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**1. Difference between squeue, srun, and sbatch**

* **squeue**: Shows the list of jobs in the queue with details like job ID, user, state, and partition.
* **srun**: Runs jobs interactively in real-time, ideal for tasks that need immediate execution.
* **sbatch**: Submits a job script for batch processing. The job waits in the queue until resources are free.

**2. What are partitions in SLURM?**

Partitions are like job queues in SLURM. They group nodes with specific rules, like time limits or priorities, to organize and manage workloads. Admins use them to divide resources for different tasks or users.

**3. How to check job status in SLURM?**

To check job status, use these commands:

* **squeue**: Shows the current jobs in the queue.
* **sacct**: Gives details about past jobs (completed ones).
* **scontrol show job <job ID>**: Shows info about a specific job.

**4. What is the role of slurmctld, slurmd, and slurmdbd?**

* **slurmctld**: Manages the job queue, assigns resources, and schedules jobs. It’s like the brain of SLURM.
* **slurmd**: Runs on compute nodes to manage and monitor jobs on those nodes.
* **slurmdbd**: Stores job and cluster data in a database, useful for tracking and reporting.

**5. Different job states in SLURM**

* **PENDING (PD)**: Job is waiting for resources.
* **RUNNING (R)**: Job is currently running.
* **COMPLETED (CD)**: Job finished successfully.
* **FAILED (F)**: Job ended with an error.
* **CANCELLED (CA)**: Job was stopped by a user or admin.
* **TIMEOUT (TO)**: Job ran longer than its allowed time.
* **NODE FAIL (NF)**: Job failed because of a problem with a node.

**6. Format options for sinfo**

The sinfo command has different options to show cluster info:

* **-N**: Shows details about each node.
* **-p**: Filters results by partition.
* **-R**: Explains why some nodes are unavailable.
* **-o <format>**: Customizes the output. For example:
  + %P: Partition name.
  + %t: State of the nodes.
  + %D: Number of nodes in a partition.