UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola de Doctorat

Chalmers University of Technology
and University of Gothenburg
Computer Science and Engineering
S-412 96 Gothenburg
Sweden

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INFORME EXPERT EXTERN / INFORME EXPERTO EXTERNO / EXTERNAL REFEREE REPORT

Nom de l'expert / Nombre del experto / Name of the referee MIQUEL PERICAS GLEIM
Categoria / Categoría / Category ASSISTANT PROFESSOR
Departament, Universitat a què pertany / Departamento, Universidad a la que pertenece / Department, University to which s/he belongs Department of Computer Science and ~~Eningeering~~ Engineering, Chalmers University of Technology

Títol de la tesi / Título de la tesis / Title of the thesis Exploiting Asymmetric Multi-core Systems with Flexible System Software
Nom del doctorand que presenta la tesi / Nombre del doctorando que presenta la tesis / Name of the student presenting the thesis KALLIA CHRONAKI

Especifiqueu les raons que avalen la qualitat de la tesi per a la seva defensa pública:
Especificar los motivos que avalan la calidad de la tesis para su defensa pública:
Specify reasons endorsing the quality of the thesis for its public reading:

Quins objectius s'han assolit amb la tesi?
¿Qué objetivos se han logrado con la tesis?
What objectives have been achieved with the thesis?

The thesis makes important contributions in the area of scheduling for heterogeneous multicores. The first contribution is an analysis of scheduling approaches on asymmetric CMPs, comparing OS-level approaches with runtime-level approaches. The second contribution are task criticality-aware schedulers that achieve improved performance and energy-delay-product over homogeneous approaches when running on ARM's big.LITTLE architecture. The third contribution is a hardware enhancement to increase the speed at which new tasks can be executed. This is particularly important manycore CMPs with large number of cores.

Originalitat del treball:
Originalidad del trabajo:
Originality of the work:

Heterogeneous scheduling has been researched in the past. This work is however the first work that proposes dynamic methods for criticality-aware scheduling that do not require a costly offline analysis of the task graph. When it comes to hardware support for scheduling, this work differs from prior schemes that propose full hardware implementations of the runtime. The proposed TaskGenX is a simpler approach that offloads to hardware only the task creation. The work shows that this is enough to achieve scalability.

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Metodologia emprada / hipòtesis contrastades:
Metodología usada / hipótesis contrastadas:
Metodology used / hypotheses tested:

The thesis uses mainly benchmarks from the Parsec benchmark suite that have been reimplemented in the OmpSs programming language. These benchmarks are representative of shared-memory HPC workloads. Different methodologies are then used to evaluate the proposed schemes, depending on the scenario. Evaluations are primarily conducted on a real platform featuring an ARM big.LITTLE chip. For scalability studies, the author uses a simulation based approach based on TaskSim. These methods are appropriate for the goals of this thesis.

Valoració absoluta i/o ponderada de la tesi en relació amb altres treballs d'investigació:
Valoración absoluta y/o ponderada de la tesis presentada en comparación con otros trabajos de investigación:
Absolute and/or relative assessment of the thesis in comparison with other works of research:

This thesis make important contributions to the state-of-the-art in the field of heterogeneous and manycore scheduling.

Considera que la tesi esmentada és apta per al tràmit de lectura i la defensa pública?
¿Considera que la tesis anteriormente mencionada es apta para su lectura y defensa pública?
In consideration of all the above, is the thesis judged to be suitable for public reading?

(Si / Yes) No

Observacions:
Observaciones:
Observations:

Signatura i data
Firma y fecha
Signature and date

September 3rd, 2018

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and University of Gothenburg
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(*) Si és necessari adjunteu les respostes en els fulls annexos / Si es necesario adjunten las respuestas en las hojas anexas / If necessary, enclose the answers in the annexed sheets