



# Compute Cloud

SuperMUC-NG Status and Results Workshop

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# Agenda

- LRZ Compute Cloud "Community Cloud"
  - Characteristics
  - Hardware
  - Limitations
- Summary



# Cloud characteristics

- Infrastructure-as-a-Service (IaaS)
  - Virtual Machines (VM)
    - root access - completely manageable by the user(s)
      - Operating system, applications, and configuration
      - Networking/Firewall
    - users (you!) are responsible for (the security of) their VMs
- Built with normal server hardware

# Segments

Community Cloud

Attended Cloud Housing

LRZ internal

# Hardware

in Community Cloud segment

77 Compute nodes:

	physical	available for VMs
CPU cores	40 (2x overcommit)	40
RAM (GB)	384	180

22 GPU nodes:

	physical	available for VMs
CPU cores	40	40
RAM (GB)	768	736
GPU (Nvidia V100 16GB)	2	2

1 Huge node:

	physical	available for VMs
CPU cores	192	192
RAM (GB)	6144	5952

# Operations

- Flavors
  - Define characteristics of VMs (number of cores, memory, ...)
    - By default users can create VMs with up to 10 cores on compute nodes
      - GPUs, more cores, or access to huge node only upon request
- Limited storage in the Cloud Ceph backend - use DSS for large datasets
- No priority - all users are treated equally
- Best effort - if resources are fully used there is no other way but to wait

# Resource availability

The screenshot shows a web browser window with the URL `cc.lrz.de/lrz/`. The page title is "Cloud Usage" and it includes a navigation menu with "Cloud Usage" and "Identity". The main content area displays "Public Resources Overview" with six pie charts and "LRZ Flavor Slots" with three tables. The data is as follows:

**Public Resources Overview** (Last updated: 2021-05-26 14:24:16)

- vCPU Usage:** 85% (Used 6,115 of 7,192)
- RAM Usage:** 85% (Used 42.9TB of 50.3TB)
- GPU Usage:** 100% (Used 44 of 44)
- Storage Usage:** 32% (Used 148.2TB of 467.2TB)
- MWN Floating IP Usage:** 37% (Used 1,502 of 4,094)
- internet Floating IP Usage:** 75% (Used 770 of 1,022)

**LRZ Flavor Slots**

**Compute**

Flavor	Slots (available)	Slots (total)
tiny	1029	6120
lrz.small	1029	6120
lrz.medium	498	3060
lrz.large	232	1530
lrz.xlarge	72	612
lrz.2xlarge	24	306
lrz.4xlarge	1	153

**GPU**

Flavor	Slots (available)	Slots (total)
nvidia-v100.1	0	44
nvidia-v100.2	0	22

**Huge**

Flavor	Slots (available)	Slots (total)
lrz.huge	2	8
lrz.xhuge	1	4
lrz.2xhuge	0	2
lrz.4xhuge	0	1

# Storage

- Ceph Storage Cluster
- 15 servers with
  - 12 HDDs (for data)
  - NVMe SSD (for metadata)
- All VM volumes reside on this storage, cloud nodes do not have local storage
- ~750 TB usable for \*all\* users





# Integration

- Foundation of other LRZ services
  - RStudio
  - Datalab
  - Continuous Integration pipelines
- No possibility to access \$HOME and \$WORK of SuperMUC-NG directly
  - VMs can mount Data Science Storage (DSS) exports to transfer data between SuperMUC-NG and the Compute Cloud



# Summary

LRZ Compute Cloud is a flexible (IaaS) service for different needs

Ad-hoc creation of virtual machines

*\*Not\** an HPC system

SuperMUC-NG users can have access to the cloud: just contact us

# Resources

- User documentation  
<https://doku.lrz.de/display/PUBLIC/Compute+Cloud>
- Tutorials  
<https://doku.lrz.de/display/PUBLIC/Tutorials>
- Frequently asked questions (FAQ)  
<https://doku.lrz.de/display/PUBLIC/FAQ>