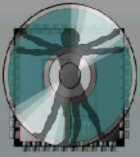# SNOW
Scalable Network of Workstations

German-Brazilian Cooperation Program on IT
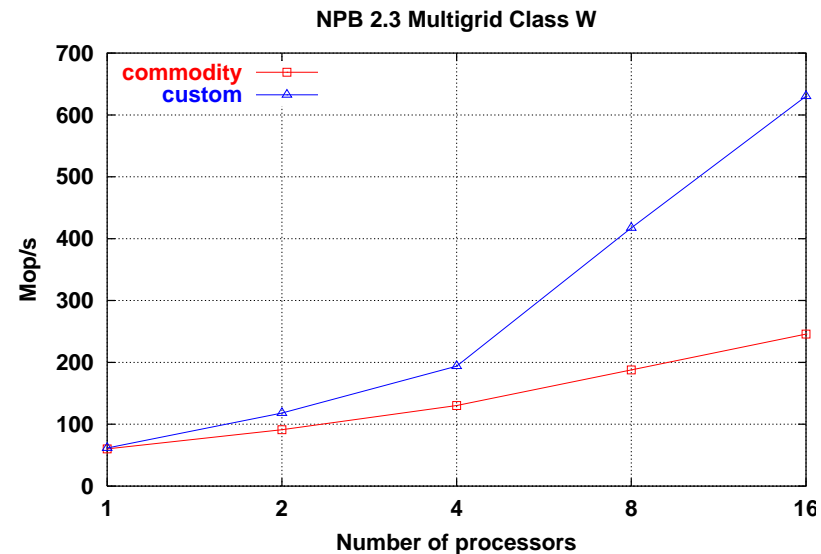
Prof. Dr. Wolfgang Schröder-Preikschat
Prof. Dr. Antônio Augusto Fröhlich
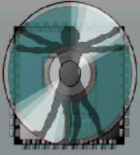Prof. Dr. Philipe Olivier Navaux

2001-2004

Motivation (1)

- **Parallel computing performance revisited**
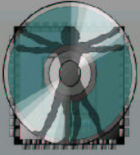 - Commodity vs. custom software

NPB 2.3 Multigrid Class W

- **Clusters are still far behind MPPs**

Motivation (2)

- Commodity hardware matches custom hardware
  - a conclusion that is not true for software
- Commodity software
  - is interactive, web-based, multi-{user,tasks,...}
  - is more distributed and less parallel
- Custom software
  - is delivering high performance and low latencies
  - is dedicated to parallel computing
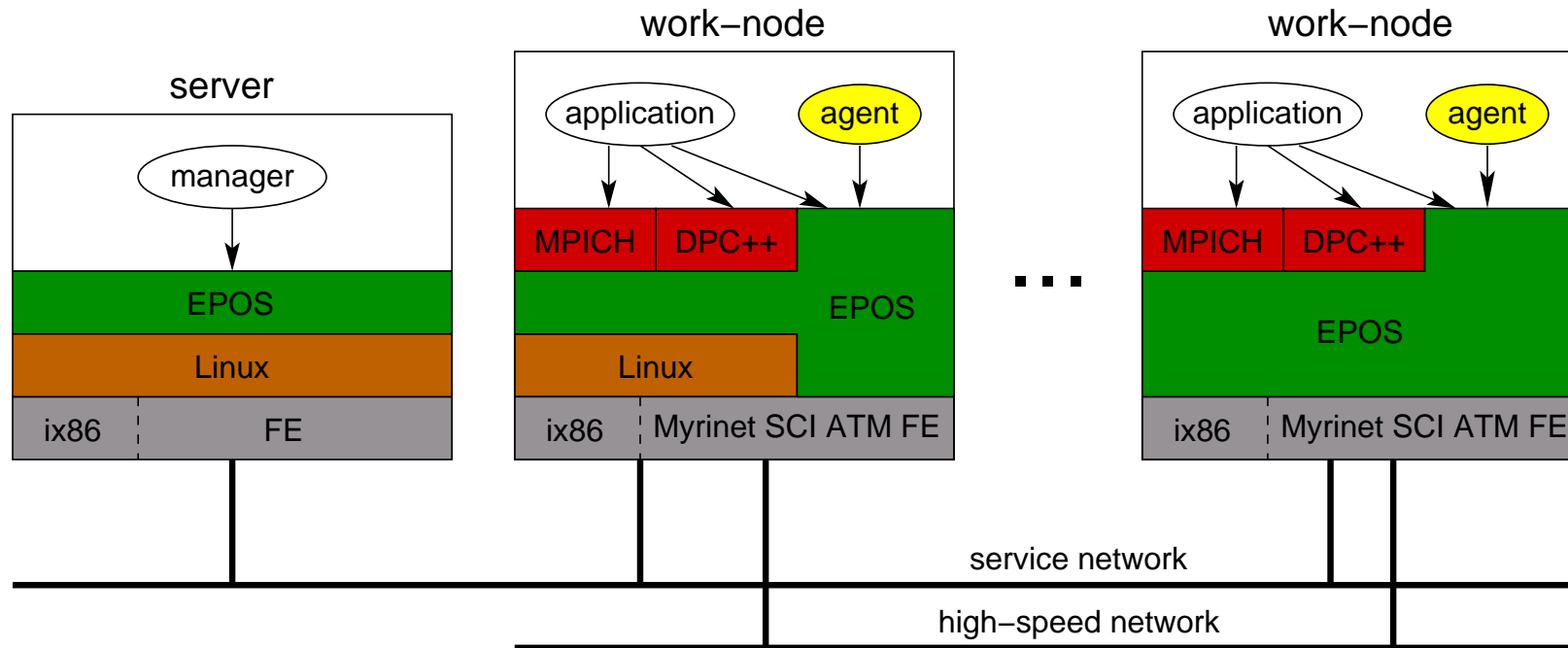- Clusters call for custom software

Goals

- Application-oriented environment
  - management tools
  - programming language
  - run-time support system
  - standard interfaces (POSIX, MPI)
- Validated by selected parallel appliations
  - DNA sequencing
  - control of complex industrial processes
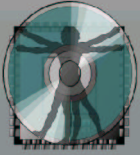- Bringing cluster effective performance closer to MPP

http://www.lisha.ufsc.br

Universidade Federal de Santa Catarina
Laboratório de Integração Software/Hardware

Overview

Partners

- **Germany**
  - Academia
    - Fraunhofer FIRST (University of Erlangen)
  - Industry
    - Pure-Systems GmbH
- **Brasil**
  - Academia
    - UFRGS-GPPD, UFSC-LISHA
  - Industry
    - ALTUS Ltda

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Fraunhofer FIRST

- Head
  - Prof. Dr. Wolfgang Schröder-Preikschat
- Tasks
  - run-time support system
  - reuse of EPOS components
  - configuration tools
- Expertise
  - **PEACE** parallel operating system
  - **PURE** embedded operating system
  - **Myrinet** cluster
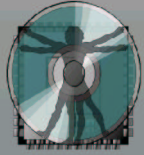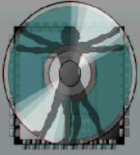
Pure-Systems GmbH

- Head
  - Danilo Beuche
- Tasks
  - Embedded applications
  - Configuration and AOP tools
- Expertise
  - **Aspect C++**
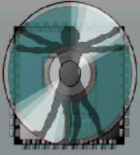 - **Automotive** applications

UFRGS-GPPD

- Head
  - Prof. Dr. Philippe O. A. Navaux
- Tasks
  - DPC++ port and adaptation
  - Parallel run-time library
- Expertise
  - Parallel programming **languages**
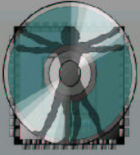 - **Myrinet** and **SCI** clusters

UFSC-LISHA

- Head
  - Prof. Antônio Augusto M. Fröhlich
- Tasks
  - Run-time support system
  - Reuse of EPOS components
  - POSIX adaptation layer
- Expertise
  - **Aboelha** operating system
  - **DNA** sequencing (MIP)

ALTUS

- Head
  - Eng. Luiz Francisco Gerbase
- Tasks
  - Industrial control applications
  - Performance analysis and validation
- Expertise
  - **Industry** automation
  - Brazilian **market leader**

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Summary

- **High-performance computing is an every growing field**
  - Cluster computing is the cost-effective alternative

- **Parallel computing is a strategic field**
  - dominated by the USA and Japan regarding MPP
  - still open for cluster-based solutions

- **Brasil and Germany have competence in the field**
  - strategic alliance can make both major players

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