Lecture Notes in Computer Science 1734
Edited by G. Goos, J. Hartmanis, and J. van Leeuwen

Berlin
Heidelberg
New York
Barcelona
Hong Kong
London
Milan
Paris
Singapore
Tokyo

Hermann Hellwagner
Alexander Reinefeld (Eds.)

SCI: Scalable Coherent Interface

Architecture and Software for High-Performance Compute Clusters

Volume Editors

Hermann Hellwagner
University of Klagenfurt, Institute of Information Technology
A-9020 Klagenfurt, Austria
E-mail: hermann.hellwagner@uni-klu.ac.at

Alexander Reinefeld
Konrad-Zuse-Zentrum für Informationstechnik Berlin (ZIB)
Takustr. 7, D-14195 Berlin-Dahlem, Germany
E-mail: ar@zib.de

Cataloging-in-Publication data applied for

Die Deutsche Bibliothek - CIP-Einheitsaufnahme

SCI - Scalable coherent interface : architecture and software for high-performance compute clusters / Hermann Hellwagner ; Alexander Reinefeld (ed.). - Berlin ; Heidelberg ; New York ; Barcelona ; Hong Kong ; London ; Milan ; Paris ; Singapore ; Tokyo : Springer, 1999
(Lecture notes in computer science ; Vol. 1734)
ISBN 3-540-66696-6

CR Subject Classification (1998): C.2, D.1-4, B.2-8

ISSN 0302-9743
ISBN 3-540-66696-6 Springer-Verlag Berlin Heidelberg New York

Typesetting: Camera-ready by author
SPIN: 10704208 06/3142 – 5 4 3 2 1 0 Printed on acid-free paper

Preface

Background

System interconnection networks have become a critical component of the computing technology of the late 1990s, and they are likely to have a great impact on the design, architecture, and use of future high-performance computers. Indeed, it is today not only the sheer computational speed that distinguishes high-performance computers from desktop systems, but the efficient integration of the computing nodes into tightly coupled multiprocessor systems. Network adapters, switches, and device driver software are increasingly becoming performance-critical components in modern supercomputers.

Due to the recent availability of fast commodity network adapter cards and switches, tightly integrated clusters of PCs or workstations have emerged on the market, now filling the gap between desktop systems and supercomputers. The use of commercial off-the-shelf (COTS) technology for both computing and networking enables scalable computing at relatively low costs. Some may disagree, but even the world champion in high-performance computing, Sandia Lab's *ASCI Red* machine, may be seen as a COTS system. With just one hardware upgrade (pertaining to the Intel processors, not the network), this system has constantly been number one in the TOP-500 list of the worldwide fastest supercomputers since its installation in 1997. Clearly, the system area network plays a decisive role in overall performance.

The Scalable Coherent Interface (SCI, ANSI/IEEE Standard 1596-1992) specifies one such fast system interconnect, emphasizing the flexibility, scalability, and high performance of the network. In recent years, SCI has become an innovative and widely discussed approach to interconnecting multiple processing nodes in various ways. SCI's flexibility stems mainly from its communication protocols: in contrast to many other interconnects, SCI is not restricted to either message-based or shared-memory communication models. Instead, it combines both, taking advantage of similar properties that have been investigated in such hybrid machines as Stanford's FLASH or MIT's Alewife architectures. Since SCI also defines a distributed directory-based cache coherence protocol, it is up to the computer architect to choose from a broad range of communication and execution models, including efficient message-passing architectures, as well as shared-memory models, in either the NUMA or CC-NUMA variants.

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.