ExaOSR-2012 Workshop Agenda
Workshop on Exascale Operating Systems and Runtime Software
October 4-5, Washington, DC
Last Update: 9/25/12
DOWNLOAD ALL WORKSHOP PAPERS, SLIDES, and NOTES

Agenda

Thursday Oct 4

08:00-08:30 Registration & breakfast

08:30-09:00 Introduction Thuc Hoang & Bill Harrod

09:00-09:45 OS council report Pete Beckman

09:45-10:15 Break

Position Paper presentations and panels:

There will be 8 sessions covering key areas for Exascale OS/R research. Position paper authors will be given 10 minutes to present their position. At the end of each session there will be a shared 15 minute Q&A period. Scribes will take notes of the Q&A discussion. In addition, four panels will be used to discuss specific questions and the impacts of research approaches.

10:15-11:00 Session 1: OS structure SLIDE DECK 1 SCRIBE NOTES
Moderator: Bronis R. de Supinski; Scribe: John Shalf

- John Lange: "Partitioned Multistack Environments for Exascale Systems"
- Martin Schulz and David Lowenthal: "Automatic Customization of OS and Runtime Stacks"
- Peter Dinda: "Adaptive and Extensible Virtualization for Exascale"

11:00-11:55 Session 2: Core specialization SLIDE DECK 2 SCRIBE NOTES
Moderator: Arthur Maccabe; Scribe: Mike Lang

- Yutaka Ishikawa et al.: "Operating System Kernel for Manycore Architectures"
- Larry Kaplan: "Full Operating System Core Specialization"
- Yoonho Park et. al.: "A Hybrid Approach to Exascale Operating Systems"
- Jim McKie et. al.: "Edging Towards Exascale With NIX" and "Process Isolation and Exascale Operating Systems and Runtimes"

11:55 – 12:35 Panel 1: Global OS and Node OS Architectures SLIDE DECK PANEL 1 SCRIBE NOTES
Panelists: Peter Dinda, Larry Kaplan and Martin Schulz

Moderator John Shalf; Scribe: Dorian Arnold

Questions:

- Is there a natural separation of functionality between node OS/R and global OS/R?
- What is the path for OS/R interoperability across systems?
- How will the new OS/R architecture impact applications?
- What hardware features are most critical to an Exascale OS/R?

12:35 – 1:45 Lunch
01:45-02:30 Session 3: Memory SLIDE DECK 3 SCRIBE NOTES
Moderator: John Shalf; Scribe: Arthur Maccabe

- Kamil Iskra et. al.: "Advanced Virtual Memory for Exascale"
- Scott Levy, et. al. "Exploiting Content Similarity to Improve Memory Performance"
- Brian Van Essen and Maya Gokhale: "Persistent memory view of in-system storage"

02:30-3:15 Session 4: Fine Grain SLIDE DECK 4 SCRIBE NOTES
Moderator: Pete Beckman; Scribe: Bronis R. de Supinski

- Jonathan Appavoo et. al: "EbbRT"
- Roberto Gioiosa and Sriram Krishnamoorthy: "Operating System Support for Fine-Grained Task Migration"

03:15-3:45 Break

3:45 – 4:15 Panel 2: OS/R Support for Novel Programming Models SLIDE DECK PANEL 2 SCRIBE NOTES
Please be aware of current X-Stack investments related to runtime support for programming models (see https://sites.google.com/site/xstackprogramreview/)
Panelists: Jonathan Appavoo, Kamil Iskra and Sriram Krishnamoorthy
Moderator: Arthur Maccabe; Scribe: Franck Cappello

Questions:

- What are the key changes in the programming model that will most directly impact the **structure** of the OS/R?
- How will dynamic and adaptive programming models impact the required **functionality** of the OS/R?
- How will changing memory and I/O systems influence the research directions we should pursue?

04:15-05:00 Session 5: Power SLIDE DECK 5  SCRIBE NOTES
Moderator: Sriram Krishnamoorthy; Scribe: Maya Gokhale

- Patrick Bridges, et al.: "Run-Time Support for Integrated Power and Resilience Management"
- Kamil Iskra, et al.: "Power Management for Exascale"
- Luiz Derose: "Application Level Power Analysis and Power Management"

Friday Oct 5

08:00-08:30 Breakfast

08:30-09:15 Session 6: Adaptation (1) SLIDE DECK 6  SCRIBE NOTES
Moderator: Mike Lang; Scribe: Ron Brightwell

- Laxmikant Kale: "An Introspective and Adaptive Runtime System"
- Henry Hoffmann: "Managing Competing Goals with a Self-aware Runtime System"
- Christian Engelmann, et. al.: "Dynamic Self-Aware Runtime Software for Exascale Systems"

09:15-10:00 Session 7: Adaptation (2) SLIDE DECK 7  SCRIBE NOTES
Moderator: Ron Brightwell; Scribe: Sriram Krishnamoorthy

- Karsten Schwan, et al.: "Core Containers: System Support for Provisioning and Controlling Dynamic Exascale Codes"
- Bruce Childers, et al.: "X-REEact: Fighting Runtime Variances Across Time and Space"
- Abhinav Bhattele and Todd Gamblin: "OS/Runtime challenges for dynamic topology aware mapping"

10:00 – 10:30 Panel 3: Adaptation SLIDE DECK PANEL 3  SCRIBE NOTES
Questions:

- Perfectly synchronized operations across millions of cores can suffer performance problems in the face of OS/R jitter. If we expect the OS/R and Exascale applications to be dynamic and adaptive, is jitter no longer a problem?
- What are the key real-time feedback mechanisms required to support adaptive, self-aware OS/R behavior?
- How will performance tuning and debugging change in the presence of adaptive OS/R layers?

10:30-11:00 Break

11:00-11:45 Session 8: Resilience SLIDE DECK 8  SCRIBE NOTES
Moderator: Maya Gokhale; Scribe: Kamil Iskra
- Kurt Ferreira et al.: "An Operating System Resilient to DRAM Failures"
- Franck Cappello and Ana Gainaru: "Resilience through failure avoidance: New detectors of failure precursors and improved prediction workflow"

11:45 – 12:45 Lunch

12:45 – 1:15 Panel 4: Power and Resilience SLIDE PANEL 4  SCRIBE NOTES
Panelists: Franck Cappello, Luiz Derose and John Daly
Moderator: Ron Brightwell; Scribe: Abhinav Bhatale
Questions:

- How will the user collaborate on resilience: what will the OS/R provide and what will the user code provide?
- How will the user be aware of power/energy issues on exascale systems?
- Will the user's code be expected to detect corrupted data or adjust power?
- Do we expect the node-level OS/R itself to be resilient to fault (loose a single memory chip or core)? Or do we simply expect to fault at the node level, taking a node offline or adding a node to the computation?

1:15-1:45 Panel: Impressions of the Exascale OS/R research agenda SCRIBE NOTES
Panelists: John Daly, Fred Johnson, Eric Van Hensbergen, Larry Kaplan, Donald Becker, John Mellor-Crummey
Moderator: Pete Beckman; Scribe: Ron Brightwell

1:45 – 2:15 Conclusions (Pete Beckman, Ron Brightwell)

2:15 – 2:45 Executive Session
Comments on the workshop? You mail email ascii text (regular email) to the address below. Comments will be accepted until Friday the 12th. Email should be sent with the Subject: WORKSHOP FEEDBACK.