Programming Many-Core Chips

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Foreword by Håkan Eriksson

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Dedicated to the loving memory of my grandmother.
Mama, without your dedication and sacrifices, I would have never been in a position to accomplish this.

Thank you.
András Vajda

Foreword

Parallel computing has been confined, for much of its over 40 year history, to highly specialized, technology-wise advanced domains such as scientific computing or telecommunications. There were only a few experts who had the background and experience to write efficient, robust and scalable programs for these parallel machines.

A few years ago all that suddenly changed with the emergence of multi-core and many-core processors, as we reached the end of seemingly endless single-core performance scaling. While Moore's Law still provides chip designers with ever-increasing amount of transistors for building chips, these chips will now all have multiple cores and there's no end in sight for the scalability of computing power through the integration of ever more processor cores on the same piece of silicon. Practically overnight parallel programming skills became mandatory for most experts working in the field of computer programming.

Ericsson has always been at the forefront of parallel programming. We have been delivering best in class massively parallel telecommunication systems for several decades and providing our customers with quality software running on systems with hundreds of processors has always been one of our core assets. Continued leadership in this area is essential for our future success: the amount of traffic in telecom networks and consequently, the amount of computation required to sustain it, is expected to grow orders of magnitude faster than what the chip industry can match, even if it continues to deliver according to Moore's law. I believe we are well positioned to take advantage of emerging chips with hundreds or even thousands of cores in order to sustain our technology leadership in ICT.

This book is the result of the experience we as a company and our experts as individuals have accumulated over the past decades. It is driven by our desire to share with the software community the knowledge we built the hard way: learning from our mistakes and building on our successes. It is our strong belief that co-operation is essential in order to spark and sustain innovation that can generate the cutting

edge technologies from which we all—the computing community and the society in general—can ultimate benefit.

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