OPENACC MINI-HACKATHON

CeNAT, San Jose, Costa Rica
January 2019

OpenACC
More Science, Less Programming

NVIDIA aws Linux Academy

MINIAPP CHALLENGE

Problem Size

Grid Dimensions (NX x NZ)

```
nx_glob = 800; //Number of total cells in the x-dirction
nz_glob = 400; //Number of total cells in the z-dirction
```

Simulation Time

```
sim_time = 100; //How many seconds to run the simulation
```

VIM BASICS

Edit your code

```
$ vim miniWeather_mpi.cpp

Enter –INSERT- mode (Edit)
> INSERT or “I”

Leave Edit Mode
ESC
```

```
Exit
:q

Write
:w

Write & Exit
:wq
```

THINGS TO REMEMBER

Open ACC Mini-Hackathon

- Start with the benchmark
  - Sequential version; Multicore version;
- The methodology is Profile-Driven
  - Profile/Measure; Analyse; Improve; Repeat;
- Work incrementally
  - Test early, test often
- Pair programming can make your team more productive
  - Take turns on computer every 5 or 10 minutes

CHEAT SHEET

Build code

```
Multicore
-fast -ta=multicore

GPU Memory Managed
-fast –ta=tesla:managed

GPU Manual Memory Managent
-fast -ta=tesla
```

Parallel Loop Directive

```
#pragma acc parallel loop
```

Data Directive

```
#pragma acc data <clause>
```

- copy(list)
- copyin(list)
- copyout(list)
- create(list)

Optimization

```
collect( nLoops )
tile( sizeX, sizeY, ... )
private( list )
firstprivate( list )
seq( list )
gang, worker, vector
```

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Avg. Completion Time: 4 hours Max Time: 4 hours

OpenACC MiniHackathon miniWeather

The miniWeather code mimics the basic dynamics seen in atmospheric weather and climate. The dynamics themselves are dry compressible, stratified, non-hydrostatic flows dominated by buoyant forces that are relatively small perturbations on a hydrostatic background state. The equations in this code themselves form the backbone of pretty much all fluid dynamics codes, and this particular flavor forms the base of all weather and climate modeling

Rewards:

Start Activity FREE