PlaFRIM

Plateforme Fédérative de Recherche en Informatique et en Mathématiques

Softwares
Sommaire

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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
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 …
Slurm

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

**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
Slurm

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Priority

- PriorityFlags
  - CALCULATE_RUNNING
- PriorityType
  - priority/multifactor
Slurm

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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>),
    ...
```
Slurm

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**Priority**

- Job priority factor in general

```
@devel12> sprio -l
```

```
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>,
   ...)
```
Slurm

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**Priority**

- Job priority factor in general

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

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Command

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

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

Modulefiles

- Support Modules
- Dev Modules
- Module Policy
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
  - Rtfm
Spack
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.

```bash
# 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
```
Spack

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**Solverstack’s repo**

- Tutorial
  - Spack installation
  - Download source tarballs
  - Configure compilers
  - Install Spack on the remote machine
easybuild ?

#plafrim
Guix Rocks !!

#plafrim