1st NEMO User Assembly

Designing a Research Cluster - Together

Roadmap, Best Practices, Governance

Gerhard Schneider, Dirk von Suchodoletz, Bernd Wiebelt,
Anton Gamel, Konrad Meier, Michael Janczyk

www.nemo.uni-freiburg.de | www.hpc.uni-freiburg.de | www.bwhpc.de/wiki | www.bwhpc.de

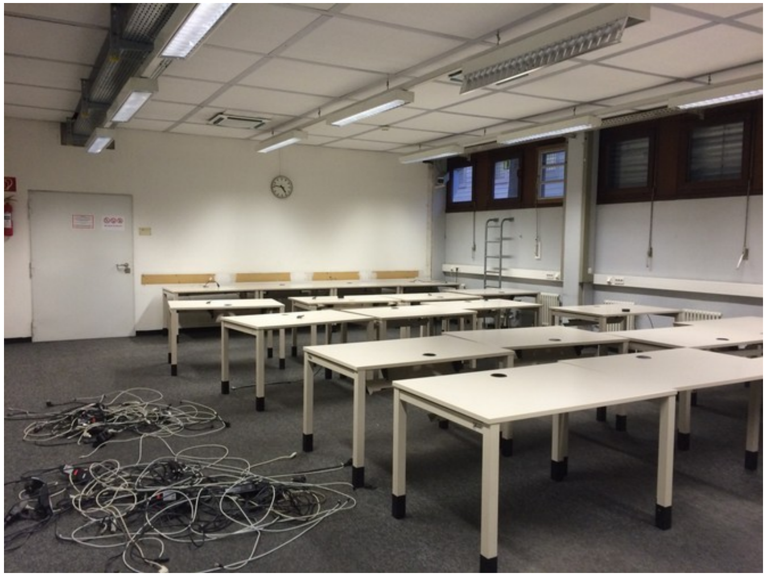
Albert-Ludwigs-Universität Freiburg

Agenda

- Welcome from Gerhard Schneider - Director Rechenzentrum
- Presentation of the bwForCluster NEMO
  - Hardware and Software Setup
  - Scheduling Principles and Policies
  - NEMO Roadmap
- Prerequisites for getting productive
  - „Rechenvorhaben“ (planned compute activities)
  - Migration from BFG and NEMO test cluster
- NEMO Governance
  - State-wide Institutions
  - „Clusterbeirat“ (NEMO specific)
- Q&A Session

Welcome

07.11.2014



12.02.2015

Welcome

28.07.2015

14.07.2016

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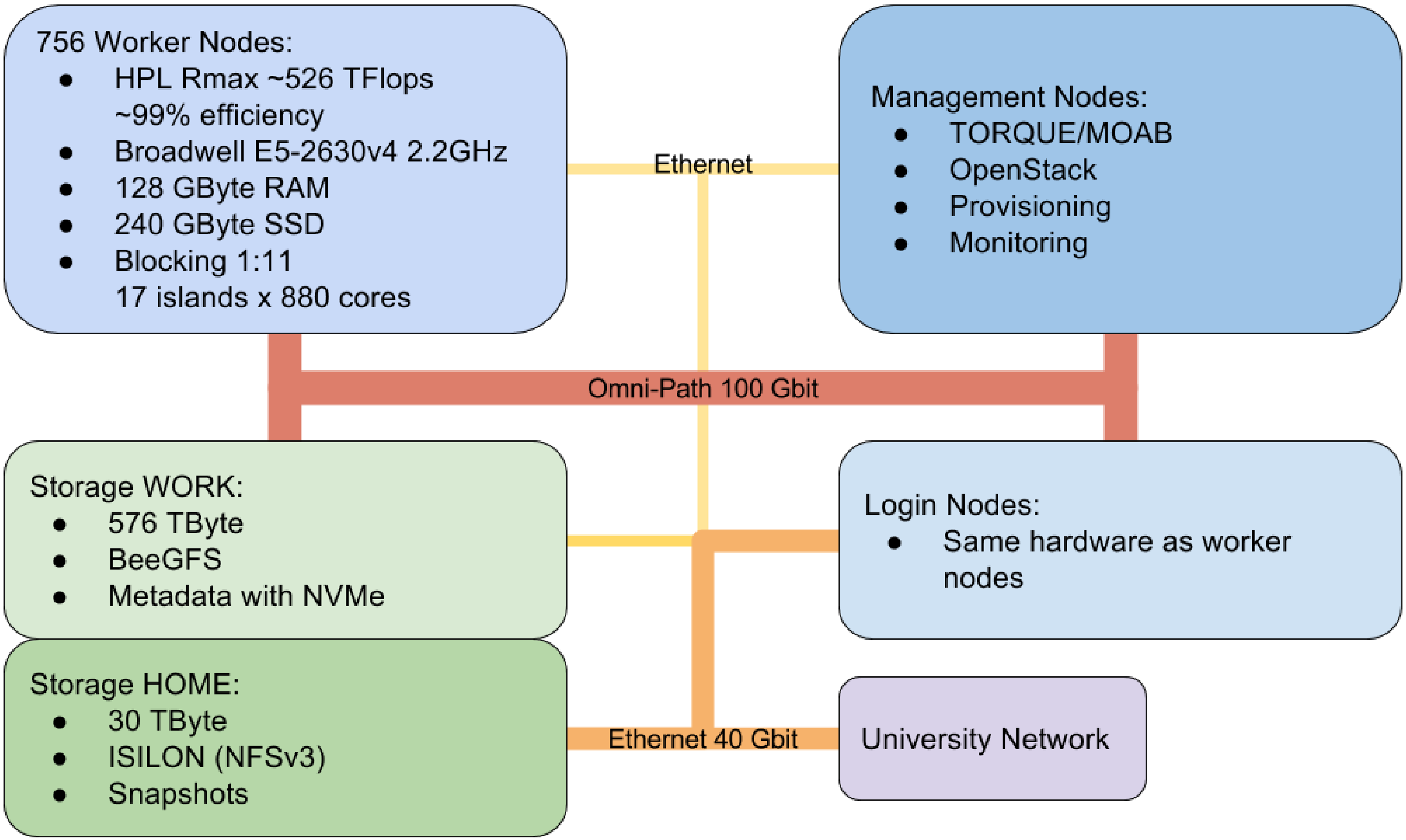
NEMO Compute Nodes

- Performance
  - 525 TFlops Rmax HPL (~99% efficiency)
- Compute nodes
  - 756
- Processor compute node
  - Intel Xeon E5-2630v4 2.2GHz 10C 25MB Cache
- Compute cores
  - >15000 (2x E5-2630v4 10 cores per node)
- Memory compute node
  - 128 GB/node (96 TB total)
- Local SSD
  - 240 GB/node (180 TB total)
- Interconnect
  - Intel Omni-Path 100 Gbit/s (1:11)

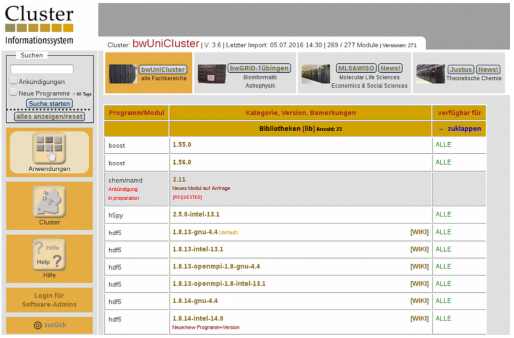
NEMO Special Hardware

- Accelerator nodes
  - 4 Intel Xeon Phi Knights Landing
- Accelerator node specification
  - 64 cores 1.3GHz 16GB Multi-Channel DRAM
- Virtualization nodes
  - 4 service nodes for research environments
- Service nodes
  - 7 servers, 4 login / interactive nodes
- Central parallel storage
  - 576 TB (~16GB/s parallel throughput)
- University / BelWü connection
  - 2x 40 Gbit/s
- http://www.bwhpc-c5.de/wiki/index.php/Category:BwForCluster_NEMO

NEMO Cluster



Software



- Operating System
  - CentOS Linux 7 (similar to RHEL 7)
- Queuing System
  - MOAB / Torque
- (Scientific) Libraries and Software
  - Environment Modules
    http://www.bwhpc-c5.de/wiki/index.php/Software_Modules
- CIS: Cluster Information System
  www.bwhpc.de/cis.php

Scheduling Policies

- Fairshare
  - Historical resource utilization is incorporated into priority decisions
  - Initially: Fairshare based on „Rechenvorhaben“
  - Will be adapted in time
- Shareholder Mechanisms
  - Rollback Reservations
  - Preemption
- Documentation

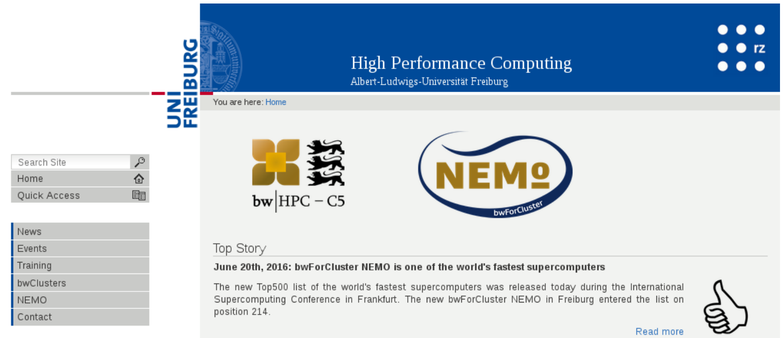
  http://docs.adaptivecomputing.com/9-0-1/MWM/help.htm

NEMO Roadmap

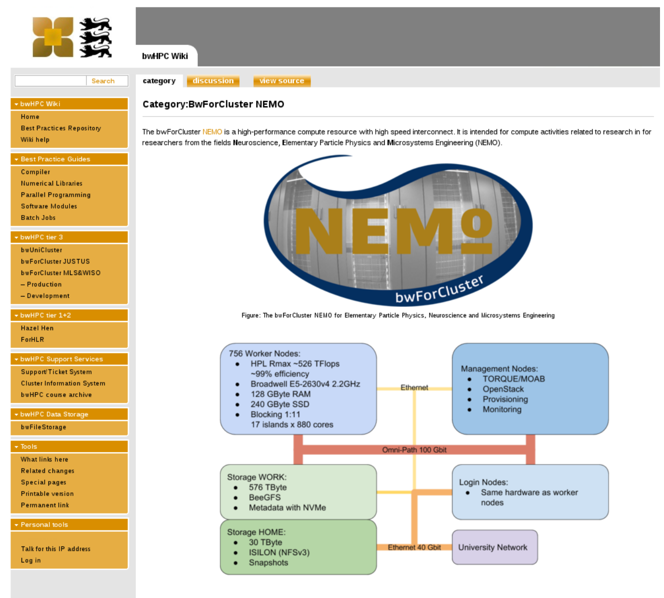
- 18.07.2016: Start Alpha Phase
  - For early testers
  - Configuration phase, no stable operation
- 01.08.2016: Start Beta Phase
  - Configuration more stable
  - Final Steps
- 15.08.2016: Start Production Phase
  - Configuration and Image finished
  - Compiler, MKL and MPI available
- (Scientific) Software upon request

NEMO Information

- News, Events and further Information
  - NEMO Portal:
    http://www.nemo.uni-freiburg.de



- Best Practices, Registration, Usage
  - bwHPC Wiki:
    http://www.bwhpc.de/wiki



- bwHPC Project
  - Central Portal:
    http://www.bwhpc.de

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Getting Productive

- Issueing bwForCluster Entitlement
  - Legal Procedure, different for every institution
- Register a new RV - „Rechenvorhaben“
  - Description of your project
  - Submitted by group leader or RV responsible
  - CAT - „Clusterauswahlteam“ routes RV to cluster
  - Co-workers can be invited into RV
- Personal Registration at bwForCluster
  - https://bwservices.uni-freiburg.de
- Wiki for Procedure

  http://www.bwhpc.de/wiki/index.php/BwForCluster_User_Access

Migration

- NEMO (Testcluster) to bwForCluster NEMO
  - There will be no seamless integration
    - New infrastructure servers
    - Users must come from ENM communities
    - Chance to start from clean slate
  - Operating and Batch System will remain
  - $HOME needs to be saved or migrated manually
  - Migration How-To will be available at:
    - http://www.hpc.uni-freiburg.de/nemo/migration

Migration

- BFG
  - Refocus on ATLAS by 31.12.2016
    - End of Membership for Non-Atlas Users
    - Data migration (Non-Atlas Users) mandatory
  - Migration to bwUniCluster or bwForClusters
  - Migration How-To will be available
    - http://www.bfg.uni-freiburg.de/migration
  - GPU based computing will be available at bwForCluster BinAC (Tübingen)

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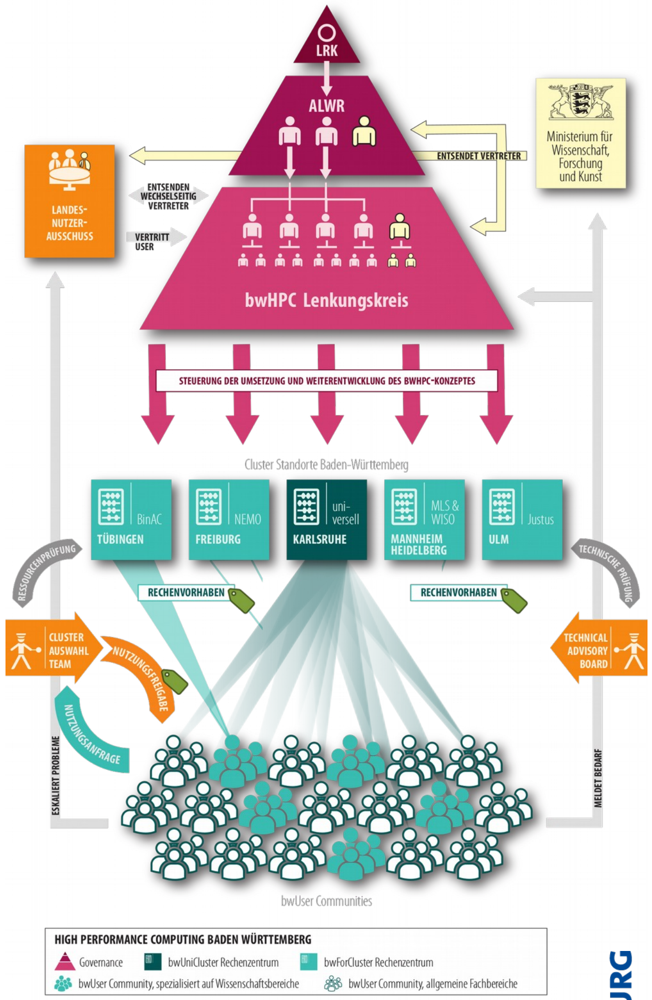
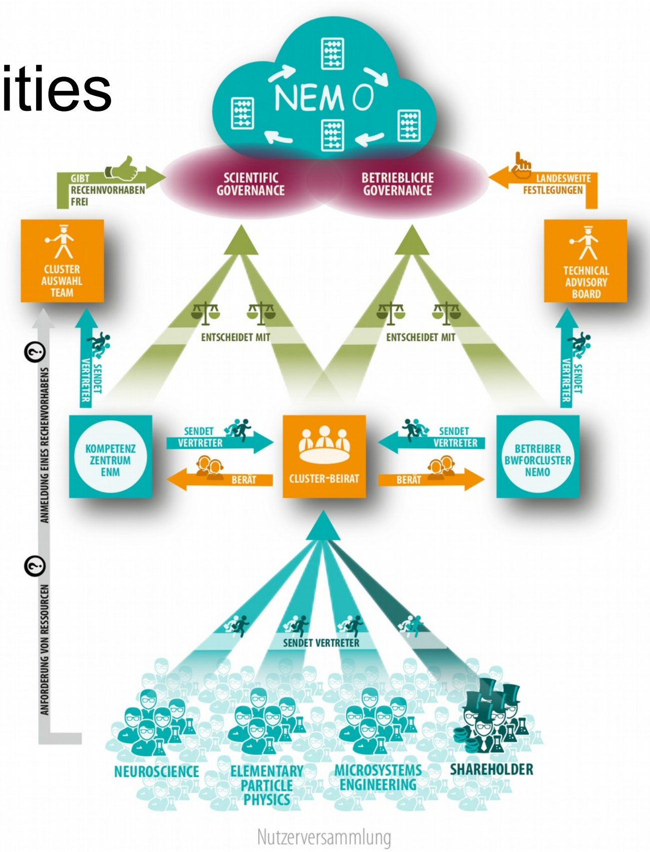
bwHPC Governance

- State-wide (Baden-Württemberg)
- „German bureaucrazy“
- bwHPC-Lenkungskreis
  - High-level strategic decisions
- Landesnutzerausschuss
  - „state wide user board“
  - One representant per University
  - For maximum escalation of user problems



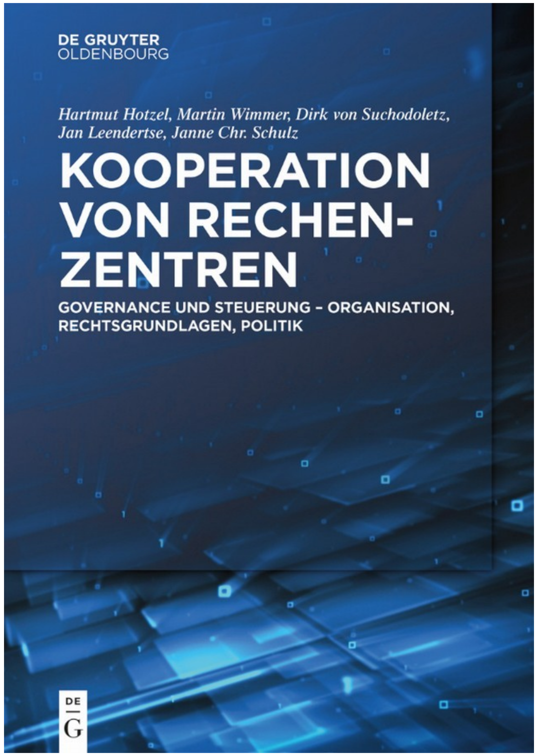
NEMO Governance

- Bound by bwHPC governance
- Closely listening to the ENM communities and Shareholders
- „Nutzerversammlung“
  - (User assembly)
  - General feedback
  - Meets at least once per year
- „Cluster-Beirat“
  - („User board“)
  - One representant per community
  - One representant for all shareholders
  - Meets at least twice per year



NEMO Governance

- Stefan Wesner, Thomas Walter, Bernd Wiebelt, Dirk von Suchodoletz, Gerhard Schneider: **Strukturen und Gremien einer bwHPC-Governance** - Momentaufnahmen und Perspektiven, in: Hotzel, H. et al. (Hrsg).: Kooperation von Rechenzentren: Governance und Steuerung - Organisation, Rechtsgrundlagen, Politik, De Gruyter, 2016, to be published
- Bernd Wiebelt, Michael Janczyk, Dirk von Suchodoletz, Ad Aertsen, Stefan Rotter, Günter Quast, Markus Schumacher, Andreas Greiner: **Strukturvorschlag für eine bwHPC-Governance der ENM-Community**, in: Hotzel, H. et al. (Hrsg).: Kooperation von Rechenzentren: Governance und Steuerung - Organisation, Rechtsgrundlagen, Politik, De Gruyter, 2016, to be published
- Dirk von Suchodoletz, Stefan Wesner, Gerhard Schneider: **Überlegungen zu laufenden Cluster-Erweiterungen in bwHPC**, in: Hotzel, H. et al. (Hrsg).: Kooperation von Rechenzentren: Governance und Steuerung - Organisation, Rechtsgrundlagen, Politik, De Gruyter, 2016, to be published



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