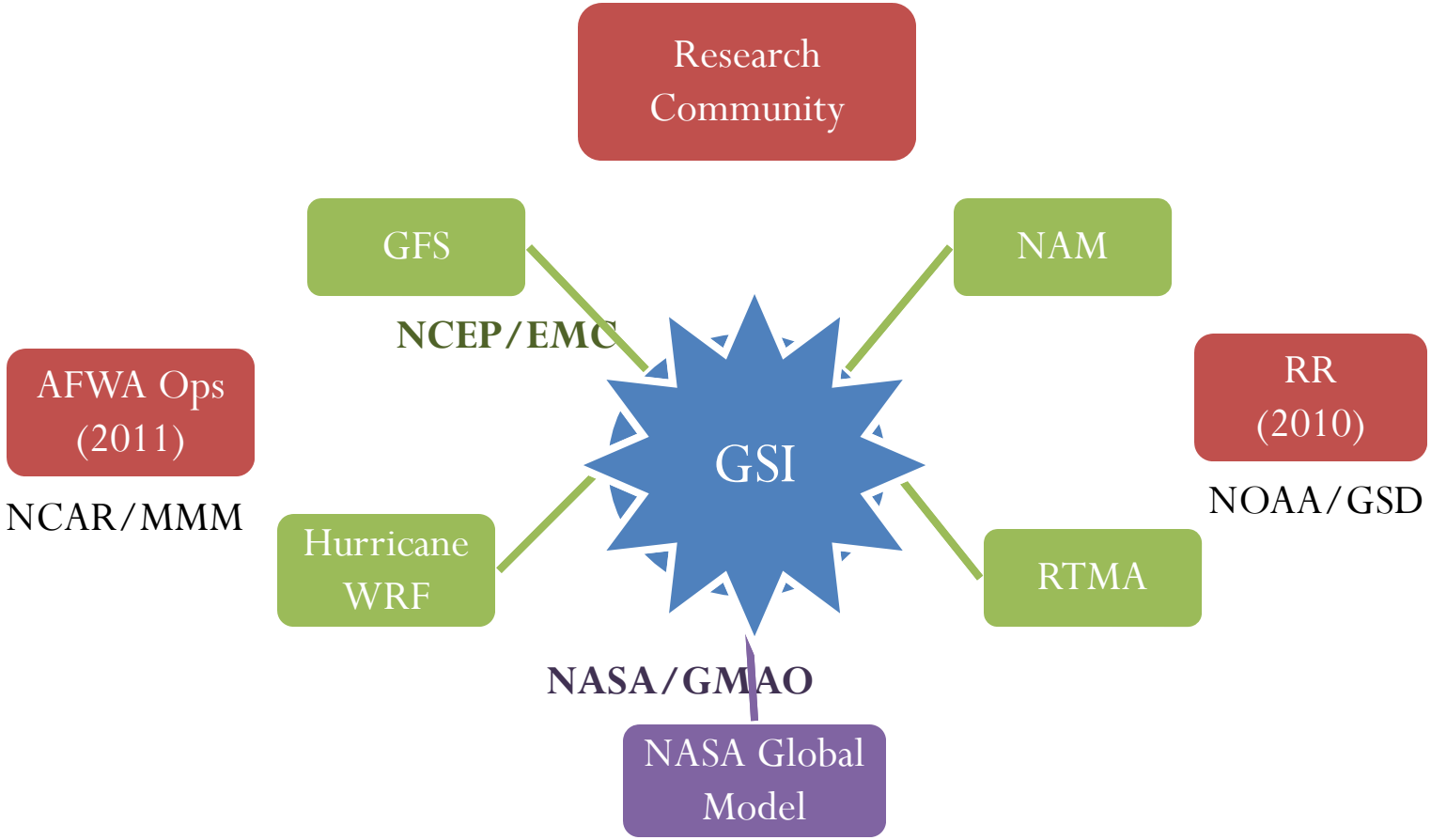


Community GSI Data Assimilation System

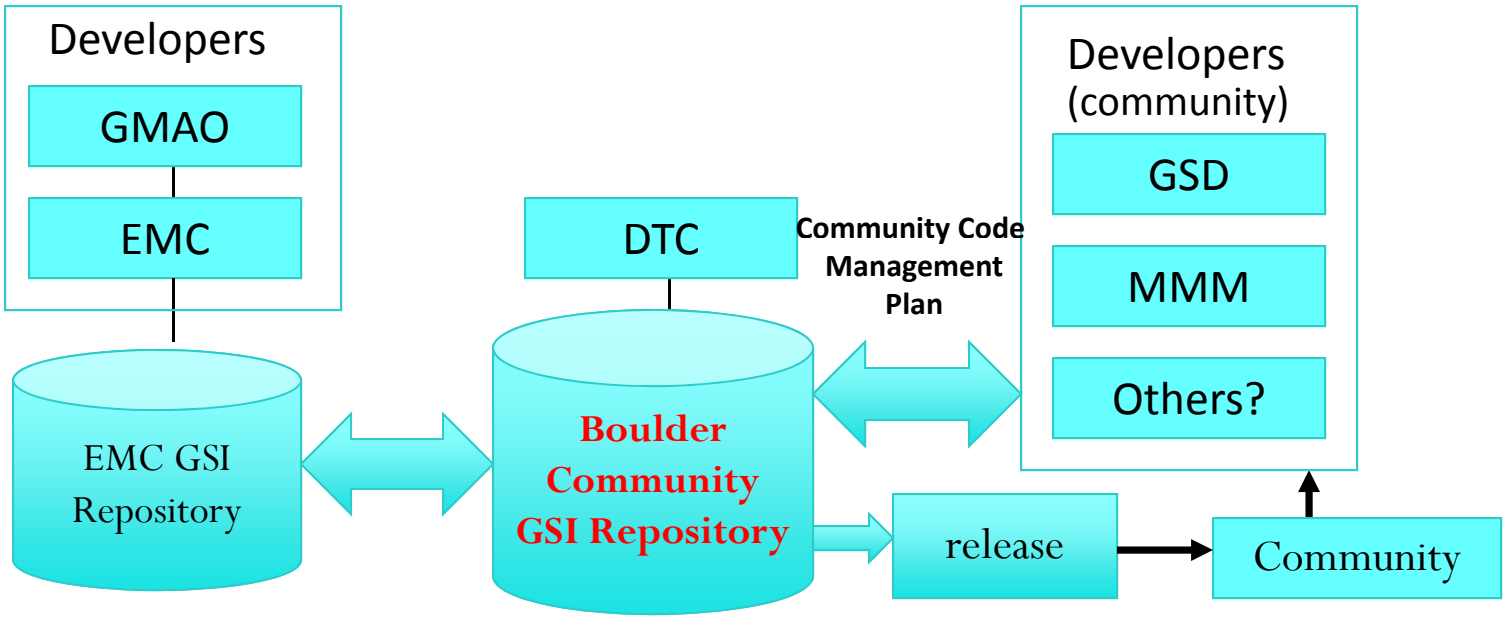
Goals:

- Provide current operational GSI capabilities to the research community (O2R)
- Provide a framework for distributed development of new capabilities & advances in data assimilation
- Provide a pathway for data assimilation research to operations process (R2O)
- Provide rational basis to operational centers and research community for enhancement of data assimilation systems

Duty of DTC:

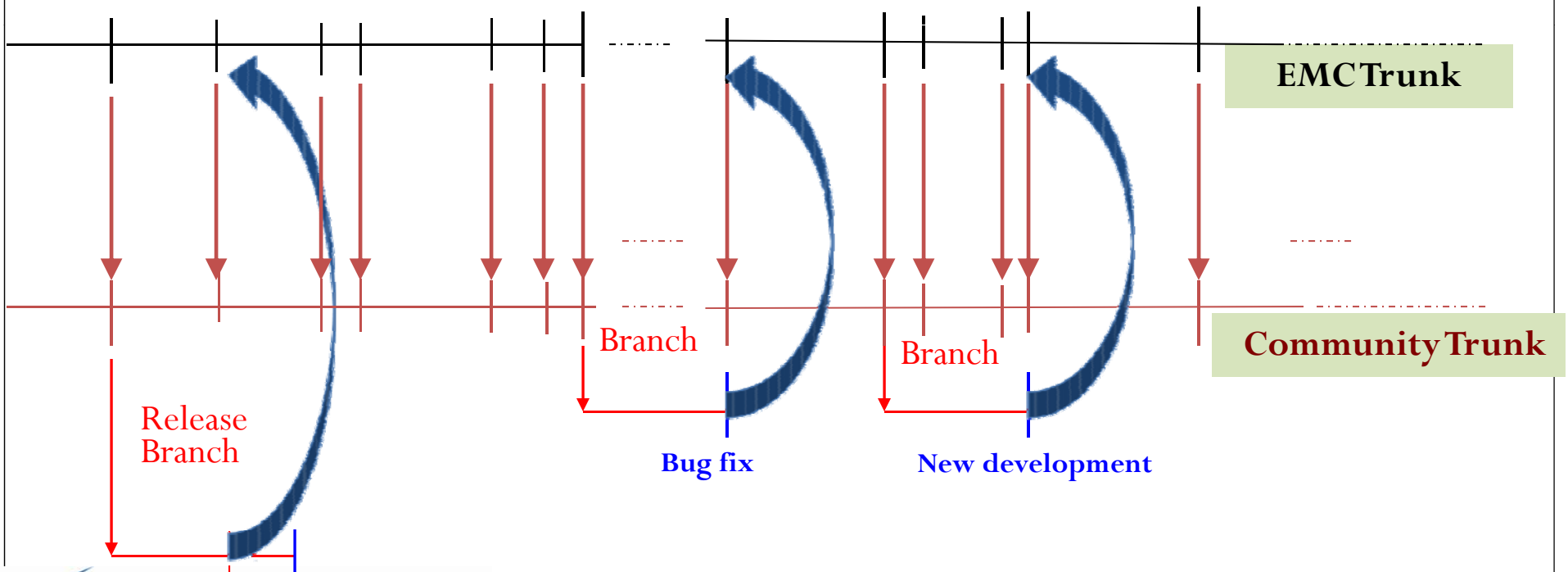
- Host the community GSI code under version control;
- Coordinate GSI related efforts among developers and partners;
- Conduct testing and evaluation (T&E) of data assimilation techniques and components.
- Develop tools and utilities to make the code user friendly;
- Provide user support and documentation;

Community GSI Code Management



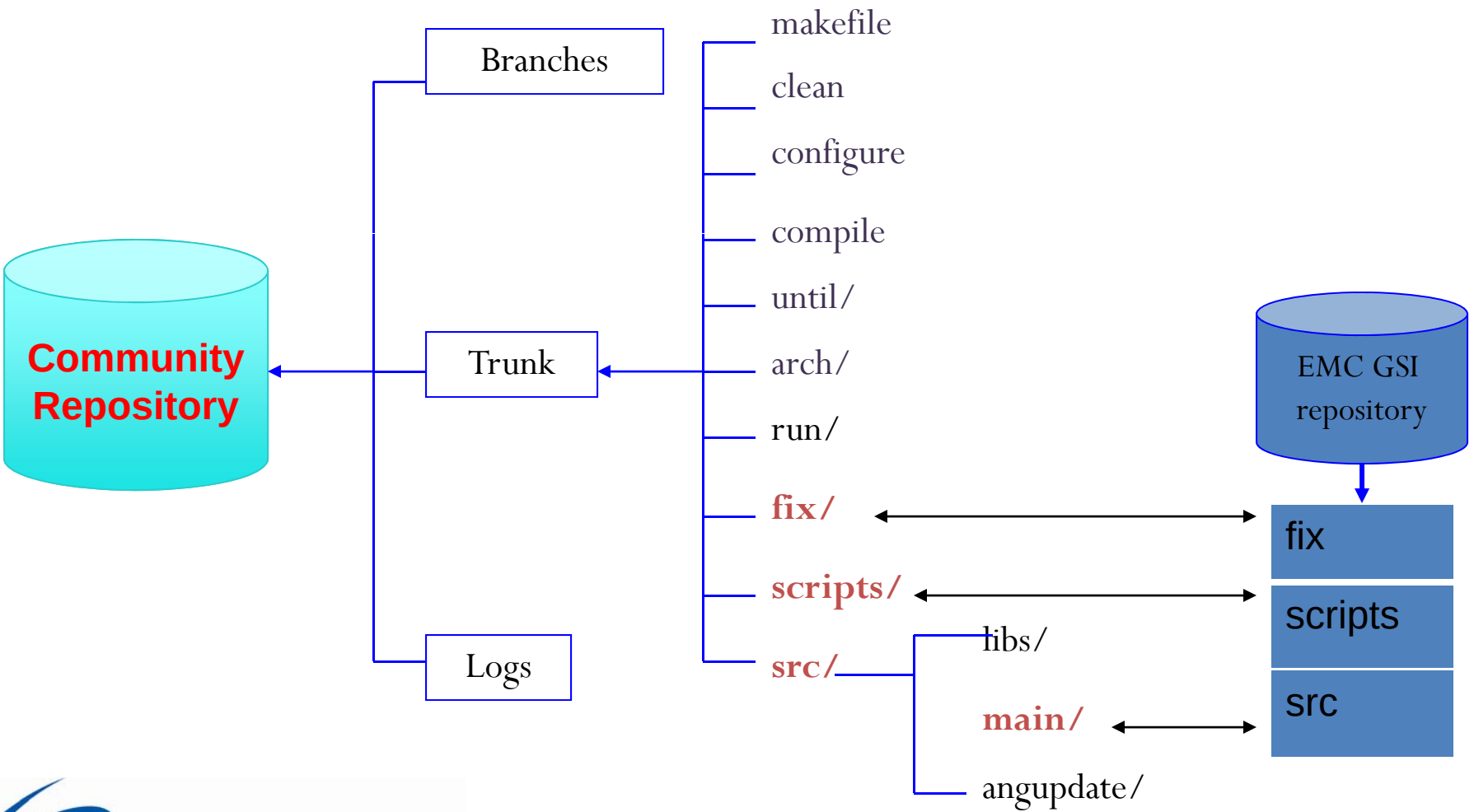
Dual GSI Code Repository Structure (2010)

- Two repository trunks share the **same GSI core** (src/, scripts/ and fix/)
- Upon approval by the GSI review committee, new development/bug fixes will be committed to the EMC trunk first
- The Boulder trunk will sync with the EMC trunk and provide parallel code to Boulder developers
- **All extra community features will be maintained in separate directories** in the Boulder trunk and do not interfere with the GSI core in common directories shared by two repositories.



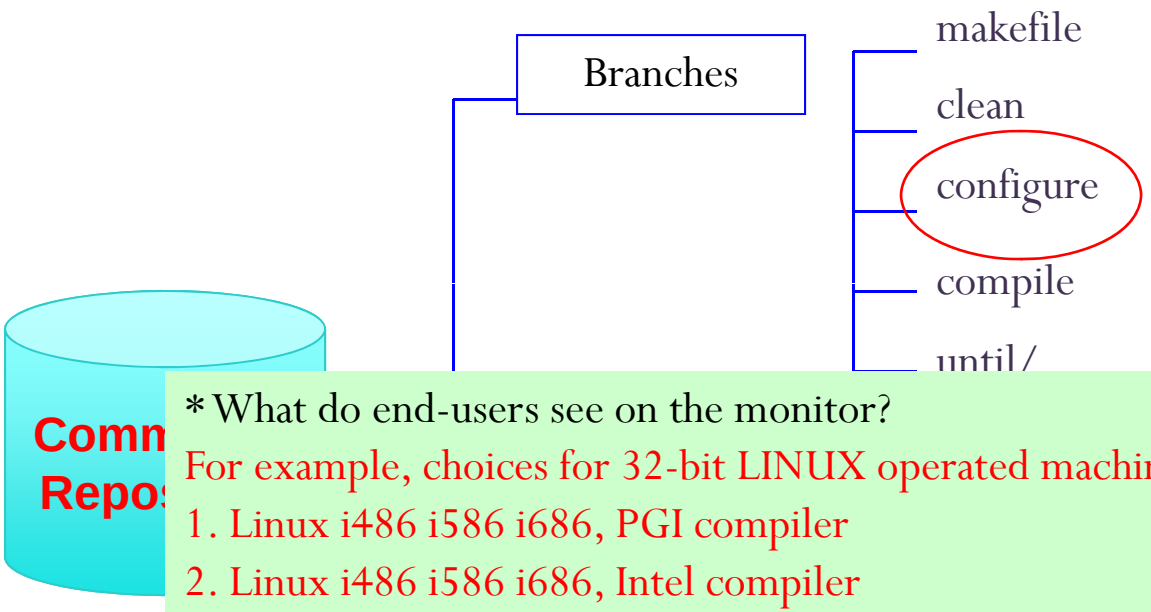
Developmental Testbed Center

GSI Core and Extra Features for Community GSI V2.0 (released on April 27, 2010)



Features for Community GSI V2.0 (released on April 27, 2010)

- Compile/configure utility
  - IBM: xlf
  - LINUX: pgi 7.0,8.0,9.0
  - LINUX: Intel 10.0 and 11.0
  - MAC OSX: PGI 8.0
  - SGI Altix: Intel 10.0 (community contribution)



* What do end-users see on the monitor?

For example, choices for 32-bit LINUX operated machines are:

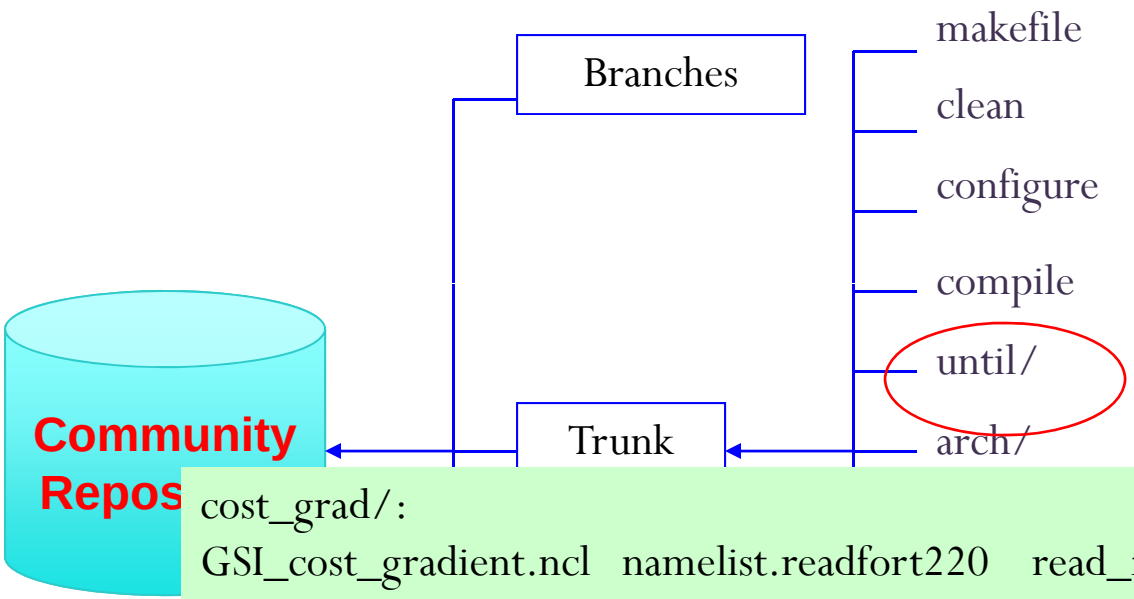
1. Linux i486 i586 i686, PGI compiler
2. Linux i486 i586 i686, Intel compiler

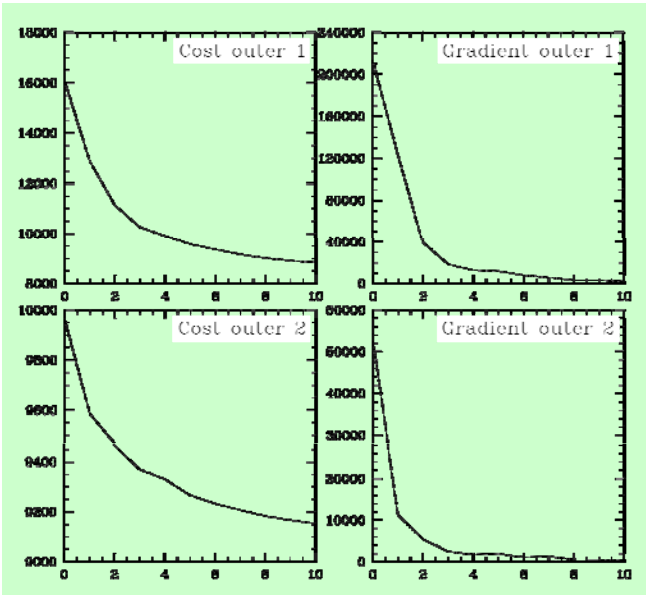
* What is behind it?

"configure"

- Checks the system hardware and software (*netCDF, mpi, and math libraries).*
- Offers the user choices for configuring GSI.
- Creates configure.gsi, which contains compilation options, paths, rules, etc. specific to your computer and compiler choice, and can be edited to change compilation options, if desired.

Features for Community GSI V2.0 (released on April 27, 2010)



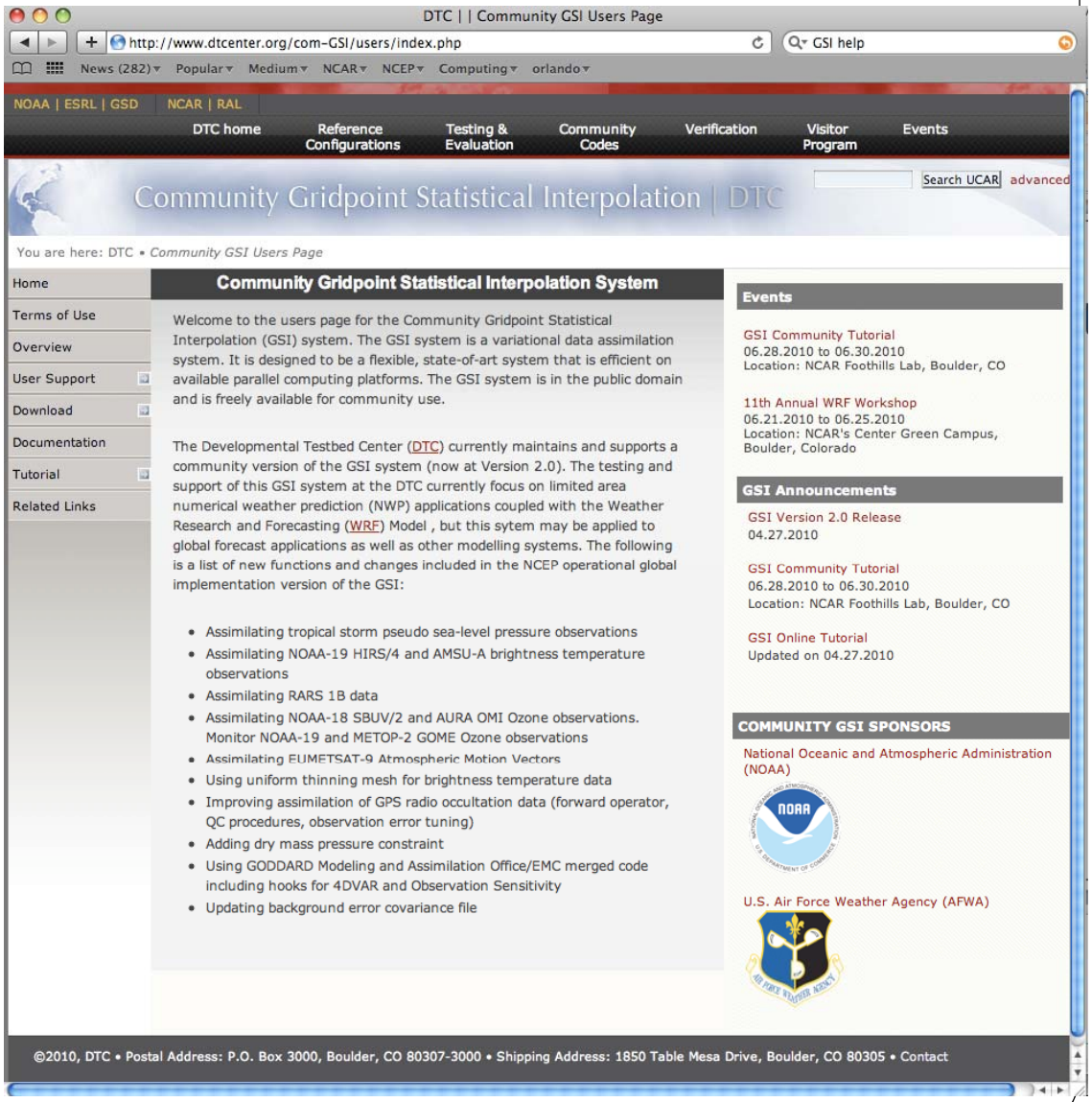


cost_grad/:
GSI_cost_gradient.ncl namelist.readfort220 read_fort220.f90
Diag/:
namelist.conv read_diag_conv.f90
namelist.rad read_diag_rad.f90
ncl_siglobs/:
GSI_singleobs_arw.ncl GSI_singleobs_nmm.ncl fill_nmm_grid2.ncl*
Ssrc/:
ssrc.c

Community GSI Website

http://www.dtcenter.org/com-GSI/users/index.php

- Release/tutorial announcement
- System component descriptions
- Documentation
  - User's Guide
  - Presentations
  - Code online browser
  - Online tutorial
- Registration
- Software downloads
- Bug fix reports
- User support information



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Community GSI Release

Tasks	NCEP Global Implementation	DTC Release
Beta release v1.0	Q1FY09 ~Feb, 2009	Jun, 2009
Official release v1.0	Q1FY09 ~Feb, 2009	Sep, 2009
Beta release v2.0	Q1FY10 Dec, 2010	Feb, 2010
Official release v2.0	Q1FY10 Dec, 2010	Apr, 2010

Community GSI Support and Outreach

- GSI helpdesk: gsi_help@ucar.edu
- GSI User's Guide: http://www.dtcenter.org/com-GSI/users/docs/index.php
- GSI online tutorial: http://www.dtcenter.org/com-GSI/users/tutorial/index.php

- GSI instructional session
  - 10th WRF Users' Workshop, Boulder, CO, June, 2009
- GSI lectures
  - 10th WRF Users' Workshop, Boulder, CO, June, 2009
  - WRF 2010 Summer Tutorial, Boulder, CO, July, 2009
  - AMS 90th Annual Meeting, Atlanta, GA, January, 2010
- GSI Residential Tutorial, Boulder, CO, June 28-30, 2010

Monday 06/28

8:30	Welcome, background and Participants' Introduction - Hans Huang (NCAR)/John Derber (EMC)
9:00	Fundamental of Data Assimilation - Hans Huang (NCAR)
10:00	Coffee Break
10:30	Overview of GSI - John Derber (EMC)
11:30	Lunch
1:00	GSI Code (SE aspect) - Don Stark (NCAR)
2:00	GSI Setup, Run and Namelist - Hui Shao (NCAR)
3:00	Coffee Break
3:30	Introduction to practice session I
3:45	Practice session (compile and run GSI, namelist option, single-obs)
5:30	Adjourn

Tuesday 06/29

8:30	Observations: PrepBUFR and BUFR - Stacie Bender (EMC)
9:30	Community Tools (1): PrepBufr Converter - Ming Hu (NOAA/GSD & CIRES)
10:00	Coffee Break
10:30	Background and Observation Error Estimation and Tuning - Wan-shu Wu (EMC)
11:30	Lunch
1:00	Community Tools (2): GEN_BE - Syed Rizvi (NCAR)
1:30	Satellite Radiance Assimilation: John Derber (EMC)
2:30	GSI Diagnostics - Ming Hu (NOAA/GSD & CIRES)
3:00	Coffee Break
3:30	Introduction to practice session
3:45	Practice session (satellite radiance data assimilation, GEN_BE)
5:30	Adjourn

Wednesday 06/30

8:30	Radar Observation Assimilation - Shun Liu (EMC)
9:15	GPS RO Data Assimilation - Lidia Cucurull (EMC)
10:00	Coffee Break
10:30	4D-Var - Todling Ricardo (GMAO)
11:30	Open discussion
12:00	Lunch
1:30	Optional Practice Session
5:30	Adjourn

GSI Community Tutorial

- **June 28-30, 2010 at NCAR Foothill Lab, Boulder, CO**
- **Agenda:**
  - ~10 hour lectures
  - ~8 hour hands-on sessions
- **Lecturers:**
  - 3 from DTC
  - 3 from NCEP/EMC
  - 1 from NOAA/NESDIS
  - 1 from NASA/GMAO
  - 1 from NCAR/MMM

Proposed Activities for FY 2010

- **Collaborations and coordination**
  - DTC Maryland staff
  - EMC visitors to Boulder
  - Monthly GSI community developer meetings
- **Boulder Community Repository**
  - Update, port and enhance
  - Sync with EMC GSI repository
  - Regression tests
  - Develop community tools
- **Community support**
  - Form a community GSI review committee
  - GSI community code release v2.0: April 2010
  - GSI community tutorial: 28-30 June 2010
  - Update GSI User's Guide v2.0
  - GSI-help, GSI webpage, online documentation and online tutorial
- **T&E**
  - AFWA GSI Testbed

Community GSI Resources

- GSI helpdesk: gsi_help@ucar.edu
- GSI News (new!):
  http://mailman.ucar.edu/mailman/listinfo/gsi_news
- Community GSI webpage:
  http://www.dtcenter.org/com-GSI/users/index.php
- Community GSI wiki (for internal developers):
  https://wiki.ucar.edu/display/dtcgsi/Home
- Community GSI tutorial:
  http://www.dtcenter.org/com-GSI/users/tutorial/resident/gsi_tutorial_2010.2.php