



Building a BeagleBone Black Super Cluster

By Andreas Josef Reichel

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Building a BeagleBone Black Super Cluster By Andreas Josef Reichel

Build and configure your own parallel computing Beowulf cluster using BeagleBone Black ARM systems

About This Book

- Configure your own cluster for high speed parallel computing
- Benefit from your personally configured super computer which is a power efficient, low-cost, and highly scalable super computer
- Write your own cluster software with the help of practical examples using powerful computational libraries specifically designed for distributed memory machines

Who This Book Is For

If you are a programmer, scientist, or someone interested in modern computer technology that goes beyond the typical PC, then this book will show you the outstanding possibilities of cluster computing with modern embedded systems based on ARM architecture. Whether you need a high-speed or low-cost scalable cluster for simulations or want to try something new, this book is the right guide for you.

What You Will Learn

- Use the minimal configuration necessary to control your BeagleBone via a network
- Build your own scalable server rack and low-cost power supply
- Set up the network backbone and configure the boards for cluster interconnection
- Use FTP, Samba, or SCP for simple file transfers
- Configure the OpenMPI Message Passing Interface for cluster communication and ScaLAPACK for distributed calculation of mathematical problems
- Develop your own simulation software and visualize your data using a highly sophisticated physics simulation package

In Detail

BeagleBone Black is a low-cost, community-supported development platform for developers and hobbyists. It boots Linux in under 10 seconds and gets started on development in less than five minutes with just a single USB cable. The BeagleBone Black ARM system is a perfect candidate for building a Beowulf cluster.

The book starts with a short introduction to the computational power of the required computers, and will take you through the hardware and key features of the BeagleBone Black ARM system. You will then be introduced to the ports and control buttons of the board. The real-life examples in the book will show you how to configure and compile the software packets, and you will be shown how to write your own cluster software and utilize important mathematical libraries. The book concludes with programming and simulation examples using sophisticated physics simulation libraries as typical applications. This book will be a very helpful guide to get started in the world of super computing.

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Editorial Review

About the Author

Andreas Josef Reichel

Andreas Josef Reichel was born in 1982 in Munich, Bavaria, to Josef and Ursula. He went to an elementary school from 1989 to 1993 and continued with lower secondary education for 4 years and started with middle school in 1996. In 1999, he finished school as the best graduate of the year. From 2000 to 2001, he went to Fachoberschule and got his subject-linked university entrance qualification, with which he began to study Physical Technology at the University of Applied Sciences in Munich. After two semesters, he got his preliminary diploma and began with general studies of Physics at the Ludwig Maximilian University of Munich in 2003. In 2011, he completed Dipl.-Phys. (Univ.) in experimental physics with the THz characterization of thin semiconductor films in photonics and optoelectronics. Now, he is working on his dissertation to Dr. rer. nat. on plasma etching processes for semiconductors at the Walter Schottky Institute of the Technische Universität München in Garching. In his spare time, he has been learning programming languages such as BASIC, Pascal, C/C++, x86 and x64 Assembler, as well as HTML, PHP, JavaScript, and the database system MySQL and has been programming since he was 13 years old. Since 1995, he has been an active hobby musician in different accordion ensembles and orchestras. He also loves to learn about languages and drawing, and he began practicing Chinese martial arts in 2012. He invests most of his free time in hobby electronic projects and family genealogical research. He was the co-author of Charge carrier relaxation and effective masses in silicon probed by terahertz spectroscopy, S. G. Engelbrecht, A. J. Reichel, and R. Kersting, Journal of Applied Physics.

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