



Medical University of Graz



# HPC for biomedical research at Medical University Graz

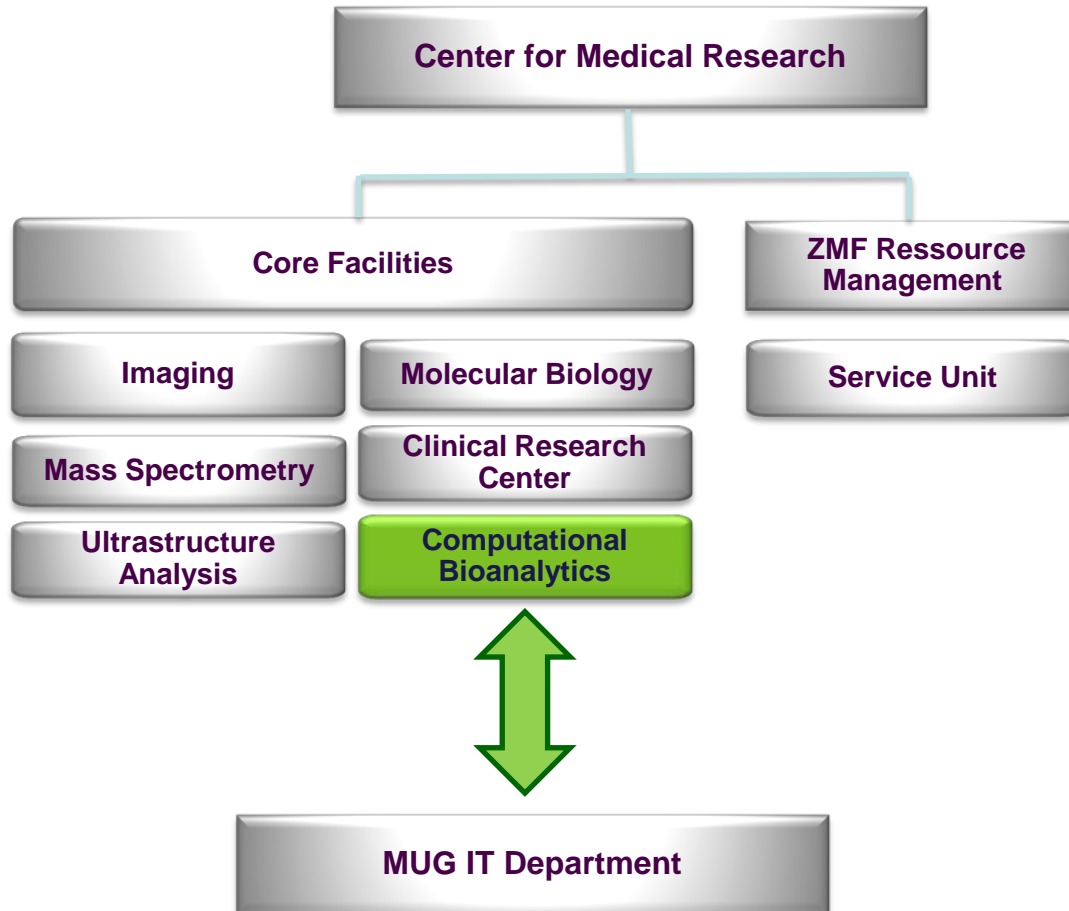


**ZMF**  
ZENTRUM FÜR MEDIZINISCHE  
GRUNDLAGENFORSCHUNG

# Institutional information



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- ▶▶ CF Manager  
Andrea Groselj-Strele
- ▶▶ Biostatistics and  
Bioinformatics services  
for:
  - Data analysis
  - Consulting
  - Training and  
Coaching

# Infrastructure Call 2016



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## Integrated Data Management

BioTechMed-Graz will be able to cooperate more closely in the future with the help of highly specialized computing technologies. The goal of the "Integrated Data Management" project is the creation of an IT-service-data-infrastructure for the BioTechMed-Graz network. The researchers will be enabled to make use of the jointly generated data by providing access for integration and co-evolutionarily analytics to interpret, structure and enrich them. **Within the scope of the project, specialized clusters are to be acquired for the analysis, integration, interpretation and enrichment of research data.**

In addition, an integrated data management platform is coordinated. The BioTechMed-Graz research activities and the aligned needs for service personnel, which supports the researchers in the application, further development and adaptation of the tools and IT infrastructure will be implemented.

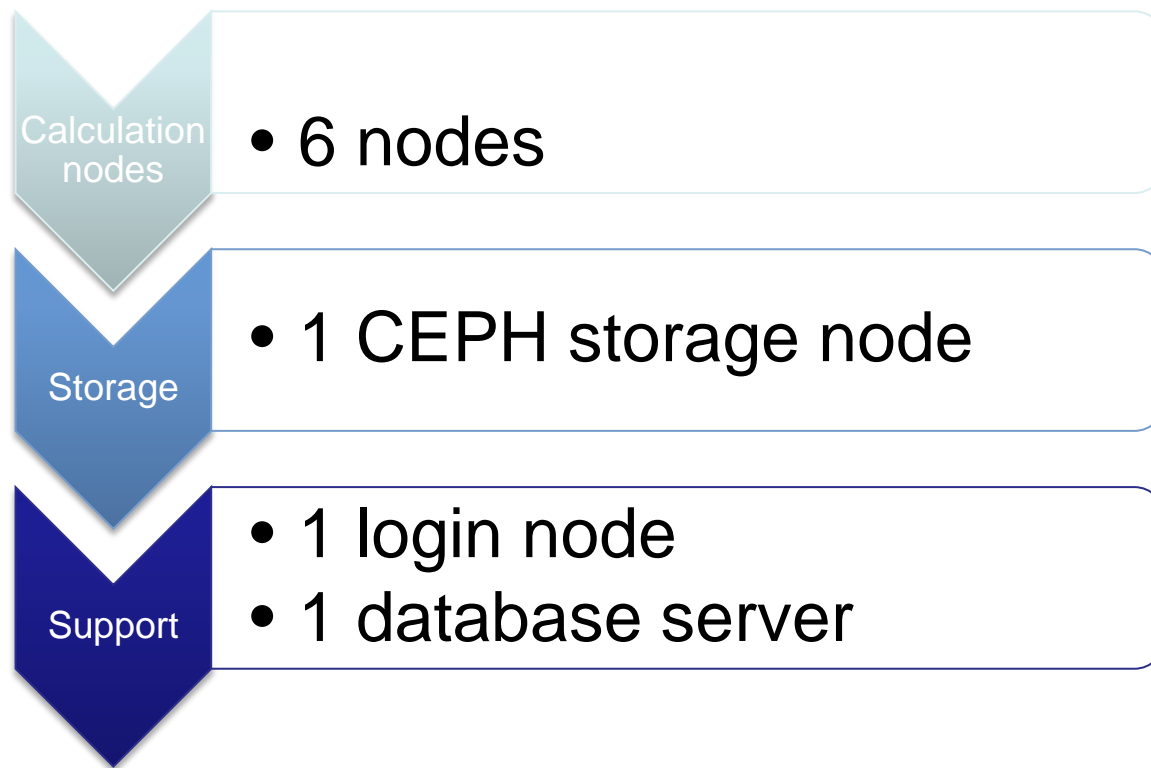
***Lead: TU Graz, Funding: 1.3 million Euro***

# Hardware



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- ▶▶ Current situation: small cluster with storage and 4 computing nodes
- ▶▶ New Infrastructure:



# HPC Cluster

Master Node  
Galaxy 17.09

  
Hewlett Packard  
Enterprise



Compute Node 1

Compute Node 2

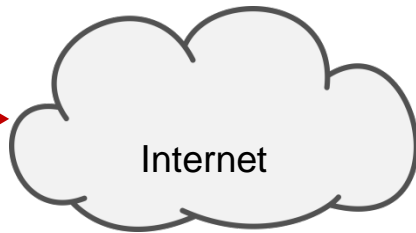
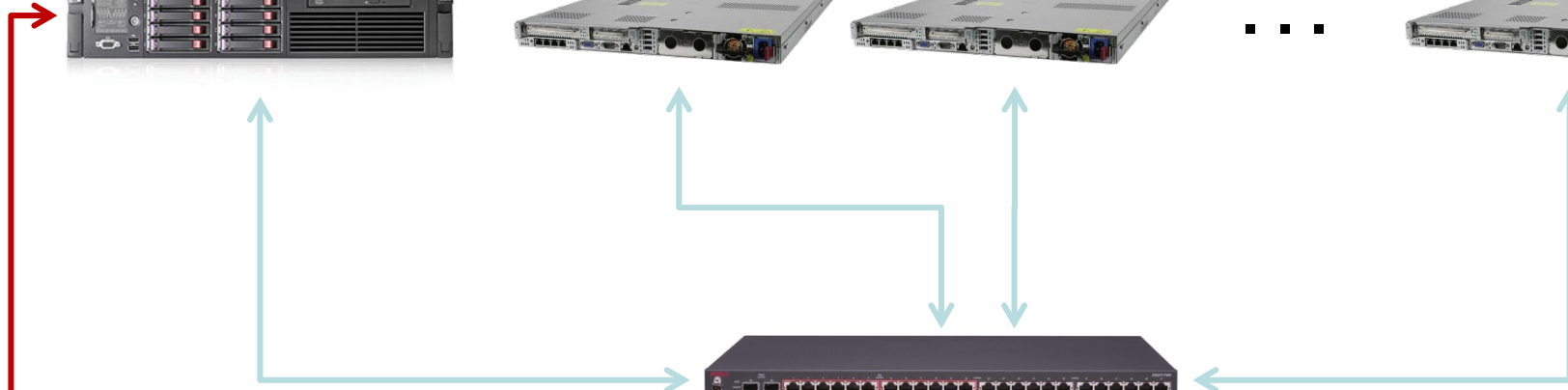
...  
Compute Node n



...



Fast Connections (10/40 Gb)



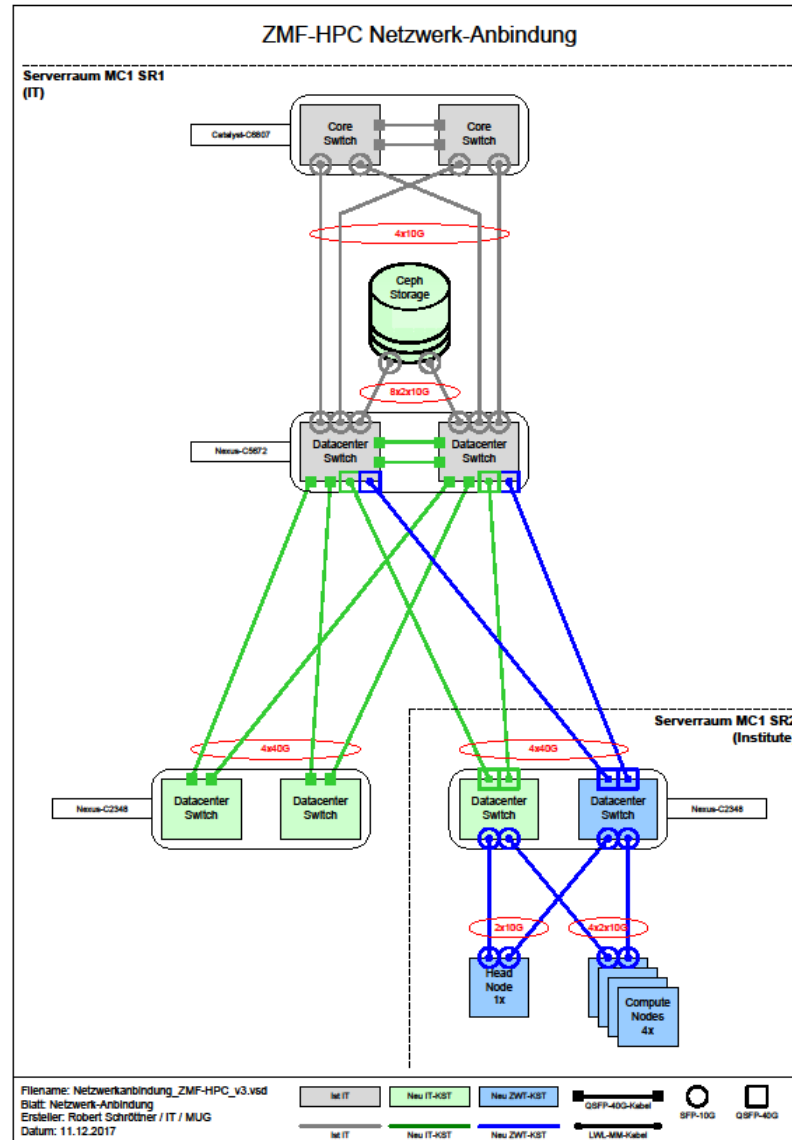
CEPH Storage system



...



# Network Backbone



# Cluster configuration



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- ▶▶ *Debian 9* OS on Master Node and Working Nodes
- ▶▶ *SLURM* for cluster management and job scheduling
- ▶▶ *Conda (Package, dependency and environment management)* system for tool management (used also by galaxy)
- ▶▶ *Galaxy* for browser based access to data, tools, pipelines or reference DBs
- ▶▶ CLI based access over *Conda* environments
- ▶▶ Backup solution will follow
- ▶▶ Modular infrastructure enables possibility to extend it according to the needs
- ▶▶ Administration personal resources, tasks split between ZID and Computational bioanalytics

<https://galaxy.medunigraz.at>



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- ▶ open source, web-based platform for data intensive biomedical research: Version 17.09

Month ↑	User and Monitor Jobs	
<a href="#">February 2018</a>	687	
<a href="#">January 2018</a>	3508	
<a href="#">December 2017</a>	2153	
<a href="#">November 2017</a>	160	
<a href="#">October 2017</a>	2043	
<a href="#">September 2017</a>	1475	
<a href="#">August 2017</a>	2520	
<a href="#">July 2017</a>	2573	
<a href="#">June 2017</a>	2546	
<a href="#">May 2017</a>	2633	
<a href="#">April 2017</a>	2449	
<a href="#">March 2017</a>	2820	
<a href="#">February 2017</a>	3811	
<a href="#">January 2017</a>	5021	
<a href="#">December 2016</a>	3553	
<a href="#">November 2016</a>	4232	
<a href="#">October 2016</a>	1183	
<a href="#">September 2016</a>	1002	
<a href="#">August 2016</a>	1147	
<a href="#">July 2016</a>	615	
<a href="#">June 2016</a>	662	
<a href="#">May 2016</a>	5	

- ▶ Registered users: 124
- ▶ Available tools: 540
- ▶ Reference DBs: 32





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# Thank you for your attention!



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# Thoughts and comments



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- ▶▶ Sustainable financing of computer infrastructure should enable state-of-the-art computing over a long period.
- ▶▶ Data analysis for large projects cannot be fulfilled with local resources at universities.
- ▶▶ Challenge to manage central HPC infrastructure with possibility to offer many different tools and databases to be used and regularly updated.
- ▶▶ Information and knowledge exchange is necessary and provides faster progress and development of bioinformatics in Austria.
- ▶▶ Networking and close cooperation of bioinformatics groups can strengthen our position and provide better financial support from government in Austria.