



# BiBiGrid Intro

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# BiBiGrid Overview

Tool for an easy Cluster Setup inside a Cloud Environment

OpenSource ( → [GitHub](#) )

Configuring and Managing Access to Cluster(s)

# BiBiGrid Requirements

- Java 11+
- Commandline Access
- OpenStack API Access
- SSH Access to Master Instance

# BiBiGrid Features

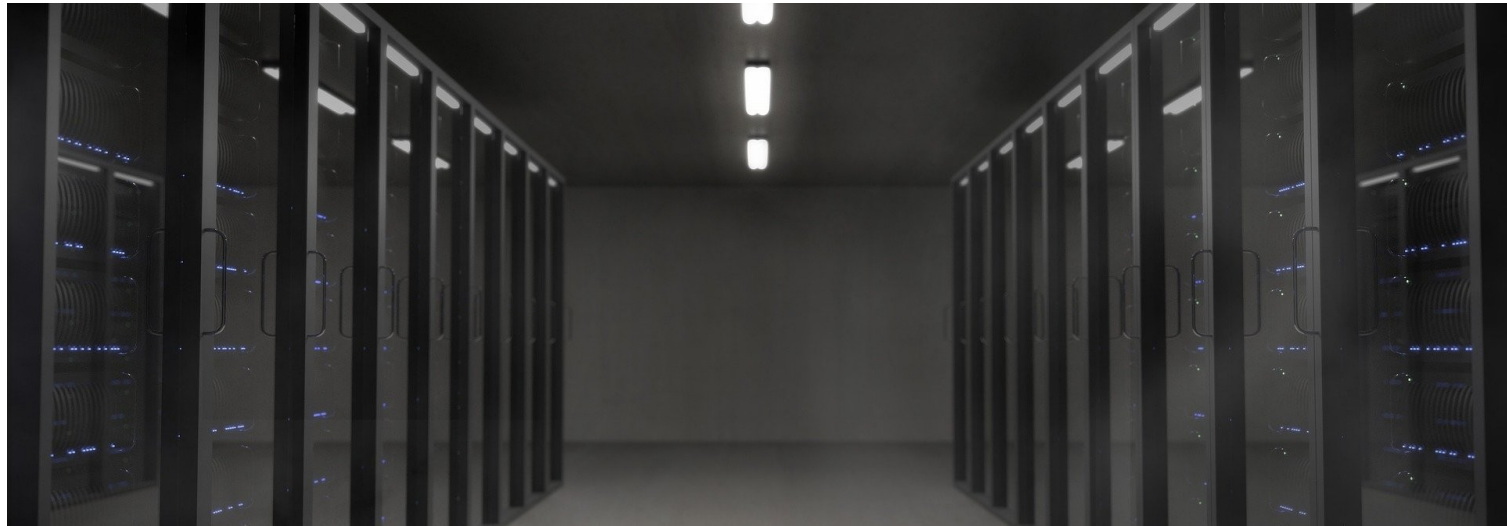
- Full Openstack support  
(AWS, Azure and Google Compute no LTS)
- WebIDE (Theia)
- Batch Grid Scheduling (Slurm)
- Monitoring (Zabbix)
- Manually Scalability
- Extensible by Ansible Roles

# High Performance Computing (HPC)

Computing nodes working together in parallel

Process data and perform complex calculations at high speeds

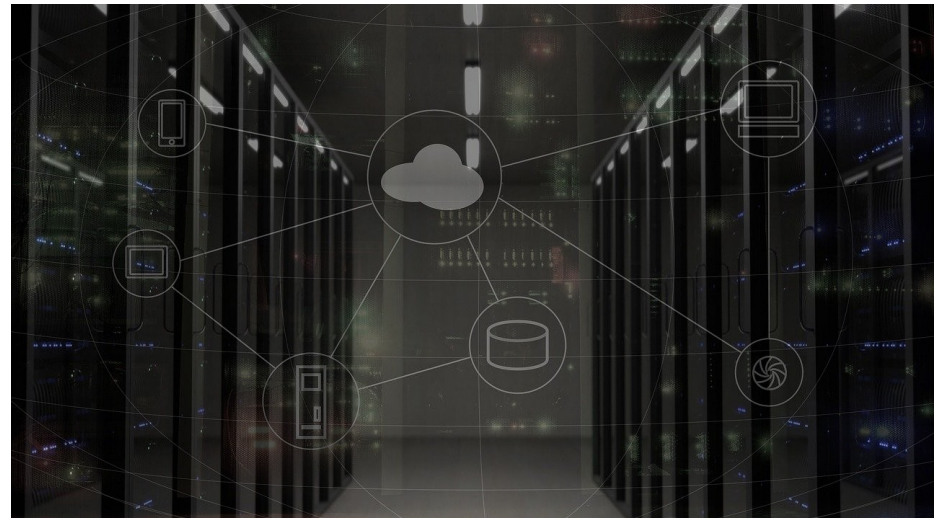
May bring Scientific, Industrial, and Societal Advancements



# Cloud Computing

Computer Network Infrastructure to access

- Data Storage
- Computing Capacity
- Application Software

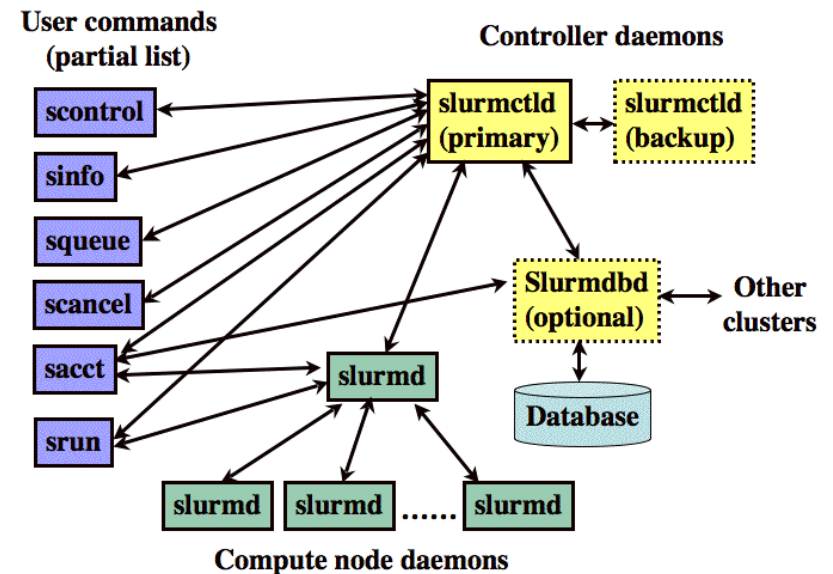


# Theia WebIDE

- *Integrated Development Environment*
- Visual Access to file structure and files
- Supports various programming languages
  - JavaScript, Java, Python and many more ...
- **Integrated Terminal**

# SLURM Batch Grid Scheduling

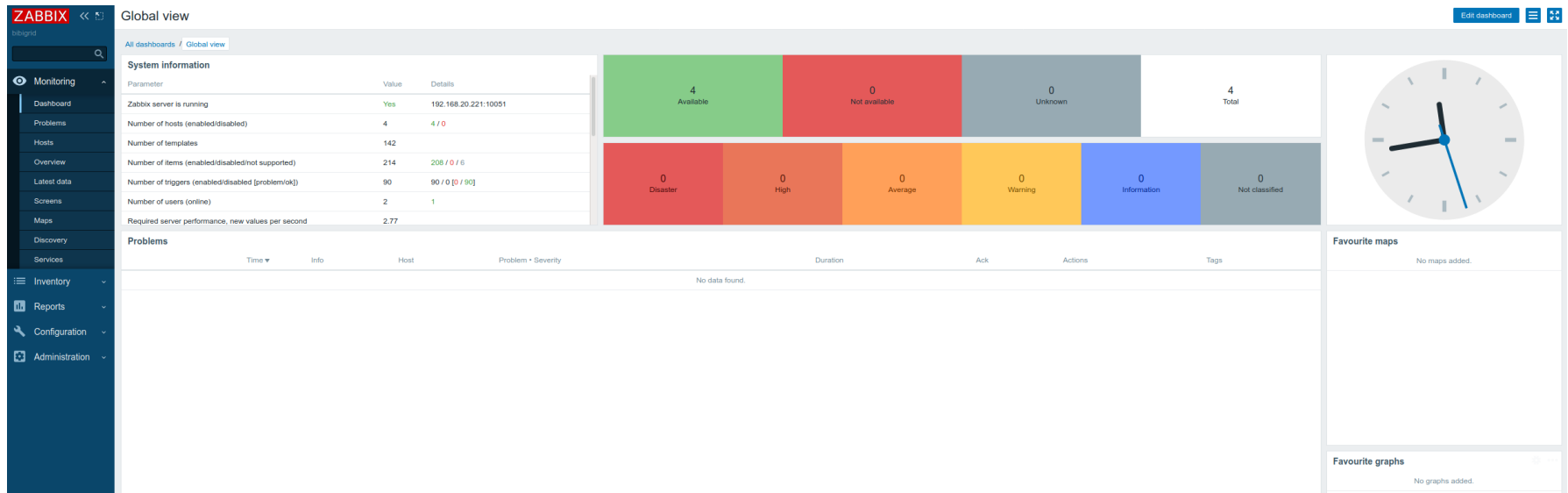
**S**imple **L**inux **U**tility for **R**esource **M**anagement  
Execute Jobs in Parallel (inside the Cluster)  
Manage Job Queues





# Monitoring with Zabbix

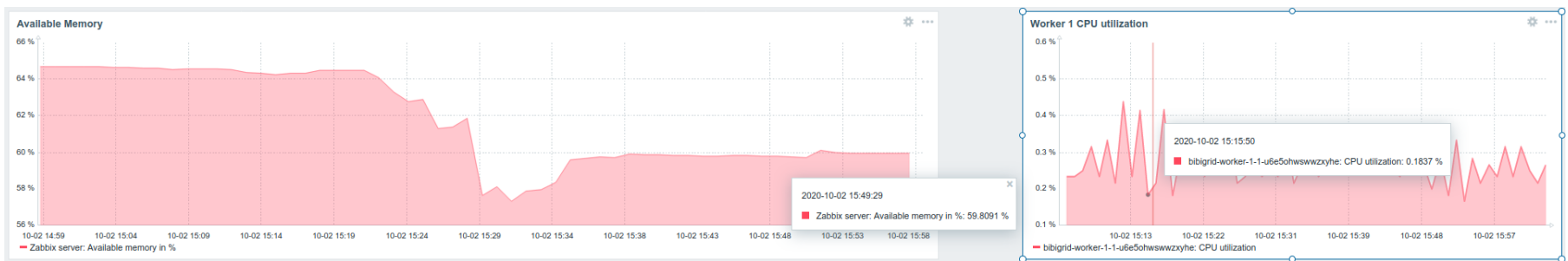
- Monitors numerous parameters of a network
- Provides information about health and integrity of servers
- Data Visualisation features



Zabbix Dashboard

# Monitoring with Zabbix

- Monitors numerous parameters of a network
- Provides information about health, integrity and load of a BiBiGrid cluster
- Data Visualisation features



Using Zabbix widgets to display BiBigrid cluster loads

# Cloud Load

The Cloud has limited resources  
e.g. VCPU Usage > 30% above the actually usable amount  
Not necessary, since resources are not required

## All Hypervisors

### Hypervisor Summary



VCPU Usage  
Used 6,163 of 4,684



Memory Usage  
Used 35.6TB of 57.8TB



Local Disk Usage  
Used 242.2TB of 612.9TB

Hypervisor [Compute Host](#)

Displaying 110 items

Hostname	Type	VCPUs (used)	VCPUs (total)	RAM (used)	RAM (total)	Local Storage (used)	Local Storage (total)	Instances
<a href="#">abens.cebitec.uni-bielefeld.de</a>	QEMU	30	28	266GB	376.6GB	2TB	7.2TB	2
<a href="#">agger.cebitec.uni-bielefeld.de</a>	QEMU	44	28	308GB	376.6GB	2TB	7.2TB	3
<a href="#">ahr.cebitec.uni-bielefeld.de</a>	QEMU	36	56	88GB	754.6GB	1TB	8.7TB	2

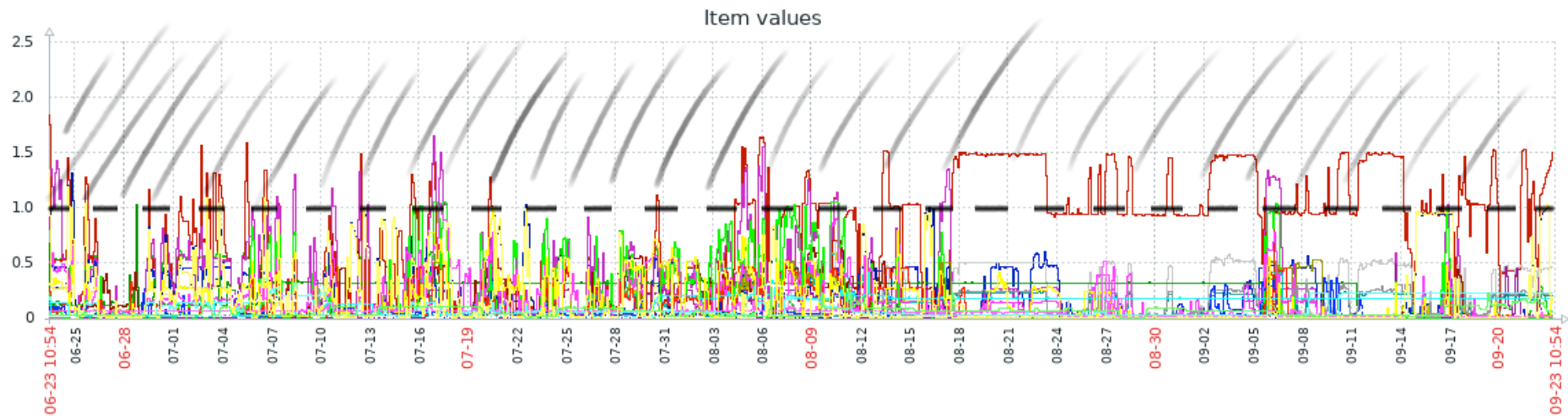
current example of the cloud resource usage

# Cloud Load

Many different Clusters inside the Network

Load = 1 means cloud site is working on full capacity

→ Not necessary to keep or store unused resources “in case..”



current cloud hypervisor workload

# Cluster Scalability

- Manual Scaling of Clusters to Avoid Overloads
- Scale Up: Append Instances to a Cluster
- Scale Down: Shutting Down Instances of a Cluster

# BiBiGrid HandsOn

Tutorials:

[Original GitHub Documentation](#)

[de.NBI Wiki](#)

For Today:

[GitHub CLUM 2020](#)