

NSF/IUCRC CAC PROJECT

INTEGRATED VISUALIZING, MONITORING, AND MANAGING HPC SYSTEMS

Jie Li

Doctoral Student, TTU

03/12/2021

Advisors:

Mr. Jon Hass, SW Architect, Dell Inc.

Dr. Alan Sill, Managing Director, HPCC, TTU

Dr. Yong Chen, Associate Professor, CS Dept, TTU

Dr. Tommy Dang, Assistant Professor, CS Dept, TTU

JOB ACCOUNTING COMMANDS

- ▶ **sacct** - Generates detailed accounting information about individual jobs or job steps
 - ▶ Filtering options by user, computer, partition, time, etc.
- ▶ **sreport** - Generates aggregated accounting reports
 - ▶ Reports resource usage by user, cluster, partition, etc.
 - ▶ Do not reported about individual jobs or steps
- ▶ **sstat** - Generates very detailed accounting report about individual currently running job or job step

SLURM JOB EXTRACTION WORKFLOW

Sacct cmd

```
-starttime,  
-endtime,  
-state=completed,timeout,preempted,  
    cancelled,failed  
-format=jobid,jobname, partition...
```

Add more fields

Aggregate job records

(Aggregate job steps into job)

Follow the similar logic

Format job info
(Generate PBS-like logs)

Generate UGE-like logs

SDSC implementation

HPCC implementation

UGE LOGS

- **45** accounting record entries in total
- Entries are separated by colon (':') signs

```
'qname':'hostname':'group':'owner':'job_name':'job_number':'account':'priority':'submission_time':'start_time':'end_time':'failed':'exit_status':'ru_wallclock':'ru_utime':'ru_stime':'ru_maxrss':'ru_ixrss':'ru_ismrss':'ru_idrss':'ru_isrss':'ru_minflt':'ru_majflt':'ru_nswap':'ru_inblock':'ru_oublock':'ru_msgsnd':'ru_msgrcv':'ru_nsignals':'ru_nvcsw':'ru_nivcsw':'project':'department':'granted_pe':'slots':'task_number':'cpu':'mem':'io':'category':'iow':'pe_taskid':'maxvmem':'arid':'ar_sub_time'
```

- **24** fields can be found in (or derived from) Slurm available fields
- Missing fields are empty ""

```
['Partition', 'NodeList', 'Group', 'User', 'JobName', 'JobID', 'Account', 'Priority', 'Submit', 'Start', 'End', 'ExitCode', 'UserCPU', 'SystemCPU', 'MaxRSS', 'MaxPages', 'AllocCPUs', 'NTasks', 'CPUTimeRAW', 'TresUsageInTot', 'TresUsageOutTot', 'MaxVMSize', 'ReservationId', 'Reserved']
```

- filesystem in Trackable RESources (TRES) only has 'disk' (local disk) usage; 'lustre' usage is not included.

DEMO

USE SLURM REST API TO GENERATE LOGS

- [GET /slurm/v0.0.36/diag](#)
 - [GET /slurm/v0.0.36/job/{job_id}](#)
 - [GET /slurm/v0.0.36/jobs](#)
 - [GET /slurm/v0.0.36/node/{node_name}](#)
 - [GET /slurm/v0.0.36/nodes](#)
 - [GET /slurm/v0.0.36/partition/{partition_name}](#)
 - [GET /slurm/v0.0.36/partitions](#)
 - [GET /slurm/v0.0.36/ping](#)
-
- Slurm REST API does **NOT SUPPORT** querying jobs by specifying a time range
 - The time range of returned job info is not clear for me (last 1 hour? Since midnight?)
 - **Probably more complex** for aggregating job info
-
- [GET /slurmdb/v0.0.36/diag](#)
 - [GET /slurmdb/v0.0.36/account/{account_name}](#)
 - [GET /slurmdb/v0.0.36/accounts](#)
 - [GET /slurmdb/v0.0.36/association](#)
 - [GET /slurmdb/v0.0.36/associations](#)
 - [GET /slurmdb/v0.0.36/cluster/{cluster_name}](#)
 - [GET /slurmdb/v0.0.36/clusters](#)
 - [GET /slurmdb/v0.0.36/config](#)
 - [GET /slurmdb/v0.0.36/job/{job_id}](#)
 - [GET /slurmdb/v0.0.36/jobs](#)
 - [GET /slurmdb/v0.0.36/qos](#)
 - [GET /slurmdb/v0.0.36/qos/{qos_name}](#)
 - [GET /slurmdb/v0.0.36/tres](#)
 - [GET /slurmdb/v0.0.36/user/{user_name}](#)
 - [GET /slurmdb/v0.0.36/users](#)
 - [GET /slurmdb/v0.0.36/wckey/{wckey}](#)
 - [GET /slurmdb/v0.0.36/wckey](#)

A black and white photograph of a massive concrete dam. The dam's face is composed of large, rectangular concrete panels, creating a grid-like texture. A curved walkway or road runs along the top edge of the dam, bordered by a metal railing. A small figure of a person stands on this walkway, providing a sense of scale to the enormous structure. The sky above is a uniform, dark grey.

QUESTIONS?/COMMENTS?