PlaFRIM

Plateforme **F**édérative de **R**echerche en **I**nformatique et en **M**athématiques

Softwares

Sommaire

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01

Slurm

Slurm

Slurm is a highly configurable open source workload and resource manager.

Key features of Slurm :

- Scales to millions of cores and tens of thousands of GPGPUs
- Heterogenous platform support allowing users to take advantage of GPGPUs
- Topology aware job scheduling for maximum system utilization
- Flexible plugin framework enables Slurm to meet complex customization requirements

Slurm

Slurm is a highly configurable open source workload and resource manager.

Slurm on PlaFRIM :

- Multiple partitions
- QoS
- Cgroup
- Priority

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Slurm

Slurm is a highly configurable open source workload and resource manager.

Multiple Partitions

- 15 to 16 partitions …
- 1 to 4 partitions per type
- From 1 hour to 7 days
- Shadow partition …

Slurm

Slurm is a highly configurable open source workload and resource manager.

Multiple Partitions

- sinfo
- sinfo -p « partition name »

Slurm

Slurm is a highly configurable open source workload and resource manager.

QoS

Will affect each job submitted to slurm :

- Job scheduling priority by the QoS priority factor
- Job limits

    - AccountingStorageEnforce=associations,limits,qos
- Partition QoS

    - GrpCPUs, GrpNODEs …

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Slurm

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QoS

Will affect each job submitted to slurm :

- sacctmgr show qos
- sacctmgr show assoc format=account,partition,user,qos,MaxJobsPerUser,MaxSubmitJobsPerUser

Slurm

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Cgroup

- a container for a set of processes subject to common controls or monitoring, implemented as a directory and a set of files (state objects) in the cgroup virtual filesystem.

  - TaskPlugin=task/cgroup

  - ProctrackType=proctrack/cgroup

  - SelectType=select/cons_res

  - SelectTypeParameters=CR_Socket_Memory

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Slurm

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Priority

- PriorityFlags

  - CALCULATE_RUNNING
- PriorityType

  - priority/multifactor

Slurm

Slurm is a highly configurable open source workload and resource manager.

Priority

- Job priority factor in general

```
Job_priority =
        (PriorityWeightAge) * (age_factor) +
        (PriorityWeightFairshare) * (fair-share_factor) +
        (PriorityWeightJobSize) * (job_size_factor) +
        (PriorityWeightPartition) * (partition_factor) +
        (PriorityWeightQOS) * (QOS_factor) +
        SUM(TRES_weight_cpu * TRES_factor_cpu,
            TRES_weight_<type> * TRES_factor_<type>,
            ...)
```

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Priority

- Job priority factor in general

```
Job_priority =
        (PriorityWeightAge) * (age_factor) +
        (PriorityWeightFairshare) * (fair-share_factor) +
        (PriorityWeightJobSize) * (job_size_factor) +
        (PriorityWeightPartition) * (partition_factor) +
        (PriorityWeightQOS) * (QOS_factor) +
        SUM(TRES_weight_cpu * TRES_factor_cpu,
            TRES_weight_<type> * TRES_factor_<type>,
            ...)
```

@devel12> sprio -l

Slurm

Slurm is a highly configurable open source workload and resource manager.

Priority

- Job priority factor in general

```
@devel12> sprio -w
@devel12> scontrol show config | grep ^Priori
```

Slurm

Slurm is a highly configurable open source workload and resource manager.

Command

- salloc
- sbatch
- squeue
- scontrol show jobid « jobid »
- scancel

02

modules

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Modules

Environment Modules package provide a convenient way to dynamically change the user's environment through modulefiles.

Modulefiles

- Support Modules
- Dev Modules
- Module Policy

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Modules

Environment Modules package provide a convenient way to dynamically change the user's environment through modulefiles.

Modulefiles

- Support Modules

  - Compiler

  - Mpi

  - Specific libraries

  - Tools

Modules

Environment Modules package provide a convenient way to dynamically change the user's environment through modulefiles.

Modulefiles

- Dev Modules

  - Open to all user sharing his own module to the community

  - Respect the Module Policy

  - Please .. clean all module unsupported yet

Modules

Environment Modules package provide a convenient way to dynamically change the user's environment through modulefiles.

Modulefiles

- Module Policy

  - Convention defined by User Commitee

  - Explained on plafrim.fr

    ➢ **https://www.plafrim.fr/en/module-policy/**

  - Rtfm

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03

Spack

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Spack

Spack is a package manager for supercomputers, Linux, and macOS. It makes installing scientific software easy. With Spack, you can build a package with multiple versions, configurations, platforms, and compilers, and all of these builds can coexist on the same machine.

```
# Install a specific version by appending @
$ spack install hdf5@1.10.1

# Specify a compiler (and optional version), with %
$ spack install hdf5@1.10.1 %gcc@4.7.3

# Add special boolean compile-time options with +
$ spack install hdf5@1.10.1 %gcc@4.7.3 +szip

# Add custom compiler flags
$ spack install hdf5@1.10.1 %gcc@4.7.3 cppflags="-O3 -floop-block"

# Cross-compile for compute nodes on a Cray or Blue Gene/Q
$ spack install hdf5@1.10.1 target=backend
```

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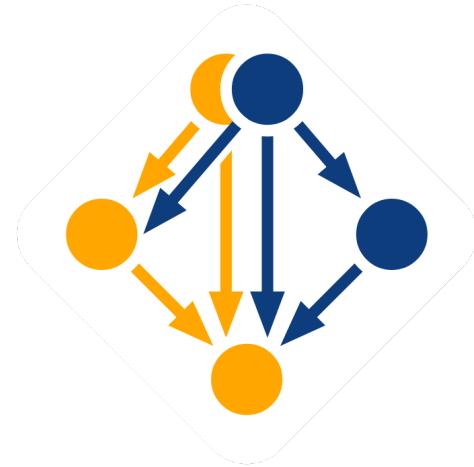
Solverstack's repo

- Tutorial

  - Spack installation

  - Download source tarballs

  - Configure compilers

  - Install Spack on the remote machine

Guix Rocks !!

#plafrim