The de.NBI Cloud Portal represents the central access point to the federated de.NBI Cloud platform. Cloud resources are allocated based on project applications:

- Users apply for cloud resources by proposing a project and describing required resources.
- The project application is reviewed by a scientific committee.
- After approval of the application the project is created in the de.NBI Cloud Portal.
- Project resources are allocated at one of the cloud sites.

Through a cloud federation concept, the de.NBI sites are integrated into a single cloud computing platform. The user will be guided to the anticipated service and the suitable cloud via the central de.NBI Cloud Portal. The whole system is accessible through single sign-on (SSO) and is based on the ELIXIR Authentication and Authorization Infrastructure (ELIXIR-AAI).

For project applications and additional information visit: https://cloud.denbi.de

Email contact: cloud@denbi.de

@denbiCloud

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Cover photo: Björn Fischer
THE de.NBI CLOUD MISSION

The de.NBI Cloud is a full academic cloud federation, providing compute and storage resources free of charge for academic users. In life sciences today, the handling, analysis and storage of enormous amounts of data pose a challenge to many researchers. Especially the recent improvements in sequencing technologies result in the generation of large scale genomic data, generating a high demand on powerful compute infrastructure for subsequent analyses.

The de.NBI Cloud provides a powerful IT infrastructure in combination with flexible bioinformatics workflows and analysis tools to the life science community in Germany. The de.NBI Cloud offers reliable IT security concepts and user access rules to ensure secure data access and storage. It closes the gap of missing computational resources for life science researchers in Germany.

The de.NBI Cloud project started in 2016 as collaboration between the universities of Bielefeld, Freiburg, Gießen, Heidelberg and Tübingen. The close cooperation with the ELIXIR cloud ensures the connectivity and sustainability in the international context.

de.NBI CLOUD SERVICE

The de.NBI Cloud operates the major service levels:

- **Infrastructure as a Service (IaaS)** suited for experienced power users that want full control over the compute environment; plain access to virtualized infrastructure
- **Platform as a Service (PaaS)** suited for experienced users who utilize fully configured infrastructure for the deployment of custom workflows
- **Software as a Service (SaaS)** suited for users without cloud experience who can use virtual machines (VMs) of preconfigured, state-of-the-art analysis tools and pipelines

Pre-configured VMs
- Workflows for sequence analysis, including Illumina and Oxford Nanopore data
- Fully established software packages and workflow systems
- beeGFS on Demand (BeeOND) as shared file-system between multiple VMs (including Cinder Volumes)

Specialized Hardware
- High memory nodes (up to 4 TB RAM) for e.g. assembly of metagenomes and eukaryotic genomes
- GPU nodes for e.g. machine learning
- Field-Programmable Gate Arrays (FPGA) for e.g. high-performance genome alignments

Large scale distributed workflows
- Easy setup of cloud-based computing clusters (e.g. BiBiGrid, Butler)
- Ready-made and proven workflows for e.g. genomics/metagenomics, metabolomics and epigenetics
- UNICORE, Arvados

Big Data Analysis
- Local access to public data resources: NCBI GenBank, RefSeq, PRIDE (PROteomics IDENTifications), CPTAC (mass spectometry), ICGC (International Cancer Genome Consortium), etc.
- Hadoop and Spark-based solutions for big data analysis

Research Environments
- Containerized Galaxy environment for reproducible research
- Container technologies (Singularity, Docker)
- Jupyter Notebooks

de.NBI CLOUD TRAINING

The de.NBI Cloud sites provide specialized training courses for users with different expertise in cloud computing, bioinformatics and from various research fields in life sciences to utilize the de.NBI Cloud resources.

Training activities include one- to two-day training courses, online training, and themed one-week summer schools.

Detailed training overview is available at: www.denbi.de/training