Fraunhofer
ITWM

🐦 @open-carme

FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM

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OPEN CARME
HPC MEETS MACHINE LEARNING

We combine existing open source solutions from HPC and the machine learning/data analytics community. With this in mind we build a framework that provides an easy interactive access to the compute power of HPC centers and gets the maximum out of your AI tool chain.

Carme's key features

- **Seamless integration** into existing HPC setups

- User-friendly **web-interface** providing **flexible** and **os-independent** access from anywhere in the world

- **Interactive jobs** to develop directly **on the cluster** with your favorite deep learning tools

- Fully **separated jobs** with **custom resources**

- **Intuitive abstraction** of complex cluster topologies

- **Distributed multi-node/multi-gpu jobs** with direct access to **GPI, GPI-Space, MPI, HP-DLF and Horovod**

- User maintained and **containerized environments** using **Singularity** and **Anaconda**

Visit us at open-carme.org! For technical details, more information and a live demo come to our booth!

Fraunhofer-Institut für Techno- und Wirtschaftsmathematik ITWM

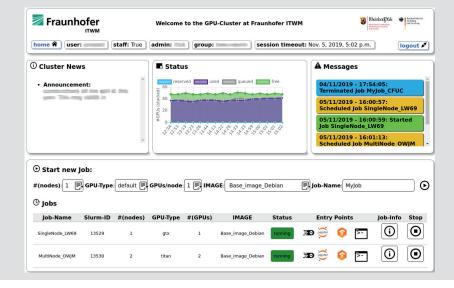Fraunhofer-Platz 1
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Welcome to the GPU-Cluster at Fraunhofer ITWM

Fraunhofer ITWM

home | user: | staff: True | admin: | group: | session timeout: Nov. 5, 2019, 5:02 p.m. | logout

ⓘ **Cluster News**
- Announcement:

📊 **Status**
reserved | used | queued | free

⚠ **Messages**
04/11/2019 - 17:54:05: Terminated Job MyJob_CFUC
05/11/2019 - 16:00:57: Scheduled Job SingleNode_LW69
05/11/2019 - 16:00:59: Started Job SingleNode_LW69
05/11/2019 - 16:01:13: Scheduled Job MultiNode_OWJM

▶ **Start new Job:**
#(nodes): 1 | GPU-Type: default | GPUs/node: 1 | IMAGE: Base_image_Debian | Job-Name: MyJob ▶

🕐 **Jobs**

Job-Name	Slurm-ID	#(nodes)	GPU-Type	#(GPUs)	IMAGE	Status	Entry Points	Job-Info	Stop
SingleNode_LW69	13529	1	gtx	1	Base_image_Debian	running		ⓘ	⏹
MultiNode_OWJM	13530	2	titan	2	Base_image_Debian	running		ⓘ	⏹

1 *Carme Dashboard with: status bar, system messages, cluster load, job status messages, job configuration with "Start button", list of running jobs (with different entry points, job information and the "Stop button").*

Open Carme's features (in more detail)

▪ Seamless integration with available HPC tools
· Job scheduling via SLURM
· Native LDAP support for user authentication
· Integrate existing distributed file systems like BeeGFS

▪ Access via web-interface
· **OS independent** (only web browser needed)
· Full user **information** (running jobs, cluster usage, news/messages)
· **Start/Stop jobs** within the web-interface

▪ Interactive jobs
· **Flexible access to GPUs**
· Access via **web driven GUIs** like Theia-IDE or JupyterLab
· Job specific **monitoring information** in the web-interface
  (GPU/CPU utilization, memory usage, access to TensorBoard)

▪ Distributed multi-node and/or multi-gpu jobs
· **Easy and intuitive** job scheduling
· Directly use **GPI, GPI-Space, MPI, HP-DLF and Horovod** within the jobs

▪ Full control about accounting and resource management
· Job scheduling according to **user specific roles**
· **Compute resources** are **user exclusive**

▪ User maintained, containerized environments
· **Singularity containers**
  (runs as normal user, GPU, Ethernet and Infiband support)
· **Anaconda Environments**
  (easy updates, project/user specific environments)
· **Built-in matching between GPU driver and ML/DL tools**