

# Technical Details

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# Downloading MET

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- MET distributed as a tarball to be downloaded and compiled locally.
  - METv1.1 released on July 11, 2008.
  - METv2.0 scheduled for February 2009.
  - METv2.0 BETA pre-installed on tutorial machines.
  - Register and download: [www.dtcenter.org/met/users](http://www.dtcenter.org/met/users)
- Language:
  - Written primarily in C++ with calls to a Fortran library
- Supported Platforms and Compilers:
  - Linux with GNU compilers
  - Linux with Portland Group (PGI) compilers
  - Linux with Intel compilers
  - IBM machines with IBM compilers

# www.dtcenter.org/met/users

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Model Evaluation Tools

Welcome

Welcome to the users page for the Model Evaluation Tools (MET) verification package. MET was developed by the National Center for Atmospheric Research (NCAR) Developmental Testbed Center (DTC) through the generous support of the U.S. Air Force Weather Agency (AFWA) and the National Oceanic and Atmospheric Administration (NOAA).

Description

MET is designed to be a highly-configurable, state-of-the-art suite of verification tools. It was developed using output from the Weather Research and Forecasting (WRF) modeling system but may be applied to the output of other modeling systems as well.

MET provides a variety of verification techniques, including:

- Standard verification scores comparing gridded model data to point-based observations
- Standard verification scores comparing gridded model data to gridded observations
- Object-based verification method comparing gridded model data to gridded observations

Joint Numerical Testbed Projects

Developmental Testbed Center (DTC)

Weather Research and Forecasting (WRF) Model Support

Model Evaluation Tools (MET)

Data Assimilation Testbed Center (DATC)

Joint Numerical Testbed Events


- WRF Tutorial (WRF, WRF-Var, MET)  
01.26.2009 to 02.05.2009  
Location: NCAR Foothills Laboratory, Boulder, CO

MET Announcements


- Current release: **METv1.1** (07.11.2008)
- Online Tutorial added for METv1.1.

MET SPONSORS

U.S. Air Force Weather Agency (AFWA)



National Oceanic and Atmospheric Administration (NOAA)



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# Dependencies

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- REQUIRED:
  - GNU Make Utility
  - C++ and Fortran compilers (GNU, PGI, Intel, or IBM)
  - NetCDF version 3 Library
  - BUFRLIB Library
  - GNU Scientific Library (GSL)
  - F2C Library (f2c or g2c, for some compilers)
- RECOMMENDED:
  - WRF Post-Processor
  - COPYGB (included with WRF-Post)
  - R statistics and graphics package
  - *CWORDSH (not needed for v2.0)*

# Directory Structure

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File or Directory	Contents
README	Installation instructions and release notes.
Makefile_gnu (pgi, intel, ibm)	Top-level Makefile to be configured prior to building MET.
lib/	Source code for internal MET libraries.
src/	Source code for the MET applications.
doc/	MET User's Guide.
bin/	Built MET executables.
scripts/	Test scripts to be run after building MET.
data/	Sample data used by the test scripts.
out/	Output generated by the test scripts.

# Building MET

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- Steps for building MET:

-  Build the required libraries with the same family of compilers to be used with MET.

-  Select the appropriate Makefile.

- GNU, PGI, or IBM

-  Configure the Makefile.

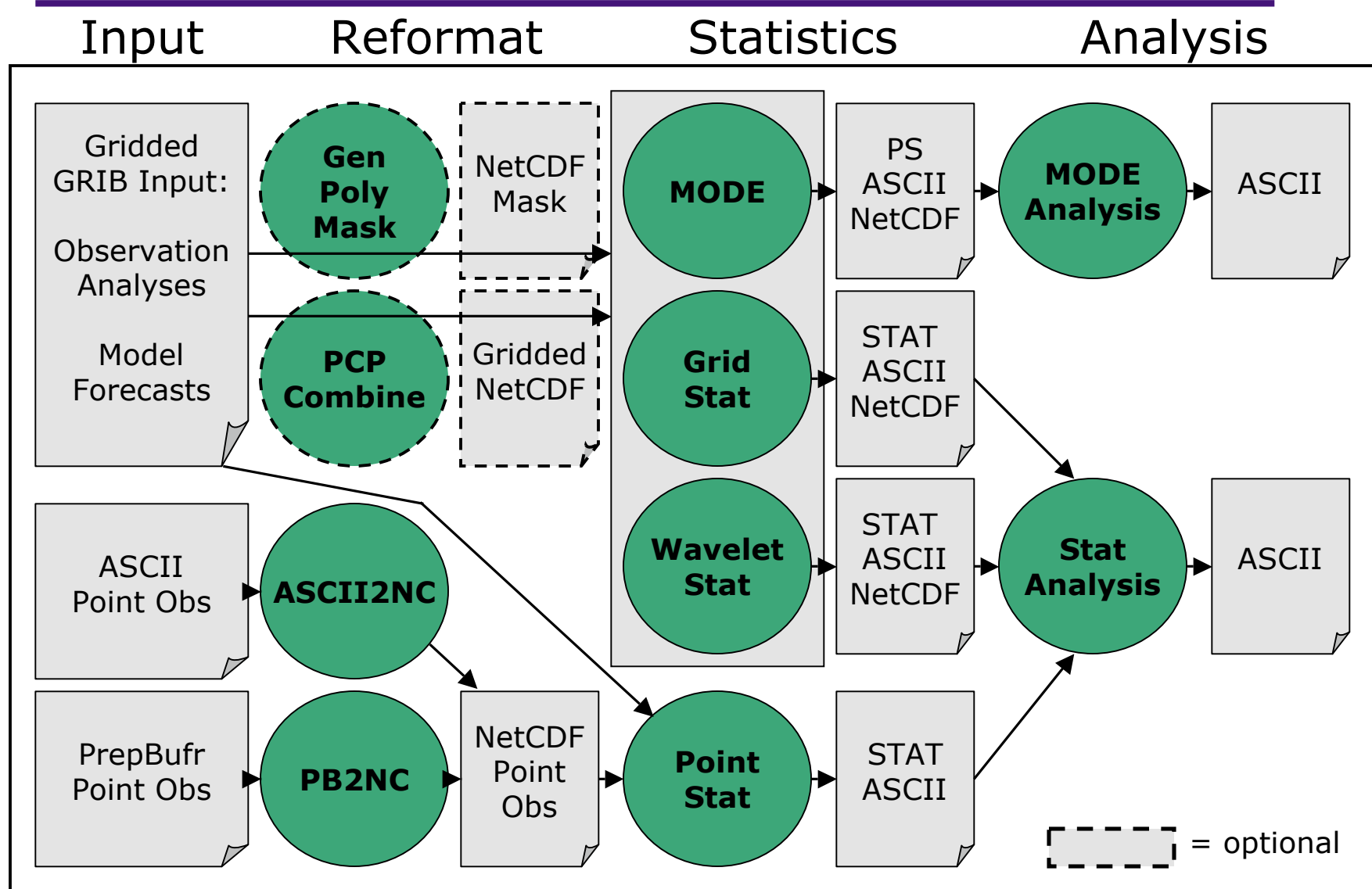
- C++ and Fortran compilers
    - Paths for NetCDF, BUFRLIB, GSL, and F2C libraries

-  Execute the GNU Make utility to build all of the MET utilities.

-  Run the test script and check for runtime errors.

- Runs each of the MET tools at least once.
    - Uses sample data distributed with the tarball.

# MET v2.0 Flowchart



# Graphics

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- Limited graphics incorporated into MET.
  - Generated using internal PostScript library.
- Several options for plotting MET statistical output - including R, NCL, IDL, GNUPlot, and many others.
- Users are encouraged to submit their own plotting and/or analysis scripts using any tool for posting to the MET website.



# R Statistics and Graphics

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- The R Project for Statistical Computing ([www.r-project.org](http://www.r-project.org))
  - Powerful statistical analysis and plotting tools.
  - Freely available and well supported for Linux/Windows/Mac.
- Sample R plotting and analysis scripts posted on the MET website.
- Recent praise for R in the technology section of the NY Times:
  - **Data Analysts Captivated by R's Power**

# Configuration Files

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- Set of command line tools controlled using command line options and ASCII configuration files.
  - Well commented and documented in MET User's Guide.
  - Easy to modify.
  - Distributed with the tarball.
- Configuration files control things such as:
  - Fields/levels to be verified.
  - Thresholds to be applied.
  - Interpolation methods to be used.
  - Verification methods to be applied.
  - Regions over which to accumulate statistics.