Hewlett Packard
Enterprise

HPE Exercises Introduction

PDC Summer School 2024

August 21-22, 2024

Materials Locations

- Unless informed otherwise Slides will be made available on Dardel in this location

  `/cfs/klemming/home/h/harveyr/PDC_SS24_HPE/Slides/`

- Exercises may be obtained from GitLab:

  https://gitlab.com/cerl/events/exercises-pdc-summer-school-2024

  `git clone https://gitlab.com/cerl/events/exercises-pdc-summer-school-2024.git`

- If you cloned yesterday, please `` `git pull` `` to get the most up to date examples

- Exercises may be found in separate folders as indicated in the top level page of the GitLab repository

Setting up the environment to compile and Run the Exercises

A project and reservations are setup for use during the training

- Use the following flags in the SLURM commands:

  `-p gpu -A edu24.summer --reservation=labg-08-21`

  or add to scripts if you wish.

- To run the examples either use above options with sbatch/srun/salloc or you can also set SLURM environment variables, e.g. to set a default for srun...

  ```
  export SLURM_ACCOUNT=edu24.summer
  export SLURM_RESERVATION=labg-08-21
  ```

  (to be repeated for variables with prefix `SBATCH_`, `SALLOC_` for sbatch and salloc)

Exercises: Wed 1000-1100

- Slides in `/cfs/klemming/home/h/harveyr/PDC_SS24_HPE/Slides/`
- Exercises from GitLab or …/`Exercises`
- Instructions in Readme.md (easier to read from GitLab)

- Directory: `device_discovery`
  - This is a simple example that uses HIP API to discover GPUs, confirming you can run a GPU job on the system

- Directory: `vector_scale_and_add`
  - In this example you will add GPU acceleration to a simple vector operation already implemented in OpenMP for CPU

- Directory: `reductions`
  - In this example you will implement a reduction operation to sum differences between two vectors.

Exercises: Wed 1415-1530

- Slides in `/cfs/klemming/home/h/harveyr/PDC_SS24_HPE/Slides/`
- Exercises from GitLab or …/`Exercises`

- Directory: `sgemm_blas or daxpy`
  - Example of using a scientific library, and exploring performance, respectively – you can choose which to try (or both)

- Directory: `debugging`
  - Use rocgdb to debug BabelStream on the GPU

- Directory: `profiling`
  - Use rocprof to profile an application and visualize with Perfetto

Exercises: Wed 1600-1700

- Slides in `/cfs/klemming/home/h/harveyr/PDC_SS24_HPE/Slides/`
- Exercises from GitLab or …/`Exercises`

Choose one or more of these based on available time:

- Directory: `hipify`
  - Using the hipify tool to convert from CUDA to HIP
- Directory: `hipfort`
  - Example of using hipfort

If time permits:

- Directory: `multiple_streams`