

NCAR benchmarking applications - 2019-2020 release

31 March 2020 - Benchmark Q&As updated

For questions and answers regarding the NWSC-3 HPC Benchmarks, refer to the updated NWSC-3 Benchmarks Q&As document.

19 March 2020 - Updated benchmarks released

Please note that the NWSC-3 HPC Benchmarks have been updated to include changes to the GOES and OSU MPI benchmarks. Prospective Offerors for the NWSC-3 Request for Proposal (RFP), which will be released 2 April 2020, should download the updated benchmark code, input cases, and instructions (see below). NCAR does not plan to make any additional changes to the HPC Benchmarks unless there are issues with the ones provided here.

19 July 2019 - Benchmarks released

The NWSC-3 HPC Benchmarks are available ahead of an anticipated release of the NWSC-3 Request for Proposal (RFP) in Q1 of 2020. NCAR does not plan to make any changes to the HPC Benchmarks unless there are issues with the ones provided here.

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Ensuring that real applications perform well on NCAR computing platforms is critical for getting the best value out of complex and costly high-performance computing and storage resources. Climate and weather applications are large, often with millions of lines of code, and are generally difficult to configure in a way that permits ease of use for things such as system deployments, upgrades, and procurements.

Thus, NCAR has developed a suite of application kernels, micro-benchmarks, and full applications with moderate input cases that can be used as proxies for the full applications and still provide meaningful information and insights into system performance. A few of these are well-known benchmarks that are commonly used in HPC for characterizing system performance.

NCAR's benchmarking applications are listed in the table below, along with file names, sizes, and checksums. These packages include source files, build scripts, and input data sets required to compile and run the applications. In cases where the benchmarks depend on applications and libraries that are not part of the package distributions, you will find version number and download details in the README files.

Documentation and **benchmark download packages** are available through the Globus-based NCAR Data Sharing Service. Instructions are given below for obtaining a Globus account, installing the required Globus software, and downloading the benchmark packages via the **NCAR HPC Benchmarks** endpoint. See the Globus instructions below for more information.

Benchmarks

Name	Description	File Contents	File Name	Size (Bytes)	MD5 Checksum
CLUBB	Physics Kernel	Instructions	CLUBB_2019-05-19.pdf	63246	006fb83f72d3cc4042c361701f837ea4
		Benchmark Files	CLUBB_2019-05-19.tar.gz	184931304	626d0c5108f76c662d8e722fa64cf e82
DART_WRF	Model Kernel	Instructions	DART_WRF_2019-05-20.pdf	59749	cbe78c13a80073910c0275467c52ee2c
		Benchmark Files	DART_WRF_2019-05-20.tar.gz	258607013	a388e961fce0960d096417cd45e1f00f
GOES	ML Benchmark	Instructions	GOES16_2020-04-27.pdf	71665	1d9ba301526d25cd768304e14fa5ab14
		Benchmark Files	GOES16_2020-04-27.tar.gz	3578032111	5517e495689c75c4f71478d5d3f45e7e
MG2	Physics Kernel	Instructions	MG2_2019-05-20.pdf	61804	c13a288f425993504ab9ce5db692c008
		Benchmark Files	MG2_2019-05-20.tar.gz	85366943	25ebc145a374d3ccd1d410f9d495261a
MPAS-A*	GPU-capable Atmospheric Model	Instructions	MPAS_2019-06-26.pdf	274813	cf523aa8e3a9d889d11817d0d07edca9
		Benchmark Files	(For access, follow the MPAS-A instructions below)		

		Input Data	MPAS_2020-04-27_data.tar.gz	17270465681	0ced450ce164b86cb9a6c82a5dcfd966
Stream	Memory Bandwidth	Instructions	Stream_2019-05-22.pdf	69436	577d9da38eed93d782d6a046c36d7353
		Benchmark Files	Stream_2019-05-22.tar.gz	20743	23d9d58f8d709553c7e409ab1b1e44cc
WACCM	Physics Kernel	Instructions	WACCM_2019-05-19.pdf	62391	6bb2d8bd1df3471ad93a17540e2c2c17
		Benchmark Files	WACCM_2019-05-19.tar.gz	18289529	b31c36c58f5ecbbb613caaa39b663b32
WRF	Weather Research and Forecasting (WRF) Model	Instructions	WRF_2019-09-06.pdf	93213	2a47071030e4417d4873938333a60af9
		Benchmark Files	WRF_2019-09-06.tar.gz	9778202346	bec5bf5cc682b14ebb30a2da51d381ab
OSU MPI	MPI Communications Benchmark	Instructions	osu-micro-benchmarks-5.5_2020-03-12.pdf	62732	4baea167d0698973e751b75e578ac6bb
		Benchmark Files	osu-micro-benchmarks-5.5_2020-03-12.tar.gz	765369	bcb970d5a1f3424e2c7302ff60611008

Globus instructions

Step 1: Obtain a Globus account

Go to www.globus.org and click the **Sign Up** button in the upper-right corner.

Step 2: Install Globus Connect Personal

Go to <https://www.globus.org/globus-connect-personal> and install the version of Globus Connect Personal appropriate for your computer. Versions are available for Mac OS X, Linux, and Windows.

Step 3: Use Globus to download benchmarks

1. Access the **NCAR HPC Benchmarks** folder on Globus. (You will need to log in to Globus with the account created in Step 1.)
2. Select the files you wish to download and click **Transfer or Sync** to in the right-hand pane.
3. Select the endpoint you wish to transfer files to. This can be the computer where you installed Globus Connect Personal in Step 2, or another Globus endpoint to which you have access.
4. Click on the **Start** button below the file manager to initiate the transfer.

Your download will be submitted through the Globus Transfer service. You will receive an email when your transfer has completed. You can monitor the transfer by clicking **Activity** in the left-hand menu to bring up the Globus Activity view.

* **Note:** Access to the MPAS-A benchmark code is restricted. To obtain access, follow the instructions below.

Instructions for obtaining NWSC-3 MPAS-A benchmark source code

Code releases for the MPAS-A GPU project will occur through the open-source GitHub site. However, before you may access the site, you are required to sign the [MPAS-A Confidentiality Agreement](#). To obtain access to the MPAS-A GPU GitHub site, send both your signed MPAS-A Confidentiality Agreement and your GitHub account/login to [Alison Propes](#), UCAR's Subcontract/Procurement Manager.

Note that all materials (including source code, products derived from source code, and documents) related to NWSC-3 MPAS should **not** be distributed, either formally or informally, in any form. Publishing any kind of results obtained from the NWSC-3 MPAS-A source code requires written consent from UCAR.