

Scalable MaximaPool with Docker Swarm or Kubernetes

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<https://projects.gwdg.de/projects/netzwerk-mathe-digital/wiki/stack-maxima-pool-technical-details>

Stack Uses Maxima

- local
- separated server
 - MaximaPool
 - MaximaPool as Docker Container

The Peak

- local - enough for testing
- separated server
 - there is always a limit
 - big server - most of the time idle
 - not scalable

Virtualisation

- Maximapool in a virtual machine
- Maximapool as Docker Container
 - Still a single server
 - Dead lock possible

Using More Servers

- Docker Swarm
- turns a pool of Docker hosts
 - into a virtual, single host
 - avoids dead locks
 - more or less easy setup
- **but:**
 - deprecated
 - buggy

Kubernetes

- created by Google for container
- dynamic allocation of resources
 - scaling up and down
 - automation across clusters of hosts
 - rolling updates
- industrial standard
- sophisticated setup

DockerSwarm

- public since February 2019
- about 400 CPUS, 128 docker container
- used by several german universities
- first overload 22th. of April 2020
 - Memory overflow (limit 768 MB each container)
 - DockerSwarm network bug

Kubernetes

- roll out in May 2020
- replaces DockerSwarm
- offering different maxima and STACK versions
- really autoscaling
- near future: docker image without tomcat and java
- project news:
- <https://projects.gwdg.de/projects/netzwerk-mathe-digital/wiki/stack-maxima-pool-technical-details>

Suggestions

- centralized maximapool service for each country
- in Germany for each Bundesland

Questions ?

- feel free to contact me