BiBiGrid Intro

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Today's Schedule

Introduction to BiBiGrid (Overview, Requirements...)
Background knowledge: HPC & Cloud Computing
BiBiGrid Features
Short Break
BiBiGrid Hands-On
- Configuration
- Starting your first Cluster
- Short Break
- Log In & Try Out
- Cluster Monitoring
- Manual Scaling of Instances
- Short Break
- Ansible Introduction & Usage
- Terminating the Cluster

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

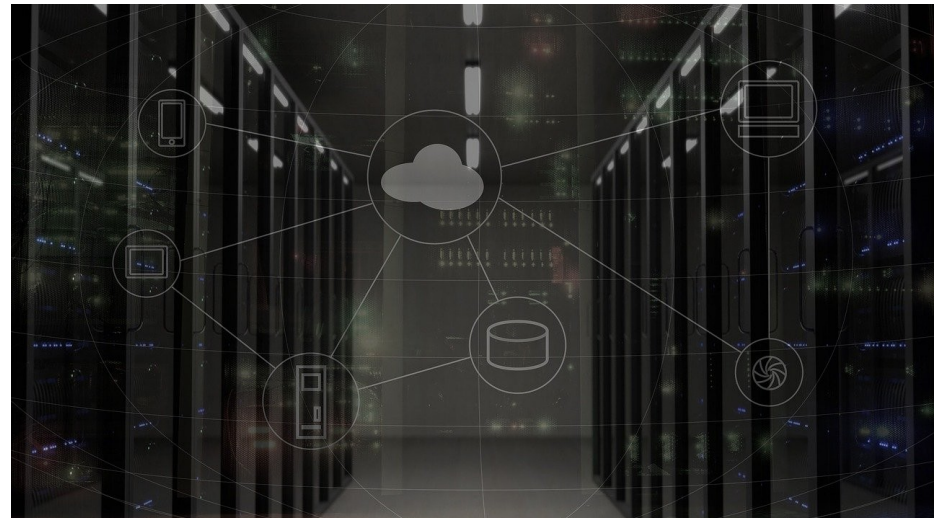Process data and perform complex calculations at high speeds

May bring Scientific, Industrial, and Societal Advancements
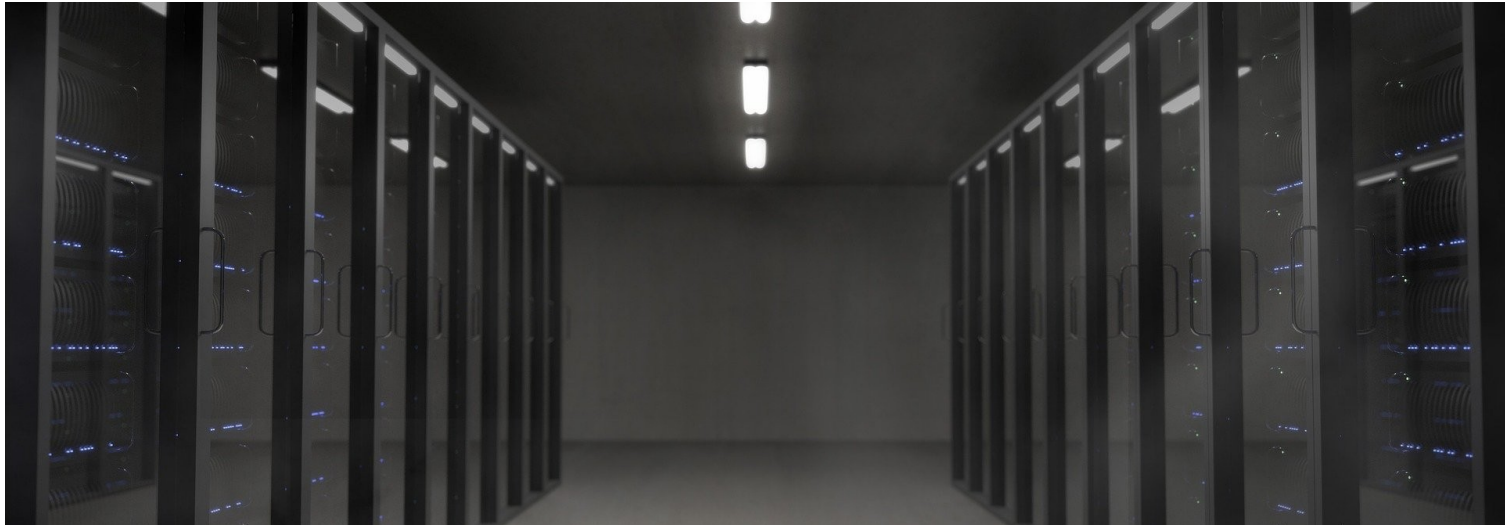
Cloud Computing

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
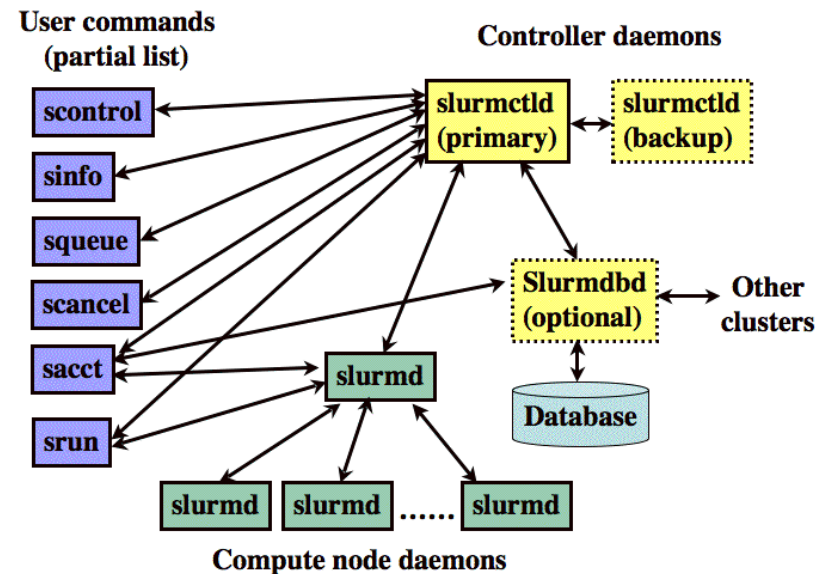
Taken from https://slurm.schedmd.com/quickstart.html
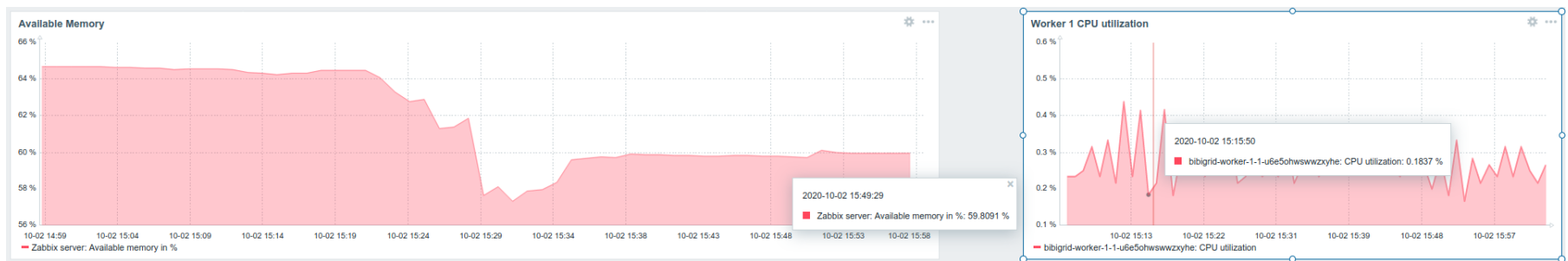
Monitoring with Zabbix

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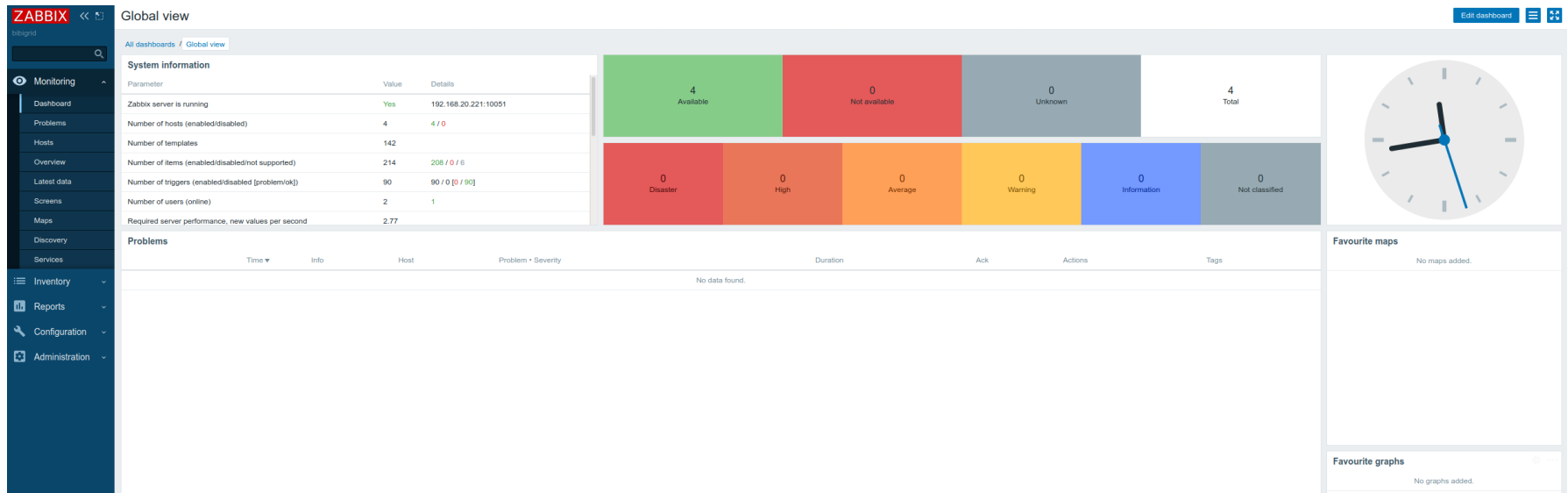
Zabbix Dashboard

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	Memory Usage	Local Disk Usage
Used 6,163 of 4,684	Used 35.6TB of 57.8TB	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
agger.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

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.."
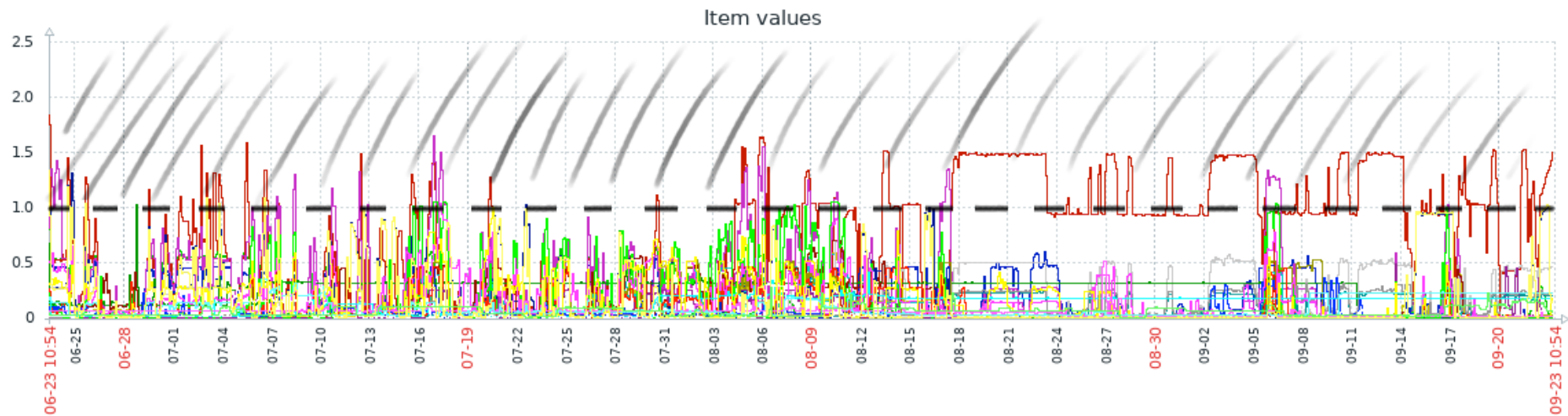
current cloud hypervisor workload

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](#)