Performance Tools and Debuggers: Introduction
Outline

• What is your favorite debugger?
  – printf?
  – You can have a better debugger on HPC environments

• How do you measure performance of your application on HPC?
  – Wall time (e.g., $time ./a.out)?
  – Flop-rate, bandwidth?
  – How to identify performance bottlenecks?
  – Leading profiling tools can help you optimize your code on HPC

• Seven powerful HPC tools in this track
  – Hardware vendor tools
    • Intel VTune and Advisor
    • NVIDIA Nsight System & Nsight Compute
    • AMD ROCm tools: ROC profiler & debugger
  – Cross-platform tools
    • ARM Forge: DDT(debugger) & MAP(profiler)
    • Perforce TotalView(debugger)
  – Open source community tools
    • HPCToolkit
    • TAU
Team for Tools Track

JaeHyuk Kwack (Argonne)
Scott Parker (Argonne)
Kevin O’Leary (Intel)
Kristopher Keipert (NVIDIA)
Suyash Tandon (AMD)
Beau Paisley (ARM)
Nikolay Piskun (PERFORCE)
John Mellor-Crummey (Rice Univ.)
Sameer Shande (Univ. of Oregon / Paratools)
Agenda

Track 6 – Performance Tools and Debuggers

8:30AM Introduction of Tools Track
JaeHyuk Kwack, ANL

8:40AM NVIDIA
Kris Keipert, NVIDIA
Kevin O’Leary, Intel

9:20AM Intel

10:00AM Break

10:30AM AMD
Suyash Tandon, AMD

11:10AM Parallel Sessions:
- Main room: Hands-on (Intel, AMD)
  Kevin O’Leary, Intel
  Suyash Tandon, AMD
- Breakout room: Hands-on (NVIDIA)
  Kris Keipert, NVIDIA

12:15PM Lunch

1:15PM Hands-on (continued)

1:30PM ARM Tools
Beau Paisley, ARM

2:10PM TotalView
Nikolay Piskun, Perforce Software

2:50PM Parallel Sessions:
- Main room: Hands-on (TotalView)
  Nikolay Piskun, Perforce Software
- Breakout room: Hands-on (Arm Tools)
  Beau Paisley, ARM

3:50PM Break

Open source community tool sessions

3:50PM Break

4:10PM HPCToolkit
John Mellor-Crummey, Rice U.

4:50PM Tau
Sameer Shende, Paratools/U Oregon

5:30PM Parallel Sessions:
- Main room: Hands-on (Tau)
  Sameer Shende, Paratools/U Oregon
- Breakout room: Hands-on (HPCToolkit)
  John Mellor-Crummey, Rice U.

6:30PM Dinner

7:30PM After-dinner talk: An Accidental Benchmark
Jack Dongarra, Univ. of Tenn.

8:15PM Parallel Sessions (optional):
- Main Room: Hands-on (Intel, AMD, TotalView, Tau)
  Kevin O’Leary, Intel
  Suyash Tandon, AMD
  Nikolay Piskun, Perforce Software
  Sameer Shende, Paratools/U Oregon
- Breakout Room: Hands-on (NVIDIA, Arm, HPCToolkit)
  Kris Keipert, NVIDIA
  Beau Paisley, ARM
  John Mellor-Crummey, Rice U.

9:30PM Adjourn
Systems for Hands-on

- System reservation for today
  - Theta: 512 nodes 8:30AM-9:30PM (-q ATPESC2022 -A ATPESC2022)
  - Cooley: 80 nodes 8:30AM-9:30PM (-q training -A ATPESC2022)
  - ThetaGPU: 8 nodes (64 gpus) 8:30AM-9:30PM (-q single-gpu -A ATPESC2022)
    rest ~ 12 nodes (full-node) 8:30AM-9:30PM (-q training-gpu -A ATPESC2022)

- NVIDIA Cloud GPU resources
  - Sign-up: https://developer.nvidia.com/

- Intel DevCloud for Intel GPUs

- AMD Accelerator Cloud (AAC): very limited resource available today

- ASCENT: no reservation, but usable with the default queue (with –P TRN011)
Thanks and Enjoy!