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# Slurm Roadmap

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Versions 16.05 and beyond

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Slurm User Group 2015

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# Version 16.05

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- Version 16.05 to be released in May 2016
  - Maintaining 9 month release cycle
- Some key features already determined
- Other possible features still under discussion
  - Optimize agility

# Federated Cluster Support

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- Provides enterprise-wide workload management
  - Manage work-flow through various phases on different hardware: pre-processing, computation, post-processing, visualization
  - Optimize system utilization and responsiveness
  - Can be configured to support ultra-high throughput
- Separate presentation with more details

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# Intel Knights Landing Support

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- Improved controls over task layout
  - 60+ cores with 2-D mesh interconnect
- User control over NUMA memory and MCDRAM configuration
  - Node re-boot required for configuration changes

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# PMix Version 2.0 Support

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- Improved MPI scalability and performance
- <https://www.open-mpi.org/projects/pmix/>

# Support for heterogeneous resources

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- These developments have as goal to extend the job specification language of SLURM to support MPMD (Multiple Program Multiple Data)
- With the support of heterogeneous resources, the idea is to introduce a new type of jobs named job packs which will be described by a set of pack groups, each pack group having the same resources requirements.
- Examples of executions illustrating the targeted capability :
  - `srun -n 2 -c2 ./app1 : -n 4 --mem-per-core 256 --gres=gpu:2 ./app2`
  - Or
  - `sbatch -n 2 -c 2 : -n 4 --mem-per-core 256 --gres=gpu:2 ./script.sh`
  - `cat script.sh`
    - `srun --pack-group 0 ./app1 : --pack-group 1 ./app2`
    - `srun --pack-group=[0,1] ./app`

# Energy fairsharing

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- Provide incentives to users to be more energy efficient
  - Based upon the energy accounting mechanisms and normal fairsharing
    - Accumulate past jobs energy consumption and align that with the shares of each account
    - Implemented as a new multi-factor plugin parameter in SLURM
    - Energy efficient users will be favored with lower stretch and waiting times in the scheduling queue

Yiannis Georgiou, David Glesser, Krzysztof Rządca, Denis Trystram  
A Scheduler-Level Incentive Mechanism for Energy Efficiency in HPC  
(In proceedings of CCGRID 2015)

# Beyond 16.05

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- Scheduling
  - Scheduling within Energy Constraints
  - Multi-objective resource selection
  - Machine Learning Optimizations
- Hybrid environments
  - Deploy Big Data workflows and Cloud environments upon HPC clusters
- Enable SLURM simulation in very large scales
  - Proposal for flexible solution enabling comparisons with new generation RJMS



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# Questions?

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