



JUWELS

Jülich Wizard for European Leadership Science

29.05.2018 | Michael Stephan | HPS group @ JSC

- System vendor: Bull - atos technologies
- JUQUEEN successor
- Modular Supercomputing Architecture
 - Next-generation capability computing system @ JCS
 - First (cluster) module
 - versatile cluster architecture based on commodity multi-core CPUs
 - Second (booster) module
 - optimized for massively parallel workloads
 - very likely GPU based
 - currently scheduled for the beginning of 2020
- Dedicated to GCS, PRACE projects

- Bull Sequana X1000 system (10 cells)
 - Dual Intel Xeon Skylake 8168
 - 266 TByte memory
 - 122,448 CPU cores
 - Mellanox Infiniband EDR/HDR
- 12 Petaflop/s peak
 - 10.4 PFlop/s (CPU)
 - 1.6 PFlop/s (GPU)
- Connected to the GPFS file system on JUST



- 2271 standard compute nodes
 - Dual Intel Xeon Skylake 8168
 - 2x 24 cores, 2.7 GHz, 96 GB memory
 - EDR-Infiniband (Connect-X5)
- 240 large memory compute nodes
 - Dual Intel Xeon Skylake 8168
 - 2x 24 cores, 2.7 GHz, 192 GB memory
 - EDR-Infiniband (Connect-X5)
- 48 accelerated compute nodes
 - Dual Intel Xeon Gold 6148
 - 2x 20 cores, 2.4 GHz, 192 GB memory
 - EDR-Infiniband (Connect-X5)
 - 4x Nvidia V100 GPU
- All compute nodes are diskless!
- 12 login nodes
 - Dual Intel Xeon Gold 6148
 - 2x 20 cores, 2.4 GHz, 768 GB memory
 - EDR-Infiniband (Connect-X5)
 - 100 GigE external network (DFN)
 - 2x 1TB HDD (Raid 1)
- 4 visualisation nodes
 - Dual Intel Xeon Gold 6148
 - 2x 20 cores, 2.4 GHz, 768 GB memory
 - EDR-Infiniband (Connect-X5)
 - 100 GigE external network (DFN)
 - 2x 1TB HDD (Raid 1)
 - 1x Nvidia Pascal P100

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Sequana Skylake Blade



- Operating system: CentOS 7.5+
- Batch system based on Slurm/Parastation
 - Workload management and UI => Slurm
 - Resource management => Parastation (psid + psslurm)
- Programming environment:
 - GNU Compilers
 - Intel Professional Fortran & C/C++ Compilers
 - OpenMP (Intel, GNU)
 - CUDA
 - Communication libraries
 - Parastation MPI (based on MPICH3)
 - Intel MPI
 - OpenMPI
 - Optimized mathematical libraries (Intel Math Kernel Library, etc.)
- Applications (/usr/local)

- Access with SSH keys
- Recommendation: RSA (4096 bit) or Ed25519
- Protection of private key with non-trivial pass phrase is mandatory!

login to JUWELS

```
ssh-keygen -t rsa -b 4096
```

```
ssh-keygen -t rsa -b ed25519
```

```
ssh <user>@juwels.fz-juelich.de
```

```
ssh <user>@juwels[00-11].fz-juelich.de
```

```
ssh <user>@juwelsvis.fz-juelich.de
```

```
ssh <user>@juwelsvis[00-03].fz-juelich.de
```

module environment

```
# List available toolchains
module avail

# Load the desired compiler and MPI
module load <Compiler> <MPI>

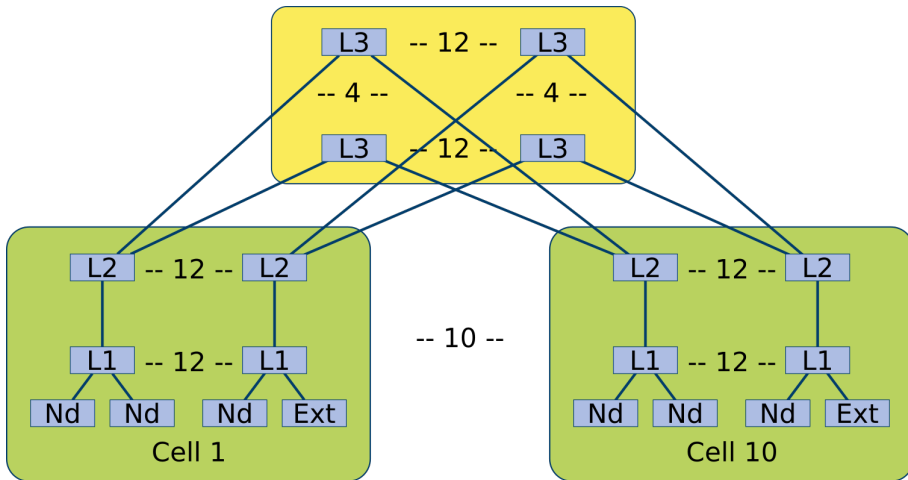
# List available packages based on current list of modules
module avail

# Load additional applications/libraries
module load <module name>

# Search for an application/library
module spider <name>
```

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Fat-tree InfiniBand topology



- motd: Message of the day
 - Information about preventive and emergency maintenances
 - Information about system configuration changes
- On-line documentation
 - http://www.fz-juelich.de/ias/jsc/EN/Expertise/Supercomputers/JUWELS/JUWELS_node.html
- User support at FZJ
 - sc@fz-juelich.de
 - Phone: 02461 61-2828

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