

Seminar: Scheduling – Modern Problems in a Seemingly Solved Discipline

Closing Session
Sommersemester 2022

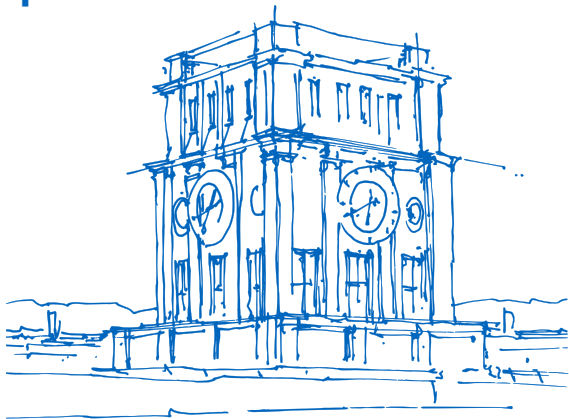
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Fakultät für Informatik
Technische Universität München

July 25th, 2022



Semester Retro-view

W.1	Kick-off-Session	02.05.2022		
W.2	Guidelines-Session	09.05.2022		
1.	Metrics and Fundamentals of Scheduling	23.05.2022	E. Eroğlu	
3.	GPU Scheduling (Warps and Compute Units)	30.05.2022	S. Hopperdietzel	
4.	Process Scheduling (OS)	30.05.2022	M. Delic	
5.	Modern Batch Scheduling by example of FLUX	13.06.2022	L. Hacker	
6.	Clouds and Container Scheduling	13.06.2022	M. Konkov	
7.	Large-Scale Cluster management by example of Borg	20.06.2022	S. Råde	
8.	Scheduling for Heterogeneous Systems	20.06.2022	O. Thaeter	
10.	Co-Scheduling	27.06.2022	J. August	
11.	IO-Aware Scheduling	04.07.2022	M. Pavel	
12.	Malleability	04.07.2022	L. Krakau	
14.	ML-Based Scheduling	11.07.2022	R. Bachmann	
9.	Workflows and scheduling	18.07.2022	D. Ertas	
W.13	Closing Session	25.07.2022		

Summary

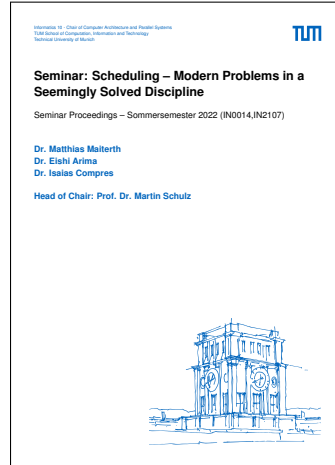
- 13 Presentations
- 13 Seminar-Papers

on various Topics of Scheduling around the topics of HPC.

- 12 available to you in the Proceedings!
- Excellent Group Discussions!
- (And hopefully useful take-aways for you!)

Seminar Proceedings

- Combined effort!
- Thanks for the contributions!
- Available on the course website
- And handed out in this session
- (And that's why I was pedantic about the style ;) !)



Best Paper Award

Best Paper Award

“Modern Batch Scheduling by example of Flux”

~

Leander Hacker

Things we didn't discuss: But you might want to look into!

- Theoretical Background
 - Queueing theory
 - Queueing networks
 - Theoretical foundations of scheduling
- Theoretical Optimal solutions
 - Simulation of scheduling



M/M/1 Queue

Source: https://upload.wikimedia.org/wikipedia/commons/6/65/Mm1_queue.svg

⇒ There are great lectures on the theory of this!

Why we offer this Seminar

- We're applying this kind of research in our everyday work
 - Knowledge Transfer
 - Teaching close to research
 - Training the next generation
- Teaching Tools-of-the-trade
 - Scientific Writing
 - Presenting Scientific Work

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- Our Own Research Directions:
 - Scheduling in HPC
 - Extensions beyond the current state of the art:
 - Malleability
 - Power Aware Scheduling
 - Quantum Computing

Research Systems @ LRZ



QPU Cryostat @ LRZ



BEAST
Bavarian Energy, Architecture, and Software Testbed
@ LRZ

Production Systems @ LRZ



SuperMUC-NG @ LRZ

Discussion

- What are your take-aways from this seminar?
- What were useful lessons learned?
- Where can you apply the knowledge and tools?

For any interest in
Computer Architecture &
Parallel Systems

from Research, to Coursework, and Theses Projects:

Informatik 10 - Lehrstuhl für
Rechnerarchitektur & Parallele Systeme
Prof. Dr. Martin Schulz

<https://www.ce.cit.tum.de/caps/>

