



BiBiGrid

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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

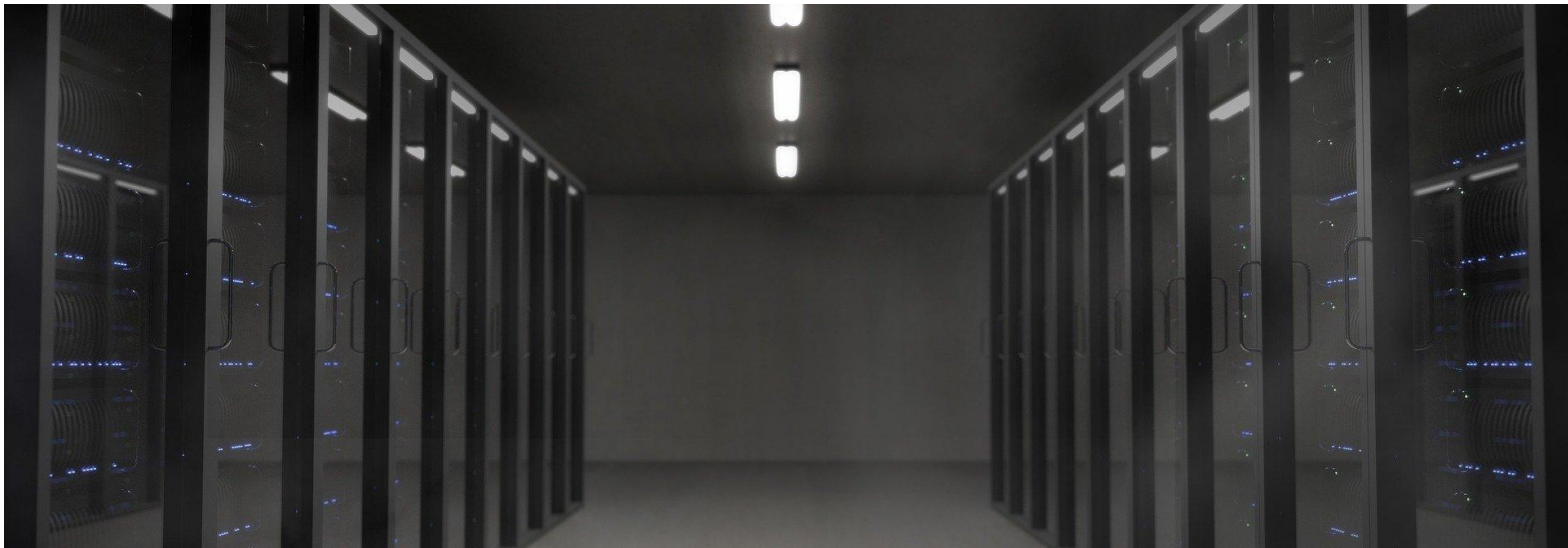
- Full Openstack support
(AWS, Azure and Google Compute no LTS)
- WebIDE (Theia)
- Batch Grid Scheduling (Slurm)
- Monitoring (Zabbix)
- Manually Scalability
- Extensible by Ansible Roles

High Performance Computing (HPC)

Computing nodes working together in parallel

Process data and perform complex calculations at high speeds

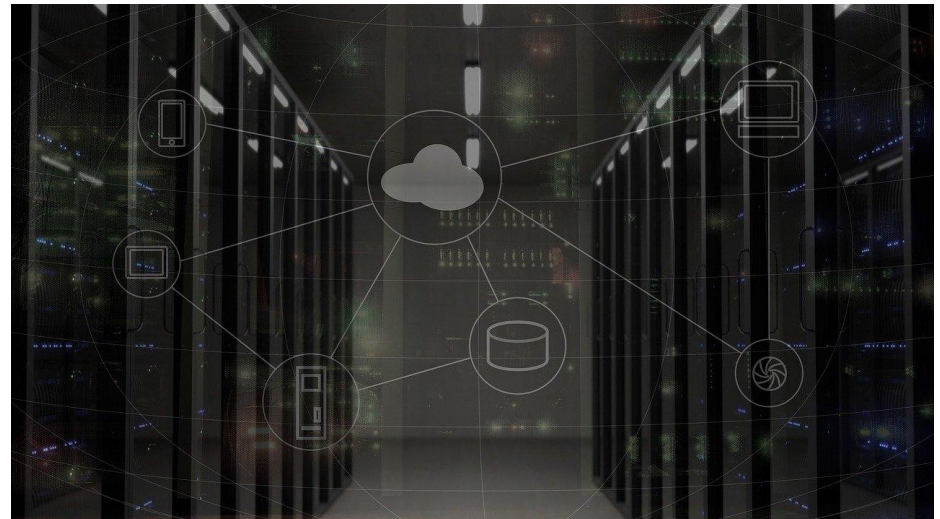
May bring Scientific, Industrial, and Societal Advancements



Cloud Computing

Computer Network Infrastructure to access

- Data Storage
- Computing Capacity
- Application Software

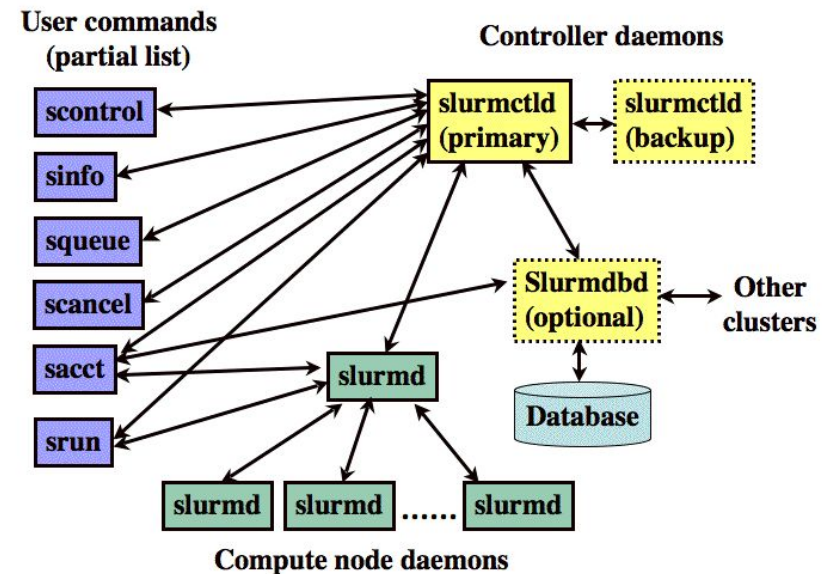


Theia WebIDE

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

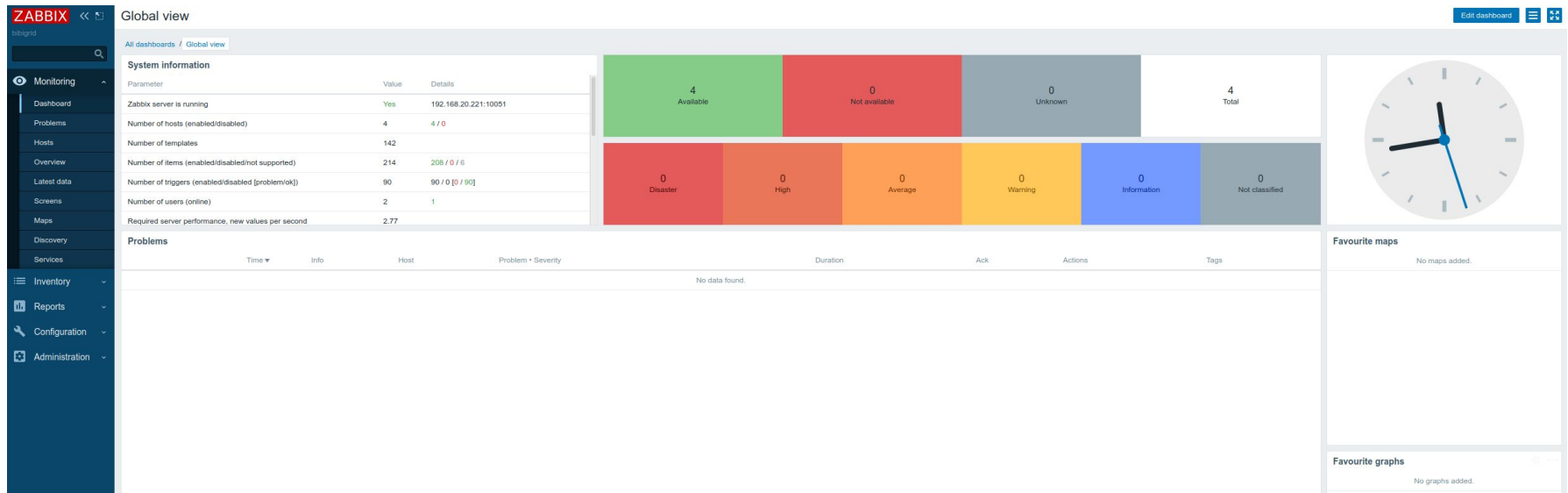
SLURM Batch Grid Scheduling

Simple **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

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Using Zabbix Widgets to display Cluster Loads

Ansible

Ansible is an IT automation tool for

- Configuration of systems
- Deployment of Software
- Orchestration of more advanced IT tasks

Simplicity and ease-of-use

Strong focus on Security and Reliability

Visit [How Ansible Works](#) and the [Ansible Documentation](#) as well as the [Community Documentation](#) for further information

Cluster Network Load

The Network 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
abens.cebitec.uni-bielefeld.de	QEMU	30	28	266GB	376.6GB	2TB	7.2TB	2
aggar.cebitec.uni-bielefeld.de	QEMU	44	28	308GB	376.6GB	2TB	7.2TB	3
ahr.cebitec.uni-bielefeld.de	QEMU	36	56	88GB	754.6GB	1TB	8.7TB	2

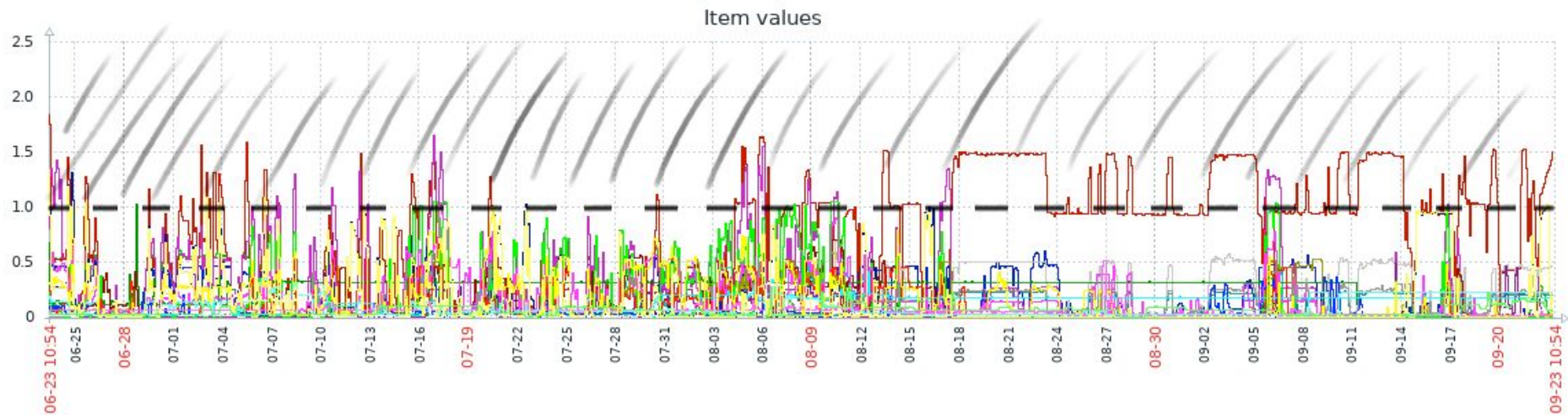
Actual Example of the Network Usage

Cluster Network Load

Many different Clusters inside the Network

Load = 1 means Network is working on full capacity

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



Actual Example of the Network 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](#)