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Evolving OpenMP for Evolving Architectures

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Preface

OpenMP is a widely accepted, standard application programming interface (API) for high-level shared-memory parallel programming in Fortran, C, and C++. Since its introduction in 1997, OpenMP has gained support from most high-performance compiler and hardware vendors. Under the direction of the OpenMP Architecture Review Board (ARB), the OpenMP specification has evolved up to and beyond version 4.5. The 4.5 version includes several refinements to existing support for heterogeneous hardware environments, many enhancements to its tasking model including the task-loop construct, and support for doacross loops. As indicated in TR7, OpenMP 5.0, will include significant new features, such as mechanisms for memory affinity and the standardization of tool APIs, and improvements in existing ones, such as the device and tasking constructs.

The evolution of the standard would be impossible without active research in OpenMP compilers, runtime systems, tools, and environments. OpenMP is important both as a standalone parallel programming model and as part of a hybrid programming model for massively parallel, distributed memory systems built from multicore, manycore, and heterogeneous node architectures. Overall, OpenMP offers important features that can improve the scalability of applications on expected exascale architectures.

The community of OpenMP researchers and developers is united under the cOMPunity organization. This organization has held workshops on OpenMP around the world since 1999: the European Workshop on OpenMP (EWOMP), the North American Workshop on OpenMP Applications and Tools (WOMPAT), and the Asian Workshop on OpenMP Experiences and Implementation (WOMPEI), which attracted annual audiences from academia and industry. The International Workshop on OpenMP (IWOMP) consolidated these three workshop series into a single annual international event that rotates across Europe, Asia-Pacific, and the Americas. The first IWOMP workshop was organized under the auspices of cOMPunity. Since that workshop, the IWOMP Steering Committee has organized these events and guided the development of the series. The first IWOMP meeting was held in 2005, in Eugene, Oregon, USA. Since then, meetings have been held each year, in: Reims, France; Beijing, China; West Lafayette, USA; Dresden, Germany; Tsukuba, Japan; Chicago, USA; Rome, Italy; Canberra, Australia; Salvador, Brazil; Aachen, Germany; Nara, Japan; and Stony Brook, USA. Each workshop has drawn participants from research and industry throughout the world. IWOMP 2018 continued the series with technical papers and tutorials. The IWOMP meetings have been successful in large part due to generous support from numerous sponsors.

The IWOMP website (www.iwomp.org) provides information on the latest event, as well as links to websites from previous years' events. This book contains the proceedings of IWOMP 2018. The workshop program included 16 technical papers, two keynote talks, and a tutorial on OpenMP. The paper "The Impact of Taskyield on the

Design of Tasks Communicating Through MPI" by Joseph Schuchart, Keisuke Tsugane, Jose Gracia, and Mitsuhisa Sato was selected for the Best Paper Award. All technical papers were peer reviewed by at least three different members of the Program Committee.

September 2018

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