

# NSF/IUCRC CAC PROJECT

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## INTEGRATED VISUALIZING, MONITORING, AND MANAGING HPC SYSTEMS

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## SLURM - JOB METRICS

```
{
  "account": "",
  "accrue_time": 1599169822,
  "admin_comment": "",
  "array_job_id": 0,
  "array_task_id": null,
  "array_max_tasks": 0,
  "array_task_string": "",
  "association_id": 0,
  "batch_features": "",
  "batch_flag": true,
  "batch_host": "compute-14-13",
  "flags": [
    "JOB_WAS_RUNNING"
  ],
  "burst_buffer": "",
  "burst_buffer_state": "",
  "cluster": "genius",
  "cluster_features": "",
  "command": "\/home\/li29729\/samples\/run_mpi.sh",
  "comment": "",
  "contiguous": false,
  "core_spec": null,
  "thread_spec": null,
  "cores_per_socket": null,
  "billable_tres": 24.000000,
  "cpus_per_task": null,
  "cpu_frequency_minimum": null,
  "cpu_frequency_maximum": null,
  "cpu_frequency_governor": null,
  "cpus_per_tres": "",
  "deadline": 0,
  "delay_boot": 0,
  "dependency": "",
  "derived_exit_code": 0,
  "eligible_time": 1599169822,
  "end_time": 1599169942,
  "excluded_nodes": "",
  "exit_code": 0,
  "features": "",
  "federation_origin": "",
  "federation_siblings_active": "",
  "federation_siblings_viable": "",
  "gres_detail": [
  ],
  "group_id": 100,
  "job_id": 49,
  "job_resources": {
  },
  "job_state": "RUNNING",
  "last_sched_evaluation": 1599169822,
  "licenses": "",
  "max_cpus": 0,
  "max_nodes": 0,
  "mcs_label": "",
  "memory_per_tres": "",
  "name": "run_mpi.sh",
  "nodes": 2,
  "nice": null,
  "node_index": [
    0,
    1
  ],
  "tasks_per_core": null,
```

## SLURM - JOB METRICS

```
"tasks_per_node": 0,
"tasks_per_socket": null,
"tasks_per_board": 0,
"cpus": 24,
"tasks": 4,
"het_job_id": 0,
"het_job_id_set": "",
"het_job_offset": 0,
"partition": "normal",
"memory_per_node": 24093,
"memory_per_cpu": null,
"minimum_cpus_per_node": 1,
"pn_min_tmp_disk": 0,
"preempt_time": 0,
"pre_sus_time": 0,
"priority": 4294901721,
"profile": null,
"qos": "normal",
"reboot": false,
"required_nodes": "",
"requested_node_by_index": [
],
"requeue": true,
"resize_time": 0,
"restart_cnt": 0,
"resv_name": "",
"shared": "none",
"show_flags": [
    "SHOW_ALL",
    "SHOW_LOCAL"
],
"sockets_per_board": 0,
```

```
"sockets_per_node": null,
"start_time": 1599169822,
"state_description": "",
"state_reason": "None",
"standard_error": "",
"standard_input": "\\dev\\null",
"standard_output": "\\home\\li29729\\samples\\mm.out",
"submit_time": 1599169822,
"suspend_time": 0,
"system_comment": "",
"time_limit": 2,
"time_minimum": 0,
"threads_per_core": null,
"tres_bind": "",
"tres_freq": "",
"tres_per_job": "",
"tres_per_node": "",
"tres_per_socket": "",
"tres_per_task": "",
"tres_req_str": "cpu=4,node=2,billing=4",
"tres_alloc_str":
"cpu=24,mem=48186M,node=2,billing=24",
"user_id": 1011,
"user_name": "",
"wckey": "",
"current_working_directory": "\\home\\li29729\\samples"
}
```

## SLURM - JOB METRICS

```
"time": 1583792296,  
"measurement": "JobsInfo",  
"tags":  
  "JobId": 1234567  
"fields":  
  "StartTime": 1583792500  
  "SubmitTime": 1583792200  
  "FinishTime": 1583794200  
  "JobName": "test"  
  "User": "abc"  
  "TotalNodes": 2  
  "CPUCores": 24  
  "NodeList": "[ '101.10.1.1',  
                  '101.10.1.2' ]"
```

JobsInfo data point for UGE metrics

```
"start_time": 1599169822,
```

```
"submit_time": 1599169822,
```

```
"end_time": 1599169942,
```

```
"name": "run_mpi.sh",
```

```
"user_id": 1011,  
"user_name": "",
```

```
"nodes": 2,
```

```
"cpus": 24,
```

```
"node_index": [  
  0,  
  1  
],
```

?

There is **no corresponding description** for the  
"**node\_index**" in the OpenAPI specification

Corresponding Slurm metrics

## SLURM - JOB METRICS

---

```
"name": "run_mpi.sh",  
"nodes": 2,  
"nice": null,  
"node_index": [  
    0,  
    1  
],
```

Requests **2** nodes

- zero-origin index to the node

```
"name": "run_mpi.sh",  
"nodes": 1,  
"nice": null,  
"node_index": [  
    0,  
    0  
],
```

Requests **1** node

match up with a partition's node\_inx[]

/\* index of the connected nodes in the node\_record\_table \*/

In the case of indexes into the node table, this is an array of integers with pairs of start and end index number into the node information records and the data is terminated with a value of -1. See slurm.h for full details on the data structure's contents

```
/* list index pairs into node_table for *nodes:  
    * start_range_1, end_range_1,  
    * start_range_2, ..., -1 */
```

## SLURM - JOB METRICS

---

JobId=60 JobName=run\_mpi.sh  
UserId=li29729(1011) GroupId=users(100) MCS\_label=N/A  
Priority=4294901757 Nice=0 Account=(null) QOS=normal  
JobState=COMPLETED Reason=None Dependency=(null)  
Requeue=1 Restarts=0 BatchFlag=1 Reboot=0 ExitCode=0:0  
RunTime=00:01:44 TimeLimit=00:02:00 TimeMin=N/A  
SubmitTime=2020-09-10T13:41:16 EligibleTime=2020-09-10T13:41:16  
AccrueTime=2020-09-10T13:41:16  
StartTime=2020-09-10T13:41:17 EndTime=2020-09-10T13:43:01 Deadline=N/A  
SuspendTime=None SecsPreSuspend=0 LastSchedEval=2020-09-10T13:41:17  
Partition=normal AllocNode:Sid=genius:24997  
ReqNodeList=(null) ExcNodeList=(null)  
NodeList=compute-14-[13-14]  
BatchHost=compute-14-13  
NumNodes=2 NumCPUs=24 NumTasks=16 CPUs/Task=1 ReqB:S:C:T=0:0:\*:\*  
TRES=cpu=24,mem=48186M,node=2,billing=24  
Socks/Node=\* NtasksPerN:B:S:C=0:0:\*:\* CoreSpec=\*  
MinCPUsNode=1 MinMemoryNode=24093M MinTmpDiskNode=0  
Features=(null) DelayBoot=00:00:00  
OverSubscribe=NO Contiguous=0 Licenses=(null) Network=(null)  
Command=/home/li29729/samples/run\_mpi.sh  
WorkDir=/home/li29729/samples  
StdErr=/home/li29729/samples/mm.out  
StdIn=/dev/null  
StdOut=/home/li29729/samples/mm.out  
Power=  
MailUser=(null) MailType=NONE

## SLURM - JOB METRICS

---

JobId=62 JobName=run\_mpi.sh  
UserId=li29729(1011) GroupId=users(100) MCS\_label=N/A  
Priority=4294901755 Nice=0 Account=(null) QOS=normal  
JobState=RUNNING Reason=None Dependency=(null)  
Requeue=1 Restarts=0 BatchFlag=1 Reboot=0 ExitCode=0:0  
RunTime=00:00:05 TimeLimit=00:02:00 TimeMin=N/A  
SubmitTime=2020-09-10T13:45:35 EligibleTime=2020-09-10T13:45:35  
AccrueTime=2020-09-10T13:45:35  
StartTime=2020-09-10T13:45:37 EndTime=2020-09-10T13:47:37 Deadline=N/A  
SuspendTime=None SecsPreSuspend=0 LastSchedEval=2020-09-10T13:45:37  
Partition=normal AllocNode:Sid=genius:24997  
ReqNodeList=(null) ExcNodeList=(null)  
NodeList=compute-14-13  
BatchHost=compute-14-13  
NumNodes=1 NumCPUs=12 NumTasks=8 CPUs/Task=1 ReqB:S:C:T=0:0:\*:\*  
TRES=cpu=12,mem=24093M,node=1,billing=12  
Socks/Node=\* NtasksPerN:B:S:C=0:0:\*:\* CoreSpec=\*  
MinCPUsNode=1 MinMemoryNode=24093M MinTmpDiskNode=0  
Features=(null) DelayBoot=00:00:00  
OverSubscribe=NO Contiguous=0 Licenses=(null) Network=(null)  
Command=/home/li29729/samples/run\_mpi.sh  
WorkDir=/home/li29729/samples  
StdErr=/home/li29729/samples/mm\_2.out  
StdIn=/dev/null  
StdOut=/home/li29729/samples/mm\_2.out  
Power=  
MailUser=(null) MailType=NONE

## SLURM - JOB METRICS

---

JobId=62 JobName=run\_mpi.sh  
UserId=li29729(1011) GroupId=users(100) MCS\_label=N/A  
Priority=4294901755 Nice=0 Account=(null) QOS=normal  
JobState=COMPLETED Reason=None Dependency=(null)  
Requeue=1 Restarts=0 BatchFlag=1 Reboot=0 ExitCode=0:0  
RunTime=00:01:19 TimeLimit=00:02:00 TimeMin=N/A  
SubmitTime=2020-09-10T13:45:35 EligibleTime=2020-09-10T13:45:35  
AccrueTime=2020-09-10T13:45:35  
StartTime=2020-09-10T13:45:37 EndTime=2020-09-10T13:46:56 Deadline=N/A  
SuspendTime=None SecsPreSuspend=0 LastSchedEval=2020-09-10T13:45:37  
Partition=normal AllocNode:Sid=genius:24997  
ReqNodeList=(null) ExcNodeList=(null)  
NodeList=compute-14-13  
BatchHost=compute-14-13  
NumNodes=1 NumCPUs=12 NumTasks=8 CPUs/Task=1 ReqB:S:C:T=0:0:\*:\*  
TRES=cpu=12,mem=24093M,node=1,billing=12  
Socks/Node=\* NtasksPerN:B:S:C=0:0:\*:\* CoreSpec=\*  
MinCPUsNode=1 MinMemoryNode=24093M MinTmpDiskNode=0  
Features=(null) DelayBoot=00:00:00  
OverSubscribe=NO Contiguous=0 Licenses=(null) Network=(null)  
Command=/home/li29729/samples/run\_mpi.sh  
WorkDir=/home/li29729/samples  
StdErr=/home/li29729/samples/mm\_2.out  
StdIn=/dev/null  
StdOut=/home/li29729/samples/mm\_2.out  
Power=  
MailUser=(null) MailType=NONE



## SLURM - NODE METRICS

```
"time": 1583792296,  
"measurement": "UGE",  
"tags":  
  "NodeId": "101.10.1.1"  
  "Sensor": "CPUUsage",  
"fields":  
  "Reading": 0.50
```

```
"time": 1583792296,  
"measurement": "UGE",  
"tags":  
  "NodeId": "101.10.1.1"  
  "Sensor": "MemUsage",  
"fields":  
  "Reading": 0.35
```

```
"architecture": "x86_64",  
"burstbuffer_network_address": "",  
"boards": 1,  
"boot_time": 1592925266,  
"cores": 6,  
"cpu_binding": 0,  
"cpu_load": 1,  
"free_memory": 23351,  
"cpus": 12,  
"features": "",  
"active_features": "",  
"gres": "",  
"gres_drained": "",  
"gres_used": "",  
"mcs_label": "",  
"name": "compute-14-14",  
"next_state_after_reboot": "invalid",  
"address": "compute-14-14",  
"hostname": "compute-14-14",  
"state": "allocated",  
"operating_system": "Linux  
3.10.0-957.1.3.el7.x86_64 #1 SMP Thu Nov 29  
14:49:43 UTC 2018",  
"owner": null,  
"port": 6818,  
"real_memory": 24093,  
"reason": "",  
"reason_changed_at": 0,  
"reason_set_by_user": "",  
"slurmd_start_time": 1592925375,  
"sockets": 2,  
"threads": 1,  
"temporary_disk": 0,  
"weight": 1,  
"tres": "cpu=12,mem=24093M,billing=12",  
"slurmd_version": "20.02.3"
```

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 of the dam, with a metal railing. A small figure of a person stands on this walkway, providing a sense of scale to the enormous structure. The sky is a uniform, dark grey.

**QUESTIONS?/COMMENTS?**