E4S: The Extreme-scale Scientific Software Stack
Release 22.08

Release 22.08 notes

August 31, 2022

Extreme-scale Scientific Software Stack (E4S)

- **E4S**: HPC Software Ecosystem – a curated software portfolio

- A **Spack-based** distribution of software tested for interoperability and portability to multiple architectures with support for GPUs from NVIDIA, AMD, and Intel in a single distribution

- Available from **source**, **containers**, **cloud, binary caches**

- Leverages and enhances SDK interoperability thrust

- Not a commercial product – an open resource for all

- Oct 2018: E4S 0.1 - 24 full, 24 partial release products

- Jan 2019: E4S 0.2 - 37 full, 10 partial release products

- Nov 2019: E4S 1.0 - 50 full, 5 partial release products

- Feb 2020: E4S 1.1 - 61 full release products

- Nov 2020: E4S 1.2 (aka, 20.10) - 67 full release products

- Feb 2021: E4S 21.02 - 67 full release, 4 partial release

- May 2021: E4S 21.05 - 76 full release products

- Aug 2021: E4S 21.08 - 88 full release products

- Nov 2021: E4S 21.11 - 91 full release products

- Feb 2022: E4S 22.02 – 100 full release products

- May 2022: E4S 22.05 – 101 full release products

- August 2022: E4S 22.08 – 102 full release products

https://e4s.io

Lead: Sameer Shende
(U Oregon)

Also include other products .e.g.,
AI: PyTorch, TensorFlow (CUDA, ROCm)
Co-Design: AMReX, Cabana, MFEM

E4S Download from https://e4s.io

Download E4S 22.08 GPU Container Images: NVIDIA, AMD, Intel

- Separate full featured Singularity images for 3 GPU architectures
- GPU full featured images for
  - x86_64 (Intel, AMD, NVIDIA)
  - ppc64le (NVIDIA)
  - aarch64 (NVIDIA)   NEW!
- Full featured images available on Dockerhub
- 100+ products on 3 architectures

https://e4s.io

Download E4S 22.05 GPU Container Images: NVIDIA, AMD, Intel

Note on Container Images

Container images contain binary versions of the Full Release packages listed above. Full-featured GPU-enabled container images are available from Dockerhub:

```
# docker pull ecpe4s/e4s-cuda:22.08
```

```
# docker pull ecpe4s/e4s-rocm:22.08
```

```
# docker pull ecpe4s/e4s-oneapi:22.08
```

E4S Full GPU Images

These images contain a full Spack-based deployment of E4S, including GPU-enabled packages for NVIDIA, AMD, or Intel GPUs.

These images also contain TensorFlow, PyTorch, and TAU.

AMD ROCm (x86_64)	NVIDIA CUDA (x86_64, ppc64le, aarch64)	Intel OneAPI (x86_64)
ecpe4s/e4s-rocm:22.08 🐳 docker	ecpe4s/e4s-cuda:22.08 🐳 docker	ecpe4s/e4s-oneapi:22.08 🐳 docker
e4s-rocm-22.08.sif Ⓢ mirror 1	e4s-cuda-x86_64-22.08.sif Ⓢ mirror 1	e4s-oneapi-22.08.sif Ⓢ mirror 1
	e4s-cuda-ppc64le-22.08.sif Ⓢ mirror 1	
	e4s-cuda-aarch64-22.08.sif Ⓢ mirror 1	

https://e4s.io

E4S 22.08 Full Featured and Base Images

E4S Full GPU Images

These images contain a full Spack-based deployment of E4S, including GPU-enabled packages for NVIDIA, AMD, or Intel GPUs.

These images also contain TensorFlow, PyTorch, and TAU.

AMD ROCm (x86_64)

ecpe4s/e4s-rocm:22.08 🐳 docker

e4s-rocm-22.08.sif Ⓢ mirror 1

NVIDIA CUDA (x86_64, ppc64le, aarch64)

ecpe4s/e4s-cuda:22.08 🐳 docker

e4s-cuda-x86_64-22.08.sif Ⓢ mirror 1

e4s-cuda-ppc64le-22.08.sif Ⓢ mirror 1

e4s-cuda-aarch64-22.08.sif Ⓢ mirror 1

Intel OneAPI (x86_64)

ecpe4s/e4s-oneapi:22.08 🐳 docker

e4s-oneapi-22.08.sif Ⓢ mirror 1

GPU Base Images

These images come with MPICH, CMake, and the relevant GPU SDK – either AMD ROCm, NVIDIA CUDA Toolkit and NVHPC, or Intel OneAPI.

NVIDIA Multi-Arch (X86_64, PPC64LE, AARCH64)

ecpe4s/e4s-base-cuda:22.08 🐳 docker

e4s-base-cuda-x86_64-22.08.sif Ⓢ mirror 1

e4s-base-cuda-aarch64-22.08.sif Ⓢ mirror 1

e4s-base-cuda-ppc64le-22.08.sif Ⓢ mirror 1

ROCM X86_64

ecpe4s/e4s-base-rocm:22.08 🐳 docker

e4s-base-rocm-22.08.sif Ⓢ mirror 1

Intel OneAPI X86_64

ecpe4s/e4s-base-oneapi:22.08 🐳 docker

e4s-base-oneapi-22.08.sif Ⓢ mirror 1

https://e4s.io

22.08 Release: 102 Official Products + dependencies (gcc, cuda, x86_64)

```
 1: adios2              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/adios2-2.8.3-ifkuulgk4fcrwgcizlflfquna2x5ofay
 2: alquimia            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/alquimia-1.0.9-2lrac7o4ffv4rqt4h2vgzjud3tkjwkrd
 3: aml                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/aml-0.2.0-pwiapieu4qrmlv64dvz6ztnlryomtxov
 4: amrex               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/amrex-22.08-2k6mn7x6c6bn37e4qqhcjjpof5l663ec
 5: arborx              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/arborx-1.2-hpqevuvvjoqfpgt3334czuut4secym7u
 6: archer              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/archer-2.0.0-ubhbdonoquovu6i6yh6byf5vkjqdst2s
 7: argobots            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/argobots-main-62s4jy7ijfzur2pw2rzadwo5ixgnizjl
 8: ascent              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ascent-0.8.0-k6pkjgeaxjbtjnqv4qalvfi76a3tecyn
 9: axom                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/axom-0.6.1-adc6pqaau33eh47lt62cd7gx6qv3qebj
10: bolt                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bolt-2.0-t3nxvx37r4r4b4v6o4tmjplwxosamm65
11: bricks              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bricks-r0.1-75cmpltjkrkwrjklzkss7khajjf72lco
12: butterflypack       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/butterflypack-2.1.1-q5eimvsxo5jzoyxlaq7mrkoe7l5o3y2n
13: cabana              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/cabana-0.5.0-uzm7qvptohoxhz3fpxqbob2sq4a5bbli
14: caliper             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/caliper-2.8.0-v4tnqpfc5dcnxslg4ltuqkhxcr6aydfa
15: chai                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/chai-2022.03.0-v4q3jdzv5zvmq4x2gswjxscqonewm43j
16: conduit             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/conduit-0.8.3-zphidjxhjkiwukbg4sdftgsrjbfov5y3
17: darshan-runtime     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/darshan-runtime-3.4.0-caydqukivwqaecivrajoj5nusrqzgl7t
18: datatransferkit     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/datatransferkit-3.1-rc3-blednv72j7co7xf7j3wspaswy6jtxbwy
19: dyninst             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/dyninst-12.2.0-3dwen3nn22mkqjsivikdd43rrl4vehvz
20: faodel              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/faodel-1.2108.1-kqkwty5hn4cvjrgbvutzgk3p45tb5sdc
21: flecsi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flecsi-2.1.0-jdt5s7vqugxnqcco3hiqyqdtc6p3jlp3
22: flit                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flit-2.1.0-hh43s4mmqrw3p7zj2hlkylklgr3tggf5
23: flux-sched          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flux-sched-0.23.0-qod4dtvrvmat3npnpwysrpebxjexsxhr
24: fortrilinos         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/fortrilinos-2.0.0-6lceq2wyliv7xqkif2es47bpgm3ztvxj
25: gasnet              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gasnet-2022.3.0-mjam365qep6iiqr36s454x4psmgrkwp6
26: geopm               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/geopm-1.1.0-vzi6bqaktmcahuvu66oozto2wtoe27la
27: ginkgo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ginkgo-1.4.0-7iqzf3oxknmk2iv3i74eu4d44otnqh37
28: globalarrays        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/globalarrays-5.8-2qdtkpndvwvqylybsfxps2px3ansltxn
29: gotcha              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gotcha-1.0.3-a2gy4enms44svpeek5vzlvnalx3pr6ia
30: gptune              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gptune-3.0.0-db3njgcxugdun5d452wiw7goxw4hhykx
31: h5bench             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/h5bench-1.2-hul73s3xtl2srumekg7cuo2bb533fmot
32: hdf5                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-1.13.2-doki3exhfk6ofx2gum2nv6fdjs3lab4s
33: hdf5-vol-async      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-vol-async-1.2-34dt32yinsj52cwxykv6jzcpbnejdptf
34: heffte              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/heffte-2.2.0-goupv4n2hgxdtezc3g6r7isf4h5jvsm3
35: hpctoolkit          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpctoolkit-2022.05.15-xjug5nhvocxzdrbooncuk3te6t3rw7wa
36: hpx                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpx-1.8.1-lrb5wsjktqgsswclupnaayb2ohq3ptkw
37: hypre               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hypre-2.25.0-4nmvphj2dtfh7uisr44f7oftptmenl3l
38: kokkos              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/kokkos-3.6.01-7vuflt6v5ahimf6e3noa6o67kx5ut3ns
39: kokkos-kernels      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/kokkos-kernels-3.6.00-uihsqkd6swloqua3hdkxe6kr5oaolkxz
40: lammps              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/lammps-20220623-5cqu3suoycin5fgoz4cvc3qzq7elqqif
41: legion              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/legion-21.03.0-y36c4daichtlrjq3zlarfzdcenlndktb
42: libnrm              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libnrm-0.1.0-tj463dbbvyerlzhtesccp525byjmug5n
43: libquo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libquo-1.3.1-zihxwoeobknjaj3bmaybfaoqn3jwfvso
44: loki                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/loki-0.1.7-rgel6sujgugxzqvtddd2jibhuw7dmhai
45: magma               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/magma-2.6.2-zw7i6ultwjuxsyztuyijjx72fle7ytil
46: mercury             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mercury-2.1.0-ubcppuuys2e6mbwe26kg5rerwuzfrqno
47: metall              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/metall-0.21-vi6z32g7zotumjtcgonykfhje35z4lmr
48: mfem                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mfem-4.4.0-bcbkjggyj26nvx7ojhxyats3mbm57ycl
49: mpark-variant       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpark-variant-1.4.0-fokhy42s3yd7uh75qo43ifjnzchsbr3g
50: mpich               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpich-4.0.2-yurg3uwktdw4kw76r5djfsnjdzdmp6cm
51: mpifileutils        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpifileutils-0.11.1-6dj2vqlpw5qydyq7v52ubu55op3ajpq7
```

- NVHPC 22.7 with CUDA 11.7
- Support for A100 and V100 GPUs
- TensorFlow v2.9.1 and
- PyTorch v1.12.1 optimized for GPUs

22.08 Release: 102 Official Products + dependencies (gcc, cuda, x86_64) (contd.)

```
 52: netlib-scalapack   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/netlib-scalapack-2.2.0-25vd6rfq4ufuesofo57jysj5x53nxu74
 53: nccmp              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nccmp-1.9.0.1-ftszrnqzc2cygoqrtioee6h3fjx6w6yv
 54: nco                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nco-5.0.1-rlffrqp2xzm4uvdwqqodtn3exrr2dlnd
 55: nrm                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nrm-0.1.0-uwg666h4ka32lj2bxmc4nj36liyil3zq
 56: omega-h            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/omega-h-9.34.1-27heb5almci24q7zg7mfn2mdqq6562va
 57: openmpi            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openmpi-4.1.4-7co3hc3hfgfszjffum3fu7c3q23ozqy4
 58: openpmd-api        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openpmd-api-0.14.5-pj2hi5r2m5wubpacflddd3tivqjwunbi
 59: papi               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papi-6.0.0.1-yjnzh45s2nzeeb553xpx5qxinm73jdgz
 60: papyrus            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papyrus-1.0.2-ae7pqcjs72utsbtgq6x3q4e5tqzpgocb
 61: parallel-netcdf    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parallel-netcdf-1.12.2-v7h7r3hqjw6vakzqj6uarb465ss4oj6v
 62: paraview           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/paraview-5.10.1-lf7udp3dnwkptjh5mxr4xotc4wuf2jfm
 63: parsec             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parsec-3.0.2012-7hbcudupjmlfcgihhtfp7pe2moszdvcl
 64: pdt                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pdt-3.25.1-22x4lgxduh2ejs477htndgxuiha5uo2s
 65: petsc              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/petsc-3.17.4-ywonj5xmzv4nsjahsg5oww6f246t7r62
 66: phist              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/phist-1.9.5-ey2e2xjqrkogucncqlcaiay5pi5yqnpo
 67: plasma             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plasma-21.8.29-q4m6euppnulfmxi5aufltyd3kgdhvtts
 68: plumed             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plumed-2.8.0-z265gsvzvb43xn42lajf6d3fa6k6jpn2
 69: precice            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/precice-2.5.0-mojal5qfjqzzseifja5xdulyeukdzjml
 70: pruners-ninja      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pruners-ninja-1.0.1-okgyfnztj2rfcyitth4n4oexghk445hr
 71: pumi               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pumi-2.2.7-whec6o6kj7qpo53s2yyqch5xda5akdgp
 72: py-cinemasci       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-cinemasci-1.7.0-n3pshnjlwj5mdpp4m3w5xc42h3cufci3
 73: py-jupyterhub      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-jupyterhub-1.4.1-odbpt2k2xolyk4qnfeti6pyjlrxm7n2a
 74: py-libensemble     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-libensemble-0.9.2-2zefvm7ymmap5i66nie5ocfq7a7ewz7v
 75: py-parsl           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-parsl-1.1.0-w6buwwgyvx7qk3d66an6nzhlh2d7fe3f
 76: py-radical-saga    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-radical-saga-1.16.0-qkvjgejq5dwb7x2245wgah6h7yobzvto
 77: qthreads           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/qthreads-1.16-vujctsewvsjga2drshoekdnvl4l6cp6d
 78: raja               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/raja-2022.03.0-shzxmdu6mmyuwlxfwsa6k54njfu34r23
 79: rempi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/rempi-1.1.0-3fg5re7uwjzb33j7dq2mathtmosmmisq
 80: scr                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/scr-3.0-7wiky6bzgzdc3tjt5ifb2mjqohp2yfs7
 81: slate              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slate-2022.06.00-7cfrzgha7dslzh7b5z5ut5al5msxt3gr
 82: slepc              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slepc-3.17.2-5r2ldqn5hlnnwqv32yp7esc7whvkx32r
 83: stc                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/stc-0.9.0-qhahav5nnvg5l2nrp4duimrhao6baxem
 84: strumpack          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/strumpack-6.3.1-7vhcwyrwmc5tnexxg35ldxg5uqa4r5vx
 85: sundials           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sundials-6.2.0-aput4a22o2yszv7qs56wiphtwhlpnh3r
 86: superlu-dist       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/superlu-dist-7.2.0-wcbmvrhgeedp7yboeyfjyq2gz6isxtd3
 87: swig               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/swig-4.0.2-fortran-2lwjtiomnbzbigiewcmal7au5dcf4vcu
 88: sz                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sz-2.1.12.2-akue3hil6zq2zzenppezg45bbqt3i5yn
 89: tasmanian          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/tasmanian-7.7-qo27astbmevs5oobkd6ppbzefv3leyrc
 90: tau                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/tau-2.31.1-eaz3ll4c7te7unzirnnprsaoaweooqjc
 91: trilinos           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/trilinos-13.4.0-lxifibtz722twlogwq7am35l3wqvlggx
 92: turbine            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/turbine-1.3.0-rjsro3aodby6kmhjjfttzz2tm6rqz2kp
 93: umap               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umap-2.1.0-4pteduzi242vxrweax7fx3mpgcrd42bl
 94: umpire             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umpire-2022.03.1-jd62ya4tnh57jsg6mnya646hxcsfhadm
 95: unifyfs            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/unifyfs-0.9.2-pacjxtgkc7jmvfkolj4iyo77n2xxxgh6
 96: upcxx              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/upcxx-2022.3.0-rafoonfubm2nlnwdwftgq4zmr2vcbg36
 97: variorum           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/variorum-0.4.1-yso3svxvqafqtn3yzjbnmb3eiycyhzsd
 98: veloc              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/veloc-1.5-jyg2jtgwfejr7symlqovguhzdcmin65j
 99: vtk-m              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/vtk-m-1.8.0-rx5o7ex23yc2ddbubqwsdkibddjr5jym
100: wannier90          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/wannier90-3.1.0-bendys2jbtol2nkzh4ojga5ucyptvwor
101: warpx              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/warpx-22.08-llgiiakur6amductbpxoagd2gslv6c2q
102: zfp                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/zfp-0.5.5-i5glkgnjhnf7voxibu4xzvsh4yhu53d2
```

- NVHPC 22.7 with CUDA 11.7
- Support for A100 and V100 GPUs
- TensorFlow v2.9.1 and
- PyTorch v1.12.1 optimized for GPUs

ECP EXASCALE COMPUTING PROJECT

22.08 Release: 102 Official Products + dependencies (gcc, rocm, x86_64)

```
 1: adios2              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/adios2-2.8.3-a4apzfywnvv2emsljo2xk4damq24xzv2
 2: alquimia            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/alquimia-1.0.9-2lrac7o4ffv4rqt4h2vgzjud3tkjwkrd
 3: aml                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/aml-0.2.0-pwiapieu4qrmlv64dvz6ztnlryomtxov
 4: amrex               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/amrex-22.08-cgee5yd7qejoozilsj5gkgmpueegzvph
 5: arborx              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/arborx-1.2-vapqi6l4e65azl3ppbxtca52ggfujvdu
 6: archer              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/archer-2.0.0-ubhbdonoquovu6i6yh6byf5vkjqdst2s
 7: argobots            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/argobots-main-62s4jy7ijfzur2pw2rzadwo5ixgnizjl
 8: ascent              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ascent-0.8.0-oia5j2hoeitlarm4vck76f5djoza3zf4
 9: axom                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/axom-0.6.1-adc6pqaau33eh47lt62cd7gx6qv3qebj
10: bolt                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bolt-2.0-t3nxvx37r4r4b4v6o4tmjplwxosamm65
11: bricks              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bricks-r0.1-grzmk2kve765caw6nj4lintbr62vmdkr
12: butterflypack       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/butterflypack-2.1.1-q5eimvsxo5jzoyxlaq7mrkoe7l5o3y2n
13: cabana              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/cabana-0.5.0-pvpptrgt4xpy62mkbrmk64kgez5woqu3
14: caliper             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/caliper-2.8.0-wyjlzrfe33xu7od5dhm5cer3fnc4rahg
15: chai                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/chai-2022.03.0-photgtbub3gt2tlskxzr2jma3fhzqhl2
16: conduit             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/conduit-0.8.3-zphidjxhjkiwukbg4sdftgsrjbfov5y3
17: darshan-runtime     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/darshan-runtime-3.4.0-caydqukivwqaecivrajoj5nusrqzgl7t
18: datatransferkit     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/datatransferkit-3.1-rc3-blednv72j7co7xf7j3wspaswy6jtxbwy
19: dyninst             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/dyninst-12.2.0-3dwen3nn22mkqjsivikdd43rrl4vehvz
20: faodel              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/faodel-1.2108.1-kqkwty5hn4cvjrgbvutzgk3p45tb5sdc
21: flecsi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flecsi-1.4.2-mvvbz4ittvjlhnvlcet5ikgu3p3psg6d
22: flit                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flit-2.1.0-hh43s4mmqrw3p7zj2hlkylklgr3tggf5
23: flux-sched          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flux-sched-0.23.0-qod4dtvrvmat3npnpwysrpebxjexsxhr
24: fortrilinos         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/fortrilinos-2.0.0-6lceq2wyliv7xqkif2es47bpgm3ztvxj
25: gasnet              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gasnet-2022.3.0-mjam365qep6iiqr36s454x4psmgrkwp6
26: geopm               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/geopm-1.1.0-vzi6bqaktmcahuvu66oozto2wtoe27la
27: ginkgo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ginkgo-1.4.0-bfh5lj4zztteyo6eq7d5l6sv7kyua3pn
28: globalarrays        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/globalarrays-5.8-2qdtkpndvwvqylybsfxps2px3ansltxn
29: gotcha              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gotcha-1.0.3-a2gy4enms44svpeek5vzlvnalx3pr6ia
30: gptune              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gptune-3.0.0-db3njgcxugdun5d452wiw7goxw4hhykx
31: h5bench             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/h5bench-1.2-hul73s3xtl2srumekg7cuo2bb533fmot
32: hdf5                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-1.13.2-doki3exhfk6ofx2gum2nv6fdjs3lab4s
33: hdf5-vol-async      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-vol-async-1.2-34dt32yinsj52cwxykv6jzcpbnejdptf
34: heffte              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/heffte-2.2.0-2m4ttzls4zlw5bdbzod6je4felq6cuda
35: hpctoolkit          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpctoolkit-2022.05.15-drylvdtyt4ususob7lgpne7wbqgvljeq
36: hpx                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpx-1.8.1-gbrz4os5rroqiudxr26by2vwoeoq53kd
37: hypre               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hypre-2.25.0-taa2qtk4x2xsuf2tpjsy34gtofg3ikhr
38: kokkos              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/kokkos-3.6.01-nmum3pdmiadkpb4inpbvupgh2y2hxhlm
39: kokkos-kernels      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/kokkos-kernels-3.6.00-rvppu6v4dd5azlfewkzcppoldp56aze5
40: lammps              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/lammps-20220623-5cqu3suoycin5fgoz4cvc3qzq7elqqif
41: legion              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/legion-21.03.0-y36c4daichtlrjq3zlarfzdcenlndktb
42: libnrm              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libnrm-0.1.0-tj463dbbvyerlzhtesccp525byjmug5n
43: libquo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libquo-1.3.1-zihxwoeobknjaj3bmaybfaoqn3jwfvso
44: loki                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/loki-0.1.7-rgel6sujgugxzqvtddd2jibhuw7dmhai
45: magma               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/magma-2.6.2-j65vxohn4w267ypso5x4jckqfjynkwop
46: mercury             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mercury-2.1.0-ubcppuuys2e6mbwe26kg5rerwuzfrqno
47: metall              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/metall-0.21-vi6z32g7zotumjtcgonykfhje35z4lmr
48: mfem                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mfem-4.4.0-nf5ukqqvpyzdfkxjuqqkoiktootmsbbx
49: mpark-variant       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpark-variant-1.4.0-fokhy42s3yd7uh75qo43ifjnzchsbr3g
50: mpich               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpich-4.0.2-5c7gjg4ngezfg34sczmcjglosat45cqq
51: mpifileutils        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpifileutils-0.11.1-6dj2vqlpw5qydyq7v52ubu55op3ajpq7
```

- ROCm 5.2.0
- Support for MI100 as well as MI250X
- TensorFlow v2.9.1 and
- PyTorch v1.12.1 optimized for GPUs

EXASCALE
COMPUTING
PROJECT

22.08 Release: 102 Official Products + dependencies (gcc, rocm, x86_64) (contd.)

```
 52: netlib-scalapack  /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/netlib-scalapack-2.2.0-25vd6rfq4ufuesofo57jysj5x53nxu74
 53: nccmp             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nccmp-1.9.0.1-ftszrnqzc2cygoqrtioee6h3fjx6w6yv
 54: nco               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nco-5.0.1-rlffrqp2xzm4uvdwqqodtn3exrr2dlnd
 55: nrm               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nrm-0.1.0-uwg666h4ka32lj2bxmc4nj36liyil3zq
 56: omega-h           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/omega-h-9.34.1-27heb5almci24q7zg7mfn2mdqq6562va
 57: openmpi           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openmpi-4.1.4-7co3hc3hfgfszjffum3fu7c3q23ozqy4
 58: openpmd-api       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openpmd-api-0.14.5-pj2hi5r2m5wubpacflddd3tivqjwunbi
 59: papi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papi-6.0.0.1-c3oavnkaeczxhe52todjoxwugiwfiygx
 60: papyrus           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papyrus-1.0.2-ae7pqcjs72utsbtgq6x3q4e5tqzpgocb
 61: parallel-netcdf   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parallel-netcdf-1.12.2-v7h7r3hqjw6vakzqj6uarb465ss4oj6v
 62: paraview          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/paraview-5.10.1-lf7udp3dnwkptjh5mxr4xotc4wuf2jfm
 63: parsec            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parsec-3.0.2012-jcncg7zoqrwo7ipyms4qwtdtdr2zvbdd
 64: pdt               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pdt-3.25.1-22x4lgxduh2ejs477htndgxuiha5uo2s
 65: petsc             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/petsc-3.17.4-7njjpmskey2xjmfqiiksdncjfsfmw3w4
 66: phist             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/phist-1.9.5-ey2e2xjqrkogucncqlcaiay5pi5yqnpo
 67: plasma            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plasma-21.8.29-q4m6euppnulfmxi5aufltyd3kgdhvtts
 68: plumed            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plumed-2.8.0-z265gsvzvb43xn42lajf6d3fa6k6jpn2
 69: precice           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/precice-2.5.0-mojal5qfjqzzseifja5xdulyeukdzjml
 70: pruners-ninja     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pruners-ninja-1.0.1-okgyfnztj2rfcyitth4n4oexghk445hr
 71: pumi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pumi-2.2.7-whec6o6kj7qpo53s2yyqch5xda5akdgp
 72: py-cinemasci      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-cinemasci-1.7.0-n3pshnjlwj5mdpp4m3w5xc42h3cufci3
 73: py-jupyterhub     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-jupyterhub-1.4.1-odbpt2k2xolyk4qnfeti6pyjlrxm7n2a
 74: py-libensemble    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-libensemble-0.9.2-2zefvm7ymmap5i66nie5ocfq7a7ewz7v
 75: py-parsl          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-parsl-1.1.0-w6buwwgyvx7qk3d66an6nzhlh2d7fe3f
 76: py-radical-saga   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-radical-saga-1.16.0-qkvjgejq5dwb7x2245wgah6h7yobzvto
 77: qthreads          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/qthreads-1.16-vujctsewvsjga2drshoekdnvl4l6cp6d
 78: raja              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/raja-2022.03.0-6nq56g5rvugzzaayo3q6b5epvcmvfjkn
 79: rempi             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/rempi-1.1.0-3fg5re7uwjzb33j7dq2mathtmosmmisq
 80: scr               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/scr-3.0-7wiky6bzgzdc3tjt5ifb2mjqohp2yfs7
 81: slate             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slate-2022.06.00-ktpojb6ylnhagggrkzpeqdfhrbozdmit
 82: slepc             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slepc-3.17.2-bx4ijflbkktdang4g6xenlnobey42seb
 83: stc               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/stc-0.9.0-qhahav5nnvg5l2nrp4duimrhao6baxem
 84: strumpack         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/strumpack-6.3.1-kx75etw2spcggpy4zqwrdcvnqldnp5pe
 85: sundials          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sundials-6.2.0-sl2skwaa76kuszzppsitzmh4weokcfvi
 86: superlu-dist      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/superlu-dist-7.2.0-n7bybcdjda3utbirdvkrxcs5crrs3t4s
 87: swig              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/swig-4.0.2-fortran-2lwjtiomnbzbigiewcmal7au5dcf4vcu
 88: sz                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sz-2.1.12.2-akue3hil6zq2zzenppezg45bbqt3i5yn
 89: tasmanian         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/tasmanian-7.7-jjhp5npow5pv2gtfa2nchcebr63eypg6
 90: tau               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/tau-2.31.1-uzrqphih6obl6x6aukrtuwubcmr6tgmb
 91: trilinos          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/trilinos-13.0.1-nlwa4lqiqwruxfctvcauaufmkwhxjibm
 92: turbine           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/turbine-1.3.0-rjsro3aodby6kmhjjfttzz2tm6rqz2kp
 93: umap              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umap-2.1.0-4pteduzi242vxrweax7fx3mpgcrd42bl
 94: umpire            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umpire-2022.03.1-mnn3tttwlzyasrh7zbwgskffj6gnkpcz
 95: unifyfs           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/unifyfs-0.9.2-pacjxtgkc7jmvfkolj4iyo77n2xxxgh6
 96: upcxx             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/upcxx-2022.3.0-rafoonfubm2nlnwdwftgq4zmr2vcbg36
 97: variorum          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/variorum-0.4.1-yso3svxvqafqtn3yzjbnmb3eiycyhzsd
 98: veloc             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/veloc-1.5-jyg2jtgwfejr7symlqovguhzdcmin65j
 99: vtk-m             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/vtk-m-1.8.0-ll52zwmiedarngxxa32sgafpzokznoc5
100: wannier90         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/wannier90-3.1.0-bendys2jbtol2nkzh4ojga5ucyptvwor
101: warpx             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/warpx-22.08-llgiiakur6amductbpxoagd2gslv6c2q
102: zfp               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/zfp-0.5.5-6csn5bcuypuo3lteydiwsykoyjqylbz2
```

- ROCm 5.2.0
- Support for MI100 as well as MI250X
- TensorFlow v2.9.1 and
- PyTorch v1.12.1 optimized for GPUs

ECP EXASCALE COMPUTING PROJECT

22.08 Release: 102 Official Products + dependencies (gcc, oneAPI, x86_64)

```
 1: adios2            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/adios2-2.8.3-a4apzfywnvv2emsljo2xk4damq24xzv2
 2: alquimia          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/alquimia-1.0.9-2lrac7o4ffv4rqt4h2vgzjud3tkjwkrd
 3: aml               /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/aml-0.2.0-av6pzg2cygtm2oeonnnylxaof5iaf5bb
 4: amrex             /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/amrex-22.08-k7etpgmun4z6gqi3twjuyyucjpo4jwsg
 5: arborx            /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/arborx-1.2-x3hj7qi56h3s2xwb5qb5mbmaf7sl57eb
 6: archer            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/archer-2.0.0-ubhbdonoquovu6i6yh6byf5vkjqdst2s
 7: argobots          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/argobots-main-62s4jy7ijfzur2pw2rzadwo5ixgnizjl
 8: ascent            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ascent-0.8.0-oia5j2hoeitlarm4vck76f5djoza3zf4
 9: axom              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/axom-0.6.1-adc6pqaau33eh47lt62cd7gx6qv3qebj
10: bolt              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bolt-2.0-t3nxvx37r4r4b4v6o4tmjplwxosamm65
11: bricks            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bricks-r0.1-grzmk2kve765caw6nj4lintbr62vmdkr
12: butterflypack     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/butterflypack-2.1.1-q5eimvsxo5jzoyxlaq7mrkoe7l5o3y2n
13: cabana            /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/cabana-0.5.0-zwmcefjwrdjisab7ip2kdnrxhxg2cxoi
14: caliper           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/caliper-2.8.0-wyjlzrfe33xu7od5dhm5cer3fnc4rahg
15: chai              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/chai-2022.03.0-photgtbub3gt2tlskxzr2jma3fhzqhl2
16: conduit           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/conduit-0.8.3-zphidjxhjkiwukbg4sdftgsrjbfov5y3
17: darshan-runtime   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/darshan-runtime-3.4.0-caydqukivwqaecivrajoj5nusrqzgl7t
18: datatransferkit   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/datatransferkit-3.1-rc3-blednv72j7co7xf7j3wspaswy6jtxbwy
19: dyninst           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/dyninst-12.2.0-3dwen3nn22mkqjsivikdd43rrl4vehvz
20: faodel            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/faodel-1.2108.1-kqkwty5hn4cvjrgbvutzgk3p45tb5sdc
21: flecsi            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flecsi-1.4.2-mvvbz4ittvjlhnvlcet5ikgu3p3psg6d
22: flit              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flit-2.1.0-hh43s4mmqrw3p7zj2hlkylklgr3tggf5
23: flux-sched        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flux-sched-0.23.0-qod4dtvrvmat3npnpwysrpebxjexsxhr
24: fortrilinos       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/fortrilinos-2.0.0-6lceq2wyliv7xqkif2es47bpgm3ztvxj
25: gasnet            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gasnet-2022.3.0-mjam365qep6iiqr36s454x4psmgrkwp6
26: geopm             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/geopm-1.1.0-vzi6bqaktmcahuvu66oozto2wtoe27la
27: ginkgo            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ginkgo-1.4.0-bfh5lj4zztteyo6eq7d5l6sv7kyua3pn
28: globalarrays      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/globalarrays-5.8-2qdtkpndvwvqylybsfxps2px3ansltxn
29: gotcha            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gotcha-1.0.3-a2gy4enms44svpeek5vzlvnalx3pr6ia
30: gptune            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gptune-3.0.0-db3njgcxugdun5d452wiw7goxw4hhykx
31: h5bench           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/h5bench-1.2-hul73s3xtl2srumekg7cuo2bb533fmot
32: hdf5              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-1.13.2-doki3exhfk6ofx2gum2nv6fdjs3lab4s
33: hdf5-vol-async    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-vol-async-1.2-34dt32yinsj52cwxykv6jzcpbnejdptf
34: heffte            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/heffte-2.2.0-2m4ttzls4zlw5bdbzod6je4felq6cuda
35: hpctoolkit        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpctoolkit-2022.05.15-kb2yvndwj7j247idlusc2uroqpx5fc5v
36: hpx               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpx-1.8.1-gbrz4os5rroqiudxr26by2vwoeoq53kd
37: hypre             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hypre-2.25.0-taa2qtk4x2xsuf2tpjsy34gtofg3ikhr
38: kokkos            /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/kokkos-3.6.00-e3aolvmpjxbtwihjvn24v47sats3bw3m
39: kokkos-kernels    /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/kokkos-kernels-3.6.00-hhupbyutxfmvzoetc3idq4ph7m2hx364
40: lammps            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/lammps-20220623-5cqu3suoycin5fgoz4cvc3qzq7elqqif
41: legion            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/legion-21.03.0-y36c4daichtlrjq3zlarfzdcenlndktb
42: libnrm            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libnrm-0.1.0-tj463dbbvyerlzhtesccp525byjmug5n
43: libquo            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libquo-1.3.1-zihxwoeobknjaj3bmaybfaoqn3jwfvso
44: loki              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/loki-0.1.7-rgel6sujgugxzqvtddd2jibhuw7dmhai
45: mercury           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mercury-2.1.0-ubcppuuys2e6mbwe26kg5rerwuzfrqno
46: metall            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/metall-0.21-vi6z32g7zotumjtcgonykfhje35z4lmr
47: mfem              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mfem-4.4.0-nf5ukqqvpyzdfkxjuqqkoiktootmsbbx
48: mpark-variant     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpark-variant-1.4.0-fokhy42s3yd7uh75qo43ifjnzchsbr3g
49: mpich             /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/mpich-4.0.2-sxre2qqfpvyak2hchnp3gegdncxzvvco
50: mpifileutils      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpifileutils-0.11.1-6dj2vqlpw5qydyq7v52ubu55op3ajpq7
51: netlib-scalapack  /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/netlib-scalapack-2.2.0-25vd6rfq4ufuesofo57jysj5x53nxu74
```

- oneAPI 5.2.0
- Support for Intel GPUs (DG1,…)
- TensorFlow v2.9.1 and
- PyTorch v1.12.1

22.08 Release: 101 Official Products + dependencies (gcc, oneAPI, x86_64)

```
 1: adios2              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/adios2-2.8.3-a4apzfywnvv2emsljo2xk4damq24xzv2
 2: alquimia            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/alquimia-1.0.9-2lrac7o4ffv4rqt4h2vgzjud3tkjwkrd
 3: aml                 /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/aml-0.2.0-av6pzg2cygtm2oeonnnylxaof5iaf5bb
 4: amrex               /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/amrex-22.08-k7etpgmun4z6gqi3twjuyyucjpo4jwsg
 5: arborx              /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/arborx-1.2-x3hj7qi56h3s2xwb5qb5mbmaf7sl57eb
 6: archer              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/archer-2.0.0-ubhbdonoquovu6i6yh6byf5vkjqdst2s
 7: argobots            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/argobots-main-62s4jy7ijfzur2pw2rzadwo5ixgnizjl
 8: ascent              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ascent-0.8.0-oia5j2hoeitlarm4vck76f5djoza3zf4
 9: axom                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/axom-0.6.1-adc6pqaau33eh47lt62cd7gx6qv3qebj
10: bolt                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bolt-2.0-t3nxvx37r4r4b4v6o4tmjplwxosamm65
11: bricks              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/bricks-r0.1-grzmk2kve765caw6nj4lintbr62vmdkr
12: butterflypack       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/butterflypack-2.1.1-q5eimvsxo5jzoyxlaq7mrkoe7l5o3y2n
13: cabana              /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/cabana-0.5.0-zwmcefjwrdjisab7ip2kdnrxhxg2cxoi
14: caliper             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/caliper-2.8.0-wyjlzrfe33xu7od5dhm5cer3fnc4rahg
15: chai                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/chai-2022.03.0-photgtbub3gt2tlskxzr2jma3fhzqhl2
16: conduit             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/conduit-0.8.3-zphidjxhjkiwukbg4sdftgsrjbfov5y3
17: darshan-runtime     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/darshan-runtime-3.4.0-caydqukivwqaecivrajoj5nusrqzgl7t
18: datatransferkit     /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/datatransferkit-3.1-rc3-bledmv72j7co7xf7j3wspaswy6jtxbwy
19: dyninst             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/dyninst-12.2.0-3dwen3nn22mkqjsivikdd43rrl4vehvz
20: faodel              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/faodel-1.2108.1-kqkwty5hn4cvjrgbvutzgk3p45tb5sdc
21: flecsi              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flecsi-1.4.2-mvvbz4ittvjlhnvlcet5ikgu3p3psg6d
22: flit                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flit-2.1.0-hh43s4mmqrw3p7zj2hlkylklgr3tggf5
23: flux-sched          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/flux-sched-0.23.0-qod4dtvrvmat3npnpwysrpebxjexsxhr
24: fortrilinos         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/fortrilinos-2.0.0-6lceq2wyliv7xqkif2es47bpgm3ztvxj
25: gasnet              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gasnet-2022.3.0-mjam365qep6iiqr36s454x4psmgrkwp6
26: geopm               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/geopm-1.1.0-vzi6bqaktmcahuvu66oozto2wtoe27la
27: ginkgo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/ginkgo-1.4.0-bfh5lj4zztteyo6eq7d5l6sv7kyua3pn
28: globalarrays        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/globalarrays-5.8-2qdtkpndvwvqylybsfxps2px3ansltxn
29: gotcha              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gotcha-1.0.3-a2gy4enms44svpeek5vzlvnalx3pr6ia
30: gptune              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/gptune-3.0.0-db3njgcxugdun5d452wiw7goxw4hhykx
31: h5bench             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/h5bench-1.2-hul73s3xtl2srumekg7cuo2bb533fmot
32: hdf5                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-1.13.2-doki3exhfk6ofx2gum2nv6fdjs3lab4s
33: hdf5-vol-async      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hdf5-vol-async-1.2-34dt32yinsj52cwxykv6jzcpbnejdptf
34: heffte              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/heffte-2.2.0-2m4ttzls4zlw5bdbzod6je4felq6cuda
35: hpctoolkit          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpctoolkit-2022.05.15-kb2yvndwj7j247idlusc2uroqpx5fc5v
36: hpx                 /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hpx-1.8.1-gbrz4os5rroqiudxr26by2vwoeoq53kd
37: hypre               /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/hypre-2.25.0-taa2qtk4x2xsuf2tpjsy34gtofg3ikhr
38: kokkos              /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/kokkos-3.6.00-e3aolvmpjxbtwihjvn24v47sats3bw3m
39: kokkos-kernels      /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/kokkos-kernels-3.6.00-hhupbyutxfmvzoetc3idq4ph7m2hx364
40: lammps              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/lammps-20220623-5cqu3suoycin5fgoz4cvc3qzq7elqqif
41: legion              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/legion-21.03.0-y36c4daichtlrjq3zlarfzdcenlndktb
42: libnrm              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libnrm-0.1.0-tj463dbbvyerlzhtesccp525byjmug5n
43: libquo              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/libquo-1.3.1-zihxwoeobknjaj3bmaybfaoqn3jwfvso
44: loki                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/loki-0.1.7-rgel6sujgugxzqvtddd2jibhuw7dmhai
45: mercury             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mercury-2.1.0-ubcppuuys2e6mbwe26kg5rerwuzfrqno
46: metall              /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/metall-0.21-vi6z32g7zotumjtcgonykfhje35z4lmr
47: mfem                /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mfem-4.4.0-nf5ukqqvpyzdfkxjuqqkoiktootmsbbx
48: mpark-variant       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpark-variant-1.4.0-fokhy42s3yd7uh75qo43ifjnzchsbr3g
49: mpich               /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/mpich-4.0.2-sxre2qqfpvyak2hchnp3gegdncxzvvco
50: mpifileutils        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/mpifileutils-0.11.1-6dj2vqlpw5qydyq7v52ubu55op3ajpq7
51: netlib-scalapack    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/netlib-scalapack-2.2.0-25vd6rfq4ufuesofo57jysj5x53nxu74
```

- oneAPI 2022.1.0
- Support for Intel GPUs (DG1,…)
- TensorFlow v2.9.1 and
- PyTorch v1.12.1

22.08 Release: 101 Official Products + dependencies (gcc, oneAPI, x86_64) (contd.)

```
52: nccmp          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nccmp-1.9.0.1-ftszrnqzc2cygoqrtioee6h3fjx6w6yv
53: nco            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nco-5.0.1-rlffrqp2xzm4uvdwqqodtn3exrr2dlnd
54: nrm            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/nrm-0.1.0-uwg666h4ka32lj2bxmc4nj36liyil3zq
55: omega-h        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/omega-h-9.34.1-27heb5almci24q7zg7mfn2mdqq6562va
56: openmpi        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openmpi-4.1.4-7co3hc3hfgfszjffum3fu7c3q23ozqy4
57: openpmd-api    /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/openpmd-api-0.14.5-pj2hi5r2m5wubpacflddd3tivqjwunbi
58: papi           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papi-6.0.0.1-c3oavnkaeczxhe52todjoxwugiwfiygx
59: papyrus        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/papyrus-1.0.2-ae7pqcjs72utsbtgq6x3q4e5tqzpgocb
60: parallel-netcdf /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parallel-netcdf-1.12.2-v7h7r3hqjw6vakzqj6uarb465ss4oj6v
61: paraview       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/paraview-5.10.1-lf7udp3dnwkptjh5mxr4xotc4wuf2jfm
62: parsec         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/parsec-3.0.2012-jcncg7zoqrwo7ipyms4qwtdtdr2zvbdd
63: pdt            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pdt-3.25.1-22x4lgxduh2ejs477htndgxuiha5uo2s
64: petsc          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/petsc-3.17.4-7njjpmskey2xjmfqiiksdncjfsfmw3w4
65: phist          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/phist-1.9.5-ey2e2xjqrkogucncqlcaiay5pi5yqnpo
66: plasma         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plasma-21.8.29-q4m6euppnulfmxi5aufltyd3kgdhvtts
67: plumed         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/plumed-2.8.0-z265gsvzvb43xn42lajf6d3fa6k6jpn2
68: precice        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/precice-2.5.0-mojal5qfjqzzseifja5xdulyeukdzjml
69: pruners-ninja  /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pruners-ninja-1.0.1-okgyfnztj2rfcyitth4n4oexghk445hr
70: pumi           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/pumi-2.2.7-whec6o6kj7qpo53s2yyqch5xda5akdgp
71: py-cinemasci   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-cinemasci-1.7.0-n3pshnjlwj5mdpp4m3w5xc42h3cufci3
72: py-jupyterhub  /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-jupyterhub-1.4.1-odbpt2k2xolyk4qnfeti6pyjlrxm7n2a
73: py-libensemble /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-libensemble-0.9.2-2zefvm7ymmap5i66nie5ocfq7a7ewz7v
74: py-parsl       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-parsl-1.1.0-w6buwwgyvx7qk3d66an6nzhlh2d7fe3f
75: py-radical-saga /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/py-radical-saga-1.16.0-qkvjgejq5dwb7x2245wgah6h7yobzvto
76: qthreads       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/qthreads-1.16-vujctsewvsjga2drshoekdnvl4l6cp6d
77: raja           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/raja-2022.03.0-6nq56g5rvugzzaayo3q6b5epvcmvfjkn
78: rempi          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/rempi-1.1.0-3fg5re7uwjzb33j7dq2mathtmosmmisq
79: scr            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/scr-3.0-7wiky6bzgzdc3tjt5ifb2mjqohp2yfs7
80: slate          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slate-2022.06.00-ktpojb6ylnhagggrkzpeqdfhrbozdmit
81: slepc          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/slepc-3.17.2-bx4ijflbkktdang4g6xenlnobey42seb
82: stc            /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/stc-0.9.0-qhahav5nnvg5l2nrp4duimrhao6baxem
83: strumpack      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/strumpack-6.3.1-kx75etw2spcggpy4zqwrdcvnqldnp5pe
84: sundials       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sundials-6.2.0-sl2skwaa76kuszzppsitzmh4weokcfvi
85: superlu-dist   /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/superlu-dist-7.2.0-n7bybcdjda3utbirdvkrxcs5crrs3t4s
86: swig           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/swig-4.0.2-fortran-2lwjtiomnbzbigiewcmal7au5dcf4vcu
87: sz             /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/sz-2.1.12.2-akue3hil6zq2zzenppezg45bbqt3i5yn
88: tasmanian      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/tasmanian-7.7-jjhp5npow5pv2gtfa2nchcebr63eypg6
89: tau            /spack/opt/spack/linux-ubuntu20.04-x86_64/oneapi-2022.1.0/tau-2.31.1-63bnqnsh766tv5wc6tpwcvs7eltdxbrw
90: trilinos       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/trilinos-13.0.1-nlwa4lqiqwruxfctvcauaufmkwhxjibm
91: turbine        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/turbine-1.3.0-rjsro3aodby6kmhjjfttzz2tm6rqz2kp
92: umap           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umap-2.1.0-4pteduzi242vxrweax7fx3mpgcrd42bl
93: umpire         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/umpire-2022.03.1-mnn3tttwlzyasrh7zbwgskffj6gnkpcz
94: unifyfs        /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/unifyfs-0.9.2-pacjxtgkc7jmvfkolj4iyo77n2xxxgh6
95: upcxx          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/upcxx-2022.3.0-rafoonfubm2nlnwdwftgq4zmr2vcbg36
96: variorum       /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/variorum-0.4.1-yso3svxvqafqtn3yzjbnmb3eiycyhzsd
97: veloc          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/veloc-1.5-jyg2jtgwfejr7symlqovguhzdcmin65j
98: vtk-m          /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/vtk-m-1.8.0-ll52zwmiedarngxxa32sgafpzokznoc5
99: wannier90      /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/wannier90-3.1.0-bendys2jbtol2nkzh4ojga5ucyptvwor
100: warpx         /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/warpx-22.08-llgiiakur6amductbpxoagd2gslv6c2q
101: zfp           /spack/opt/spack/linux-ubuntu20.04-x86_64/gcc-9.4.0/zfp-0.5.5-6csn5bcuypuo3lteydiwsykoyjqylbz2
```

- oneAPI 2022.1.0
- Support for Intel GPUs (DG1,…)
- TensorFlow v2.9.1 and
- PyTorch v1.12.1

22.08 Release: 102 Official Products + dependencies (gcc, cuda, ppc64le)

```
 1: adios2              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/adios2-2.8.3-7nsyrc6kahbnbl2tqgbv322ufie35pzt
 2: alquimia            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/alquimia-1.0.9-g6nhgxj5eaitwniowal6nfip72wmkzx4
 3: aml                 /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/aml-0.2.0-s5it2fyntsesracr6txvi5kncwwvttla
 4: amrex               /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/amrex-22.08-34qawx6htudsd6wgagrt5ru3eo7z4np5
 5: arborx              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/arborx-1.2-65osfgiogccjutjvu2hmngh6z6e2jrjr
 6: archer              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/archer-2.0.0-rcjtr3w4r2tteedz24jhfpsfojod6nuh
 7: argobots            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/argobots-main-ilx5nitwe7gaacifewubp2dvxc2uskuq
 8: ascent              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/ascent-0.8.0-totua2ppnyfhxdysz5saikevjlala5qj
 9: axom                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/axom-0.6.1-dej5vhwggy2vnydantd3haclvnh5y55m
10: bolt                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/bolt-2.0-bl5ig6en3zunbu5tfnvxqw62jknumnas
11: butterflypack       /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/butterflypack-2.1.1-ti7y7um3mpfx4f2ucamidv4x4t5p7vpe
12: cabana              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/cabana-0.5.0-356anwyn6bkht7egun5pmgwebmmnihx3
13: caliper             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/caliper-2.8.0-k5ufu72t43udvlbz5i3hf6gysorcihys
14: chai                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/chai-2022.03.0-zmpc3f5btywvgkcs74ol3wazhz5rs2zn
15: conduit             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/conduit-0.8.3-iwonbdzbalb56w5o2tnmwopbrb2r6bww
16: darshan-runtime     /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/darshan-runtime-3.4.0-cgw2cs256bs2aessqxjhwzwwrqwjxwei
17: datatransferkit     /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/datatransferkit-3.1-rc3-udyvcaoeiqtmuzeoa44sqwctumwuyxkk
18: dyninst             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/dyninst-12.2.0-kwpzzbzicwsphaf7ocdpgt6baguqdpf3
19: exaworks            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/exaworks-0.1.0-maa6zjr3pfrn2h2vfzklpbvsmqr5vgen
20: faodel              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/faodel-1.2108.1-7oxg4zrhpi3xm5sqk7y2oruujrohowgw
21: flecsi              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/flecsi-1.4.develop-ruphpyiuv76dbxdv4nipuujjh5fo3pfe
22: flit                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/flit-2.1.0-2kawcymwozn66hkq4np4jcogbt34zbxn
23: flux-sched          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/flux-sched-0.23.0-4odnpsy56mqdxlgrzufzdjtroq43qxq6
24: fortrilinos         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/fortrilinos-2.0.0-7ms2o6of3pmfq4kw4a3247c3kpsc73vt
25: gasnet              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/gasnet-2022.3.0-3r75b4m4pbpbzd42p6cdmpmhzzwfvmkx
26: ginkgo              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/ginkgo-1.4.0-3ra2f2ndjvda45kaoa6ob5oev3xwzthm
27: globalarrays        /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/globalarrays-5.8-wettvecurrakqb5ffsjlcbzig47kkqtv
28: gotcha              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/gotcha-1.0.3-hue5wt5nlveea5vze6anftnfdb2pdbdk
29: gptune              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/gptune-3.0.0-otv4ftz3az3d3wrwvhdqfybvnjdglydt
30: h5bench             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/h5bench-1.2-hkdgo2bteut344gdlkp756qreb6nfj4v
31: hdf5                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/hdf5-1.13.2-svgv2yyddmux2p4y6rin5k7ejyyc6z5m
32: hdf5-vol-async      /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/hdf5-vol-async-1.2-7jtovsqcyla3r4cawpv6lpiag5q6geaz
33: heffte              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/heffte-2.2.0-zzjrtfbtxaidamlawaa6v5ess5xhcd23
34: hpctoolkit          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/hpctoolkit-2022.05.15-yrwa4oepvs6bypc3wn4aawl4pe5q7ibm
35: hpx                 /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/hpx-1.7.1-j5q4id6ky7pgifga4j32kay2maolb4hb
36: hypre               /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/hypre-2.25.0-scgd77y25s5vruyvaycpobdqyk26t2t2
37: kokkos              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/kokkos-3.6.01-mbsx2so4eosgd56k5dvff6mbu7sxpvih
38: kokkos-kernels      /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/kokkos-kernels-3.6.00-f72mqsqzq6qyg6grpezzvx5gp6cz7wjf
39: lammps              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/lammps-20220623-id74dp3jg7thpobmyrtxqfu6zhbtofh7
40: legion              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/legion-21.03.0-kwymsyynejvpyh6sctqgy64zfnsqjbmn
41: libnrm              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/libnrm-0.1.0-qarezm3auz7lirsssphuzlevoct7qz5i
42: libquo              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/libquo-1.3.1-dihyof2tvfbu47op7cvn63lcf6nh6tzo
43: loki                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/loki-0.1.7-43nybfg2z5ypiiqbg2usflrhhptaadmt
44: magma               /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/magma-2.6.2-negzjmippyt7lfmqalseyskru4crg35k
45: mercury             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/mercury-2.1.0-xd7oe2splnsfzrxfrr5yxktyld4gpinv
46: metall              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/metall-0.21-b6j3sj7q3cxxbjgunlslmcav5cx64tkn
47: mfem                /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/mfem-4.4.0-oxnamp5mkzkt3q7iihrfnr5sya5wzjbq
48: mpark-variant       /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/mpark-variant-1.4.0-s7ixfxkewi5xoiiafavtnbyz7pd6c7z6
49: mpich               /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/mpich-4.0.2-6q5eqqjmamfvta7ga4mjughdzjireidz
50: mpifileutils        /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/mpifileutils-0.11.1-uuqbe222fdaoitvlqf4xlijhohznorcg
51: netlib-scalapack    /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/netlib-scalapack-2.2.0-lj7jrdvxmoabn6odyu7wswftmobiub7o
```

- NVHPC 22.7 with CUDA 11.7
- Support for NVIDIA GPUs
- TensorFlow v2.5.1 and
- PyTorch v1.9.0a0

22.08 Release: 102 Official Products + dependencies (gcc, cuda, ppc64le) (contd.)

```
52: nccmp            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/nccmp-1.9.0.1-b2biujlrewsbnjcqena6fhrtwybpqlfs
53: nco              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/nco-5.0.1-oqn4efunbh4mznf5al55tgzd57oyzpi2
54: nrm              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/nrm-0.1.0-snmckncyvlywy53efp45ngdirua3uuyr
55: omega-h          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/omega-h-9.34.1-owqvup46h74duo3oxa3nohr4qkwhfn3l
56: openmpi          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/openmpi-4.1.4-ryvs7bro7hkhoyjzcw4lbombcw2vilax
57: openpmd-api      /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/openpmd-api-0.14.5-vzdjd2b4bg5vykcz6lyvykhliscvekvj
58: papi             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/papi-6.0.0.1-bnoe4srsi5xol3ltygdhk23u7xphazsq
59: papyrus          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/papyrus-1.0.2-ye22fw5fvo5nhaea7jxpz3jtz47t5b2b
60: parallel-netcdf  /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/parallel-netcdf-1.12.2-zjkmrza3qybehtiq4va5zwrp322utm3a
61: paraview         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/paraview-5.10.1-c2pqottdxxyfdd2wkxi2edo33p4heztr
62: parsec           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/parsec-3.0.2012-cvz3u7h2iwme2haxcbfbmbvgybwgg2x5
63: pdt              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/pdt-3.25.1-47y3qxyid4npbd2ve2srnrxb4sr3rsax
64: petsc            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/petsc-3.17.4-drtsee2jxausu3yt4rxnnxutp4r3sxyk
65: plasma           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/plasma-21.8.29-okt32cqw4arp2vi7dluvocm3ndstgorg
66: plumed           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/plumed-2.8.0-2pj7ienqinrmh2t5pgsufuklwg7jjnta
67: precice          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/precice-2.5.0-rm4bameae5cmfoc3rqpicdpgztzditfa
68: pruners-ninja    /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/pruners-ninja-1.0.1-5ijbydfrcn76dzn5pjjjm5m3jlrav3mj
69: pumi             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/pumi-2.2.7-h6kszjhj7dccajatohl5po3gkndq7ij7
70: py-cinemasci     /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-cinemasci-1.7.0-6ibi5aw7ujjawhsnjpv2tns6zx6emltk
71: py-jupyterhub    /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-jupyterhub-1.4.1-tqkcrgnrqesdl7uryr7aokofl7ms5tal
72: py-libensemble   /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-libensemble-0.9.2-zeug2attuhtymijafg5ihemahlrhwznj
73: py-opentuner     /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-opentuner-0.8.7-cvfutbrsanrszituq27unz7pmfw5fbtx
74: py-parsl         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-parsl-1.1.0-pyryfx5atbfm6funwxmbkksa56zvvpzk
75: py-radical-pilot /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-radical-pilot-1.16.0-oupsux6auyokae5n2jfeoyvjtqnpn33h
76: py-radical-saga  /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/py-radical-saga-1.16.0-ryl2vsm7cqhazi3asvpvz5fv7esgjgki
77: qthreads         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/qthreads-1.16-ru4m576uaiho2vqfzc4esk3xck42ev5b
78: raja             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/raja-2022.03.0-yiwxcmxky3thqoknw5axjwqwndtkokv2
79: rempi            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/rempi-1.1.0-i7p5rlvv7adj6efff5jbfmivzww5q4n3
80: scr              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/scr-3.0-7d6m7mdovw53am7ixn54gmxprawhvutu
81: slate            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/slate-2022.06.00-j3uubnfvluhvb2rj4hrmsd2r6qckcnxd
82: slepc            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/slepc-3.17.2-m7mqqjxz4bbdef3b7nlstidn6iswwgbq
83: stc              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/stc-0.9.0-q4hwjsbe3k573hdn5hodbflwqzxwjjp6
84: strumpack        /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/strumpack-6.3.1-miudgjbbo46plywx524uehzbwqiiqn46
85: sundials         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/sundials-6.2.0-cfsjagqxuefeuvq3frd34jcl4rsvwash
86: superlu-dist     /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/superlu-dist-7.2.0-nsingsvcnnmentgfz5y53yzbq5hgjyew
87: swig             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/swig-4.0.2-fortran-gjatmtgc7n6gqbmvmdu77oyynhj6iflz
88: sz               /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/sz-2.1.12.2-v7tu5kayes62dnabc47a77gz3hl4el2a
89: tasmanian        /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/tasmanian-7.7-77vj27ggcesbfxgwfdivjgvtr3dm7izb
90: tau              /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/tau-2.31.1-ho4j5lbtqu7lwmiux6vqkanm4m37s3wg
91: trilinos         /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/trilinos-13.4.0-gukyoepnsoxg5pdnnowjzyrxggtejkjb
92: turbine          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/turbine-1.3.0-5vvkbd76rob34yz7tzd22fi3yzwjlvm7
93: umap             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/umap-2.1.0-gfccivqkrovbuknxzahlinua6b2lps2r
94: umpire           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/umpire-2022.03.1-6uumqt5rw72uqrg5lybqtbgezjhjzz6a
95: unifyfs          /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/unifyfs-0.9.2-q7l7n6bdohgq3fhplaae52fav6webkl4
96: upcxx            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/upcxx-2022.3.0-xpvexkttgp576asxt2cgenlwaczxryy2
97: veloc            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/veloc-1.5-cnqwbrkslgu5lfrdon73qqde2znaep7n
98: vtk-m            /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/vtk-m-1.8.0-msm4mqdhfqgywx45juamwyi6j5nybqxh
99: wannier90        /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/wannier90-3.1.0-3wohurtflidtoz2yv4uepvrivr6iiy2k
100: warpx           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/warpx-22.08-asny47ruhqvuyjfemc276zo36n3lbhhu
101: yaksa           /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/yaksa-0.2-6rybbzhpmv4clemvrcncyqjndnhwf436
102: zfp             /spack/opt/spack/linux-ubuntu18.04-ppc64le/gcc-7.5.0/zfp-0.5.5-mk5enpglkfouqzvc6vhy74fnooyzv5yi
```

- NVHPC 22.7 with CUDA 11.7
- Support for NVIDIA GPUs
- TensorFlow v2.5.1 and
- PyTorch v1.9.0a0

22.08 Release: 101 Official Products + dependencies (gcc, cuda, aarch64) NEW!

```
 1: adios2          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/adios2-2.8.3-rgr2vbgswebchs6ymdould42fwjxiwe7
 2: alquimia        /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/alquimia-1.0.9-teodmopfaqz7viav2ctczfjipeeoqtwv
 3: aml             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/aml-0.2.0-tim3isvremvkujg7y6ckvtsuwwhxhmao
 4: amrex           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/amrex-22.08-ealqug3ntw5f3nozkqpzcoabc5oztwri
 5: arborx          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/arborx-1.2-ae4n4db4ckqozmkicvwandpd2x5xlbfd
 6: archer          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/archer-2.0.0-4scivwwlzlr7nu63lpln443twh746xmg
 7: argobots        /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/argobots-main-bmuh5lsksx7l6xu7bsm5ayofvw6mlo4k
 8: ascent          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/ascent-0.8.0-fcvvqoquxxw7ri4fvblgyuiaqsiafm7g
 9: axom            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/axom-0.6.1-uu7v4ibgwt3eteszxc2krn5uypjl5nvh
10: bolt            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/bolt-2.0-pgzaq5aullwxnjchzyums74qyut37jtk
11: butterflypack   /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/butterflypack-2.1.1-rejgtjnhcctlbov7brawhxev7cilubtv
12: cabana          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/cabana-0.5.0-edh3x7tosealn3sadyl4gr6piouv4t2r
13: caliper         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/caliper-2.8.0-go7uhpm6qqy5i2brnbty3qgbeaqd2njf
14: chai            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/chai-2022.03.0-hrlbfqdziweoefpukxwfe43azyato6mw
15: conduit         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/conduit-0.8.3-gwiudnpzdrwvcumatfmnytjk44bjaqym
16: darshan-runtime /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/darshan-runtime-3.4.0-rklgx5hbnq3vgylaw6s34fpwyq4iqrlc
17: datatransferkit /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/datatransferkit-3.1-rc3-harz4dlj2z3lzr4hhkhc5zzqplkytwja
18: dyninst         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/dyninst-12.2.0-jfrrwtqtsonluclyhbks4rqugtjenawk
19: exaworks        /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/exaworks-0.1.0-o7dcje73ldpwobqf5ohytnmxu257c7ld
20: faodel          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/faodel-1.2108.1-i6rm7nvhaoet4hrc5y5aeczuxqqfpyff
21: flecsi          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/flecsi-2.1.0-pm4xvjbvv2vpdfpbmsv2hfn2wtv2stqn
22: flit            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/flit-2.1.0-wzxaiopjcpxurdhrlfkujkl2qit2w5em
23: flux-sched      /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/flux-sched-0.23.0-7qdi2ps6373qjamcn4ntdpu54pq6k5tp
24: fortrilinos     /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/fortrilinos-2.0.0-ti6atcwvdvwax7aml345tadljktq52vg
25: gasnet          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/gasnet-2022.3.0-mbkku2iucn7jhg6kupah4flwiehaj3vj
26: ginkgo          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/ginkgo-1.4.0-2o45765ui46nivg3i46io7lwohdyq2rj
27: globalarrays    /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/globalarrays-5.8-vmsjflq4ebhorerizfakwwqmwqvbx4cm
28: gotcha          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/gotcha-1.0.3-jqzmqv4n5mt7pmugchp7s35dpnzbyrd4
29: gptune          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/gptune-3.0.0-hhmgrhop7dlqrkt4m5yj2ceq7fyaa6dj
30: h5bench         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/h5bench-1.2-xqv6sfmaa4ad5sirfymaxx2t62dgydd5
31: hdf5            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/hdf5-1.13.2-ewffjmwghvsll6naya3k36yoyt3777qk
32: hdf5-vol-async  /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/hdf5-vol-async-1.2-zzbuohnrofqgelyvk4t7xytufpqh4b4h
33: heffte          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/heffte-2.2.0-wmrpm672x3e6v5acq7hetopxsmezx26g
34: hpctoolkit      /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/hpctoolkit-2022.05.15-rzz2eknpgsvpnhlp3ize2xh7zz22dnuz
35: hypre           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/hypre-2.25.0-s754pjqu24ohc3uwmcf37gu3blvcwtxd
36: kokkos          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/kokkos-3.6.01-cvv2233fqh7pnzt3xd3gxrg6enihak6g
37: kokkos-kernels  /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/kokkos-kernels-3.6.00-znn2n5ppc7bo7xsncfnaz3eq56tp74nu
38: lammps          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/lammps-20220623-r7quv3v5tusjyaeoprh6w4cklsuv5hfw
39: legion          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/legion-21.03.0-xqvx3m7gdhd43ybpj75n63c7yjrqelwb
40: libnrm          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/libnrm-0.1.0-f7s5tgfcurkdcgwuzu4zbn2znfct6t6t
41: libquo          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/libquo-1.3.1-xm3d4gimqssduwhdecszuhtzsfzxgymo
42: loki            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/loki-0.1.7-q5dtcfozzf4p7pycx4gtlqkvvglrworn
43: magma           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/magma-2.6.2-4u3gt62dtczmlvv2c7nt5qpru6yzmmze
44: mercury         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/mercury-2.1.0-fv5bxqdvqb3lv57s77xw3pmmjlk45gcq
45: metall          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/metall-0.21-op6ltaipplev2llrmqet3e5frtyp73y7
46: mfem            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/mfem-4.4.0-uvizvyebucxiqhbq4y7twveiqfydtzsi
47: mpark-variant   /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/mpark-variant-1.4.0-hhfriafnm45uljscabscmahuhfclvmql
48: mpich           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/mpich-4.0.2-q3ba3kgzkdsuc2cl2eii665iltbk4pd4
49: mpifileutils    /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/mpifileutils-0.11.1-guvx7all5mej2j4oujhkxu7taauznrry
50: netlib-scalapack /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/netlib-scalapack-2.2.0-ogqhecw42emxrrcrn57leamqxhlwiv22
51: nccmp           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/nccmp-1.9.0.1-pxiqx2mvs4tb2l67ln46nnmhwqai7bg2
```

- NVHPC 22.7 with CUDA 11.7
- Support for NVIDIA GPUs
- PyTorch v1.12.1

22.08 Release: 101 Official Products + dependencies (gcc, cuda, aarch64) NEW!

```
 52: nco               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/nco-5.0.1-gbbbpvjdasvadznrpqr2ibtt2hjrudrj
 53: nrm               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/nrm-0.1.0-y2u765zdsxaoxbyyj5ii27exgpkhusu5
 54: omega-h           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/omega-h-9.34.1-k67w4q7kmvuzr4x45wavdpwdwql25hcg
 55: openmpi           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/openmpi-4.1.4-atoxcgheeantzvq7qalgzwbz3axezzi4
 56: openpmd-api       /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/openpmd-api-0.14.5-lng5ww566gno2cdlptitqxiec6xdclr2
 57: papi              /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/papi-6.0.0.1-srlrzt2prj2k47kzlgtg7555nelbxi7n
 58: papyrus           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/papyrus-1.0.2-6yzifukoakiquambm32owcilw36yoekz
 59: parallel-netcdf   /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/parallel-netcdf-1.12.2-7vjruqq222uvddu2vca275dill3e2a3p
 60: paraview          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/paraview-5.10.1-w2tl34cwojcu5urjayyxwkpmymflogth
 61: parsec            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/parsec-3.0.2012-ebkp56dh3hqmi3fqtfldtgzd5e32op2e
 62: pdt               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/pdt-3.25.1-abjcjdc5w2hdvhib27b3xguyfzeo3hhh
 63: petsc             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/petsc-3.17.4-yepzel5qjzwm6kupg4ua5pqbx5l2rgmu
 64: plasma            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/plasma-21.8.29-dxlxswgsrzxzcxgmj2w32bxg5gcptivy
 65: plumed            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/plumed-2.8.0-37hrtcs6kr6dwt42iwe7tsg2ve4dlkly
 66: precice           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/precice-2.5.0-f6igne52tjfjt5kafhr7w47i5juuo7j4
 67: pruners-ninja     /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/pruners-ninja-1.0.1-fp7k4jxfd74dgghwpqdmjtu2lvmiw2bt
 68: pumi              /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/pumi-2.2.7-osovfu2vcsvra4orfhk4sscov4okv2ue
 69: py-cinemasci      /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-cinemasci-1.7.0-mvzka5s67jkk343hwl3xyuh2zz7eq3jx
 70: py-jupyterhub     /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-jupyterhub-1.4.1-6dieq54hv4td7sgrcmti24bdjazl6xpc
 71: py-libensemble    /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-libensemble-0.9.2-ounmseonelaqueazjhfaaqlxxi6t6vbj
 72: py-opentuner      /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-opentuner-0.8.7-rsdlieu2al6g25lrlumqvj3dcb6cxphr
 73: py-parsl          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-parsl-1.1.0-j2ramnsdu4zz5s7bchf7buhns6e5nwvn
 74: py-radical-pilot  /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-radical-pilot-1.16.0-5l3efsvga3ot2bmdm26katk7z274tmxk
 75: py-radical-saga   /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/py-radical-saga-1.16.0-bsdgy53odz7xbpken65baalnff2npdg5
 76: qthreads          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/qthreads-1.16-3nh4xmtaptpkqmzmjln5cshnkkkk4pzd
 77: raja              /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/raja-2022.03.0-6eskyhbk5jl7vor6pjqic656wfcj6xok
 78: rempi             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/rempi-1.1.0-c2nci6esacmv2i3wv7zbafj24jqmkfa7
 79: scr               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/scr-3.0-44nhq57qlgxrmgezeud4mbgo7qvuglmt
 80: slate             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/slate-2022.06.00-k6jdbfottjj5ujw25d6fkix7hxadytyp
 81: slepc             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/slepc-3.17.2-36xj5xq2ojbj5sjxbmxopmgk6vxuwrrs
 82: stc               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/stc-0.9.0-jfdjo25gl6cyost5hi5mpg3qfubzn4wk
 83: strumpack         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/strumpack-6.3.1-olxykkpasg23rbjor3dwi6tkdfmiuoww
 84: sundials          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/sundials-6.2.0-4qldezzkrgss7pnozdzkcoxqhup5i4yd
 85: superlu-dist      /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/superlu-dist-7.2.0-53kdsn33u5jeh6hq2eimwrkef5amrgnj
 86: swig              /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/swig-4.0.2-fortran-fdu2szubut42nxivrzggo47ahwfji4j6
 87: sz                /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/sz-2.1.12.2-sovcw4kcmxxs2oz6sh2jeyimocik6gr4
 88: tasmanian         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/tasmanian-7.7-jodfk74drvk6kunjwz5jzw7ifj6odnzg
 89: tau               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/tau-2.31.1-ydbuxabngrhidmlxnj7e2enuztdwwik2
 90: trilinos          /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/trilinos-13.4.0-eqvhpdov6elszekkzyovcobzw6hv6jzw
 91: turbine           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/turbine-1.3.0-3vou37d6rrodyhmwivlu7gb33fywipbs
 92: umap              /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/umap-2.1.0-ikhuysi655ghcdyrtx4a65rtmcibntjz
 93: umpire            /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/umpire-2022.03.1-cuudeezgk33ysguxr4sc3ovn6lodqhnf
 94: unifyfs           /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/unifyfs-0.9.2-z3kx3p5l45rezwho2lqktfswztbsrlmw
 95: upcxx             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/upcxx-2022.3.0-ozqrl36zdacykfwohpw2ubzbbfflnw7z
 96: veloc             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/veloc-1.5-vunhtbm5se6sc4e4mrr66xn6d456f2cr
 97: vtk-m             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/vtk-m-1.8.0-yrweg65332slls5onxv7jr4oppgqagh3
 98: wannier90         /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/wannier90-3.1.0-76cc4klulcfmdukwav3teatt3jrgsolm
 99: warpx             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/warpx-22.08-luvfurdkag5cz2yg7btywfupbtrijqhz
100: yaksa             /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/yaksa-0.2-ouc72jlxh5sgfrigmtvvyd2llimnfhir
101: zfp               /spack/opt/spack/linux-ubuntu20.04-aarch64/gcc-9.4.0/zfp-0.5.5-ztprlcezlhtvnntskofecuze3hkqkax6
```

- NVHPC 22.7 with CUDA 11.7
- Support for NVIDIA GPUs
- PyTorch v1.12.1
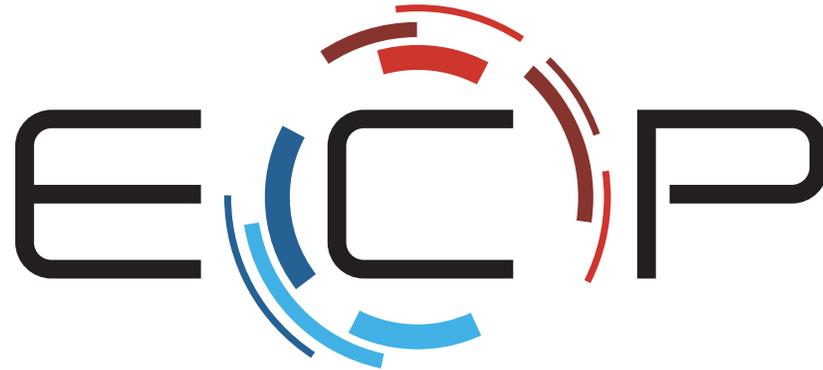
EXASCALE COMPUTING PROJECT

Extreme-scale Scientific Software Stack (E4S)

- Three base images and three full featured images x86_64

    - ROCm

    - CUDA

    - oneAPI

- Base image and full-featured image with CUDA for ppc64le and aarch64.

- 100+ HPC and AI/ML products (TensorFlow, PyTorch).

Thank you

Thank you to all collaborators in the ECP and broader computational science communities. The work discussed in this presentation represents creative contributions of many people who are passionately working toward next-generation computational science.