

HiPEAC²: 1st Task Force Meeting on Reliability and Availability

Barcelona, June 3, 2008

Agenda

- Intro - 5min
 - Overview of the area
 - Goals of the task force
 - Some food for thought
 - News
 - Todos
- Discussion/Feedback from participants - 20 min
 - What are the major challenges/emerging solutions
 - Instruments to achieve the goals
 - Charter of the task force
- Short Presentations and QA - 50min
 - Industrial and academic perspective
- Additional discussion and Wrap-up - 10-15 min

Reliability and Availability: Trends

- Technology developments are presenting us with the challenge of building computer systems made of unreliable parts.
- Tomorrow's world:
 - Failures will not be exceptional
 - Various origins for failures
 - soft-errors, process variation, wear-out, hardware and software bugs, incomplete specifications, impossibility to simulate all use cases, ...
- Worst scenario: **reliability constraints may obviate the benefits of technology scaling. High cost to provide reliability and availability slows down ICT and economic growth.**
- **Future systems need to be Dependable**
 - Ability to operate correctly and satisfactory in the presence of faults
 - Online detect, repair, recover
 - Reduced down time
 - Low dependability/euro ratio
- Dependability and predictability of real-time performances: are they opposite constraints?

HiPEAC's response

- Task Force on reliability to promote awareness and research in this area
- Orthogonal to many clusters
- Task Force Leader: Marc Duranton, NXP
- Vice-chair: Yiannakis Sazeides (Yanos), UCY

Goals of the R&A TF (30.1.2008)

1. Agree on the definition of terms reliability and dependability
2. Collect the constraints and requirements of applications, system, core and technology providers concerning reliability and availability
3. Collect state of the art and foreseeable technologies that could fulfill 1), analyze potential gaps.
 - 1) and 2) will be closely done with the roadmap task
4. Organize meetings in the HiPEAC cluster context to enforce awareness and promote, advance the state of the art in the techniques improving reliability and availability, both from a hardware and a software point of view.
5. Propose courses for the summer school.

Some questions...

- Is dependability the only solution for reliability problems?
- What are the main dependability problems/challenges (short (5 years) and long term)?
- Implications if not addressed successfully?
- What does the above mean in different contexts (High performance, Embedded, Compilers)?
 - Does multi-core, on-chip interconnect, parallel programming present novel challenges/opportunities? How and what?
- What are existing technologies and future directions that facilitate dependability?
- How R&A challenges predicated on other technical issues/developments? Risk factors?

Some questions... (cntd)

- Is the HiPEAC community trying to address these issues?
- Who is doing what research?
- Need to extend metrics too account the effects of reliable design
 - Reliability Aware Speed binning (yield and PV)
- How to best address reliability and availability issues in HiPEAC?
 - Exposure to industrial perspective
 - Tutorials, workshops, conference, summer school
 - Project proposals (next FP7 call)
 - Contribute to this TF

NEWS

- 2nd Task Force Meeting during Summer School
- Micro-41: Workshop on Dependable Architecture (organizers HiPEAC members)
- HiPEAC Conference: Tutorial on Reliability

Todos List

- Register in the R&A TF email list
- Send me email with brief description of your research activity and link to your project web site
- Provide feedback for roadmap
- Participate and contribute in future meetings and R&A TF related events

and...

- Increase R&A awareness in the other clusters and the projects you are involved

Short Presentations

- Michael Vinov, IBM, Haifa
 - Emre Ozer, ARM
 - Osman Unsal, BSC
 - Bjorn De Sutter, University of Ghent
 - Angelos Billas, FORTH
 - Veerle Desmet, University of Ghent
 - Davide Bertozzi, University of Ferrara
 - Tor Skeie, Simula
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- FP7 Project: Reality (M. C. Miguel & G. Desoli)

Thank you for participating!