Performance Tools and Debuggers

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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?
  – Flop-rate, bandwidth?
  – How to identify performance bottlenecks?
  – Leading profiling tools can help you optimize your code on HPC

• Debugging Tools in this track
  – ARM DDT (in ARM Forge)
  – Perforce TotalView

• Profiling Tools in this track
  – ARM MAP (in ARM Forge)
  – Intel VTune
  – Intel Advisor
  – CrayPat
  – HPCToolkit
  – TAU
Team for Tools Track

- JaeHyuk Kwack (Argonne National Laboratory)
- Scott Parker (Argonne National Laboratory)
- Ryan Hulguin (ARM)
- Nikolay Piskun (PERFORCE)
- Paulius Velesko (Intel)
- John Levesque (HPE/Cray)
- John Mellor-Crummey (Rice Univ.)
- Sameer Shande (Univ. of Oregon / Paratools)
Agenda

Debugging Tool sessions before lunch

9:00  Speaker check-in
9:30  Introduction
9:40  ARM Forge
10:15 TotalView
10:50 Parallel Sessions:
   • Break
   • ROOM B: Hands-on: ARM  
     Ryan Hulguin, ARM
   • ROOM C: Hands-on: TotalView  
     Nikolay Piskun, PERFORCE
11:45  Lunch

Profiling Tool sessions before lunch

12:45 p.m. Intel VTune/Advisor
1:25  CrayPat
2:00 Parallel Sessions:
   • Break
   • ROOM B: Hands-on: Intel VTune/Advisor  
     Paulius Velesko, Intel
   • ROOM C: Hands-on: CrayPat  
     John Levesque, HPE
2:55  HPCToolkit
3:30  TAU
4:05 Parallel Sessions:
   • ROOM B: Hands-on: HPCToolkit  
     John Mellor-Crumme, Rice University
   • ROOM C: Hands-on: TAU  
     Sameer Shende, University of Oregon / Para Tools, Inc.
5:00  Adjourn
ZoomGov sessions

• Main Room
  – https://exascaleproject.zoomgov.com/j/1608499706?pwd=NFhklddzZmpjSmRTWWJVdUkzTGV3Zz09
  – All presentations sessions for Arm Forge, TotalView, Intel VTune/Advisor, CrayPat, HPCToolkit, and TAU

• Room B
  – https://exascaleproject.zoomgov.com/j/1601131634?pwd=SDRSNEtKT3daQ0xqL0FSOC9rMG5yQT09
  – Hands-on sessions for Arm Forge, Intel VTune/Advisor, and HPCToolkit

• Room C
  – https://exascaleproject.zoomgov.com/j/1610856640?pwd=SHRINkpGWGY2RDFPeUs2SmJRby9nUT09
  – Hands-on sessions for TotalView, CrayPat, and TAU
Slack Channels

- **Arm Forge (#ddt-map)**

- **TotalView (#totalview)**
Slack Channels

- Intel VTune/Advisor (#vtune-advisor)
  - @Ray Loy created this channel on July 22nd. This is the very beginning of the #vtune-advisor channel.
  - Ray Loy 2:10 PM
  - Joined VTune-advisor along with 5 others.
  - Thursday, July 23rd

- CrayPat (#craypat)
  - @Ray Loy created this channel on July 22nd. This is the very beginning of the #craypat channel. Description: Discussion about Cray tools e.g. CrayPat
  - Ray Loy 2:12 PM
  - Joined CrayPat
  - Ray Loy 2:12 PM
  - Set the channel description: Discussion about Cray tools e.g. CrayPat
  - JaeHyuk Kwack(ALCF) 2:16 PM
  - was added to CrayPat by Ray Loy, along with 3 others. Also, Yasi and 14 others joined.

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ATPESC 2019, July 28 – August 9, 2019

ATPESC 2020, July 26 – August 7, 2020
Slack Channels

- HPCToolkit (#hpctoolkit)
- TAU (#tau)
Systems for Hands-on

• System reservation for today
  – Theta: 512 nodes from 9am – 6pm in Central  
    (-q ATPESC2020 -A ATPESC2020)
  – Cooley: 80 nodes from 9am – 6pm in Central  
    (-q training -A ATPESC2020)

• Intel DevCloud for Intel Gen9 GPUs

• ASCENT: no reservation, but usable with the default queue
Thanks and Enjoy!