Karlsruhe Institute of Technology

bwCloud: cross-site server virtualization

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STEINBUCH CENTRE FOR COMPUTING - SCC

Agenda

- About
- Use Cases
- Architecture
- Usage
- Monitoring
- Next steps
- Summary
- Q&A

About bwCloud project

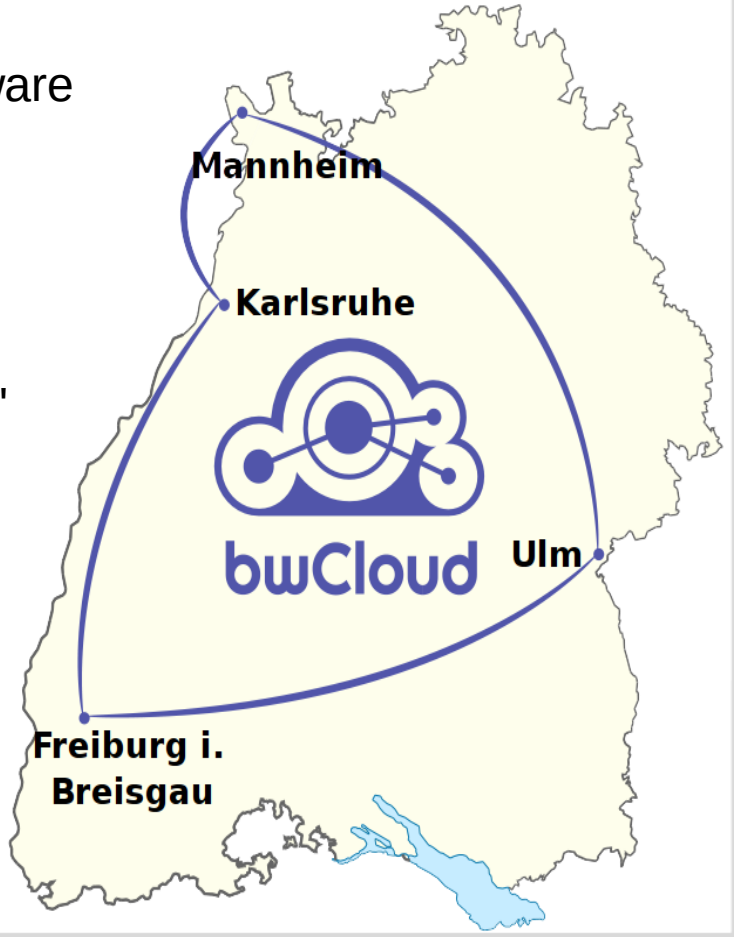
- Project objectives
  - Prototypical implementation of a university-Cloud
  - Development of a concept for a national service
- Project partners
  - University Mannheim (Project Management)
  - BelWü
  - KIT Karlsruhe (SCC)
  - University Freiburg
  - University Ulm
  - University Stuttgart
- Duration
  - 2 Years (till 31.12.2016)
- Service Model: IaaS
  - VM Software Container, Operating system level
- Deployment model: on-site Community Cloud
  - Distributed / Federated Cloud Infrastructure
  - Distributed user management (centralized authentication component is coupled to bwIDM)

Use Cases

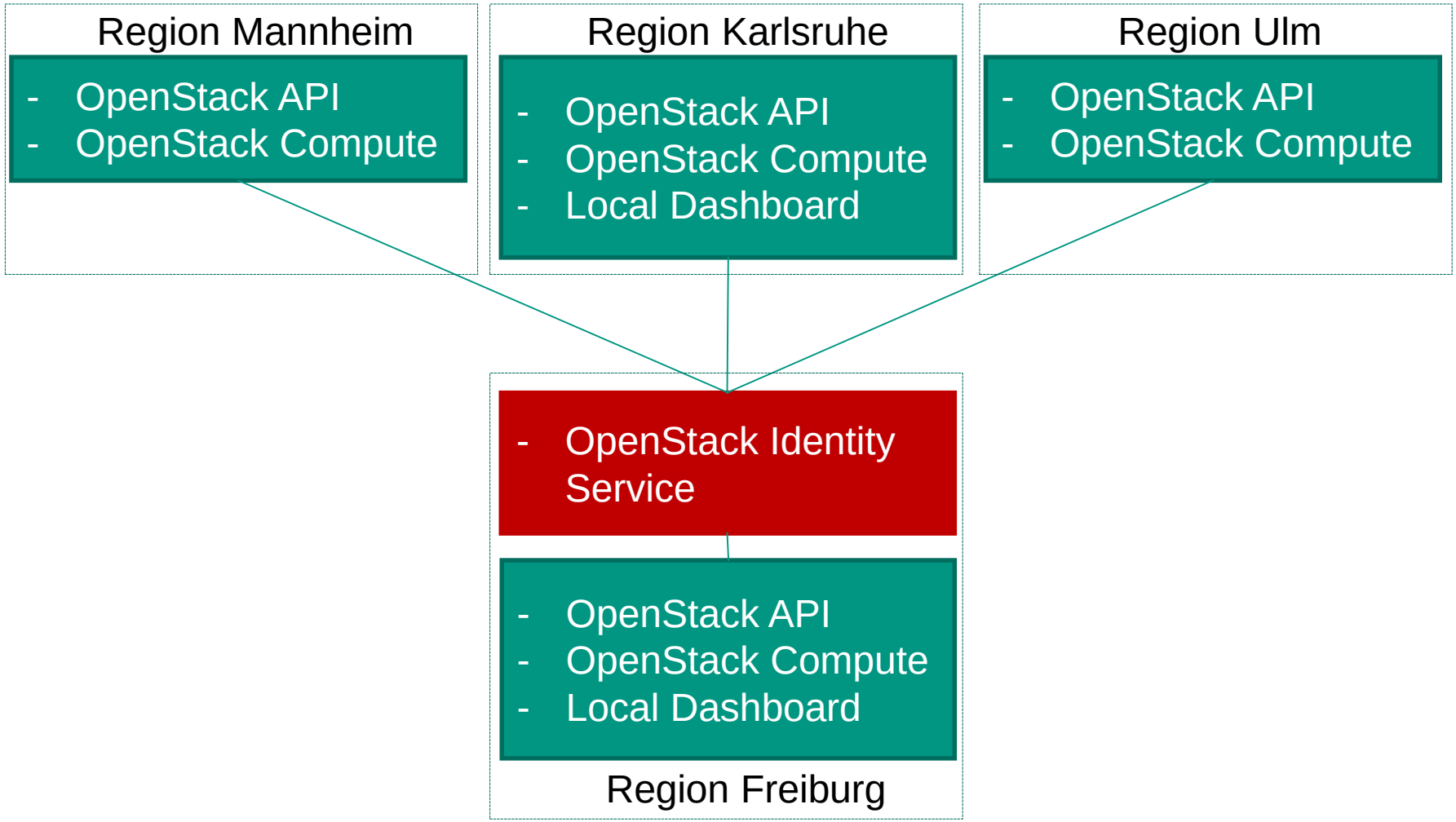
- Case 1: “Student-VM”
  - Students who need resources (virtual machines) during their studies
  - The usage time & resource consumption of VMs are limited
  - Collective billing
- Case 2: “Institut-/Scientist-VM”
  - Multiple instances (Web server + database)
  - API access to the Cloud Services
  - Use separate storage services for permanent data
  - Individual billing
- Case 3: “Site operation/administration”
  - In principle, an unlimited resource consumption
  - The main question: which Data center would like to participate?

Architecture

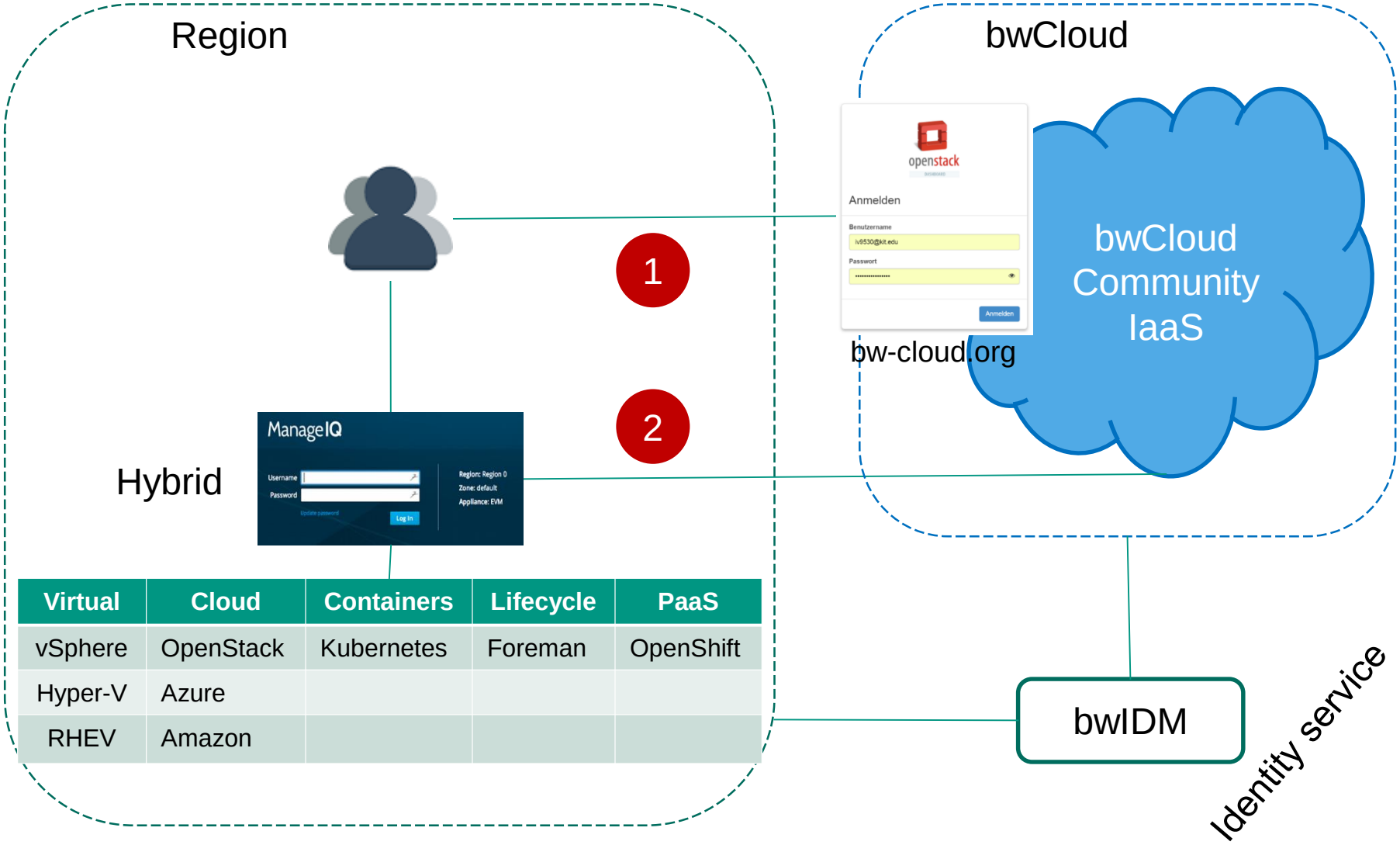
- Prototype includes four sites
  - Mannheim, Karlsruhe, Freiburg, Ulm
- Objectives
  - Building and networking of distributed hardware
  - Evaluation of new technologies / concepts
  - Building capacity in distributed operating (OpenStack) environments
  - Mounting and preparation of processes / procedures / know how for "national service"
- Status: Current hardware equipment (total):
  - 18 Nodes
  - ca. 3,5 TByte RAM
  - ca. 132 TByte HDD
  - 36 CPUs or 280 Cores



Architecture: Multi-Region OpenStack



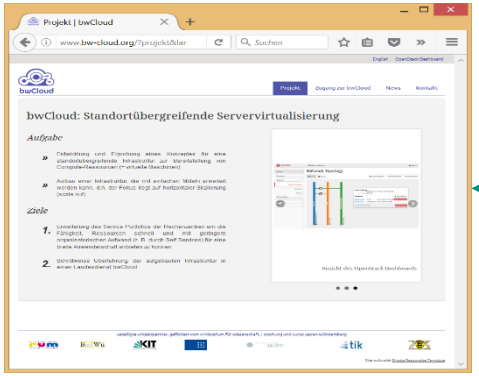
Architecture: Community (+ Hybrid)



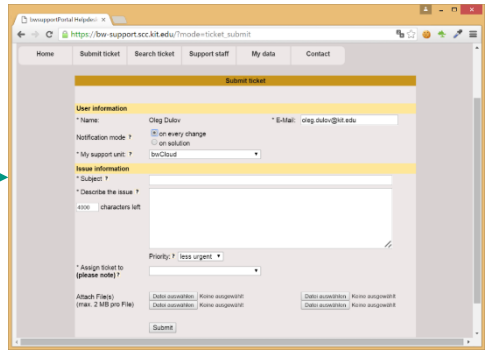
Virtual	Cloud	Containers	Lifecycle	PaaS
vSphere	OpenStack	Kubernetes	Foreman	OpenShift
Hyper-V	Azure			
RHEV	Amazon			

Usage

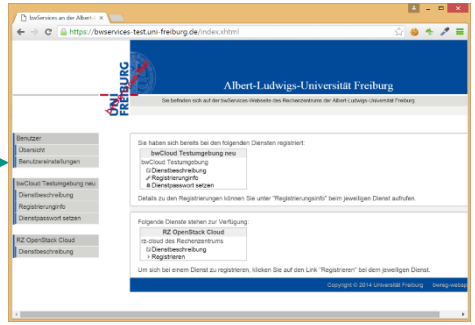
Information portal
http://www.bw-cloud.org



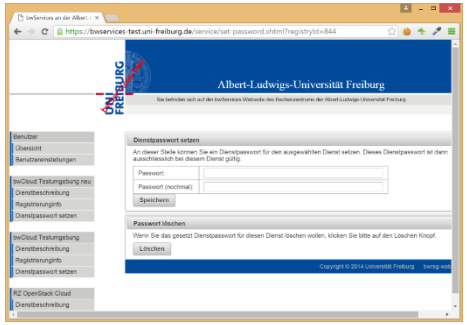
Ticket system



Step 1:
Register

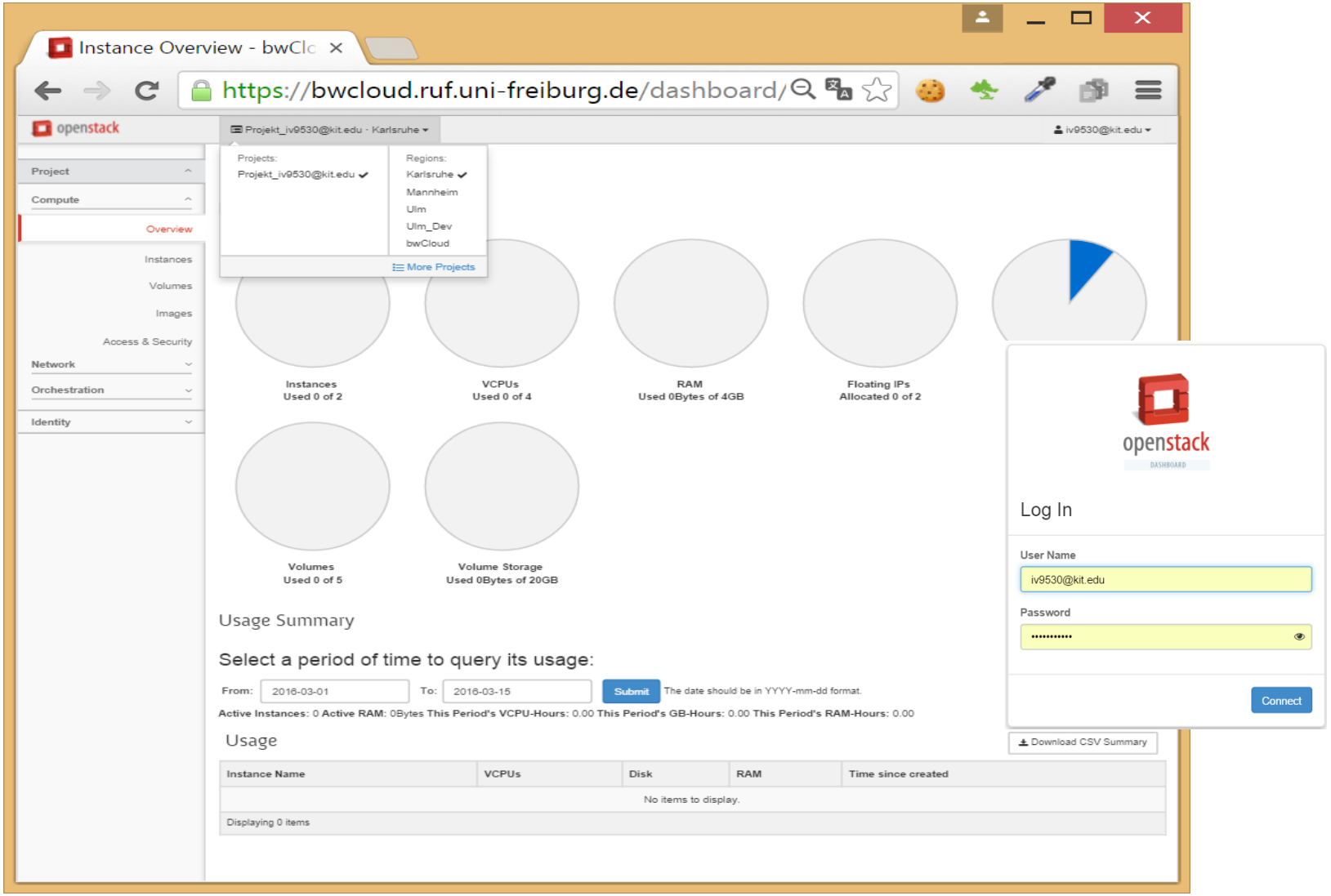


Step 2:
Set service password

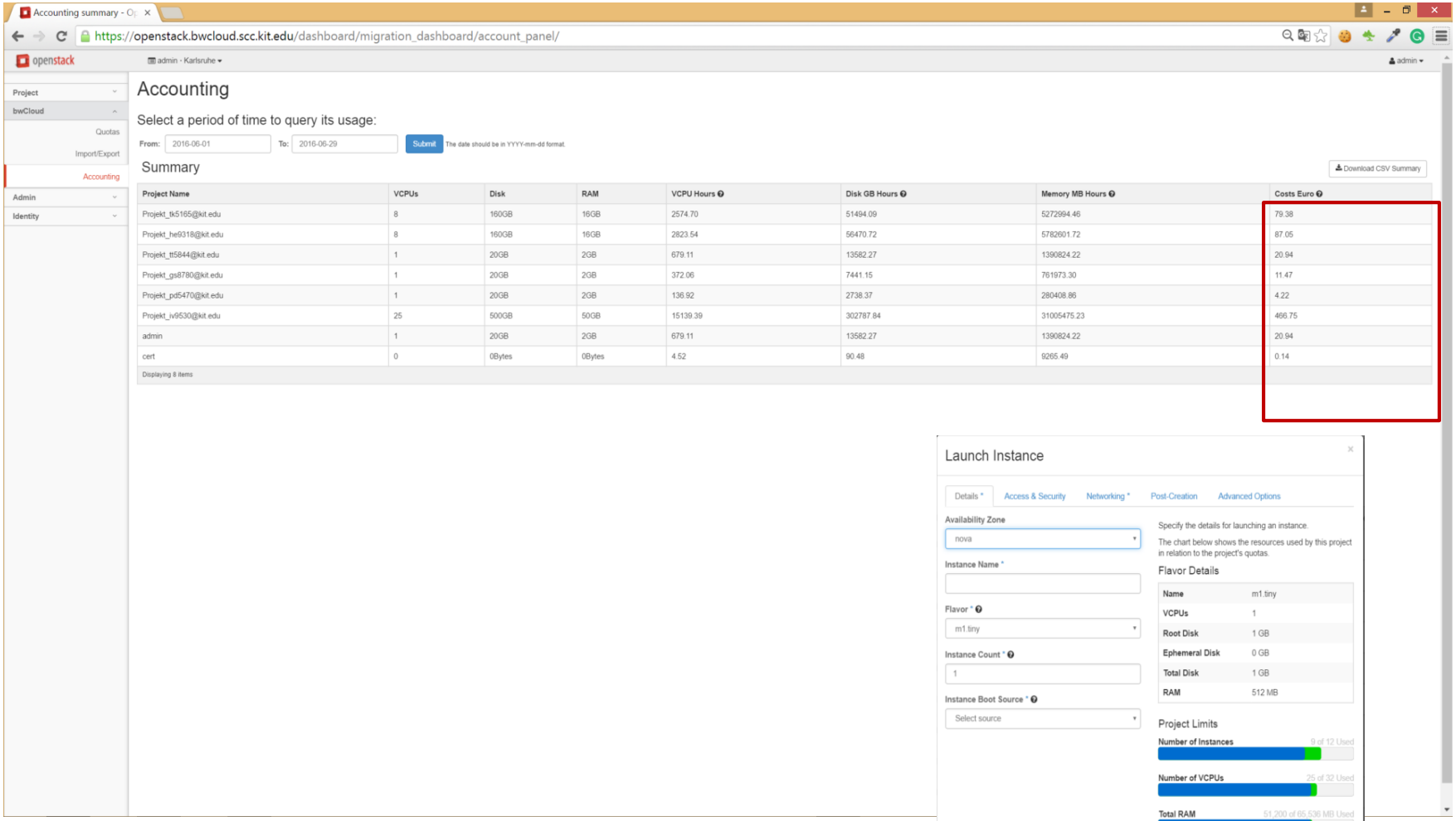


Step 3:
Use

Usage: Dashboard

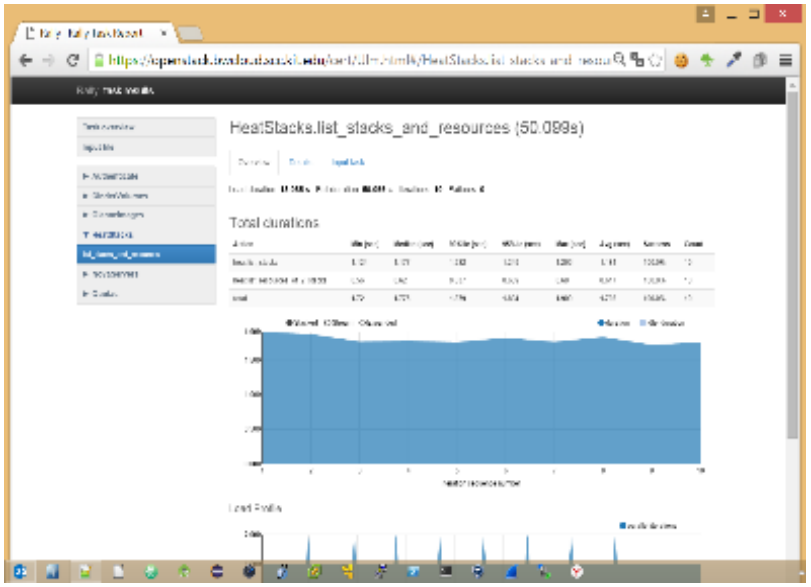


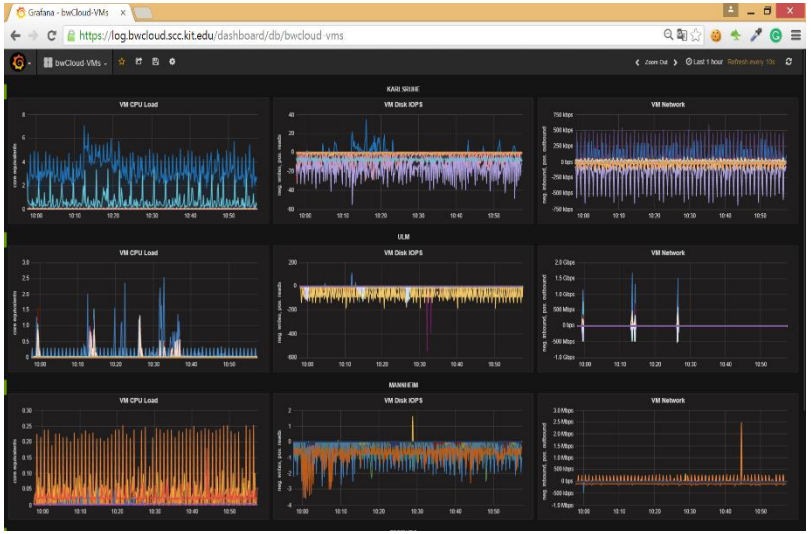
Usage: Accounting



Monitoring

- Blackbox -> central
  - OpenStack Rally
- Whitebox -> every Site
  - Collectd
  - InfluxDB
  - Elasticsearch
  - Grafana -> central
- In evaluation
  - OpenStack Monasca
  - Sensu





Next steps & plans

- 2016
  - Develop concept for service bwCloud, based on experience from prototype evaluation
  - VMs Migration between Sites
  - Hybrid Model evaluation
  - Windows Images on OpenStack
    - Try to avoid Hyper-V
- > 2017
  - 1.1.2017: bwCloud goes into production
  - Extends Sites with additional Hardware
  - “Big storage”, Billing, etc. …

Summary

- bwCloud project is
  - Prototype for future Cloud implementation in Baden Württemberg
  - IaaS with cross site infrastructure
  - Based on OpenStack

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Thank you for your attention!

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