Parallel Programming

Organization

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Team

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Cluster administration

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Parallel Programming

- Part of module Parallel Systems (MINF-KS-PS, 6 CP)
- Lecture number: 0432 L 596
- Integrated Course (4 weekly hours, 4 Credit Points)

- Applicability
  - Informatik (MSc): Mandatory course in module MINF-KS-PS
  - Informatik (Diplom): Study Area BKS
  - Techn. Informatik (MSc): Mandatory course in module MINF-KS-PS
  - Techn. Informatik (Diplom): Catalogue Technical Applications

- Exam
  - Oral exam of complete module Parallel Systems
  - Prerequisite: Successful completion of assignments

Requirements

- Formal
  - Bachelor in Computer Science or related
- Knowledge
  - Basic knowledge in computer architecture, operating systems, algorithms and data structures
  - C programming
- Miscellaneous
  - tubIT account

Parallel Systems Website

- Primary resource for information (beside our meetings)
  - News, announcements
  - Lecture slides, assignments, further links
  - Discussion forum
  - Registration form
- Hosted on ISIS
  - https://www.kbs.tu-berlin.de/ps
- Please register using the registration form!

Timetable

- Friday, 10-12, MA 041
  - Lecture
  - Discussion of assignments
- Wednesday, 10-12, Lab EN 457/458
  - Demonstrations, practical work
  - Supervised solving of practical assignments
- No meeting on:
  - Wednesday, 1.5. (public holiday)

Learning Outcomes

- You will…
  - be able to design parallel algorithms for a wide variety of parallel architectures
    - Clusters, Servers, Desktops, GPUs, …
  - be able to exploit parallelism on all levels
  - know the basics of parallel programming environments
    - MPI, OpenMP, OpenCL
  - have had a look at existing solutions to certain problems
    - Linear algebra, sorting, data parallel primitives, …

Assignments

- To be done in groups
  - (Group size depends on the number of participants)
- Solutions must be uploaded in ISIS
  - With names and matriculation numbers inside the document
  - Theoretical exercises as a single PDF document
  - Practical exercises as a single .tar.gz or .zip
    - Additional “live hand-in” during Lab hours
- Practical exercises
  - Use C as programming language
  - Are “stretchable”

Lab EN 457/458

Lab EN 457/458 – Rules

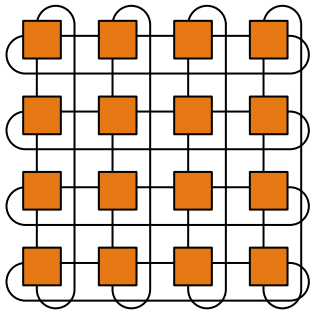
- PIN-code protected (no disclosure!)
- Lab is only for activities related to Parallel Systems!

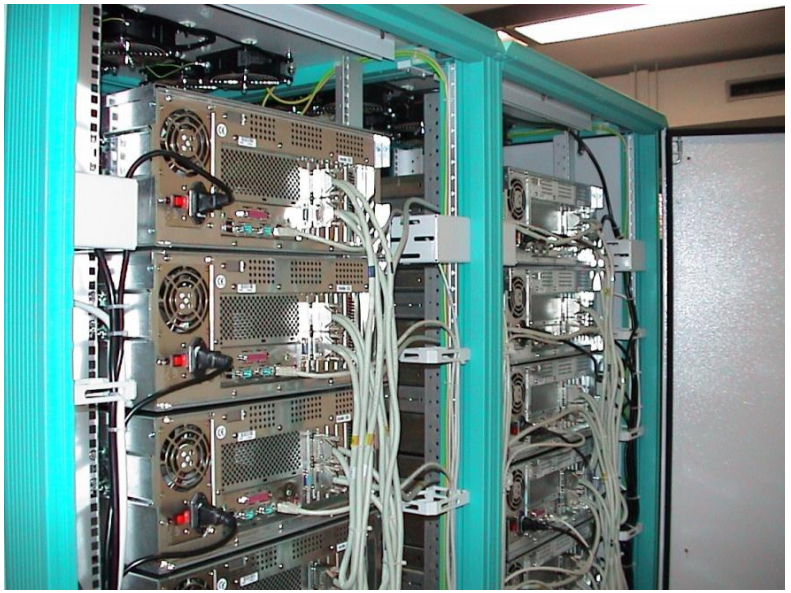
- No eating and drinking inside!
- No abuse in any way
  - No attacks, no eavesdropping, etc.
  - No hardware manipulation (i. e., there are spare power outlets for notebooks + spare ethernet cables)
- Violating any point results in expulsion!

- (You do not have to use the Lab in order to solve the assignments.)

TuSCI – SCI-Cluster

- 16 nodes, each node has
  - 2 processors (1,7 GHz Pentium 4), 1 GB RAM
- Interconnected in a 4x4 2D torus using SCI

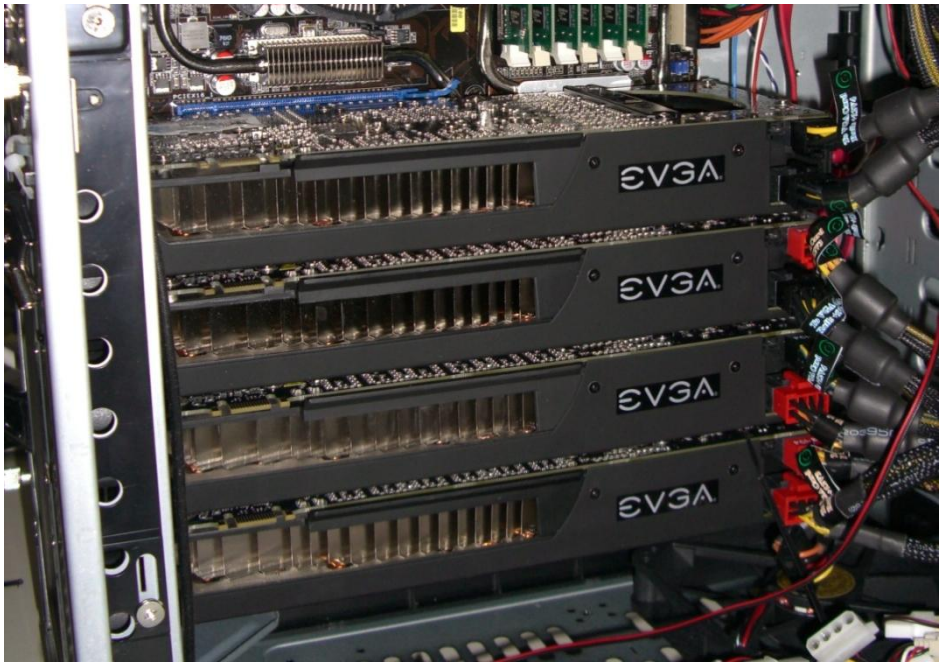




- In case of technical problems with the cluster
  - tusci-admin@kbs.cs.tu-berlin.de

GPU Server

- Quad GTX 295
  - Two chips per card
- GTX 275
  - 30 cores (Streaming Multiprocessors)
  - 240 functional units



Multicore Server

- Quad AMD Opteron 8435
  - 64 GB RAM
  - NUMA System
  - 4 processors at 2.6 GHz
  - 6 cores per processor