



HPC @ Uni.lu
Chaos, Gaia, Nyx and Granduc clusters

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Welcome to the HPC @ Uni.lu platform !
This is the official website of HPC @ Uni.lu platform, which assembles information about the computing clusters operated by the University of Luxembourg and the organization running them.
The country that out-computes will be the one that out-competes.
— The Council on Competitiveness

Recent Posts

- [XPS & iocost4](#)
- [FOSDEM 2014](#)
- [Alinea Press Release](#)
- [New B Interconnect and new nodes on Gaia](#)
- [Quick configuration guide for the Infiniband switch Mellanox Vxlan 4036](#)

GitHub Repos

- tutorials
- qualif
- dotties
- launcher-scripts
- reports
- vindia-bootstrap
- ganglia_infiniband_module

Tweets

Server room @ Belval
This picture corresponds to the server room in the LC80 building @ Belval, hosting the [Gaia](#) cluster. The violet lights come from the Nexsan disk enclosures.

Featured Systems
We currently operate a total of 371 computing nodes (3908 cores, 43.751 TFlops) and a shared storage capacity of 934.4 TB (+ 360 TB for backup).

Platform Status
Several tools report in live the current status of our systems.
[Check them out!](#)

User Docs
We took the time to make the [HPC documentation](#) as complete as possible. Please make sure you read it carefully.

Latest News
Get the latest news / advertisements linked to the UL HPC platform in [this page](#).

Expans



- 2 geographical sites, 3 server rooms
- 4 clusters: 3880 cores, 43.204 TFlops
 - ↪ incl. 18 dual [GP]GPU nodes
 - ↪ incl. 96 experimental ARM-based nodes
 - ↪ 1996.4 TB (raw) shared storage
- 5,749,432€ (Cumul. HW Investment) since 2007
- Mainly Open-Source software stack
 - ↪ SSH, LDAP, OAR, Puppet, Modules...
 - ↪ Commercial: ICTCE, Allinea, TotalView...



HPC R&D @ UL

- Technical Member of *Grid'5000*
- MC Member of related COST actions
 - ↪ *IC0804: Energy efficiency in large scale distributed systems*
 - ↪ *IC1305: Network for Sustainable Ultrascale Computing (NESUS)*



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- Research contributions in HPC-related topics
 - ↪ **HPC Performance & Energy-Efficiency** [1,2,3]
 - Evaluation of hybrid platforms (low-power processors and/or cloud)

- [1] M. Guzek & al. *A Holistic Model of the Performance and the Energy-Efficiency of Hypervisors in an HPC Environment*. J. CCPE, 2014
- [2] S. Varrette & al. *HPC Performance and Energy-Efficiency of the OpenStack Cloud Middleware*. IEEE ICPP'14
- [3] M. Jarus & al. *Performance Evaluation and Energy Efficiency of High-Density HPC Platforms Based on Intel, AMD and ARM Processors*. LNCS 8046 EE-LSDS'13



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 - ↪ HPC Performance & Energy-Efficiency [1,2,3]
 - ↪ Dynamic Adaptation and Fault-Tolerance [4,5,6]

- [4] S. Varrette & al. *Using Data-flow analysis in MAS for power-aware HPC runs.* IEEE HPCS'13
- [5] J. Muszyński & al. *Convergence Analysis of Evolutionary Algorithms in the Presence of Crash-Faults and Cheaters* J. CAMWA, 2012
- [6] R. Rajachandrasekar & al. *Monitoring and predicting hardware failures in HPC clusters with FTB-IPMI.* IEEE IPDPS'12



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 - ↪ Parallel Programming / Optimization Ex: CFD [7], EAs [8]

- [7] X. Besseron & al. *Unified Design for Parallel Execution of Coupled Simulations using the Discrete Particle Method*. PARENG'13
- [8] B. Dorronsoro & al. *Achieving super-linear performance in parallel multi-objective evolutionary algorithms by means of cooperative coevolution*. J. Computers & OR, 2013



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 - ↪ Scheduling Heuristics [9,10]

[9] C. O. Diaz & al. *Scalable, low complexity, and fast greedy scheduling heuristics for highly heterogeneous distributed computing systems*. J. of Supercomputing, 2014

[10] J Taheri & al. *Hopfield neural network for simultaneous job scheduling and data replication in grids*. J. Future Generation Comp. Syst., 2013



FET HPC Expectations

- Planned H2020 Call: **FETHPC1-a – HPC core technologies**

Type of Partner Sought

- **Industrial / SME** Partner for FETHPC1-a call
- **Topic of interest:**
 - ⇒ **Implementation & evaluation of next generation HPC systems**
 - ↪ Cutting-edge ultra low-power HPC systems (ARM-based etc.)
 - ↪ Novel Direct-Liquid Cooling technologies*
 - ↪ HPC/Big Data for systems Biology

*: Belval Server rooms (500 m²) to equip with HPC racks (40kW/rack) by 2016

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