Expanse
Managing Allocations & Charging

San Diego Supercomputer Center

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Job Charging is Simple! ☺

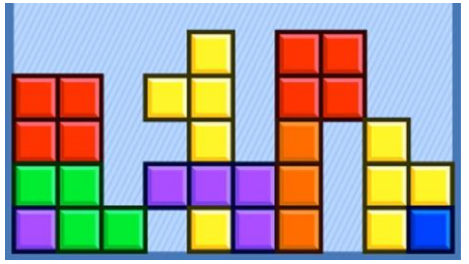
- Expanse and Expanse-GPU **are separate resources**
- Resources are allocated in **Service Units (SUs)**
- Jobs request resources (CPUs, GPUs, RAM,…)
- Jobs charged for **resources requested, not resources used**
- Minimum charge for all jobs is 1 SU

Charge = Resources Requested * Job Duration * Charge Factor

Expanse Partitions

Partition Name	*Max Walltime*	*Max Nodes/Job*	*Max Running Jobs*	*Max Running + Queued Jobs*	*Charge Factor*	*Comments*
compute	48 hrs	32	64	128	1	Used for **exclusive access** to regular compute nodes
shared	48 hrs	1	4096	4096	1	Single-node jobs using **fewer than 128 cores**
gpu	48 hrs	4	16	24	1	Used for **exclusive access** to the GPU nodes
gpu-shared	48 hrs	1	16	24	1	Single-node job using fewer than 4 GPUs
large-shared	48 hrs	1	1	4	1	Single-node jobs using large memory **up to 2 TB (minimum memory required 256G)**
debug	15 min	2	1	2	1	**Priority access** to compute nodes set aside for testing of jobs with **short walltime and limited resources**
gpu-debug	15 min	2	1	2	1	**Priority access** to **GPU** nodes set aside for testing of jobs with **short walltime and limited resources**
preempt	7 days	32		128	.8	Discounted jobs to run on free nodes that can be pre-empted by jobs submitted to any other queue (**NO REFUNDS**)
gpu-preempt	7 days	1			.8	

CPU Charging

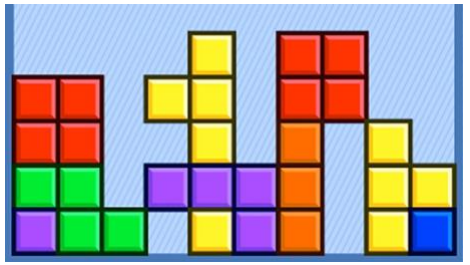


- 1 Expanse node has **128 cores, 256G of memory**
  - 1 Expanse SU(1 core hour) = 1 core, <=2G of memory
  - Default memory 1G

- **Charge = Equivalate #CPUs * Job Duration * Charge Factor**

$$Max[\#\ Cores|Memory\ GB\ ]\ *wallclock(hr)\ *charge\ factor$$

GPU Charging



- 1 GPU Node has **4 GPUs, 40 cores, 384 GB DDR4 DRAM**
  - 1 GPU SU(1 GPU hour) = 1 GPU, <=10cores, <=96 Memory
  - Default 1 core, 1G memory

- **GPU SUs = Equivalate #GPUs * Job Duration * Charge Factor**

$$Max[\#GPUs\ |\#\ Cores|Memory\ GB\ ]\ *wallclock(hr)\ *charge\ factor$$

Viewing Allocation Information

- Load sdsc module
- **Expanse-client** [command]
  - List projects users and usage
  - List users allocations and usage

```
[nickel@login01 ~]$ expanse-client project
Requires a group argument[nickel@login01 ~]$ expanse-client project use300

 Resource          sdsc_expanse
 Project           use300
 Total allocation  5050000
 Total spent       1296192
 Expiration        August 2, 2021
```

	NAME	USED	AVAILABLE	USED BY PROJECT
1	cirving	0	5050000	1296192
2	jpg	5592	5050000	1296192
3	mahidhar	521004	5050000	1296192
4	manu1729	3636	5050000	1296192
5	mkandes	760099	5050000	1296192
6	mthomas	49	5050000	1296192
7	nickel	5812	5050000	1296192
8	sinkovit	0	5050000	1296192
9	sivagnan	0	5050000	1296192
10	tcooper	0	5050000	1296192

```
[nickel@login02 ~]$ module load sdsc
[nickel@login02 ~]$ expanse-client user -v

 Resource  sdsc_expanse
```

	NAME	PROJECT	USED RECORDED	USED QUEUED	AVAILABLE	USED BY PROJECT RECORDED	USED BY PROJECT QUEUED
1	nickel	sds154	0	0	50000	0	0
2	nickel	use300	5805	0	5050000	996005	13

```
[nickel@login02 ~]$
```

Review

- **Charges based on reserved resources**
  - Max[# Cores| # GPUs | Memory GB]
- **Default 1GB of memory per core/GPU in all partitions**
  - Designate memory with --mem
- **Minimum charge 1 SU**
- Expanse Nodes 128 cores, 256 G
- Expanse GPUs: 4 GPUs, 40 cores, 384 G
- New partitions
- ***https://www.sdsc.edu/support/user_guides/expanse.html***